

Solution Manual for Operations and Supply Chain Management The Core 3rd Edition Jacobs Chase 0073525235 9780073525235

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CHAPTER 2 STRATEGY AND SUSTAINABILITY

Review and Discussion Questions

1. Can a factory be fast, dependable, flexible, produce high-quality products, and still provide poor service from a customer's perspective?

Yes, if a customer's needs are not considered and does not influence strategy development, an organization could be delivering the wrong service or product. Even though the product is of high quality, delivered quickly, and offers many options and features, overall service could be rated "poor" by a customer who demands a different mix of features and attributes. It also could be a factor of how the product is delivered to the customer. Rude or inattentive salespersons, incompetent technical support, or difficulty in obtaining warranty service can all negatively impact the customer's impression of a firm's service, regardless of the ultimate quality of the goods and the speed of delivery.

2. Why should a service organization worry about being world class if it does not compete outside its own national border? What impact does the Internet have on this?

As the environment changes, firms can find themselves faced with competition from outside their industry, or from outside their home country. Even if they do not, the principles of a world-class firm can be applied to any and all manufacturing and service concerns. Benchmarking or rating your firm's performance to the best in your industry or class can provide future strategic directions for improvements.

The Internet is global by its very nature. Retail stores must now compete with Internet stores. Local auction houses will be in competition with Internet auction sites such as eBay. Virtually all organizations will be impacted in some form by the Internet. It is important that this impact be considered.

3. What are the major priorities associated with operations and supply chain strategy? How has their relationship to each other changed over the years?

The four major imperatives are cost, quality, delivery, and flexibility. In the sixties, these four imperatives were viewed from a tradeoff's perspective. For example, this meant that improving quality would result in higher cost, and in many cases that was true. However, advances in manufacturing and information technologies since then have reduced the size of those tradeoffs, allowing firms to improve on several or all of these imperatives simultaneously, gaining greater competitive advantage than was possible 50 years ago. The problem now becomes one of prioritizing and managing towards orderly improvement.

4. Find examples where companies have used features related to environmental sustainability to "win" new customers.

Car companies use environmental concerns in marketing ads. The development of hybrid and flex-fuel cars is one way they have operationalized those concerns. Consumer goods companies display the "made with recycled material" logo on the packaging. Bottled water manufacturers are using and advertising bottles made with less plastic.

5. For each of the different priorities in question 3, describe the unique characteristics of the market niche with which it is most compatible.

Cost is most compatible with products that are commodities (i.e., highly standardized products with many alternative suppliers). Quality provides companies a means of (1) differentiating a product and winning orders or (2) competing in a market and qualifying for orders. Quality is now pervasive among all market niches in that customers now expect high quality. Speed and reliability of delivery are essential in those markets where there is a large degree of customization. In addition, reliable delivery may be a competitive advantage in some regions of the world where delivery is difficult due to geographical or political reasons. Flexibility is important where customers demand low volume but wide varieties of products.

6. A few years ago the dollar showed relative weakness with respect to foreign currencies, such as the yen, mark, and pound. This stimulated exports. Why would long-term reliance on a lower valued dollar be at best a short-term solution to the competitiveness problem?

This approach is dependent on economic policies of other nations. This is a fragile dependency. A long-term approach is to increase manufacturing and service industry productivity in order to regain competitive advantage. At a national level, solutions appear to lie in reversing attitudes. At a firm level, competitive weapons are consistent quality, high performance, dependable delivery, competitive pricing, and design flexibility.

7. In your opinion, do business schools have competitive priorities? Yes. Their competitive priorities include:

Quality of professors and curriculum—consistent quality and high performance
Leader in development of new curriculum topics—design changes
Academic level of student attracted—consistent quality
Quantity and quality of research published—consistent quality
Quality of library resources—quality
What companies recruit at the school—after sales service
Success rate of graduates—consistent quality
Availability of financial aid—low price and after sales service
Cost of tuition—low price

8. Why does the “proper” operations and supply chain strategy keep changing for companies that are world-class competitors?

The top three priorities have generally remained the same over time: make it good, make it fast, and deliver it on time. Others have changed. Part of this may be explained by realizing that world class organizations have achieved excellence in these three areas and are, therefore, focusing attention on some of the more minor areas to gain competitive advantage. The changes in the minor priorities may result from recognizing opportunities or from changes in customer desires or expectations.

9. What is meant by the expressions *order winners* and *order qualifiers*? What was the order winner(s) for your last purchase of a product or service?

Order winners are dimensions that differentiate the product or service or services of one firm from another. Order qualifiers are dimensions that are used to screen a product or service as a candidate for purchase. Order qualifiers get a company’s “foot in the door.” Order winners are what make the sale. Obviously, answers will vary for the order winners from your last purchase.

10. Identify an operations and supply chain - related "disruption" that recently impacted a company. What could the company have done to have minimized the impact of this type of disruption prior to it occurring?

The March 2011 tsunami that struck Japan was geographically concentrated but had global impact on multiple firms, many of which had no physical presence at all in the affected area. Examples include firms that had sole source agreements with suppliers in the affected area. The tsunami left these companies scrambling to find new suppliers to feed into their supply chains. These firms could have reduced the impact of the tsunami by having a few high-quality, dependable suppliers located in different geographical regions. There are many other examples that could be taken from this one event. A simple Internet search will provide plenty of material for discussion.

11. What do we mean when we say productivity is a “relative” measure?

For productivity to be meaningful, it must be compared with something else. The comparisons can be either intra-company as in the case of year-to-year comparisons of the same measure, or intercompany as in the case of benchmarking. Intercompany comparisons of single factor productivity measures can be somewhat tenuous due to differences in accounting practices (especially when comparing with foreign competitors) and the balance of labor to capital resources.. Total factor productivity measures are somewhat more robust for comparison purposes.

Problems

1. As Operations Manager, you are concerned about being able to meet sales requirements in the coming months. You have just been given the following production report.

	JAN	FEB	MAR	APR
Units Produced	2300	1800	2800	3000
Hours per Machine	325	200	400	320
Number of Machines	3	5	4	4

Find the average monthly productivity (units per machine hour).

To answer this we need to realize that the measure of hours given is per machine, so we have to multiply that by the number of machines in each period to get the total machine hours in each period. Those figures are used in the calculations below.

Average productivity: $(2300/975 + 1800/1000 + 2800/1600 + 3000/1280)/4$

Average productivity $(2.36+1.80+1.75+2.34)/4= 2.06$ units per machine hour

2. Sailmaster makes high-performance sails for competitive windsurfers. Below is information about the inputs and outputs for one model, the Windy 2000.

Units sold	1,217
Sale price each	\$1,700
Total labor hours	46,672
Wage rate	\$12/hour
Total materials	\$60,000
Total energy	\$4,000

Calculate the productivity in **sales revenue/labor expense**.

We have to do some interim calculations here. Sales revenue is calculated by multiplying units sold by the unit sales price. Labor expense is calculated by multiplying labor hours by the wage rate.

$$(1217*1700) / (46672*12) = 3.69$$

3. *Live Trap Corporation* received the data below for its rodent cage production unit. Find the **total** productivity?

Output	Input	
50,000 cages	Production time	620 labor hours
Sales price: \$3.50 per unit	Wages	\$7.50 per hour
	Raw materials (total cost)	\$30,000
	Component parts (total cost)	\$15,350

Total productivity could be expressed two ways here based on how you express output: in units sold, or dollars of sales.

Units sold:

$$50,000 / ((620 * \$7.50) + 30,000 + 15,350) = 1.00 \text{ units sold per dollar input}$$

Dollars of sales:

$$(50000 * 3.5) / ((620 * \$7.50) + 30,000 + 15,350) = 3.5 \text{ dollars in sales per dollar input}$$

4. Two types of cars (Deluxe and Limited) were produced by a car manufacturer last year. Quantities sold, price per unit, and labor hours follow. What is the labor productivity for each car? Explain the problem(s) associated with the labor productivity.

	<u>QUANTITY</u>	<u>\$/UNIT</u>
Deluxe car	4,000 units sold	\$8,000/car
Limited car	6,000 units sold	\$9,500/car
Labor, Deluxe	20,000 hours	\$12/hour
Labor, Limited	30,000 hours	\$14/hour

Labor Productivity – units/hour

Model	Output in Units	Input in Labor Hours	Productivity (Output/Input)
Deluxe Car	4,000	20,000	0.20
Limited Car	6,000	30,000	0.20

Labor Productivity – dollars

Model	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Deluxe Car	4,000(\$8,000)= \$32,000,000	20,000(\$12.00)= \$240,000	133.33
Limited Car	6,000(\$9,500)= \$57,000,000	30,000(\$14.00)= \$420,000	135.71

The labor productivity measure is a conventional measure of productivity. However, as a partial measure, it may not provide all of the necessary information that is needed. For example, increases in productivity could result from decreases in quality, and/or increases in material cost.

5. A U.S. manufacturing company operating a subsidiary in an LDC (less-developed country) shows the following results:

	U.S.	LDC
Sales (units)	100,000	20,000
Labor (hours)	20,000	15,000
Raw materials (currency)	\$20,000	FC 20,000
Capital equipment (hours)	60,000	5,000

- a. Calculate partial labor and capital productivity figures for the parent and subsidiary. Do the results seem misleading?

Labor Productivity

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	20,000	5.00
LDC	20,000	15,000	1.33

Capital Equipment Productivity

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	60,000	1.67
LDC	20,000	5,000	4.00

Yes. You might expect the capital equipment productivity measure to be higher in the U.S. than in a LDC. Also, the measures seem contradictory. Each plant appears to be far more productive than the other on one measure, but much worse on the other.

- b. Compute the multifactor productivity figures for labor and capital together. Do the results make more sense?

b. Multifactor – Labor and Capital Equipment

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	20,000 + 60,000 = 80,000	1.25
LDC	20,000	15,000 + 5,000 = 20,000	1.00

Yes, labor and equipment can be substituted for each other. Therefore, this multifactor measure is a better indicator of productivity in this instance.

c. Calculate raw material productivity figures (units/\$ where \$1 = FC 10). Explain why these figures might be greater in the subsidiary.

Raw Material Productivity

Country	Output in Units	Input in Dollars	Productivity (Output/Input)
U.S.	100,000	\$20,000	5.00
LDC	20,000	FC 20,000/\$10 = \$2,000	10.00

The raw material productivity measures might be greater in the LDC due to a reduced cost paid for raw materials, which is typical of LDC's, especially if there are local sources for the raw materials.

6. Various financial data for the past two years follow. Calculate the total productivity measure and the partial measures for labor, capital, and raw materials for this company for both years. What do these measures tell you about this company?

		Last Year	This Year
Output:	Sales	\$200,000	\$220,000
Input:	Labor	30,000	40,000
	Raw materials	35,000	45,000
	Energy	5,000	6,000
	Capital	50,000	50,000
	Other	2,000	3,000

Total Productivity

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	\$200,000	\$30,000 + 35,000 + 5,000 + 50,000 + 2,000 = \$122,000	1.64
This Year	\$220,000	\$40,000 + 45,000 + 6,000 + 50,000 + 3,000 = \$144,000	1.53

Partial Measure – Labor

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	\$200,000	\$30,000	6.67
This Year	\$220,000	\$40,000	5.50

Partial Measure – Raw Materials

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	\$200,000	\$35,000	5.71
This Year	\$220,000	\$45,000	4.89

Partial Measure – Capital

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	\$200,000	\$50,000	4.00
This Year	\$220,000	\$50,000	4.40

The overall productivity measure is declining, which indicates a possible problem. The partial measures can be used to indicate cause of the declining productivity. In this case, it is a combination of declines in both labor and raw material productivity, which were somewhat offset by an increase in the capital productivity. Further investigation should be undertaken to explain the drops in both labor and raw material productivity. An increase in the cost of both of these measures, without an accompanying increase in the selling price might explain these measures.

7. An electronics company makes communications devices for military contracts. The company just completed two contracts. The navy contract was for 2,300 devices and took 25 workers two weeks (40 hours per week) to complete. The army contract was for 5,500 devices that were produced by 35 workers in three weeks. On which contract were the workers more productive?

Contract	Output in Units	Input in Hours	Productivity (Output/Input)
Navy	2300	$25(2)40 = 2000$	1.15
Army	5500	$35(3)40 = 4200$	1.31

The workers were more productive on the Army contract.

8. A retail store had sales of \$45,000 in April and \$56,000 in May. The store employs eight full-time workers who work a 40-hour week. In April the store also had seven part-time workers at 10 hours per week, and in May the store had nine part-timers at 15 hours per week (assume four weeks in each month). Using sales dollars as the measure of output, what is the percentage change in productivity from April to May?

Month	Output in Dollars	Input in Hours	Productivity (Output/Input)	Percentage Change
April	\$45,000	$(8(40)+7(10))*4 = 1560$	28.85	
May	\$56,000	1820	30.77	$(30.77-28.85)/28.85 = 6.66\%$

9. A parcel delivery company delivered 103,000 packages last year, when its average employment was 84 drivers. This year the firm handled 112,000 deliveries with 96 drivers. What was the percentage change in productivity over the two years?

Year	Output in Packages	Input in Drivers	Productivity (Output/Input)	Percentage Change
Last	103,000	84	1226.2	
This	112,000	96	1166.7	$(1166.7 - 1226.2)/1226.2 = - 4.85\%$

10. A fast-food restaurant serves hamburgers, cheeseburgers, and chicken sandwiches. The restaurant counts a cheeseburger as equivalent to 1.25 hamburgers and chicken sandwiches as 0.8 hamburger. Current employment is five full-time employees who work a 40-hour week. If the restaurant sold 700 hamburgers, 900 cheeseburgers, and 500 chicken sandwiches in one week, what is its productivity? What would its productivity have been if it had sold the same number of sandwiches (2,100), but the mix was 700 of each type?

Part	Output in Hamburger Equivalents	Input in Hours	Productivity (Output/Input)
700 Hamburgers 900 Cheeseburgers (1.25) 500 Chicken Sandwiches (.80)	2225	200	11.125
700 Hamburgers 700 Cheeseburgers (1.25) 700 Chicken Sandwiches (.80)	2135	200	10.675

Case: Timbuk2¹ - Teaching Note

You can have a lot of fun with this case. Start off by logging on to the Timbuk2 website and explore what is going on there. If you have a little money in a teaching account you might actually order a custom bag and give it away or raffle it off in class, this will really get their attention. You make a big deal of it all when the bag comes in and you give it to the lucky student. This also helps to reinforce the topic with the students.

1. Consider the two categories of products that Timbuk2 makes and sells. For the custom messenger bag, what are the key competitive dimensions that are driving sales? Are their competitive priorities different for the new laptop bags sourced in China?

This is one of the “other dimensions” and in this case it is the customization of the bag. Other than being able to get the colors they prefer, the customer also get pockets that meet the unique needs the customer has in mind. They can be successful with standardizing the laptop bags since the purpose here is pretty well defined.

2. Compare the assembly line in China to that in San Francisco along the following dimensions: (1) volume or rate of production, (2) required skill of the workers, (3) level of automation, and (4) amount of raw materials and finished goods inventory.

Dimension	China	San Francisco
Volume/rate of production	High	Low
Required skill of workers	Low	High
Level of automation	High	Low
Raw materials and finished good inventory	Low raw materials, but may have finished goods	High raw materials, virtually no finished goods

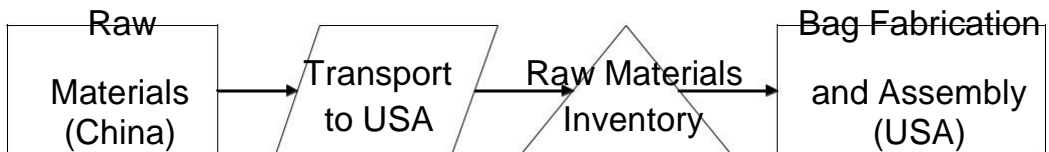
3. Draw two diagrams, one depicting the supply chain for those products sourced in China and the other depicting the bags produced in San Francisco. Show all the major steps including raw material, manufacturing, finished goods, distribution inventory, and transportation. Other than manufacturing cost, what other costs should Timbuk2 consider when making the sourcing decision?

¹ Many thanks to Kyle Cattani for the idea behind this case. He does this regularly in his MBA class at Indiana University.

Bag Fabrication and Assembly in China



Bag Fabrication and Assembly in USA



The big cost other than manufacturing is the cost to transport material to the USA versus the cost of transporting the completed bags to the USA. Here we assume that the material would be sourced in China. This is probably not a bad assumption.