

LECTURE NOTES

CHAPTER OPENING EXAMPLE

ACER USES ADVANCED SUPPLY CHAIN TECHNOLOGY TO SERVE CUSTOMERS IN EUROPE

Stan Shih designed Taiwan's first desktop calculator in the early 1970s. He teamed up with four of his friends and launched Multitech International in 1976 with US\$25,000. In 1980, the company introduced Dragon, a Chinese language terminal which won Taiwan's top design award. In 1983, the company introduced an Apple-version personal computer and its first IBM-compatible personal computer.

The company changed its name to Acer (the Latin word meaning "sharp, acute, able, and facile") in 1987. In the late 1990s, Acer experienced weaker performance as the Acer brand name faced cut-throat competition while its contract manufacturing arm (which built machines for customers like Dell and IBM) fell behind Taiwanese rivals Quanta Computer and Hon Hai Precision Industry.

A reorganization was carried out by spinning off the contract manufacturing arm and the consumer electronics division into different companies, Wistron and BenQ, respectively. Acer then concentrated on building its brand, particularly in Europe.

By 2004, Acer became the leading notebook seller in Italy, Germany, the Netherlands, and Austria, and second overall (in notebook and personal computer sales) in Italy and Spain.

Acer uses TNT Express as a global supply chain partner. TNT provides Acer with one-stop logistics solutions in customs clearance, quality control, inventory management, track and trace systems, and express transportation systems. TNT offers Acer its Integrated Direct Express (IDE) service, which enables customers to group packages for different European destinations into one consignment.

To handle the massive volume of cargo and to precisely monitor the flow of individual packages, TNT adopted a high-definition RFID (radio frequency identification)-based solution provided by Xterprise.

I. SIGNIFICANCE OF SUPPLY CHAIN AND LOGISTICS MANAGEMENT [LO1]

- U.S. companies spend over a half trillion dollars transporting raw materials and finished goods, more on materials handling, warehousing, storage, and holding

inventory, still more on managing the distribution process, including the cost of information technology each year.

- Worldwide, these activities and investments cost companies over \$3.4 trillion each year.

A. Relating Marketing Channels, Logistics, and Supply Chain Management

- **Logistics** involves those activities that focus on getting the right amount of the right products to the right place at the right time at the lowest possible cost.
- **Logistics management** is the practice of organizing the *cost-effective flow* of raw materials, in-process inventory, finished goods, and related information from point of origin to point of consumption to satisfy *customer requirements*.
 - a. Logistics deals with decisions to move a product from the source of raw materials to consumption—the *flow* of the product.
 - b. The logistics decisions made have to be *cost-effective*.
 - c. A firm needs to reduce logistics costs as long as it delivers expected *customer service* to satisfy customer requirements.
- Supply chain and supply chain management involve collaboration, coordination, and information sharing among manufacturers, suppliers, and distributors to create a seamless flow of goods and services to customers.

B. Supply Chains versus Marketing Channels

- A **supply chain** is a sequence of firms that perform activities required to create and deliver a good or service to consumers or industrial users.
 - a. It differs from a marketing channel in terms of membership.
 - b. A supply chain includes suppliers that provide raw material inputs to a manufacturer as well as the wholesalers and retailers that deliver finished goods.
- **Supply chain management**.
 - a. Is the integration and organization of information and logistic activities *across firms* in a supply chain for the purpose of creating and delivering goods and services that provide value to consumers.
 - b. The application of information technology that allows companies to share and operate systems for order processing, transportation scheduling, and inventory and facility management.

C. Sourcing, Assembling, and Delivering a New Car: The Automotive Supply Chain

- A supply chain is a series of linked suppliers and customers in which every customer is, in turn, a supplier to another customer until a finished product reaches the ultimate consumer.
- Coordinating and scheduling material and component flows for their assembly into actual automobiles by carmakers is dependent on logistical activities.
- A central link is the carmaker supply chain manager, who:
 - a. Is responsible for translating customer requirements into actual orders and arranging or delivery dates and financial arrangements for car dealers.
 - b. Works with car dealers to ensure that the right mix of automobiles are delivered to different locations.
 - c. Makes sure that spare parts are available so that dealers can meet the car maintenance and repair needs.
- Logistics cost 25% to 30% of the retail price of a new car.

Web Link

Build Your Own BMW with a Mouse

In the automotive industry, supply chain management is complex given the variety of car options available. To appreciate the challenge, visit the BMW website at www.bmwusa.com. Click the “Build your BMW” button and choose a model. Then, select your exterior, interior, packages, options, and accessories.

This task represents a sizable undertaking for a BMW supply manager since a BMW comes in thousands of versions, including dealer-installed options. A supply of these items has to be at the BMW dealer for installation when customers pick their new cars.

D. Supply Chain Management and Marketing Strategy [LO2]

A firm’s marketing strategy determines the focus of its supply chain.

1. Aligning a Supply Chain with Marketing Strategy.

The choice of a supply chain follows from a clearly defined marketing strategy and involves three steps:

- a. *Understand the customer.* A company must identify the needs of the customer segment to help it define the relative importance of efficiency and responsiveness in meeting customer requirements.
- b. *Understand the supply chain.*
 - A company must understand what a supply chain does well.
 - Supply chains range from those that are responsive to customer requirements and demand to those that emphasize efficiency by supplying products at the lowest possible delivered cost.
- c. *Harmonize the supply chain with the marketing strategy.*
 - A company needs to ensure that what the supply chain is capable of doing well is consistent with the targeted customer's needs and its marketing strategy.
 - If a mismatch exists, it will need to redesign the supply chain to support the marketing strategy or change the marketing strategy.

MARKETING MATTERS

IBM – Creating an On-demand Supply Chain

Beginning in 2001, IBM set about to build a single integrated supply chain that would handle raw material procurement, manufacturing, logistics, customer support order entry, and customer fulfillment across all of IBM. Although the task wasn't easy, IBM overhauled its supply chain from raw material sourcing to postsales support. Today, IBM is uniquely poised to configure and deliver a tailored mix of hardware, software, and service to provide a total solution for its customers.

2. Dell: A Responsive Supply Chain.

The Dell marketing strategy targets customers who desire having the most up-to-date personal computer equipment customized to their needs. Dell has opted for a responsive supply chain.

- a. Dell relies on more expensive express transportation to receive components from suppliers and deliver finished products to customers.
- b. Dell achieves product variety and manufacturing efficiency by designing products with common platforms and components.
- c. Dell has located manufacturing facilities worldwide to ensure rapid delivery.
- d. Dell has invested heavily in information technology to link itself with suppliers and customers.

3. Wal-Mart: An Efficient Supply Chain.

- Wal-Mart's marketing strategy is to be a reliable, lower-price retailer for a wide variety of mass consumption consumer goods. Wal-Mart has opted an efficient supply chain designed to deliver products to consumers at the lowest possible cost.
 - a. Wal-Mart keeps relatively low inventory levels, and most is stocked in stores, not warehouses, so it is available for sale.
 - b. Wal-Mart uses *cross-docking*—a practice that involves unloading products from suppliers, sorting products for individual stores, and quickly reloading products onto its trucks for a particular store—to keep inventory levels low. Cross-docking allows Wal-Mart to operate small number of distribution centers to service its vast network of stores.
 - c. Wal-Mart runs its own fleet of trucks to service its stores. This increases costs and investment, but the benefits in responsiveness justify the cost.
 - d. Wal-Mart has invested significantly in information technology to operate its supply chain. Information from stores about customer requirements and demand is fed to its suppliers, which manufacture only what is being demanded.

4. 7-Eleven: Use of Information Technology in a Supply Chain

- a. 7-Eleven is shifting its marketing strategy and focusing on providing competitive prices for its high-volume items as well as its fresh-food offerings.
 - b. 7-Eleven has since established itself as a worldwide chain of convenience stores. It has stores in 18 different countries, with Japan, the United States, Taiwan, and Thailand being its largest markets.
 - c. 7-Eleven invested over US\$100 million in information technology with three main objectives. They involve (1) automating and simplifying store operations, (2) using technology to improve customer service and the customer experience, and (3) delivering quality information across the different areas of the business to enable fact-based decision making.
 - d. 7-Eleven's information system allows it to collect data from point-of-sale (POS) terminals and transmit it in real time to a data warehouse where data are analyzed to improve the understanding of customers' preferences, pricing and new product launches.
- These three examples provide three lessons that can be learned:

- a. There is no one best supply chain for every company.
- b. The best supply chain is the one that is consistent with the needs of the customer segment being served and that complements a company's marketing strategy.
- c. Supply chain managers are often called upon to make trade-offs between efficiency and responsiveness on various elements of a company's supply chain.

LEARNING REVIEW

1. What is the principal difference between a marketing channel and a supply chain?

Answer: A supply chain also includes suppliers who provide raw materials to a manufacturer as well as the wholesalers and retailers—the marketing channel—who deliver the finished goods to ultimate consumers.

2. The choice of a supply chain involves what three steps?

Answer: (1) Understand the customer. (2) Understand the supply chain. (3) Harmonize the supply chain with the marketing strategy.

II. OBJECTIVE OF INFORMATION AND LOGISTICS MANAGEMENT IN A CUSTOMER-DRIVEN SUPPLY CHAIN [LO3]

The objective of information and logistics management in a supply chain is to minimize logistics costs while maximizing customer service.

A. Information's Role in Supply Chain Responsiveness and Efficiency

- Information consists of data and analysis regarding inventory, transportation, distribution facilities, and customers throughout the supply chain.
- Continuing advances in information technology make it possible to track logistics activities and customer service variables and manage them for efficiency and responsiveness.
- **Electronic data interchanges (EDIs)** combine proprietary computer and telecommunication technologies to exchange electronic invoices, payments, and information among suppliers, manufacturers, and retailers.
 - a. EDI provides a seamless electronic link from a retail checkout counter to suppliers and manufacturers when linked with store scanning equipment and systems.

- b.** EDI is used in retail, apparel, transportation, pharmaceutical, grocery, health care, and insurance industries, as well as by local, state, and federal government agencies.
- Another technology is the *extranet*, which is an Internet-based network that permits secure business-to-business communication between a manufacturer and its suppliers, distributors, and sometimes other partners. Extranets are less expensive and more flexible to operate than EDI because of their connection to the public Internet.
- Other technologies help manage information in a supply chain. Enterprise resource planning (ERP) technology and supply chain management software track logistics cost and customer service variables.

B. Total Logistics Cost Concept

- **Total logistics cost** includes expenses associated with transportation, materials handling and warehousing, inventory, stockouts (being out of inventory), order processing, and return goods handling.
- It is important to study the impact of all logistics decisions when considering a change since these costs are interrelated.
- In Figure 16-3, many firms have a number of warehouses that receive shipments in large quantities and then redistribute smaller shipments to local customers.
 - a.** As the number of warehouses increases, more inventory is stored, causing inventory costs to rise and transportation costs to fall since goods are closer to customers.
 - b.** Although neither of the two individual cost elements is minimized, the total cost curve for the overall system is.

C. Customer Service Concept

- If a supply chain is a *flow*, the end of it—*output*—is the service delivered to customers, which can be expensive.
- Customer service is now seen not merely as an expense but as a means to increase customer satisfaction and sales.
- Within a supply chain context, **customer service** is the ability of logistics management to satisfy users in terms of time, dependability, communication, and convenience.

1. Time.

- a. **Lead time** for an item, which means the lag from ordering an item until it is received and ready for use or sale.
 - This is also referred to as *order cycle time* or *replenishment time* and may be more important to retailers or wholesalers than consumers.
 - The elements that make up the order cycle include recognition of the need to order, order transmittal, order processing, documentation, and transportation.
 - A current emphasis in supply chain management is to reduce lead times to minimize customer inventory levels.
- b. **Quick response** or **efficient consumer response** delivery systems reduce the retailer's lead time for receiving merchandise which then lowers a retailer's inventory investment, improves customer service levels, and reduces logistic expenses.

MARKETING MATTERS

For Fashion and Food Merchandising, Haste Is as Important as Taste

Fashion and food depend a lot on taste and require timely merchandising. Fashion retailers need to identify what's hot so it can be ordered quickly and what's not to avoid markdowns. Charles & Keith has employed a *quick response* delivery system. Its point-of-sale scanner system records each day's sales. When stock falls below a minimum level, the system automatically generates a replenishment order. The distribution centers will then process orders and send them down to the stores.

Food marketers use the term *efficient consumer response* to describe their replenishment systems. All major food companies and many supermarket chains rely on electronic replenishment systems to minimize stockouts of popular items and overstocks of slow-moving items.

2. **Dependability** is the consistency of replenishment and can be broken into three elements: consistent lead time, safe delivery, and complete delivery.
 - a. Consistent service allows planning whereas inconsistencies create surprises.
 - b. Intermediaries may be willing to accept longer lead times if they know about them in advance and can thus make plans.
 - c. While surprise delays may shut down a production line, early deliveries will be almost as troublesome because of the problems of storing the extra inventory.
3. **Communication** is a two-way link between buyer and seller that helps in monitoring service and anticipating future needs through status reports.

- a. The increased communication capability of transportation carriers has enhanced the accuracy of such tracing information and improved the ability of buyers to schedule shipments.
 - b. Some firms have partnered with firms specializing in logistics in an effort to institutionalize a more proactive flow of useful information.
4. **Convenience** means that there should be a minimum of effort on the part of the buyer in doing business with the seller, who must remove unnecessary barriers.

D. Customer Service Standards

- Firms develop a set of written customer service standards that serve as objectives and provide a benchmark against which results are measured.
- Information is collected on customers' needs and competitors' practices to establish realistic standards and ongoing monitoring programs.
- Also, it is necessary to know whether customers are willing to pay a bit more for better service.

USING MARKETING DASHBOARDS

Diagnosing Out-of-Stocks and On-Time Delivery for Organic Produce

Out-of-Stock Percent and On-Time Delivery Percent

Supply chain managers recognize that out-of-stocks means lost sales. And poor on-time delivery is often the culprit. These measures are routinely compared on a weekly or monthly basis against a numerical standard and each other.

Your Challenge.

Organic produce (fresh fruits and vegetables) out-of-stocks have increased. Out-of-stocks are calculated as follows:

$$\text{Out-of-Stocks (\%)} = \left[\frac{\# \text{ of Outlets Where Brand/Product Is Listed But Unavailable}}{\text{Total \# of Outlets Where Brand/Product Is Listed}} \right]$$

Poor on-time delivery of produce was the suspected reason for the rise in out-of-stocks. On-time delivery is calculated as follows:

$$\text{On-Time Delivery (\%)} = \left[\frac{\# \text{ of Deliveries Achieved in the Timeframe Promised}}{\text{Total \# of Deliveries Initiated in a Time Period}} \right]$$

Your challenge is to examine whether on-time delivery performance might be the reason for the organic produce out-of-stocks situation.

Your Findings.

The company has set a 3 percent out-of-stock standard and a 98 percent on-time delivery standard. Based on the monthly results for organic produce shown on the marketing dashboard, there is a clear downward trend in on-time delivery that corresponds with the upward trend in out-of-stocks.

Your Actions.

The transportation department needs to improve its performance. However, the issue might reach deeper into the order cycle time for organic produce. Recall that order cycle time recognizes the need to place, transmit, process, document, and transport the order. The actual *cause* of out-of-stocks might reside in the four prior elements of order cycle time and not just transportation.

LEARNING REVIEW

- 3. The objective of information and logistics management in a supply chain is to _____.**

Answer: minimize logistics costs while delivering maximum customer service

- 4. How does consumer demand information increase supply chain responsiveness and efficiency?**

Answer: Demand information improves supply chain responsiveness because customers will find the products when and where they want them. Demand information improves supply chain efficiency because firms are better able to forecast customer needs and to produce, transport, and store the required amount of inventory.

- 5. What is the relationship between the number of warehouses a company operates, its inventory costs, and its transportation costs?**

Answer: As the number of warehouses increases, inventory costs rise and transportation costs fall. Because more inventory is warehoused, it is transported in larger volumes closer to customers. The net effect is to minimize the total costs of logistics.

III. KEY LOGISTICS FUNCTIONS IN A SUPPLY CHAIN [LO4]

- Many companies have outsourced the following four key logistic functions to third-party logistics providers in a supply chain: (1) transportation, (2) warehousing and materials handling, (3) order processing, and (4) inventory management.

- **Third-party logistics providers** are firms that perform most or all of the logistics functions that manufacturers, suppliers, and distributors would normally perform themselves.

A. Transportation

- There are five basic modes of transportation (railroads, motor carriers, air carriers, pipelines, and water carriers, and modal combinations involving two or more modes) that moves goods in a supply chain.
- All transportation modes can be evaluated on six basic service criteria:
 - a. *Cost*. Charges for transportation.
 - b. *Time*. Speed of transit.
 - c. *Capability*. What is realistically carried with this mode.
 - d. *Dependability*. Reliability of service regarding time, loss, and damage.
 - e. *Accessibility*. Convenience of the mode's routes.
 - f. *Frequency*. Scheduling.

1. Railroads. Carry heavy, bulky items over long distances.

- a. Railroads carry heavy, bulky items over long distances. Commodities (coal, farm products, chemicals, nonmetallic minerals) represent about 70% of the total tonnage.
- b. Railroads can carry larger shipments than trucks (in terms of total weight per vehicle), but their routes are less extensive.
- c. A *unit train* is dedicated to one commodity (often coal), using permanently coupled cars that run a continuous loop from a single origin to a single destination and back.
 - Even though the train returns empty, the process captures enough operating efficiencies to make it one of the lowest-cost transportation alternatives available.
 - Unit trains keep to a specific schedule so that customers can plan on reliable delivery and carry products that are quickly and automatically loaded and unloaded.
- d. *Intermodal transportation* combines different transportation modes to get the best features of each. This service attracts high-valued freight, which would normally go by truck.
 - The most popular combination is truck-rail, called *piggyback* or *trailer on flatcar (TOFC)*.

- Containers can be loaded on ships, trains, and truck trailers to expedite export/import traffic because they use less space on oceangoing vessels than trailers.
2. **Motor Carriers.** Consist of many small firms, including as many as 500,000 independent truckers and firms that own their own trucks for transporting their own products.
 - a. Trucks offer complete door-to-door service, go almost anywhere there is a road, and carry most commodities using specialized equipment.
 - b. Trucks maintain a better record than rail for loss and damage and provide faster, more reliable service, especially for shorter distances.
 - c. Trucks carry higher-valued goods that are time-sensitive and expensive to carry in inventory.
 - d. Trucks have size and weight restrictions as well as rates that are substantially higher than rail rates.
 3. **Air Carriers and Express Companies.**
 - a. Air freight is costly, but its speed may create savings in lower inventory.
 - b. Items that can be carried are limited by space constraints and are usually valuable, time-sensitive, and lightweight.
 - c. Specialized firms provide ground support in terms of collecting shipments and delivering them to the air terminal.
 4. *Freight forwarders* are firms that accumulate small shipments into larger lots and then hire a carrier to move them, usually at reduced rates with improved service.
 - a. Forwarders pay the carrier the lower rate based on a larger volume by converting shipments that are less-than-truckload into full truckloads to receive better shipping rates.
 - b. The rates charged by the forwarder to the individual shippers, in turn, are somewhat less than the small quantity rate, and the difference is the forwarder's margin.
 - c. *Air freight forwarders* or *express companies* are firms that market air express services to the general public.

B. Warehousing and Materials Handling

- *Storage warehouses* are where goods come to rest for a time.

- *Distribution centers* are designed to facilitate the timely movement of goods and represent the second most significant cost in a supply chain after transportation.
 - a. They allow firms to hold their stock in decentralized locations and are also used to facilitate sorting and consolidating products from different plants or different suppliers.
 - b. Some physical transformation can also take place in distribution centers such as mixing or blending different ingredients, labeling, and repackaging.
- *Materials handling*, which involves moving goods over short distances into, within, and out of warehouses and manufacturing plants, is a key part of warehouse operations.
 - a. The two major problems with this activity are high labor costs and high rates of loss and damage.
 - b. Materials handling equipment include forklifts, cranes, and conveyors, often automated by using computers and robots to reduce inventory holding, moving, and recording cost.

C. Order Processing

- There are several stages in the processing of an order, and a failure at any one of them can cause customer problems.
 - a. The process starts with transmitting the order by a variety of means such as the Internet, an extranet, or EDI.
 - b. Next, the order is entered into the appropriate databases and then sent to those needing it.
 - c. After checking inventory, a new quantity may need to be reordered from the production line, or purchasing may be requested to reorder from a vendor.
 - d. If the item is currently out of stock, a *backorder* is created, and the whole process of keeping track of a small part of the original order must be managed.
 - e. Finally, customer credit is checked, all documentation for the order is prepared, transportation is arranged, and an order confirmation is sent.
- Electronic order processing has replaced manual processing for most large companies.

D. Inventory Management

The major problem with inventory management is maintaining the delicate balance between too little and too much.

- Too little inventory may result in poor service, stockouts, brand switching, and loss of market share.
- Too much inventory leads to higher costs because of the money tied up in inventory and the chance that it may become obsolete.

1. Reasons for Inventory.

a. Carrying inventory has been justified on several grounds:

- Offers a buffer against variations in supply and demand, often caused by uncertainty in forecasting demand.
- Provides better service for those customers who wish to be served on demand.
- Promotes production efficiencies.
- Provides a hedge against price increases by suppliers.
- Promotes purchasing and transportation discounts.
- Protect the firm from labor strikes and parts shortages.

b. Today, firms view inventory as something to be moved, not stored, and more of a liability than an asset. The traditional justification for carrying inventory has resulted in excessive inventories that have proven costly to maintain.

2. Inventory Costs.

a. Specific inventory costs are hard to detect because they are difficult to measure and occur in different parts of the firm.

b. Inventory costs are classified as follows:

- *Capital costs.* The opportunity costs resulting from tying up funds in inventory instead of using them in other, more profitable investments; these are related to interest rates.
- *Inventory service costs.* Items such as insurance and taxes that are present in many states.
- *Storage costs.* Warehousing space and materials handling.
- *Risk costs.* Possible loss, damage, pilferage, perishability, and obsolescence.

- c. Storage, risk, and some inventory service costs vary according to the characteristics of the item inventoried. Perishable products or highly seasonal items have higher risk costs than commodities.
- d. Capital costs are proportional to the *values* of the item and prevailing interest rates. The costs of carrying inventory vary from 10 to 35 percent for different firms.

3. Supply Chain Inventory Strategies.

- a. In the past, a firm protected itself against uncertainty by maintaining a reserve inventory at each of its production and stocking points. This “just-in-case” philosophy led to unnecessary high inventory levels.
- b. In contrast is the **just-in-time (JIT) concept**, which is an inventory supply system that operates with very low inventories and requires fast, on-time delivery.
 - Production parts arrive from suppliers “just in time,” neither before nor after they are needed.
 - JIT is used where demand forecasting is reliable and is not suitable for inventories that are to be stored over significant periods of time.
- c. **Vendor-managed inventory (VMI)** is an inventory-management system whereby the supplier determines the product amount and assortment a customer (such as a retailer) needs and automatically delivers the appropriate items.

[SLN 16-1: Vendor-Managed Inventory on a Global Scale: Men’s Shirts at JCPenney]

IV. CLOSING THE LOOP: REVERSE LOGISTICS

- The flow of goods in a supply chain does not end with the consumer or industrial user. It can work in reverse.
- **Reverse logistics** is a process of reclaiming recyclable and reusable materials, returns, and reworks from the point of consumption or use for repair, remanufacturing, redistribution, or disposal.
- Reverse logistics has ecological (reduced waste and environmental impact in landfills) and economic (lowered operating costs for companies) benefits.
- Some firms have implemented reverse logistics programs themselves while others have enlisted third-party logistics providers to handle this process along with other supply chain functions.

MAKING RESPONSIBLE DECISIONS

Reverse Logistics and Green Marketing Go Together at Estée Lauder: Recycling e-Waste

Retailing industry research firms and trade groups report that consumers return billions of dollars in merchandise to retailers each year. Estée Lauder, Inc., used to dump about US \$60 million worth of its products into landfills each year, destroying more than one-third of its name-brand cosmetics returned by retailers.

That changed recently when Estée Lauder developed a sophisticated reverse logistics system that cut the volume of destroyed products in half. During the system's first year of operation, the company was able to evaluate 24 percent more returned products, redistribute 150 percent more of its returns, and save US \$475,000 in labor costs.

The company expects to reduce its disposal rate to 15 percent as the reverse logistics system becomes even more efficient. The net effect of Estée Lauder's initiative has been a reduction in costs and a cleaner environment.

LEARNING REVIEW

6. What are the basic trade-offs between the five modes of transportation?

Answer: Each mode of transportation can be evaluated against six service criteria: cost, time, capability, dependability, accessibility, and frequency.

7. What types of inventory should use storage warehouses and which type should use distribution centers?

Answer: Storage warehouses are best suited for goods that will not be needed for substantial periods of time. Distribution centers are used if inventory needs to be in decentralized locations to facilitate sorting or consolidating products from different plants or suppliers, ingredients needs to be blended, or labeling and repackaging need to be done before the goods are shipped to customers.

8. What are the strengths and weaknesses of a just-in-time system?

Answer: A JIT system saves money on inventory if demand forecasting is reliable. However, it is not suitable for inventories that are to be stored over significant periods of time.

APPLYING MARKETING KNOWLEDGE

1. **List several companies to which logistical activities might be unimportant. Also list several whose focus is only on the inbound or outbound side.**

Answers:

- a. Many service firms have relatively simple logistical problems. Banks, insurance companies, and stock brokerages would be examples. Their inbound activities consist of bringing in some supplies; outbound activities would largely be paperwork sent through the postal service or a courier.
- b. **Mainly inbound.** In many retail settings, the consumer handles the outbound logistics (in some cases delivery may be provided) or products are consumed on the premises in some service businesses (e.g., restaurants).
- c. **Mainly outbound.** In extractive industries such as mining and timber, production is at the raw material source to minimize transport and storage of bulky materials.

2. **What are some types of businesses in which order processing may be among the paramount success factors?**

Answer: Any sort of direct response business. Mail order clothing (L.L. Bean) or catalog sales (JCPenney) would be examples. Others would be businesses where many transactions must be accurately and quickly processed because they are essentially the “product” the firm sells (e.g., Charles Schwab).

3. **What behavioral problems might arise to negate the logistics concept within the firm?**

Answer: Some behavioral problems which might arise to negate the logistics concept within the firm are:

- a. Poor coordination within the company
- b. Lack of IT knowledge in a company which employs the use of technology in its logistics
- c. Lack of motivation which would result in inefficiency of staff

4. **List the customer service factors that would be vital to buyers in the following types of companies: (a) manufacturing, (b) retailing, (c) hospitals, and (d) construction.**

Answers:

- a. **Manufacturing.** Probably lead time and dependability (for production scheduling) plus two-way communications (e.g., status reports).

- b. **Retailing.** Factors related to timely delivery of orders so the merchandise can be displayed and sold. This would be especially critical for seasonal products; if they arrived late, they might not sell. Correct delivery (e.g., of colors, sizes) would also be very important.
- c. **Hospitals.** Probably reliable delivery (i.e., on time and correct items) and convenience would be the most important. Hospitals stock critical items and want quick, accurate, convenient service on others.
- d. **Construction.** Probably reliable delivery. The correct items have to be on hand, or the project may be halted. Early deliveries are also a problem since they might be damaged or stolen if they are sitting on a job site.

5. Name some cases when extremely high service levels (for example, 99%) would be warranted.

Answer: Most people would mention industries that deal with life-threatening situations (some hospital services). A more general answer is when the benefit (revenues) of such a policy exceeds its added costs, or when a firm is forced to raise service levels by the competitive situation (easy for customers to switch brands, firms). In retailing, if competitors are open longer hours, other firms might have to match this convenience factor.

6. Name the mode of transportation that would be the best for the following products: (a) farm machinery, (b) cut flowers, (c) frozen meat, and (d) sand.

Answers:

- a. **Farm machinery.** Rail, due to size and weight; perhaps truck for short distances.
- b. **Cut flowers.** Air carrier and express company. Truck if grower is near retailers.
- c. **Frozen meat.** Rail for long distances; truck for shorter distances and for deliveries to retailers.
- d. **Sand.** Rail (unit trains) and many railroads specialize in sand hauling. Water may be viable if near a route.

7. The auto industry is a heavy user of the just-in-time concept. Why? What other industries would be good candidates for its application? What do they have in common?

Answer: The common thread is location close to suppliers. This allows lower inventory since resupply can occur rapidly. Reliable transportation is required. Certain parts of the auto industry (Michigan, Ohio) exhibit this closeness. The auto industry in Japan is

even more compact. Any industry that offers the possibility of quick, reliable resupply to prevent production disruptions is a candidate.

- 8. Look again at Figure 16-3. Explain why as the number of warehouses increases, (a) inventory costs rise and (b) transportation costs fall.**

Answers:

- a. **Inventory costs rise.** Inventory costs rise as the number of warehouses increases because each of the warehouses needs to be supplied with a minimum level of inventory to supply customers.
- b. **Transportation costs fall.** Transportation costs fall as the number of warehouses increase because (1) the high-volume inbound shipments **to** the warehouses can be shipped by low-cost bulk modes while (2) the low-volume outbound shipments **from** the warehouses will be much smaller because of the shorter distances due to the larger number of warehouses.

BUILDING YOUR MARKETING PLAN

Does your marketing plan involve a product? If the answer is no, read no further and do not include this element in your plan. If the answer is yes:

- 1. If inventory is involved, (a) identify the three or four major kinds of inventory needed for your organization (retail stock, finished goods, raw materials, supplies, and so on), and (b) suggest ways to reduce their costs.**
- 2. (a) Rank the four customer service factors (time, dependability, communication, and convenience) from most important to least important from your customers' point of view, and (b) identify actions for the one or two most important to serve customers better.**

Answer: As with the Building Your Marketing Plan activity for Chapter 15, this chapter's activity is critically important for students writing marketing plans for a manufacturing firm producing and marketing a physical product. Here wise decisions in obtaining necessary raw materials and other supplies from vendors and distributing the finished product through a series of intermediaries are vital to success. But for other kinds of businesses, these decisions are of secondary importance.

SLN 16-1: SUPPLEMENTAL LECTURE NOTE

Vendor-Managed Inventory on a Global Scale: Men's Shirts at JCPenney

The text defines vendor-managed inventory (VMI) as inventory management system whereby the supplier determines the product amount and assortment a customer (such as a

retailer) needs and automatically delivers the appropriate items. The text gives a brief description of VMI at Campbell Soup. The following description provides another example, this time for JCPenney.

On a Saturday afternoon in August, Carolyn Thurmond walked into a JCPenney store in Atlanta's Northlake Mall and brought a white Stafford wrinkle-free dress shirt for her husband, size 17" neck, 34"/35" sleeve. On Monday morning, a computer technician in Hong Kong downloaded a record of the sale. By Wednesday afternoon, a factory worker in Taiwan had packed an identical shirt into a bundle to be shipped back to the Atlanta store.

This speedy process, part of a streamlined supply chain and production system for dress shirts that was years in the making, has put JCPenney at the forefront of the continuing revolution in U.S. retailing. In an industry where the goal is speedy turnaround of merchandise, JCPenney stores now hold almost no extra inventory of house-brand dress shirts. Less than a decade ago, JCPenney would have had thousands of them warehoused across the U.S., tying up capital and slowly going out of style.

The new process is one from which JCPenney is conspicuously absent. The entire program is designed and operated by TAL Apparel Ltd., a closely held Hong Kong shirt maker. TAL collects point-of-sale data for JCPenney's shirts directly from its stores in North America, and then runs the numbers through a computer model it designed. The Hong Kong company then decides how many shirts to make, and in what styles, colors and sizes. The manufacturer sends the shirts directly to each JCPenney store, bypassing the retailer's warehouses—and corporate decision makers.

Sources: Gabriel Kahn, "Invisible Supplier Has Penney's Shirts All Buttoned Up," *The Wall Street Journal* (September 11, 2003), pp. A1, A9 and "Supply-Chain Superstars," www.industryweek.com, downloaded May 23, 2004.