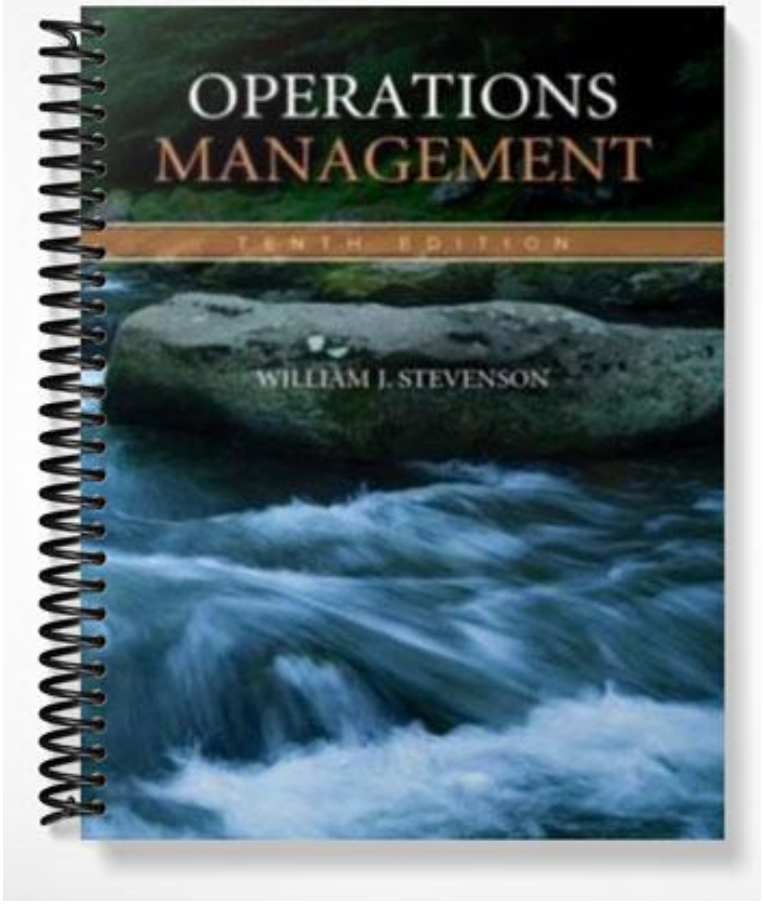
SOLUTIONS MANUAL



CHAPTER 2
COMPETITIVENESS, STRATEGY, AND PRODUCTIVITY

Teaching Notes

The topics covered in this chapter can be used to help get your course in OM off to an interesting start. Most of your students are aware that U.S. firms are having a difficult time competing with foreign firms in both the domestic and international markets. Many of them have grown up using products produced by foreign firms on an everyday basis and they have developed a great deal of respect for the quality of their products. Students are probably as familiar with names like Minolta, Honda, Toyota, Sony, BP Oil, Nestlé & BIC as they are with Ford, GM, GE, IBM, Texaco, Hershey, and Parker.

I think students will relate to the fact that companies must be productive in order to be competitive and that to be competitive they must have some well thought out approach, plan or strategy on how to achieve this position. In other words, students will be able to understand why it is important to learn what productivity really is, how we measure it, what factors affect it, and how firms can improve their productiveness. Students will become aware that business firms compete with each other in a variety of ways and will study the key competitive factors which are of primary concern in today's global business environment. Finally, the students focus on operations strategy with special attention being given to some of the newer strategies based on quality, time, and lean production systems.

Reading: Why Productivity Matters

1. Higher productivity relative to competitors is very important for a nation because it provides the nation with a competitive advantage in the marketplace. Productivity increases add value to the economy while controlling inflation. In addition, higher productivity provides the basis for a sustainable long-term growth in the economy. It allows companies to undercut competitors' prices to improve their market share, or realize higher profit margin at the same price level. Relative higher productivity also makes it more difficult for foreign companies to compete.

2. In general, service jobs have lower productivity than their manufacturing counterparts because service productivity is very difficult to measure and consequently, difficult to improve. In many cases, service jobs include intellectual activities and a high degree of variability, which makes productivity improvements difficult to achieve. Manufacturing jobs, on the other hand, lend themselves to productivity improvements mainly because they are able to utilize computer-based technology such as robotics to increase worker productivity.

3. Higher productivity allows companies to undercut competitors' prices to improve their market share, or realize higher profit margin at the same price level. Relative higher productivity also makes it more difficult for foreign companies to enter a new market because it is difficult for them to compete against companies that have relatively higher productivity.

Answers to Discussion and Review Questions

1. They would be helpful in the sense that they would give U.S. manufacturers time to step up the use of industrial robots and other measures which would make them better able to compete in domestic and world markets. The higher profits possible from reduced competition or higher prices on foreign cars could be used for research and development costs. Possible pitfalls include higher prices and less choice, which U.S. consumers would have to endure and the possibility that U.S. companies would not use this as an opportunity to improve, but merely a crutch. From the Japanese standpoint, they would be penalized for doing what many would see as a good job.

2. Business organizations compete with one another in a variety of ways. Key among them are price, quality, product differentiation, flexibility, and delivery time.

3. Characteristics such as price, quality, time, delivery speed, delivery reliability can all be order qualifiers or order winners. It is important to determine the set of order qualifier and order winner characteristics so that companies can emphasize or de-emphasize a given characteristic based on their classification of importance. Marketing must play a major role in determining order qualifiers and order winners. In classifying order winners and order qualifiers, marketing and operations must work together to match the market needs with the operational capability of the firm.

4. One store that many of us shop at is Wal-Mart. In the last decade, Wal-Mart has been steadily growing and gaining market share. There are numerous reasons why Wal-Mart has been successful in a very competitive market. Wal-Mart's ability to provide a very rich variety of goods with reasonable prices gives the company a competitive edge. Another reason involves the firm's ability to integrate various aspects of its operations with suppliers. In other words, successful supply chain management provided Wal-Mart with another competitive advantage.

   Many of us travel around the country and the world and stay at various hotels/motels. One of the hotel chains that has been successful is Super 8. The company is able to successfully compete because it is able to offer safe, clean overnight stay at very reasonable prices in small markets. The specific tactics followed by the company are consistent with the basic niche that the company has carved for itself.

5. The balanced scorecard is a top-down management system that helps managers focus attention on strategic issues related to finance, internal processes, customers, and learning and growth.

6. Strategy is the basic approach used by an organization to achieve its goal where tactics are the methods and actions are taken to accomplish strategies and carry out operations.

7. Operations strategy is the approach consistent with the organization strategy, which is used to carry out operations.

8. Time-based strategies are approaches that focus on reducing the time needed to conduct the various activities in a process. The rationale is that by reducing time, costs are generally less, productivity is higher, quality tends to be higher, product innovations appear on the market earlier, and customer service is improved.

9. a. Productivity is the ratio of output to input.

   b. Productivity measures are used to judge the effective use resources of countries, companies, and units within companies.

c. High productivity rates relative to competitors can mean competitive advantages for companies. For countries, high productivity rates can reduce the risk of inflation and generate high standards of living for the country as a whole.

d. Operations.

e. Efficiency relates to a fixed set of tools or conditions. Productivity is wider in scope. Efficiency can be improved by better use of existing labor and equipment; productivity can be improved by changing work methods, but also by changing equipment or conditions. The example of cutting grass with a pair of scissors is a good one: an efficiency approach would focus on the best way to use the scissors; a productivity approach would focus on use of a lawn mower. Note: use of a mower, while more productive than the scissors, may still have room for improvement in its efficiency.

10. Factors affecting productivity: methods, capital, quality, technology, and management.

Ways productivity can be improved: productivity measures for all operations, elimination of bottlenecks, soliciting ideas from workers, formation of work teams, study other firms, reexamination of work methods, establishment of reasonable goals for improvement, support from management, measure, reward, and publicize improvements, and finally, don't confuse productivity with efficiency since productivity is a much broader concept than efficiency.

11. The Japanese worker is probably working smarter if not harder than U.S. workers. By working smarter we mean the Japanese are using more productive work methods than American workers. One way the Japanese accomplish this is to use time-based strategies that focus on reducing the time needed to accomplish various tasks. Some of the areas in which their organizations benefit from time reduction are planning time, design time, processing time, changeover time, delivery time, and response time for complaints.

12. It appears that Boeing can concentrate on selling its smaller airplanes in larger volumes to smaller airline companies. The advantage of producing smaller airplanes is the fact that we can produce relatively large quantities at a lesser cost. The disadvantage of producing smaller airplanes is that most likely, the profit margin is less and larger quantities must be sold to generate the same income as when smaller quantities of larger airplanes are produced. The advantage of producing larger airplanes is that most likely the profit margin is higher and the Airbus company can afford to produce a smaller quantity of large airplanes to generate the same income as when larger quantities of smaller airplanes are produced by the rival company.

13. a. Interest rate on savings.

b. Interest rate on checking and CDs.

c. Loan rates.

d. Quick loan application processing.

e. No fees or low fee values (free checking, no or low ATM fees).

f. Number of branches and locations to make it more convenient for the customers.

g. Free on-line banking.

h. Extended hours of service.

i. Extra services.

j. Lower minimum deposit before charging a service fee.

14. Technology usually works best when processing requirements are uniform. Therefore, reducing the variability provides more opportunities for implementing technology.

15. Answers will vary.

Taking Stock

1. Top and senior management should be involved in formulating organizational strategy. However, the opinions of middle and lower management people should be sought in developing organizational strategy.

2. Competitive trade-offs that may arise in a fast-food restaurant include: price vs. quality, cost vs. customer service. (If we have too few cashiers, customer waiting times will increase and subsequently the service level will decrease. On the other hand, if we have too many cashiers, the server idle time will increase which in turn will result in unnecessarily high labor costs and lower productivity.)

3. a. Technology can improve competitiveness by improved product and service offerings, improved more efficient processing, better Web site, faster more efficient order processing, better communication, easier and more effective coordination of supply chains, automatic billing, and automatic error checking.

   b. Computers and the related automation of various company or manufacturing functions and the Internet can assist in improving productivity.

Critical Thinking Exercise

1. Pepsi seeks to take advantage of the current push to reduce calories, while Coke seeks to recapture demand of its classic offering.

2. The automated processing would give a much higher labor productivity ratio than the manual processing. Use multi-factor productivity for a more meaningful measure.

3. Focusing solely on efficiency may result in overlooking potential major productivity gains that could be achieved by altering inputs, rather than simply refining methods to achieve relatively modest gains.

4. The "productivity paradox" refers to massive investment in information technology that occurred in the latter part of the last century that did not appear to result in productivity gains. However, since that time, there have been consistent annual gains in productivity, perhaps due in part, the IT investments.

5. a. Some examples of businesses that would see global warming as a threat due to new and more costly regulations include companies that pollute the atmosphere (coal-fired electric generating plants), building trades (stricter building codes), farming operations, and transporting.

   b. Businesses that would see opportunities in global warming would probably not relate to the warming itself (only a degree or so over a long period), but to regulations imposed by government or pressures for companies to operate sustainably. Thus, some examples of companies that might benefit those involved in building construction, pollution controls, energy saving devices (e.g., appliance makers and sellers, autos with good gas mileage, fluorescent lighting, etc.) public transit, and recycling. (Note that some of these are on the list of those who would see global warming as a threat.)

Memo Writing Exercises

1. Emphasis must be placed on calming fears of employees concerning layoffs first. Remember that individuals are concerned about themselves, so explain the company's strategy on avoiding layoffs because of productivity gains. Be honest and do everything you can to build trust. Don't promise things you can't deliver. Remember, there are many ways to improve productivity and many are subtler than others. Also remember that you are in it for the long haul, which means continuous improvement on a daily basis and that attrition may solve many of your layoff problems from an individual perspective. Emphasize how being more productive will make the company more productive and hence more competitive and will result in the greatest good for the greatest number in the future. Think about a plan to share the company's gains with your employees and make the rewards as immediate as possible.

2. Universities may offer some accommodations that might fit this situation quite well. Some state park systems offer some good deals during the off-season for programs like this and make good environments for such programs with their natural settings.

Solutions

1. a. Anniversary = 40 meals/worker; Wedding = 40 meals/worker
   b. Possible differences in the: menu, number of courses, time of day, facilities, and worker skills/experience

2.

Week	Crew Size	Yards Installed	Labor Productivity
1	4	96	24 yards
2	3	72	24
3	4	92	23
4	2	50	25
5	3	69	23
6	2	52	26

A crew of 2 seems to work best.

3.

(1) Week	(2) Output	(3) Worker Cost@ $12x40	(4) Overhead Cost @1.5	(5) Material Cost@$6	(6) Total Cost	(7) MFP (2) ÷ (6)	Consider standard price* (7)x$140
1	30,000	2,880	4,320	2,700	9,900	3.03	424.24
2	33,600	3,360	5,040	2,820	11,220	2.99	419.25
3	32,200	3,360	5,040	2,760	11,160	2.89	403.94
4	35,400	3,840	5,760	2,880	12,480	2.84	397.12

*refer to solved problem #2

Multifactor productivity dropped steadily from a high of 3.03 to about 2.84.

4. a. Before: 80 ÷ 5 = 16 carts per worker per hour.

   After: 84 ÷ 4 = 21 carts per worker per hour.

   b. Before: $10 x 5 = $50 + $40 = $90; hence 80 ÷ $90 = .89 carts/$1.

   After: $10 x 4 = $40 + $50 = $90; hence 84 ÷ $90 = .93 carts/$1.

   c. Labor productivity increased by 31.25% (5/16).

   Multifactor productivity increased by 4.5% (.04/.89).

5. Without scrap the output can be 80 pieces per hour

$$\frac{72}{1-.10} = 80 \text{ pieces per hour}$$

$$(80 \text{ pieces per hour}) \text{ x } (100\% - 10\%) = 72 \text{ pieces per hour}$$

The increase in productivity would be 80 – 72 = 8 pieces per hour.

This would amount to an increase of (8 / 72) = 11.1%.

Solutions (continued)

6. Current period productivity = $\frac{160 \text{ units}}{40 \text{ hrs.}} = 4 \text{ units / hr.}$

Previous period productivity = $\frac{138 \text{ units}}{36 \text{ hrs.}} = 3.83 \text{ units / hr.}$

$$\text{Productivity Growth} = \frac{\text{Current Period Productivity} - \text{Previous Period Productivity}}{\text{Previous Period Productivity}}$$

$$\text{Productivity Growth} = \frac{(4 \text{ units / hr.}) - (3.83 \text{ units / hr.})}{3.83 \text{ units / hr.}} = +.043$$

Thus, there was an increase of 4.3% in productivity.

7. a.

(1) Unit	(2) Employees	(3) Customers processed	(4) Labor Cost@$25	(5) Material Cost@$5	(6) Overhead @1	(7) Total Cost	(8) LP (3) ÷ (2)	(9) MFP (3) ÷ (7)
A	4	36	800	180	800	1,780	9	.020
B	5	40	1,000	200	1,000	2,200	8	.018
C	8	60	1.600	300	1,600	3,500	7.5	.017
D	3	20	600	100	600	1,300	6.7	.015

b.

(1)	(2)	(3) Customers	(4) Labor	(5) Material	(6) Overhead	(7) Total	(8) LP	(9) MFP

Unit	Employees	processed	Cost@$25	Cost@$5	@1	Cost	(3) ÷ (2)	(3) ÷ (7)
A	4	40	800	200	800	1,800	10	.0222
B	5	45	1.000	225	1,000	2,225	9	.0202
C	8	68	1,600	340	1,600	3,540	8.5	.0192
D	3	23	600	115	600	1,315	7.7	.0175

	Labor	MFP
A	10	.0222
B	9	.0202
C	8.5	.0192
D	7.7	.0175

8.

Approach	Average Time	Cost	Productivity per Dollar Input
Current	40	40 x $2 = $80	$400/$80 = $5
Company A	30	30 x $2 + $3.50 = $63.50	$400/$63.60 = $6.30
Company B	28	28 x $2 + $3.60 = $59.60	$400/$59.60 = $6.71

9.

$$\text{MFP} = \frac{3000(3)(\$70)(.04)}{3(40)(\$25) + \$1{,}000 + \$9{,}000} = \frac{\$25{,}200}{\$13{,}000} = 1.94.$$

Case: An American tragedy; how a good company died

1. Any manufactured item is either made by a machine tool or by a machine made by a machine tool.

2. One possible strategy would have been to have a person who had extensive experience in the field, and a background in operations, run the company. This would have alleviated some of the production issues, and possible have made the company more competitive. Another would have been to seek government help more aggressively to level the playing field.

Case: Home-Style Cookies

1. A batch process is used. A worker checks the master list for ingredients, and enters that information into the computer. The computer determines ingredient quantities, and then automatically orders the ingredients, which are automatically sent to mixing machines. After mixing, the batter is poured into a cutting machine. Individual cookies are then dropped onto a continuous band and transported through an oven. Filled cookies require an extra step. After baking, cookies are cooled on a spiral cooling rack. Cookies are inspected, defectives are removed and the remaining cookies are packaged and labeled.
2. The use of automation in the mixing process resulted in a reduction in waste; cookies are cut on a diagonal; and the company recently increased the length of its ovens (i.e., more cookies can be baked at the same time).
3. All companies have a moral obligation to their employees. Small companies with local owners, particularly in a small community, are more likely to be influenced by such considerations than large companies, in large communities, even with local owners, and even less likely to be influenced if owners are distant, or uninvolved in operations. The issue is a difficult one, often without easy solutions. Cost and efficiency may favor layoffs, but ill will and the effects on morale of employees that remain are important considerations.
4. Freshness of cookies, frequent changes of label requirements, and baking to customer order are factors that favor minimal inventories. Benefits include lower inventory costs, satisfied customers (due to freshness of product), and less need for storage space.
5. Freshness, list of ingredients, packaging/display, appearance of product (size, shape, color), taste.
6. By not using preservatives, the product probably appeals to health-conscious buyers, and there are fewer ingredients to purchase, store, and mix, but without preservatives, the shelf life is limited.
7. The company's strategy is to provide a high quality ("good food") cookie that appeals to a particular market niche.

Case: Hazel Revisited

1. Her customers are her neighbors and friends. She has had personal relationships with many of her customers for years and they are going to want to help her as long as she does a good job.
2. a. By increasing her productivity, Hazel can mow more lawns over a given length of time such as day, week and/or month and increase her total revenue. Hence, if she maintains her present cost structure per lawn she will increase profits.

   b. By improving her mowing technique.

   By investing in more productive equipment.

   By experimenting with different crew sizes to find the most productive combination or division of labor.
3. She should consider time, cost and competition.
4. The advantages would be greater market share, higher sales opportunity, economies of scale, and higher utilization of the equipment. The disadvantages of expanding include additional transportation time and cost and increased wear and tear on the equipment.

5. a. There will be many people who would defend this statement and many successful small businesses are successful without mission statements and objectives. However, it is difficult to project how much improvement could be made if they did have them and used them to provide better direction, guidance, and focus. Short-run results may not be apparent but over a longer period of time, gradual and subtler improvements may become noticeable and even dramatic improvements can take place in the long run.

   b. The development of the mission statement would force Hazel to sit down and spend some time determining what business she is in or wants to be in and her business' reason for existence. This process should also help Hazel develop a clear statement of purpose which should serve as a guide in determining what she wants to accomplish in terms of goals and objectives for her business. From here, Hazel should find it easier to develop her strategy and plan how she is going to achieve her goals and objectives. This process will also assist her in gaining the proper focus for making decisions.

   c. Many people have the false impression that mission statements and goal setting are only for large organizations when the facts show that many small businesses fail because they really don't know what business they are in. Strategic planning on how you are going to accomplish your goals and objectives is just as important for the small business as it is for the large one and it is extremely important for the new small business, which desperately needs direction and guidance in the beginning.

Case- Your Garden Gloves

1. A crew size of 2 had the highest productivity, and a crew size of 3 had the lowest. Crews probably work best in pairs, which may be why a crew size of 3 had the lowest productivity. Also, four workers might had gotten in each other's way, or offered more of a distraction.
2. Even though the productivity of 4 isn't the highest, the total time to complete the cleanup will still be much less than if only a crew of 2 were to be used.
3. Perhaps the size of the crew is not as influential in regard to productivity levels as is the composition of the crew. One area that the productivity ratios fail to accommodate for is team synergy.

Operations Tour—The U.S. Postal Service

1. The U.S. Postal Service is a very large organization and processes a large volume of mail using very expensive sorting, scanning and barcoding equipment. Since this equipment and machinery are designed to process very large volumes of mail, if the Postal System does not have large volumes of mail to process, its productivity will decline.

2. The new automated processing equipment, optical readers, and barcode readers resulted in improvements in productivity. In addition, reorganization efforts, which included elimination of layers of management, overhead positions, and certain programs resulted in significant cost reductions, which also contributed to the improvement of productivity.

3.

4. Delivery companies such as FedEx and UPS that offer speedy delivery and package tracking gave businesses and individual customers an alternative besides the U.S. Postal Service. In addition, electronic communication, e-mails, and fax machines provided alternative means of communication for individuals and businesses that reduced U.S. Postal System's demand. Instead of direct-mail advertising, many companies began to use cable TV advertising because cable TV advertising had become more affordable for small and medium size companies.

5. The U.S. Postal Service developed the following strategies to become more competitive against the new threats it was facing:

   a. Reorganization—elimination of layers of management and overhead positions, elimination of certain programs.

   b. Seeking ways to reduce costs and eliminate waste.

   c. Emphasizing quality, customer service and customer convenience.

6. The changes helped the U.S. Postal Service to reduce its costs, attract new businesses, improve its productivity and reduce its projected deficits.

7. The increased use of e-mail will result in reduction of using traditional mailing, which in turn will reduce the demand for the U.S. Postal System, resulting in a possible decline in its productivity.