Solutions Manual

Chapter 2: Operations and Supply Chain Strategies

1. Corporate strategy addresses improving economic performance of the firm and value creation for the shareholders. It can be argued that the triple bottom line takes a longer term and more inclusive perspective of value that is not as easily quantified but no less impactful than traditional measures.
Cognitive Domain: Knowledge
Difficulty Level: Easy

2. Adidas includes among itsguiding principles, "We are a global organisation that is socially and environmentally responsible, that embraces creativity and diversity and is financially rewarding for our employees and shareholders." Adidas's other four principles address strengthening their brand, providing continuous improvement for the customer, helping athletes achieve peak performance, and delivering outstanding financial results. These goals appear to be wellconsidered and in no need of modification at this time.
Cognitive Domain: Analysis
Difficulty Level: Medium

3. Boeing's customers include airlines and the flying public. Their core competencies include designing and customizing aircraft and multisourcing. Boeing's operational critical success factors are flexibility (each plane is a snowflake) and coordination of a complex international supply chain. Their product factors recognize that they are dealing with a mature, high-tech product for which traceability is mandated by regulatory agencies. This product must deliver value to industry customers that have historically had thin margins.
Cognitive Domain: Analysis
Difficulty Level: Medium

4. The extra revenue potential from an early start to the Christmas shopping season must be balanced against the disruption in workers' lives as they are scheduled to work on a traditional holiday. Exposure on social media may drive some customers to the store and drive others away.
Cognitive Domain: Analysis
Difficulty Level: Medium

5. These answers are from the perspective of a U.S. company: a) might impact choices for outsourcing services; b) could delay implementation of green/sustainability initiatives; c) imports may be cheaper so increased outsourcing a possibility; d) could accelerate green/sustainability initiatives; e) could delay implementation of system requiring extensive training or social media components; f) for companies just over the 50-worker level, there might be an incentive to downsize via outsourcing or automation.
Cognitive Domain: Analysis
Difficulty Level: Medium

6. Examples include the following: employees' ability to rapidly design and program; company's ability to partner with streaming services; rollout of super-high-speed Internet in select metropolitan areas; accessibility of broadband in more rural areas; acceptance and adoption of near-universal gaming platform and/or operating system.
Cognitive Domain: Application
Difficulty Level: Medium

7a. In Week 7, labor productivity is 54/2=27 tiles/worker.
7b. The floors may have different layouts that require trimming many or very few tiles; some jobs may require patterns rather than just one color tile; accessibility of power, water, or other on-site considerations may facilitate installation in some cases.
Cognitive Domain: Application
Difficulty Level: Medium

8.
$$Birthday\ Party = \frac{150 \times \$10}{\$450 + 50 \times \$10} = \$1.58 \ ; \ Wedding\ Reception = \frac{200 \times \$40}{\$2400 + 80 \times \$10} = \$2.50 ;$$

$$Graduation\ Party = \frac{120 \times \$12}{\$720 + 40 \times \$10} = \$1.29$$

$$Anniversary\ Celebration = \frac{140 \times \$15}{\$140 + 50 \times \$10} = \$1.11$$

Udupi charges the wedding reception client significantly more per plate. On a number-of-meals-served-per-labor-hour basis, the wedding reception is actually the least productive service. For the other three events, the material cost is the factor that makes them more productive or less productive.
Cognitive Domain: Application
Difficulty Level: Medium

9a.
$$US\ Labor = \frac{\$2,500,000}{\$300,000} = 8.33; \ India\ Labor = \frac{\$1,800,000}{\$350,000} = 5.14$$

$$US\ Materials = \frac{\$2,500,000}{\$170,000} = 14.71; \ India\ Materials = \frac{\$1,800,000}{\$120,000} = 15.00$$

$$US\ Equipment = \frac{\$2,500,000}{\$360,000} = 3.01; \ India\ Equipment = \frac{\$1,800,000}{\$200,000} = 2.69$$

Material productivity is nearly identical, but U.S. labor productivity is almost 40% higher, while Indian equipment productivity is 30% higher. Labor productivity may be driven by workforce skill or education, and equipment productivity may be a result of plant modernization, plant layout, or the general level of prices in each country.
9b.

$$US\ Multifactor = \frac{\$2,500,000}{\$300,000 + \$170,000 + \$360,000} = 3.01$$

$$India\ Multifactor = \frac{\$1,800,000}{\$350,000 + \$120,000 + \$200,000} = 2.69$$

Multifactor productivity gives a complete picture and compensates for substitution effects of labor versus capital.
Cognitive Domain: Application
Difficulty Level: Medium

10.

$$August = \frac{\$50,000}{4 \times (10 \times 40 + 6 \times 15)} = \$25.51$$

$$September = \frac{\$62,000}{4 \times (8 \times 40 + 8 \times 10)} = \$32.29$$

$$Productivity\ Increase = \frac{\$32.29 - \$25.51}{\$25.51} = 26.58\%$$

Cognitive Domain: Application
Difficulty Level: Medium

11.

$$Labor\ Productivity = \frac{output}{labor\ hours} = \frac{42}{120 \times workers}$$

$$0.24 = \frac{42}{120 \times workers}$$

$$workers = \frac{42}{120 \times 0.24} = 1.46$$

Cognitive Domain: Application
Difficulty Level: Medium

12.

$$Labor\ Productivity = \frac{output}{labor\ hours} = \frac{280,000\ tiles\,/\,year}{12\ mo\,/\,yr \times 160\ hr\,/\,mo \times workers}$$

$$0.08\ tiles\,/\,hr = \frac{280,000\ tiles\,/\,yr}{12\ mo\,/\,yr \times 160\ hr\,/\,mo \times workers}$$

$$workers = \frac{280,000}{12 \times 160 \times 0.08} = 1823$$

Cognitive Domain: Application
Difficulty Level: Medium

13.

Partial Labor Productivity: $\dfrac{150,000 \text{ units}}{12,000 \text{ hours}} = 12.5$ units/hr

Partial Machine Productivity: $\dfrac{150,000 \text{ units}}{6,000 \text{ hours}} = 25$ units/hr

Multifactor Productivity: $\dfrac{150,000 \text{ units}}{12,000 \times \$20 + 6,000 \times \$15 + \$50,000 + \$18,000 \text{ hours}} = .38$ units/\$

Cognitive Domain: Application
Difficulty Level: Medium

14abc.

	Chennai	*Shanghai*	*Brussels*	*Sharjah*
Finished goods in units	15,000	11,000	5,000	8,000
Work-in-process in units	1,500	2,000	700	1800
Labor costs	$10,000	$12,000	$7000	$8000
Material costs	$45,000	$50,000	$60,000	$64, 000
Energy costs	$7,000	$9,000	$10,000	$5,000
Transportation costs	$5,000	$7,500	$11,000	$6,000
Overhead costs	$4,000	$5,500	$8,000	$6,500
Labor Productivity (units/$)	*1.5*	*0.92*	*0.71*	*1.00*
Multifactor Productivity (units/$)	*0.21*	*0.13*	*0.05*	*0.31*

Brussels has the lowest levels of both labor and multifactor productivity.
Cognitive Domain: Application
Difficulty Level: Medium

15.

	2013	*2014*	
Number of units produced	10,000	11,000	
Labor hours used	3000	2900	
Machine hours used	1,000	1,200	
Materials used (pounds)	500	450	
Energy (BTU)	40,000	29,000	*% Improvement*
Labor productivity (units/labor hour)	*3.33*	*3.79*	*13.79%*
Machine productivity (units/machine hour)	*10.00*	*9.17*	*-8.33%*
Material productivity (units/pound)	*20.00*	*24.44*	*22.22%*
Energy productivity (units/BTU)	*0.25*	*0.38*	*51.72%*

Energy productivity shows the greatest percentage improvement.
Cognitive Domain: Application
Difficulty Level: Medium

16.

2013: $\dfrac{10,000 \text{ units}}{3,000\times\$12+1,000\times\$8+500\times\$6+40,000\times\$0.6}=0.141\text{units/\$}$

2014: $\dfrac{11,000 \text{ units}}{2,900\times\$12+1,200\times\$8+450\times\$6+29,000\times\$0.6}=0.171\text{units/\$}$

The percentage change in productivity $= \dfrac{0.17-0.14}{0.14} = 21.43\%$

Cognitive Domain: Application
Difficulty Level: Medium

17.

$\dfrac{\$5\times100+\$3\times50}{40\times10}=1.625\ \$/hour\ -or-\ \dfrac{\$5\times100+\$3\times50}{40\times10\times\$15}=0.11\ \$/\$$

Cognitive Domain: Application
Difficulty Level: Medium

18a. For May: $hours = \dfrac{output}{workers\times labor\ productivity} = \dfrac{5000}{250\times.08} = 250$

18b. For June: $hours = \dfrac{output}{workers\times labor\ productivity} = \dfrac{5000}{250\times.10} = 200$

Cognitive Domain: Application
Difficulty Level: Medium