



# International Logistics part I

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FACTOR (CRITERION)*	IMPORTANCE WEIGHT	OUTSOURCE PROVIDERS		
		BIM (U.S.)	S.P.C. (INDIA)	TELCO (ISRAEL)
1. Can reduce operating costs	.2	.2 × 3 = .6	.2 × 3 = .6	.2 × 5 = 1.0
2. Can reduce capital investment	.2	.2 × 4 = .8	.2 × 3 = .6	.2 × 3 = .6
3. Skilled personnel	.2	.2 × 5 = 1.0	.2 × 4 = .8	.2 × 3 = .6
4. Can improve quality	.1	.1 × 4 = .4	.1 × 5 = .5	.1 × 2 = .2
5. Can gain access to technology not in company	.1	.1 × 5 = .5	.1 × 3 = .3	.1 × 5 = .5
6. Can create additional capacity	.1	.1 × 4 = .4	.1 × 2 = .2	.1 × 4 = .4
7. Aligns with policy/philosophy/culture	.1	.1 × 2 = .2	.1 × 3 = .3	.1 × 5 = .5
Total Weighted Score		3.9	3.3	3.8

\*These seven major criteria are based on a survey of 165 procurement executives, as reported in J. Schildhouse, *Inside Supply Management* (December 2005): 22–29.

# Productivity labor exercise

- ▶ Productivity can be measured in a variety of ways, such as by labor, capital, energy, material usage, and so on.
- ▶ At Modern Lumber, Inc., **Art Binley, president and producer of apple crates** sold to growers, has been able, with his current equipment, to produce 240 crates per 100 logs. He currently purchases 100 logs per day, and each log requires 3 labor-hours to process. He believes that he can hire a professional buyer who can buy a better-quality log at the same cost. If this is the case, he can increase his production to 260 crates per 100 logs. His labor-hours will increase by 8 hours per day.
- ▶ **What will be the impact on productivity (measured in crates per labor-hour) if the buyer is hired?**

# At stake

Hau Lee Furniture, Inc., spends 60% of its sales dollars in the supply chain and has a current gross profit of \$10,000. Hau wishes to increase gross profit by \$5,000 (50%). He would like to compare two strategies:

## **reducing material costs vs. increasing sales**

The current material costs and production costs are 60% and 20%, respectively, of sales dollars, with fixed cost at a constant \$10,000. Analysis indicates that an improvement in the supply chain that would reduce material costs by 8.3% ( $\$5,000/\$60,000$ ) would produce a 50% net profit gain for Hau, whereas a much larger 25% increase in sales ( $\$25,000/\$100,000$ ) would be required to produce the same result.

	CURRENT SITUATION	SUPPLY CHAIN STRATEGY	SALES STRATEGY
Sales	\$100,000	\$100,000	\$125,000
Cost of materials	\$60,000 (60%)	\$55,000 (55%)	\$75,000 (60%)
Production costs	\$20,000 (20%)	\$20,000 (20%)	\$25,000 (20%)
Fixed costs	\$10,000 (10%)	\$10,000 (10%)	\$10,000 (8%)
Profit	\$10,000 (10%)	\$15,000 (15%)	\$15,000 (12%)

# And PRODUCTIVITY....

- ▶ Art Binley has decided to look at his productivity from a multifactor (total factor productivity) perspective.
- ▶ To do so, he has determined his labor, capital, energy, and material usage and decided to use dollars as the common denominator.
- ▶ His total labor-hours are now 300 per day and will increase to 308 per day. His capital and energy costs will remain constant at \$350 and \$150 per day, respectively. Material costs for the 100 logs per day are \$1,000 and will remain the same. Because he pays an average of \$10 per hour (with fringes), Binley determines his productivity increase as follows ...

# Productivity Measures

## OM Explorer

### Tutor 1.1—Productivity Measures

The state ferry service charges \$18 per ticket plus a \$3 surcharge to fund planned equipment upgrades. It expects to sell 4,700 tickets during the eight-week summer season. During that period, the ferry service will experience \$110,000 in labor costs. Materials required for each passage sold (tickets, a tourist-information sheet, and the like) cost \$1.30. Overhead during the period comes to \$79,000.

- a. What is the multifactor productivity ratio?
- b. If ferry-support staff work an average of 310 person-hours per week for the 8 weeks of the summer season, what is the labor productivity ratio? Calculate labor productivity on an hourly basis.

# Productivity Measures

## Tutor 1.1—Productivity Measures

Place cell pointer on green shaded areas to examine formulas.

a. Multifactor productivity is the ratio of the value of output to the value of input.

Step 1. Enter the number of tickets sold during a season, the price per ticket, and the surcharge per ticket. To compute value of output, multiply tickets sold by the sum of price and surcharge.

Tickets sold:	4,700	Value of output:	\$98,700	
Price:	\$18			
Surcharge:	\$3			

Step 2. Enter labor costs, materials costs per passenger, and overhead cost. For value of input, add together labor costs, materials costs times number of passengers, and overhead costs.

Labor costs:	\$110,000	Materials costs:	\$1.30	Overhead:	\$79,000
				Value of input:	\$195,110

Step 3. To calculate multifactor productivity, divide value of output by value of input.

Multifactor productivity:	0.51
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# Productivity Measures

## Tutor 1.1—Productivity Measures

Place cell pointer on green shaded areas to examine formulas.

b. Labor productivity is the ratio of the value of output to labor hours. The value of output is computed in part a, step 1.

Step 1. Enter person-hours per week and the number of weeks in the season; multiply the two together to calculate labor hours of input.

Hours per week:

310

Weeks:

8

Labor hours of input:


2,480

Step 2. To calculate labor productivity, divide value of output by labor hours of input.

Labor productivity: \$39.80


Figure 1.5c





Student tuition at Boehring University is \$100 per semester credit hour. The state supplements school revenue by matching student tuition dollar for dollar. Average class size for a typical three-credit course is 50 students. Labor costs are \$4,000 per class, materials costs are \$20 per student per class, and overhead costs are \$25,000 per class.

- a. What is the *multifactor* productivity ratio for this course process?
- b. If instructors work an average of 14 hours per week for 16 weeks for each three-credit class of 50 students, what is the *labor* productivity ratio?



Natalie Attired makes fashionable garments. During a particular week employees worked 360 hours to produce a batch of 132 garments, of which 52 were “seconds” (meaning that they were flawed). Seconds are sold for \$90 each at Attired’s Factory Outlet Store. The remaining 80 garments are sold to retail distribution, at \$200 each. What is the *labor* productivity ratio of this manufacturing process?

## Sustainability

The design team developed the following revenue and cost information for the two speaker design alternatives:

### Harmonizer

PART	RESALE REVENUE PER UNIT	RECYCLING REVENUE PER UNIT	PROCESSING COST PER UNIT	DISPOSAL COST PER UNIT
Printed circuit board	\$5.93	\$1.54	\$3.46	\$0.00
Laminate back	0.00	0.00	4.53	1.74
Coil	8.56	5.65	6.22	0.00
Processor	9.17	2.65	3.12	0.00
Frame	0.00	0.00	2.02	1.23
Aluminum case	<u>11.83</u>	<u>2.10</u>	<u>2.98</u>	<u>0.00</u>
Total	\$35.49	\$11.94	\$22.33	\$2.97

### Rocker

PART	RESALE REVENUE PER UNIT	RECYCLING REVENUE PER UNIT	PROCESSING COST PER UNIT	DISPOSAL COST PER UNIT
Printed circuit board	\$7.88	\$3.54	\$2.12	\$0.00
Coil	6.67	4.56	3.32	0.00
Frame	0.00	0.00	4.87	1.97
Processor	8.45	4.65	3.43	0.00
Plastic case	<u>0.00</u>	<u>0.00</u>	<u>4.65</u>	<u>3.98</u>
Total	\$23.00	\$12.75	\$18.39	\$5.95

# Lifecycle ownership

## ► LIFE CYCLE OWNERSHIP AND CROSSOVER ANALYSIS

- Blue Star is starting a new distribution service that delivers auto parts to the service departments of auto dealerships in the local area. Blue Star has found two light-duty trucks that would do the job well, so now it needs to pick one to perform this new service. The Ford TriVan costs \$28,000 to buy and uses regular unleaded gasoline, with an average fuel efficiency of 24 miles per gallon. The TriVan has an operating cost of \$.20 per mile. The Honda CityVan, a hybrid truck, costs \$32,000 to buy and uses regular unleaded gasoline and battery power; it gets an average of 37 miles per gallon.
- The CityVan has an operating cost of \$.22 per mile. The distance traveled annually is estimated to be 22,000 miles, with the life of either truck expected to be 8 years. The average gas price is \$4.25 per gallon.
- Blue Star applies Equation to evaluate total life cycle cost for each vehicle:
- Total life cycle cost = Cost of vehicle + Life cycle cost of fuel + Life cycle operating cost
  - a) Based on life cycle cost, which model truck is the best choice?
  - b) How many miles does Blue Star need to put on a truck for the costs to be equal?
  - c) What is the crossover point in years?



# Ready for ...



QUIZ



**LO 1.1** Productivity increases when:

- a) inputs increase while outputs remain the same.
- b) inputs decrease while outputs remain the same.
- c) outputs decrease while inputs remain the same.
- d) inputs and outputs increase proportionately.
- e) inputs increase at the same rate as outputs.

**LO 1.2** Services often:

- a) are tangible.
- b) are standardized.
- c) are knowledge based.
- d) are low in customer interaction.
- e) have consistent product definition.

**LO 1.3** Productivity:

- a) can use many factors as the numerator.
- b) is the same thing as production.
- c) increases at about 0.5% per year.
- d) is dependent upon labor, management, and capital.
- e) is the same thing as effectiveness.

**LO 1.4** Single-factor productivity:

- a) remains constant.
- b) is never constant.
- c) usually uses labor as a factor.
- d) seldom uses labor as a factor.
- e) uses management as a factor.

**LO 1.5** Multifactor productivity:

- a) remains constant.
- b) is never constant.
- c) usually uses substitutes as common variables for the factors of production.
- d) seldom uses labor as a factor.
- e) always uses management as a factor.

**LO 1.6** Productivity increases each year in the U.S. are a result of three factors:

- a) labor, capital, management
- b) engineering, labor, capital
- c) engineering, capital, quality control
- d) engineering, labor, data processing
- e) engineering, capital, data processing