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STUDENT EDITION

# OM<sup>4</sup>

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## Chapter 2—Value Chains

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### TRUE/FALSE

1. A vertical integration strategy provides a firm more control and generally reduces the complexity of managing the value chain.  
ANS: F                      PTS: 1
2. The organization that outsources still retains ownership of the outsourced process or function.  
ANS: F                      PTS: 1
3. A value chain describes the flow of customer information through a production system.  
ANS: F                      PTS: 1
4. Proportional increases or decreases in perceived benefits as well as price or cost result in no net change in value.  
ANS: T                      PTS: 1
5. One approach to increasing value is to maintain perceived benefits while increasing price or cost.  
ANS: F                      PTS: 1
6. Value can be increased by adding services to customer benefit packages even when the quality or features of goods cannot be improved.  
ANS: T                      PTS: 1
7. The focus on value has forced many traditional goods-producing companies to reduce services for their customer benefits package.  
ANS: F                      PTS: 1
8. A competitively dominant customer experience is often called a value proposition.  
ANS: T                      PTS: 1
9. A value chain can be considered a "cradle-to-grave" model of the operations function.  
ANS: T                      PTS: 1
10. A value chain begins with the goods and services that are provided to customers.  
ANS: F                      PTS: 1
11. Pre-production services might include on-line training services, billing, and warranty service.  
ANS: F                      PTS: 1

12. Post-production services might include customer financing, customer benefit package design, and promotion/advertising.
- ANS: F                      PTS: 1
13. The focus of pre-production services is on gaining a customer while that of post-production services is on keeping the customer.
- ANS: T                      PTS: 1
14. A supply chain is more inclusive than a value chain.
- ANS: F                      PTS: 1
15. A value chain views an organization from an integrative perspective of goods and services, while a supply chain focuses mainly on the creation of physical goods.
- ANS: T                      PTS: 1
16. Nearly all value chains are managed from a centralized operational structure because of the inherent inefficiencies that are found in decentralized operational structures.
- ANS: F                      PTS: 1
17. Vertical integration is a modern method of outsourcing.
- ANS: F                      PTS: 1
18. A vertical integration strategy provides a firm more control while generally reducing the complexity of managing the value chain.
- ANS: F                      PTS: 1
19. Outsourcing is the opposite of vertical integration.
- ANS: T                      PTS: 1
20. Historically, service work was outsourced before many goods-producing jobs were.
- ANS: F                      PTS: 1
21. The organization that outsources still retains ownership of the outsourced process or function.
- ANS: F                      PTS: 1
22. Forward integration might include acquiring a customer.
- ANS: T                      PTS: 1
23. Backward integration refers to acquiring capabilities toward distribution.
- ANS: F                      PTS: 1

24. In breakeven analysis, whenever the anticipated volume is greater than the breakeven quantity, the firm should not outsource.

ANS: T                      PTS: 1

25. Value chain integration requires consolidating information systems among suppliers, factories, distributors, and customers; managing the supply chain and scheduling factories; and studying new ways to use technology.

ANS: T                      PTS: 1

26. Third party "system integrators" are often used for vertical integration strategies.

ANS: F                      PTS: 1

27. Offshoring is the same as outsourcing in terms of transferring ownership and control.

ANS: F                      PTS: 1

28. Offshoring generally lowers unit costs.

ANS: T                      PTS: 1

29. General Electrics would be considered a multinational enterprise because it sources, markets, and produces its goods in several countries.

ANS: T                      PTS: 1

30. Global value chains face higher levels of risk and uncertainty, requiring more inventory and day-to-day monitoring to prevent product shortages.

ANS: T                      PTS: 1

31. A reason for globalization includes shifting work closer to customers for fast delivery and customization.

ANS: T                      PTS: 1

32. While cultural differences are important in managing operations in different countries, they have little impact in designing the overall value chain.

ANS: F                      PTS: 1

### **MULTIPLE CHOICE**

1. Which of the following is false? To increase value, an organization must
  - a. decrease price or cost while holding perceived benefits constant.
  - b. change both perceived benefits and price in the same proportion.
  - c. increase perceived benefits while holding price or cost constant.
  - d. increase perceived benefits while reducing price or cost.

ANS: B                      PTS: 1

2. The first, second, and third waves of outsourcing experienced by the U.S. are
- goods-producing jobs, simple service work, skilled knowledge work
  - simple service work, goods-producing jobs, skilled knowledge work
  - simple service work, skilled knowledge work, goods-producing jobs
  - skilled knowledge work, simple service work, goods-producing jobs

ANS: A                    PTS: 1

3. \_\_\_\_\_ integration refers to acquiring capabilities at the front of the supply chain, whereas \_\_\_\_\_ integration refers to acquiring capabilities toward the back end of the supply chain.
- Vertical, horizontal
  - Upward, downward
  - Forward, backward
  - Backward, forward

ANS: D                    PTS: 1

4. A company has two alternatives for meeting a customer requirement for 9,000 units of a specialty molding. If done in-house, fixed cost would be \$350,000, with variable cost at \$30 per unit. If outsourced, the cost is \$80 per unit. Determine the breakeven point and determine if they should make the item in-house or outsource it.
- breakeven point = 7,000 units; outsource
  - breakeven point = 7,000 units; make in-house
  - breakeven point = 11,667 units; outsource
  - breakeven point = 11,667 units; make in-house

ANS: B                    PTS: 1

5. For a restaurant, order-taking, bill payment and home delivery would be considered
- services
  - inputs
  - processes
  - outputs

ANS: C                    PTS: 1

6. Which of the following is not a component of a value chain?
- goods and services
  - information
  - sources of labor
  - financial transactions

ANS: C                    PTS: 1

7. Which of the following is not true? To increase value, an organization must
- decrease price or cost while holding perceived benefits constant.
  - hold perceived benefits constant while increasing price or cost.
  - increase perceived benefits while holding price or cost constant.
  - increase perceived benefits while reducing price or cost.

ANS: B                    PTS: 1

8. In the value chain model for a hospital, patients, drugs and staff would be considered
- suppliers
  - inputs
  - processes

d. outputs

ANS: B                    PTS: 1

9. From the pre- and post-service view of a value chain, goods and services design, contract negotiation and consulting services would be considered
- pre-production services
  - production processes
  - post-production services
  - value creation

ANS: A                    PTS: 1

10. From the pre- and post-service view, transportation service, training service and consulting and technical services would be considered
- pre-production services
  - a production processes
  - post-production services
  - value creation

ANS: C                    PTS: 1

11. Which of the following generally does not result from vertical integration?
- less control over cost
  - more control over quality
  - more complexity in managing
  - higher levels of risk

ANS: A                    PTS: 1

12. The United States has experienced three waves of outsourcing. Which of the following is not one of the waves?
- skilled knowledge work
  - mass customization
  - simple service work
  - goods-producing jobs

ANS: B                    PTS: 1

13. Which of the following is not normally considered a variable cost?
- labor
  - transportation
  - equipment lease
  - material

ANS: C                    PTS: 1

14. When break-even analysis is applied to an outsourcing decision, the breakeven quantity is
- the ratio of fixed costs to the difference between variable outsourcing cost and variable in-house production cost
  - the ratio of the difference between variable outsourcing cost and variable in-house production cost to fixed costs
  - the product of the variable costs times the fixed costs
  - the product of the variable costs times the production quantity

ANS: A                    PTS: 1

15. \_\_\_\_ is the process of managing information, services and physical goods to insure their availability at the right place, at the right time, at the right cost and at the right quantity, with the highest attention given to quality.
- a. Preproduction service
  - b. Value proposition
  - c. Operational structure
  - d. Value chain integration

ANS: D                      PTS: 1

16. “The perception of the benefits associated with a good, service, or bundle of goods and services in relation to what buyers are willing to pay for them” is the definition of
- a. proportionality
  - b. competitiveness
  - c. value
  - d. equity

ANS: C                      PTS: 1

17. Outsourcing is
- a. the same as offshoring
  - b. the opposite of vertical integration
  - c. the opposite of backward integration
  - d. the same as diversifying

ANS: B                      PTS: 1

18. Operational structure of the value chain deals with
- a. management hierarchy
  - b. vertical integration
  - c. configuration of resources
  - d. culture

ANS: C                      PTS: 1

19. The control of Wal-Mart’s value chain is \_\_\_\_\_, while the control of General Electric’s is \_\_\_\_\_.
- a. post-production focused, preproduction focused
  - b. horizontal, vertical
  - c. centralized, decentralized
  - d. backward integrated, forward integrated

ANS: C                      PTS: 1

20. A competitively dominant customer experience is often called a
- a. perceived benefit
  - b. preemptive strike
  - c. moment of truth
  - d. value proposition

ANS: D                      PTS: 1

## SHORT ANSWER

1. Define value and discuss three (3) ways for organizations to increase value.

ANS:

**Value** is the perception of the benefits associated with a good, service or bundle of goods and services in relation to what buyers are willing to pay for them. A simple way of expressing value is: Perceived benefits/price (cost) to the customer. To increase value, an organization must...

- a) increase perceived benefits while holding price or cost constant
- b) increase perceived benefits while reducing price or cost, or
- c) decrease price or cost while holding perceived benefits constant

PTS: 1

2. Explain a value proposition. Relate this to a customer benefits package of goods and services

ANS:

A competitively dominant customer experience is often called a **value proposition**. A winning value proposition is one that meets the full set of customer needs, including price. The focus on value has forced many traditional goods-producing companies to add services to their customer benefit packages.

PTS: 1

3. Contrast the two views of a value chain. What is the significance of each?

ANS:

The first view is the classic process flow diagram of a value chain from suppliers to customers, along with supporting management infrastructure. This view makes it easy to understand the value chain from a process perspective.

The second view shows the value chain from pre- and post-production service perspectives, focusing on gaining a customer, value creation and keeping the customer. Preproduction services include customized and team-oriented product design, consulting services, contract negotiations, product and service guarantees, customer financing to help purchase the product, training customers to use and maintain the product, purchasing and supplier services, and other types of front-end services. Postproduction services include on-site installation or application services, maintenance and repair in the field, servicing loans and financing, warranty and claim services, warehouse and inventory management for your company and sometimes for your customers, training, telephone service centers, transportation delivery services, post-sale visits to the customer's facility by knowledgeable sales and technical-support people, recycling and remanufacturing initiatives, and other back-end services. This view of the value chain emphasizes the notion that service is a critical component of traditional manufacturing processes.

PTS: 1

4. Differentiate a supply chain from a value chain.

ANS:



A **supply chain** is the portion of the value chain that focuses primarily on the physical movement of goods and materials and the supporting flows of information and financial transactions through the supply, production and distribution processes. A value chain is broader in scope than a supply chain and encompasses all pre- and post-production services to create and deliver the entire customer benefit package. A value chain views an organization from the customer's perspective -- the integration of goods and services to create value, while a supply chain is more internally-focused on the creation of physical goods. The value chain idea is more applicable to services where service, information and entertainment play an increasing role in the total bundle of goods and services, that is, the customer benefit package.

PTS: 1

5. What are the major decisions a firm must address in designing and configuring a value chain?

ANS:

These decisions include the number, type, and location of manufacturing plants, distribution centers, retail stores, repair centers, and customer service or technical support centers; the choice of technology and processes to make goods and deliver services; ways of managing information flow throughout the value chain; the selection of suppliers and partners; and the integration of all the pieces into an effective and efficient system.

PTS: 1

6. Contrast outsourcing with vertical integration. Also, contrast backward integration with forward integration.

ANS:

**Outsourcing** is the process of having suppliers provide goods and services that were previously provided internally. Vertical integration refers to the process of acquiring and consolidating elements of a value chain to achieve more control.

**Backward integration** refers to acquiring capabilities at the front-end of the supply chain (suppliers, for example), while **forward integration** refers to acquiring capabilities toward the back-end of the supply chain (distribution or even customers, for example). Backward integration provides more control over the production portion of the supply chain. Forward integration can provide better marketing advantages.

PTS: 1

7. Explain the notion of value chain integration.

ANS:

**Value chain integration** is the process of managing information, physical goods, and services to ensure their availability at the right place, at the right time, at the right cost, at the right quantity, and with the highest attention to quality. Value chain integration includes improving internal processes for the client as well as external processes that tie together suppliers, manufacturers, distributors, and customers. For goods-producing firms it requires consolidating information systems among suppliers, factories, distributors, and customers, managing the supply chain and scheduling factories, and studying new ways to use technology.

PTS: 1

8. Define multinational enterprises. What challenges do they pose to operations managers?

ANS:

A **multinational enterprise** is an organization that sources, markets and produces its goods and services in several countries to minimize costs and to maximize profit, customer satisfaction and social welfare. Some issues that operations managers must confront in a global business environment include: (1) How to design a value chain to meet the slower growth of industrialized countries and more rapid growth of emerging economies? (2) Where to locate manufacturing and distribution facilities around the globe to capitalize on value chain efficiencies and improve customer value? (3) What performance metrics to use in making critical value chain decisions? (4) Should partnerships be developed with competitors to share engineering, manufacturing or distribution technology knowledge?

PTS: 1

9. What makes global value chains more difficult to manage than small domestic value chains?

ANS:

- Global value chains face higher levels of risk and uncertainty, requiring more inventory and day-to-day monitoring to prevent product shortages.
- Transportation is more complex in global value chains.
- The transportation infrastructure may vary considerably in foreign countries.
- Global purchasing can be a difficult process to manage when sources of supply, regional economies, and even governments change.
- International purchasing can lead to disputes and legal challenges relating to such things as price fixing and quality defects.
- Privatizing companies and property is another form of major changes in global trade and regulatory issues.

PTS: 1

10. List the variety of economic and noneconomic issues to be considered when making offshore decisions.

ANS:

Low labor costs, lower import duties and fees, lower capital costs, grow global market share, avoid national currency fluctuations, preempt competitors from entering global market, hire worldwide skills and knowledge workers, build robust value chain networks for global markets, build relationships with government officials, negative impact on media attention on remaining employees, potential loss of intellectual property, lose control of key processes, develop secure sources of supply and reduce risks, build relationships with suppliers, avoid environmental regulations and laws, possible political instability in offshore country, lack of communication and/or technical skills, learn foreign markets and cultures..

PTS: 1

## PROBLEM

1. A company has two alternatives for meeting a customer requirement for 9,000 units of a specialty molding. If done in-house, fixed cost would be \$350,000 with variable cost at \$30 per unit. Alternative two is to outsource for a total cost of \$80 per unit. Determine the breakeven quantity and determine if they should make the item in-house or outsource it.

ANS:

$$VC_1 = \$30$$

$$VC_2 = \$80$$

$$FC = \$350,000$$

$$\text{Breakeven point} = Q^* = \$350,000 / (\$80 - \$30) = 7,000 \text{ units.}$$

Since the anticipated volume is 9,000 units and is greater than the breakeven quantity, the firm should produce the part in-house and not outsource.

PTS: 1

2. Two alternatives are being considered for a customer's order whose anticipated volume is not yet known. If the firm produces in-house, the fixed cost is \$340,000 and variable cost is \$2.90 per unit. If the firm chooses to outsource, it will incur a fixed of \$275,000 and variable cost is \$3.50 per unit. Determine the breakeven quantity and a decision rule of when to outsource.

ANS:

(This problem requires to the student to view the breakeven quantity model for outsourcing in a more general fashion and apply some basic logic to develop the correct analysis)

The total cost of in-house production is  $2.9Q + 340000$

The total cost of outsourcing is  $3.5Q + 275000$

Setting these equal to each other, we have:

$$2.9Q + 340000 = 3.5Q + 275000$$

$$65000 = 0.6Q$$

$$Q = 108,333 \text{ units}$$

If the volume is less than 108,333 units, the firm should outsource; if the volume is larger than this, it should produce the order in-house.

PTS: 1

3. A manufacturing company needs to know whether to make in-house or buy a roller gear assembly for its new fax machine production. The company expects to produce 9,000 units per year. The following estimates have been made:

	<u>Make</u>	<u>Buy</u>
Fixed cost per year	\$8,000	\$0
Variable cost per part	\$5.45	\$6.93

- What is the annual cost to make the roller gear assembly in-house?
- What is the annual cost to buy the roller gear assembly?
- At what volume are they indifferent regarding the decision to make or buy?

ANS:

a. Cost to make:  $\$8,000 + \$5.45(9,000) = \$57,050$

b. Cost to buy:  $\$6.93(9,000) = \$62,370$   
 Make in-house since it has lower cost.

c.  $\$8000 + \$5.45X = \$6.93X \Rightarrow X = 5405.40 = 5405$

PTS: 1

4. A U.S. motorcycle manufacturer has the option of either making the gas tank in their newly designed cycle, or subcontracting it out to a Singapore manufacturer. Costs for the two options are:

<u>Source</u>	<u>Fixed Cost</u>	<u>Variable Cost</u>
Make in-house	\$15,000	\$21.50
Buy from Singapore	\$0	\$29.00

- Which option would be preferred at an annual volume of 1,000 gas tanks?
- Which option would be preferred at an annual volume of 5,000 gas tanks?
- For what range of production volume would it be better to make the gas tanks in-house?

ANS:

- Make:  $TC = \$15,000 + \$21.50(1000) = \$36,500$   
 Buy:  $TC = \$0 + \$29.00(1000) = \$29,000$   
 Buy is more economical by \$7,500.
- Make:  $TC = \$15,000 + \$21.50(5000) = \$122,500$   
 Buy:  $TC = \$0 + \$29.00(5000) = \$145,000$   
 Make is more economical by \$22,500.
- $\$29X = \$15,000 + \$21.50X \Rightarrow 7.50X = 15,000 \Rightarrow X = 2000$  gas tanks

PTS: 1

5. A large hotel-casino in Las Vegas is currently under construction. There will be an Italian restaurant in the hotel that will serve pizza. Management is trying to decide whether to make the pizza themselves or buy it frozen and simply heat it to customer order. There are two major sources of commercial-grade frozen pizza; Ma Ma's Products and the Chun-Yee Corporation. If they make the pizza themselves a substantial amount of preparation equipment will be required, along with skilled personnel. Frozen pizza needs either a conventional oven (Ma Ma's) or a microwave (Chun-Yee). Financial data is as shown below (variable costs are estimated based on an average pizza purchase):

<u>Source</u>	<u>Fixed Cost/year</u>	<u>Variable Cost</u>
Make in-house	\$7,870	\$3.20
Ma Ma's	\$ 860	\$5.60
Chun-Yee	\$2,460	\$4.50

- At what volume is either Ma Ma's or Chun-Yee acceptable?
- At what volume is the company indifferent to either Chun-Yee or make in-house?

ANS:

- Ma Ma's -- Chun-Yee:  
 $\$860 + \$5.60X = \$2460 + \$4.50X \Rightarrow 1.10X = 1600 \Rightarrow X = 1455$  pizzas
- Chun-Yee -- make in-house:  
 $\$2460 + \$4.50X = \$7870 + \$3.20X \Rightarrow 1.30X = 5410 \Rightarrow X = 4162$  pizzas

PTS: 1

6. John Morton, director of materials management for Computer Products Corporation (CPC) in San Jose, is now reviewing next year's plans for the supply of a component that is now purchased from

Osiega Ltd., a company in Japan. The component is the PS100 power supply assembly that is used in many of CPC's products.

CPC pays the supplier more than \$7 million per year for these units, and John wonders if money could be saved by developing another supplier for this component or if CPC should gear up to manufacture the power supply assemblies in-house within one of the CPC's own production plants.

John's purchasing-analysis staff has developed the following estimates:

Supply Source for PS100	Description of Cost	Annual Fixed Cost	Variable Cost per Unit
Osiega Ltd.	Annual tooling	\$50,000	
	Inspection and rework		\$ .16
	Shipping		.95
	Purchase price		11.88
Atlanta Spier	Annual tooling	\$95,000	
	Inspection and rework		\$ 1.05
	Shipping		.15
	Purchase price		10.59
In-house	Annual tooling	\$70,000	
	Inspection and rework		\$ .55
	Shipping		.25
	Production costs	5,000	11.50

The purchasing-analysis group has learned that CPC will need about 550,000 of the PS100 units next year.

- Which supply source provides the least cost for next year?
- How many PS100 units would have to be bought next year for each of the sources to be the least-cost source?

ANS:

- $TC = FC + vQ$   
 $TC_{OL} = 50,000 + 12.99(550,000) = \$7,194,500$   
 $TC_{AS} = 95,000 + 11.79(550,000) = \$6,579,500$  ( least cost)  
 $TC_{CPC} = 75,000 + 12.30(550,000) = \$6,840,500$   
 Atlanta Spier is the least-cost choice for next year.

- Determine the breakeven points between the sources.

CPC vs. Osiega, LTD:

$$TC_{CPC} = TC_{OL}$$

$$75,000 + 12.30(Q) = 50,000 + 12.99(Q)$$

$$.69(Q) = 25,000$$

$$Q = 36,231.9 \text{ units}$$

CPC vs. Atlanta Spier:

$$TC_{CPC} = TC_{AS}$$

$$75,000 + 12.30(Q) = 95,000 + 11.79(Q)$$

$$.51(Q) = 20,000$$

$$Q = 39,15.7 \text{ units}$$

If the annual volume is between 1 and 36,231.9 units, Osiega Ltd. would be preferred. If annual volume is between 36,231.9 and 39,215.7 units, CPC (in-house) would be preferred. If annual volume is more than 39,215.7 units, Atlanta Spier would be preferred. Obviously, with an estimated annual demand of 550,000 units, Atlanta Spier is the preferred source.