

Chapter 7

Costs

CHAPTER SUMMARY

Conventional accounting statements do not always provide all the information on costs necessary for effective business decisions. Managers should use the principles presented in this chapter to develop accurate information about costs.

Economies of scale arise from either significant fixed costs or variable costs that diminish with the scale of production. An industry where businesses exhibit scale economies will tend to be concentrated. Economies of scope arise from significant joint costs across the production of two or more items. Scope economies drive businesses to supply multiple products.

Opportunity cost is the net revenue from the best alternative course of action. Sunk costs are costs that have been committed and cannot be avoided. For effective business decisions, managers should consider opportunity costs and ignore sunk costs. The transfer price of an item within an organization should be set equal to the marginal cost.

KEY CONCEPTS

economies of scale	joint cost	direct cost
diseconomies of scale	relevance	indirect (overhead) cost
economies of scope	opportunity cost	activity-based costing
diseconomies of scope	balance	

GENERAL CHAPTER OBJECTIVES

1. Appreciate that conventional accounting statements do not always present the information needed for effective managerial decisions.
2. Discuss the concept of scale economies, relate it to fixed costs, and apply it to business strategy.
3. Discuss the concept of scope economies, relate it to joint costs, and apply it to business strategy.

4. Appreciate and apply the concept of opportunity cost, and specifically, to the capital of an organization.
5. Explain the objective and application of transfer pricing.
6. Appreciate and apply the concept of sunk cost.
7. Distinguish direct and indirect costs.
8. Apply the statistical technique of multiple regression to cost analysis.

NOTES

1. Introduction.

- (a) *Costs* depend on the *scale* (production rate) and scope (variety of different products) of the business.
 - i. Fixed cost: cost of inputs that do not change with scale.
 - ii. Variable cost: cost of inputs that change with scale.
 - iii. Note: some costs are partly fixed and partly variable.
 - iv. Marginal cost: change in total cost due to the production of an additional unit; equals the rate of change of the variable cost.
 - v. Average cost: total cost divided by scale; equals to the sum of average fixed cost and average variable cost.
- (b) The decision on scale depends on market demand and competition.
- (c) Managers should consider only the relevant *costs*.
- (d) To identify the relevant costs, alternative courses of action need to be considered.

2. Classification of costs.

- (a) Should ignore **sunk** costs. They are irrelevant.
- (b) Should consider only **avoidable** costs (*fixed* vis a vis variable, direct vis a vis indirect costs).
- (c) The division of costs into sunk and avoidable depends on past commitments and planning horizon.
- (d) The division of avoidable costs into *fixed* and variable elements depends on the technology of the business.
- (e) Which costs are direct or indirect depends on the marginal benefit relative to cost of identification. Each of direct and indirect costs may be either fixed or variable.

3. Economies of scale.

- (a) Definition: the situation where *average* cost decreases with the scale of production.
 - i. Marginal cost will be lower than the average cost.
 - ii. Any increase in production will reduce the average cost.
 - iii. Average cost curve slopes downward.

- iv. "Economies of scale" and "increasing returns to scale" are synonymous.
- (b) Intuitive factors.
 - i. Significant *fixed* inputs.
 - (1). At a larger scale, the cost of fixed inputs will be spread over more units, so that the average fixed cost will be lower,
 - (2). If the average variable cost is constant or does not increase much with scale,
 - (3). The average cost will fall with scale.
 - ii. Average variable costs that fall with scale, eg, pipeline.
- (c) Strategic implications.
 - i. Large scale operations (lower average cost).
 - ii. Mass marketing, relatively low pricing.
 - iii. A few suppliers. Extreme case: monopoly.

4. Diseconomies of scale.

- (a) Definition: the situation wherein *average* cost increases with the scale of production.
 - i. Average cost curve is U-shaped (a perfectly **competitive** business).
 - ii. "Diseconomies of scale" and "decreasing returns to scale" are synonymous.
- (b) Intuitive factors.
 - i. Insignificant *fixed* cost and variable costs rise more than proportionately with scale.
 - (1). The cost of fixed inputs will be spread over more units, so the average fixed cost will be lower,
 - (2). The average variable cost rises more than proportionately with scale.
 - (3). There is a scale where the decreasing average fixed cost is outweighed by the increasing average variable cost.
 - (4). The average cost reaches a minimum and rises with further increases in scale.
- (c) Strategic implications.
 - i. Small scale.
 - ii. Niche marketing, relatively high pricing.
 - iii. Fragmented industries. Extreme case: perfect competition.

5. Economies of scope.

- (a) Definition: the situation wherein the total cost of production is lower with joint than with separate production.
 - i. Joint cost: the cost of inputs that do not change with the scope of production (e.g., core competence).
- (b) Intuitive factors.
 - i. Significant joint costs.

- (c) Strategic implications.
 - i. Multiproduct suppliers dominate the market.
 - ii. Brand extension.
 - iii. Core competence.
- 6. **Diseconomies of scope.**
 - (a) Definition: the situation where the total cost of production is higher with joint than with separate production.
 - (b) Intuitive factors.
 - i. Insignificant joint costs.
 - (c) Strategic implications.
 - i. Produce products separately. Specialized production.
- 7. **Opportunity cost.**
 - (a) What costs are relevant depends on the alternative courses of action for the decision at hand.
 - (b) Explicit approach: consider the revenues and costs of alternative courses of action.
 - (c) **Opportunity cost** approach: the net revenue from the best alternative course of action.
 - (d) Opportunity cost of capital.
 - i. Economic value added: the net operating profit after tax subject to adjustments for accounting conventions less a charge for the cost of capital. This is a better measurement of business performance than accounting earnings.
 - ii. The failure to account for the cost of capital leads an organization to invest excessively relative to the economically efficient level (may also be biased in favor of capital intensive activities).
- 8. **Transfer pricing.**
 - (a) To maximize the profit of an entire organization, the *transfer price* of an internally produced input should be set equal to its *marginal cost*.
 - (b) Perfectly competitive market for the input.
 - i. Set *transfer price* equal to the *market price* (also equals marginal cost).
 - (c) Production of the input is subject to full capacity.
 - i. Marginal cost curve is vertical and marginal cost is not well defined.
 - ii. Set *transfer price* equal to the *opportunity cost* of the inputs, which is the *marginal benefit* that input provides to the current user.
- 9. **Sunk cost.**
 - (a) Sunk cost: a cost that has been committed and cannot be avoided once incurred.
 - (b) Identified by considering the alternative courses of action.

- i. The longer the planning horizon, the more time there will be for past commitments to unwind and greater the freedom of action.
 - ii. In the long run, all inputs are freely adjustable, so there will be no sunk costs.
- (c) Division of costs into sunk and avoidable depends on past commitments and planning horizon.
- (d) Two ways of dealing with sunk costs.
 - i. Explicitly consider the alternative courses of action.
 - ii. Remove all sunk costs from the income statement.
- (e) Strategic implications.
 - i. Use sunk costs to deter entry by competitors.
 - ii. Managers should be careful about committing costs that will become sunk.
- (f) Distinguished from *fixed* cost.
 - i. Fixed cost: cost of inputs that do not change with the production rate.
 - (1). Tend to give rise to economies of scale in the long run.
 - ii. Some fixed costs become sunk once incurred, e.g., design cost for shoe molds.
 - iii. Not all sunk costs are fixed, e.g., the second pair of shoe mold as production increases.
 - iv. Not all fixed costs become sunk when incurred.

10. Direct and indirect costs.

- (a) Direct cost: a cost that can be relatively easily identified with a particular product or job, e.g., production line labor and materials.
- (b) Indirect (overhead) cost: a cost that cannot be easily identified with a particular product or job, e.g., cost of grease in the car repair business.
- (c) Use **activity-based costing** to allocate indirect costs among the various products in a multiproduct business:
 - i. Identify the expenses and activities incurring indirect costs,
 - ii. Divide the expenses (e.g., telephone and fax charges) among the activities (e.g., shipment via a vis customer enquiries),
 - iii. Allocate the indirect cost of each activity among the products (product A and product B), and
 - iv. Combine the allocated indirect costs with the direct costs.
 - v. Conventional cost accounting allocate indirect costs in proportion to direct costs.
 - (1). This ignores the possibility that there are fixed elements in the way indirect activities support products.
 - (2). Tendency to overstate costs of high volume products and understate the costs of low volume products.

11. Multiple regression.

- (a) To analyze statistical data on costs.

- (b) Example: To understand, estimate, and forecast the relationship between costs and the scale of production.
 - i. Multiple regression: dependent variable = direct cost, independent variables = factors that affect direct costs.
 - ii. If the intercept term is positive and statistically significant, then there is a fixed cost.
 - iii. Use the estimated coefficients from a multiple regression to forecast costs at various combinations of the independent variables.
- (c) Can also apply multiple regression to detect joint costs and to allocate indirect costs.

ANSWERS TO PROGRESS CHECKS

7A. See Figure 7A on page 539 of the text.

7B. Neither economies nor diseconomies of scope.

7C. The revenue from a shutdown in Table 7.5 would become \$460,000 and the opportunity cost in Table 7.6 would become \$680,000. Eleanor should continue in the warehouse business.

7D. In Table 7.7, the column for "Cancel Launch" would have zero in every cell. In Table 7.8, the graphic consultant cost would be \$50,000, the *Road Runner* would charge \$60,000, and the *Daily Globe* would charge \$200,000. Sol should cancel the launch.

7E. The average cost of both models would be identical at \$104.50.

ANSWERS TO REVIEW QUESTIONS

1. [Omitted]
2. Southern Power's average fixed cost will rise.
3. Economies of scale are more significant in (a).
4. No.
5. Economies of scope.
6. Diseconomies of scope.

7. The salesman is providing the lunch in the expectation of selling something to the client. The cost of the "free" lunch will be reflected in the price of the item sold.
8. If business performance is measured in terms of accounting profit, management may make decisions that reduce actual profit. For instance, they might ignore opportunity costs of capital. Economic value added is a better measure of performance.
9. The "profit" should be reduced by the opportunity cost of school facilities and faculty member time.
10. The transfer price of lumber should be the market price.
11. No. The employees are already retired, hence their pension costs are sunk.
12. (a)
13. (a)
14. Direct labor and materials may not be the drivers of the indirect costs. Allocating indirect costs according to direct labor and materials may result in misleading cost calculations.
15. There is no necessary relation. Direct costs may be fixed or variable. There are indirect costs that are variable.

WORKED ANSWERS TO SAMPLE DISCUSSION QUESTION

Venus Hotel has a single 100-seat restaurant, for which the annual revenue is \$2.16 million and expenses are \$1.08 million in wages and salaries and \$648,000 in produce, other supplies, and utilities. The restaurant seating area occupies 1000 square feet while the kitchen occupies 400 square feet. Management consultants McMars have recommended that Venus reduce the restaurant to 500 square feet, with room for 50 seats. McMars proposes that Venus lease the 500 square feet extra space to a jeweler at \$20 per square foot a month.

- a. Which of the following best describes the potential rental income from the jeweler: (i) fixed cost, (ii) variable cost, (iii) opportunity cost?
- b. Suppose that McMars' proposal would reduce the restaurant's revenue and expenses by 40%. Prepare an income statement showing the two alternatives -- current operations and McMars plan.

- c. McMars further recommends that Venus introduce room service to serve some of the guests who would presently eat in the restaurant. Now, the McMars plan would only reduce the restaurant's revenue and expenses by 20% relative to the current situation. Should Venus adopt the McMars plan?
- d. The same kitchens can support both room service and restaurants. Does this illustrate economies of scale or scope?

Answer:

(a) Opportunity cost.

(b) Income showing alternatives (in thousand \$)

	Current operations	McMars plan	McMars plan with room service
Revenue	2,160	1,296	1,728
Rental		120	120
Wages	1,080	648	864
Supplies etc.	648	389	518
Profit	432	379	466

(c) See above table. Venus should adopt the McMars plan with room service.

(d) Economies of scope.