

## CHAPTER 1

# OPERATIONS AND SUPPLY CHAIN MANAGEMENT

### Discussion Questions

1. Using Exhibit 1.2 as a model, describe the source-make-deliver-return relationships in the following systems:
  - a. *An airline*
    - Source: Aircraft manufacturer, in-flight food, repair parts, computer systems*
    - Make: Aircraft and flight crew scheduling, ground services provided at airports, aircraft maintenance and repair*
    - Deliver: Outbound and arriving passenger service, baggage handling*
    - Return: Resolve any post-service issues such as lost or damaged luggage*
  - b. *An automobile manufacturer*
    - Source: Suppliers of components and raw materials*
    - Make: Manufacturing of vehicles and components or subassemblies to be sold as spare parts*
    - Deliver: Delivery to and sales from dealerships, delivery of spare parts to the wholesale system*
    - Return: Warranty and recall repairs, trade-ins*
  - c. *A hospital*
    - Source: Medical supplies, cleaning services, disposal services, food services, qualified personnel*
    - Make: Inpatient rooms, outpatient clinics, emergency room, operating rooms*
    - Deliver: Scheduling patients, providing treatment, ambulance service, family counseling*
    - Return: Billing errors, follow up visits*
  - d. *An insurance company*
    - Source: Supplies needed for the office, underwriters, legal authority to operate*
    - Make: Establish policy guidelines and pricing, field agent/representative and facility network, develop Internet service capabilities, establish preferred vehicle repair service network*
    - Deliver: Meet with and advise clients, write policies, process and pay claims*
    - Return: Refund of overpayments*
2. Define the service package of your college or university. What is its strongest element? What is its weakest one?

*The categories with examples are:*

*Supporting facility - location, buildings, labs, parking*

*Facilitating goods – class schedules, computers, books, chalk*

*Explicit services – classes with qualified instructors, placement offices*

*Implicit services – status and reputation (e.g., Ivy League schools)*

*At Indiana University and the University of Southern California, among their strongest elements are their business schools and their Operations Management programs (of course). Both also have very dedicated alumni networks. A weak element of Indiana University is its weak football program; for USC, weak elements are on-campus parking and housing.*

3. What service industry has impressed you the most with its innovativeness?

*Our vote goes to cruise lines which have introduced such onboard innovations as wave machines for belly boarding and rock climbing walls, as well as all sorts of other amenities to keep cruisers involved. The industry is doing record business as well.*

*Some of the standout companies in less innovative industries are Bank of America (has a formalized research program to try out new customer services/amenities such as video screens in next to teller lines), Intuit (e.g., putting Quicken money management software online), Ikea, JetBlue Airlines, and Progressive Insurance (discussed later in the book).*

4. What is product-service bundling and what are the benefits to customers?

*Product-service bundling is adding value-added services to a firm's product offerings to create more value for the customer. This provides benefits in two areas. First, this differentiates the organization from the competition. Secondly, these services tie customers to the organization in a positive way. Alternatively, bundling can also involve adding products to a service, for example, adding the sale of convenience items and snacks at a hotel.*

5. What is the difference between a service and a good?

*A service is an intangible process (you can't hold it in your hands), while a good is the physical output of a process. Some service businesses also provide a physical good as part of the service, like a restaurant. Also, most manufacturers of goods provide services for after-sales support, like computer tech support or automobile warranty service. So while a service and a good are definitely distinguishable, customers will often encounter both in their experiences with a company.*

6. Some people tend to use the terms effectiveness and efficiency interchangeably, though we've seen they are different concepts. But is there any relationship at all between them? Can a firm be effective but inefficient? Very efficient but essentially ineffective? Both? Neither?

*Firms can be anywhere on these two dimensions. It is possible for a firm to be the best at what they do in serving their market, but be very wasteful in doing so. Alternatively, a firm could squeeze every last dollar out of their processes but fail to deliver what the market expects and desires. Of course, the best firms will provide the goods and services that the market desires, exactly as the market desires, and do so at a minimum cost. Firms that are both inefficient and ineffective do not survive for long in any market.*

7. Two of the efficiency ratios mentioned in the chapter are the *receivable turnover ratio* and the *inventory turnover ratio*. While they are two completely separate measures, they are very similar in one way. What is the common thread between these two?

(There are a number of answers that students may come up with, from simplistic to more thoughtful. Following is one of the latter.) *Both are measuring the average amount of a valuable asset that is not generating value for the company. Accounts receivable are an asset, but they do not create value for the firm until the money is received. Reducing the average amount of accounts receivable frees up that money for use by the company on a recurring basis. Inventory is another asset, but while inventory is being held by the company it is not making any money for the firm. Reducing inventory allows the firm to invest the money that would otherwise be spent on the inventory.*

8. Look at the job postings at <http://jobs.apics.org> and evaluate the opportunities for an OSCM major with several years of experience.

*There are pages and pages of these in the APICS Career Center. Here are some examples:*

*Purchasing and Planning Manager*

*Sennheiser New Mexico*

*Sennheiser is seeking an innovative and enthusiastic individual to manage the purchasing and planning areas at our Albuquerque manufacturing facility. This key role is responsible for leading the Purchasing, Planning and Warehouse departments to achieve outstanding results. You will be charged with ensuring cost effective on-time delivery, as well as building solid relationships with other internal departments and international sister facilities. You will use production planning, procurement, inventory and materials management concepts to solve problems and provide continuous improvement in the supply chain process.*

*Senior Manager Supply Chain Financer*

*Pharmavite*

*This role contributes to Pharmavite's success by providing decision support to the organization to drive business growth and improve profitability. Responsible for supporting company innovation with respect to total delivered cost. Also supports direct sourcing team on reporting & analyzing purchase price variance and seeking out new cost savings projects. Performs ad-hoc analysis and/or support cross-functional projects to improve operational efficiencies and optimize profitability. Also manages the control function around headquarters-based operations overhead expenditures as well as capital investments.*

*Medical Device Supply Chain Manager*

*Cadwell*

*The Supply Chain Manager provides overall leadership and mentoring for the purchasing, shipping, and receiving functions for Cadwell Industries, Inc., a leading medical device manufacturer. This position oversees the organization wide management of strategic sourcing, procurement, contract negotiations, and evaluation of services while collaborating closely with staff in Engineering, Marketing, Regulatory, Sales, and Service.*

*Production/Operations Planner*

*CG Industrial Specialties*

*US - Nationwide*

*Reporting to the Operations Manager or Branch Manager; this position is responsible for preparing assembly schedules for shop technicians; coordinate material requirements with purchasing as well as coordinate shipping / receiving activities with warehouse staff.*

9. Recent outsourcing of parts and services that had previously been produced internally is addressed by which current issue facing operations and supply management today?

*The coordination of relationships between mutually supportive but separate organizations.*

10. What factors account for the resurgence of interest in OSCM today?

*With companies facing competition on a global scale, and ever-advancing manufacturing and information technologies, firms realize the competitive advantage their OSCM functions can provide if properly managed. Many have found that the same old way of doing business leaves them unable to compete successfully. The 2011 tsunami in Japan and the 2015 LA ports closure have also brought to the forefront how important supply chains are, as well as the negative economic impact that disruptions in the supply chain can cause.*

11. As the field of OSCM has advanced, new concepts have been applied to help companies compete in a number of ways, including the advertisement of the firm's products or services. One recent concept to gain the attention of companies is promoting *sustainability*. Discuss how you have seen the idea of sustainability used by companies to advertise their goods or services.

*There of course will be a number of examples that students will bring up, though they may need some prodding to jog their memories. Some examples to start with might be IBM's "I'm an IBMer" campaign where they advertise how they are "building a smarter planet." Bottled water manufacturers have reduced the amount of plastic used in many of their products, thus saving production and distribution costs, but also allowing them to advertise how the new bottles are better for the environment because they result in less waste.*

**Objective Questions**

1. What are the three elements that require integration to be successful in operations and supply chain management?

*Strategy, Processes, and Analytics*

2. Operations and supply chain management is concerned with the design and management of the entire system that has what function?

*Produces a product or delivers a service*

3. Consider the following financial data from the past year for Midwest Outdoor Equipment Corporation.

Gross Income	\$25,240,000
Total Sales	24,324,000
Total Credit Sales	18,785,000
Net Income	2,975,000
Cost of Goods Sold	12,600,000
Total Assets	10,550,000
Average Inventory	2,875,000
Average Receivables	3,445,000

- a. Compute the *receivable turnover ratio*.

$$\frac{\$18,785,000}{\$3,445,000} = 5.453$$

- b. Compute the *inventory turnover ratio*.

$$\frac{\$12,600,000}{\$2,875,000} = 4.383$$

- c. Compute the *asset turnover ratio*.

$$\frac{\$24,324,000}{\$10,550,000} = 2.306$$

4. A manufacturing company has entered into a new contract with a major supplier of raw materials used in the manufacturing process. Under the new arrangement, called *vendor managed inventory*, the supplier manages their raw material inventory inside the manufacturer's plant, and only bills the manufacturer when the manufacturer consumes the raw material. How is this likely to affect the manufacturer's inventory turnover ratio?

*This will reduce the average amount of money the firm has invested in raw material, so the inventory turnover ratio should increase.*

5. What is the name of the process in which one company studies the processes of another firm in order to identify best practices?

*Benchmarking*

6. A company has recently implemented an automated online billing and payment processing system for orders it ships to customers. As a result, it has reduced the average number of days between billing a customer and receiving payment by 10 days. How will this affect the receivables turnover ratio?

*Quicker payments will reduce the average amount of accounts receivables, so the receivables turnover ratio will increase.*

7. Match the following OSCM job titles with the appropriate duties and responsibilities.

<u>C</u> Plant manager	A: Plans and coordinates staff activities such as new product development and new facility location
<u>D</u> Supply chain manager	B: Oversees the movement of goods throughout the supply chain
<u>A</u> Project manager	C: Oversees the workforce and resources required to produce the firm's products
Business process	D: Negotiates contracts with vendors and coordinates the flow of material inputs to the production process
<u>E</u> improvement analyst	E: Applies the tools of lean production to reduce cycle time and eliminate waste in a process
<u>B</u> Logistics manager	

8. What high-level OSCM position manager is responsible for working with the CEO and company president to determine the company's competitive strategy?

*Chief Operating Officer*

9. Order the following major concepts that have helped define the OSCM field on a time line. Use 1 for the earliest to be introduced, and 5 for the most recent.

3 Supply chain management  
1 Manufacturing strategy  
5 Business analytics  
2 Total quality management  
4 Electronic commerce

10. Which major OSCM concept can be described as an integrated set of activities designed to achieve high-volume production using minimal inventories of parts that arrive at workstations exactly when they are needed?

*Just-in-time (JIT) production*

11. \_\_\_\_\_ leverage the vast amount of data in enterprise resource planning systems to make decisions related to managing resources.

*Business analytics*

12. Which current issue in OSCM relates to the ability of a firm to maintain balance in a system, considering the ongoing economic, employee, and environmental viability of the firm?

*Sustainability*

**Analytics Exercise: Comparing Companies Using Wall Street Efficiency Measures**

Each student is asked to pick an industry and compare three companies within that industry based on income per employee, revenue per employee, receivable turnover, inventory turnover, and asset turnover. The following is typical of what you might obtain:

	BP	Shell	ExxonMobil	Oil Industry
<b>Management Efficiency</b>				
Net Income/Employee	315,300	343,533	414,328	289,320
Revenue/Employee	4.6 Mil	5.2 mil	4.7 mil	3 Mil
Receivable Turnover	9.38	6.29	13.17	13.5
Inventory Turnover	11.92	13.59	21.91	15.5
Asset Turnover	1.92	1.36	1.41	1.1

Students are then asked to identify which company appears to have the most productive employees.

With this data we see that ExxonMobil does very well in generating \$414,328 net income per employee. Comparing Shell to ExxonMobil we can observe that ExxonMobil appears to be more efficient since it can generate more net income on lower revenue/employee, at least compared to Shell. The inventory turnover is highest for ExxonMobil indicating that the company is the most efficient from an operations and supply chain processes view. ExxonMobil also appears to do a good job in collecting receivables as well, thus supporting the idea that the company is very efficient. BP seems to do a little better in asset turnover, which relates to the use of its facility and equipment assets. But ExxonMobil is very good especially in comparison to the oil industry average.

Overall, ExxonMobil appears to be the most efficient, so the other companies might find it valuable to benchmark the company’s processes.

Of course, the data generated by each student will be different and an interesting interchange can be developed with students each presenting what they found from their research. It is very interesting to do comparisons across industries; retailers versus oil companies, and computer makes versus software companies, for example.