Solutions Manual

Chapter 2: Operations Strategy and Competitiveness

1. Two workers have the job of placing plastic labels on packages before the packages are shipped out. The first worker can place 1000 labels in 30 minutes. The second worker can place 850 labels in 20 minutes. Which worker is more productive?

   Answer:

   $$\text{Productivity of worker 1} = 1000 \text{ labels} / 30 \text{ minutes}$$
   $$= 33.3 \text{ labels per minute}$$

   $$\text{Productivity of worker 2} = 850 \text{ labels} / 20 \text{ minutes}$$
   $$= 42.5 \text{ labels per minute}$$

   Worker 2 is more productive.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 2 minutes

2. Last week a painter painted four houses in three days. This week she painted six houses in four days. In which week was the painter more productive?

   Answer:

   $$\text{Productivity in week 1} = 4 \text{ houses} / 3 \text{ days} = 1.33 \text{ houses per day}$$

   $$\text{Productivity in week 2} = 6 \text{ houses} / 4 \text{ days} = 1.5 \text{ houses per day}$$

   The painter was more productive in week 2.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 2 minutes

3. One type of bread-making machine can make six loaves of bread in five hours. A new model of the machine can make four loaves in two hours. Which model is more productive?

   Answer:
   $$\text{Productivity of old model machine} = 6 \text{ loaves} / 5 \text{ hours} = 1.2 \text{ loaves per hour}$$

   $$\text{Productivity of new model machine} = 4 \text{ loaves} / 2 \text{ hours} = 2.0 \text{ loaves per hour}$$

   The new model is more productive.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 2 minutes

4. A company that makes kitchen chairs wants to compare productivity at two of its facilities. At facility #1, five workers produced 225 chairs. At facility #2, six workers produced 263 chairs during the same time period. Which facility was more productive?

   Answer:
   $$\text{Productivity at facility \#1} = 225 \text{ chairs} / 5 \text{ workers} = 45 \text{ chairs per worker}$$

   $$\text{Productivity at facility \#2} = 263 \text{ chairs} / 6 \text{ workers} = 43.8 \text{ chairs per worker}$$

   Facility #1 was more productive.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 2 minutes

5. A painter is considering using a new high-tech paint roller. Yesterday he was able to paint three walls in 45 minutes using his old method. Today he painted two walls of the same size in 20 minutes. Is the painter more productive using the new paint roller?

   Answer:
   $$\text{Productivity using old method} = 3 \text{ walls} / 45 \text{ minutes} = 0.07 \text{ walls per minute}$$

   $$\text{Productivity using new method} = 2 \text{ walls} / 20 \text{ minutes} = 0.10 \text{ walls per minute}$$

   The painter is more productive using the new paint roller.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 2 minutes

6. Aztec Furnishings makes hand-crafted furniture for sale in its retail stores. The furniture maker has recently installed a new assembly process, including a new sander and polisher. With this new system, production has increased to 95 pieces of furniture per day from the previous 55 pieces of furniture per day. The number of defective items produced has dropped from 8 pieces per day to 2 per day. The production facility operates strictly eight hours per day. Evaluate the change in productivity for Aztec using the new assembly process.

   Answer:
   Using only the non-defective production, productivity has increased from (55 – 8) = 47 pieces per day to (95 – 2) = 93 pieces per day.
   Change in productivity = (93 – 47)/47 × 100% = 97.9%
   There is a 97.9% increase in productivity using the new assembly process.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 3 minutes

7. Howard Plastics produces plastic containers for use in the food packaging industry. Last year its average monthly production included 20,000 containers produced using one shift five days a week with an eight-hour-a-day operation. Of the items produced 15 percent were deemed defective. Recently, Howard Plastics has implemented new production methods and a new quality improvement program. Its monthly production has increased to 25,000 containers with 9 percent defective.
   a) Compute productivity ratios for the old and new production system.
   b) Compare the changes in productivity between the two production systems.

   Answer:
   a) Using only the nondefective production, productivity increased from (20,000 × 0.85) = 17,000 units/month to (25,000 × 0.91) = 22,750 units/month.
   b) Change in productivity = (22,750 – 17,000)/17,000 × 100% = 33.8%

   There is a 33.8% increase in productivity using the new production method.
   Section: Productivity
   Subsection: Interpreting Productivity Measures
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 4 minutes

8. Med-Tech labs is a facility that provides medical tests and evaluations for patients, ranging from analyzing blood samples to performing magnetic resonance imaging (MRI). Average price to patients is $85 per patient. Labor costs average $18 per patient, materials costs are $22 per patient, and overhead costs are averaged at $20 per patient.
   a) What is the multifactor productivity ratio for Med-Tech? What does your finding mean?
   b) If the average lab worker spends four hours for each patient, what is the labor productivity ratio?

   Answer:
   a) Multifactor productivity = $85/($18 + $22 + $20) = 1.42

   This means that the lab is charging approximately 42% over the expenses of labor, materials, and overhead.
   b) Labor productivity = $85/4 hours = $21.25 per hour
   Section: Productivity
   Subsection: Measuring Productivity
   LO: 2.5 Define productivity and identify productivity measures.
   Bloom's: Application
   AACSB: Analytic
   Time on task: 4 minutes

9. Handy-Maid Cleaning Service operates five crews with three workers per crew. Different crews clean a different number of homes per week and spend a differing amount of hours. All the homes cleaned are about the same size. The manager of Handy-Maid is trying to evaluate the productivity of each of the crews. The following data have been collected over the past week.

Work Crew	Hours	Homes Cleaned
Anna, Sue, and Tim	35	10
Jim, Jose, and Andy	45	15
Dan, Wendy, and Carry	56	18
Rosie, Chandra, and Seth	30	10
Sherry, Vicky, and Roger	42	18

Assuming the quality of cleaning was consistent between crews, which crew was most productive?

Answer:
Productivity of Anna, Sue, and Tim = 10 homes/35 hours = 0.29 homes/hour
Productivity of Jim, Jose, and Andy = 15 homes/45 hours = 0.33 homes/hour
Productivity of Dan, Wendy, and Carry = 18 homes/56 hours = 0.32 homes/hour
Productivity of Rosie, Chandra, and Seth = 10 homes/30 hours = 0.33 homes/hour
Productivity of Sherry, Vicky, and Roger = 18 homes/42 hours = 0.43 homes/hour
The crew of Sherry, Vicky, and Roger was the most productive.
Section: Productivity
Subsection: Interpreting Productivity Measures
LO: 2.5 Define productivity and identify productivity measures.
Bloom's: Application
AACSB: Analytic
Time on task: 5 minutes

10. Two nurses must each visit and attend to patients in the main hospital. The first nurse, on average, can visit 50 patients in an 8-hour day. The second nurse tends to work double shifts, and, on average, cares for 96 patients during the 15 hours she is working. Which nurse is more productive?

    Answer:

    $$\begin{aligned} \text{Productivity of nurse 1} &= 50 \text{ patients} \ / \ 8 \text{ hours} \\ &= 6.25 \text{ patients per hour} \end{aligned}$$

    $$\begin{aligned} \text{Productivity of nurse 2} &= 96 \text{ patients} \ / \ 15 \text{ hours} \\ &= 6.40 \text{ patients per hour} \end{aligned}$$

    Nurse 2 is more productive.
    Section: Productivity
    Subsection: Interpreting Productivity Measures
    LO: 2.5 Define productivity and identify productivity measures.
    Bloom's: Application
    AACSB: Analytic
    Time on task: 2 minutes

11. A gallery owner typically sells 10 works of art per month. If she invests in a pop-up gallery for 14 days in a local mall, she expects to sell 8 works of art. Would she be more productive if she invested in a pop-up gallery presence?

    Answer:
    Productivity of traditional gallery = 10 works of art / 30 days = 0.33 works of art per day or approximately one work of art every 3 days.
    Productivity of pop-up gallery = 8 works of art / 14 days = 0.57 works of art per day or approximately one work of art every 2 days.
    Section: Productivity
    Subsection: Interpreting Productivity Measures
    LO: 2.5 Define productivity and identify productivity measures.
    Bloom's: Application
    AACSB: Analytic
    Time on task: 2 minutes

12. Tech-Ed Source is a company that administers standardized certification tests in the information technology field. Those who pass obtain industry certifications that are important for advancement in their field. Average cost to test-takers is $50 per test. Labor costs for the testing facility averages $10 per test, materials costs are $5 per test-taker, and overhead costs are averaged at $15 per test-taker.
    a) What is the multifactor productivity ratio for Tech-Ed Source? What does your finding mean?
    b) If the average facility proctor spends two hours on each test-taker, what is the labor productivity ratio?

    Answer:
    a) Multifactor productivity = $50/($10 + $5 + $15) = $1.67
    This means that the company is charging approximately 67% over the expenses of labor, materials, and overhead.
    b) Labor productivity = $50/2 hours = $25 per hour
    Section: Productivity
    Subsection: Interpreting Productivity Measures
    LO: 2.5 Define productivity and identify productivity measures.
    Bloom's: Application
    AACSB: Analytic
    Time on task: 2 minutes

