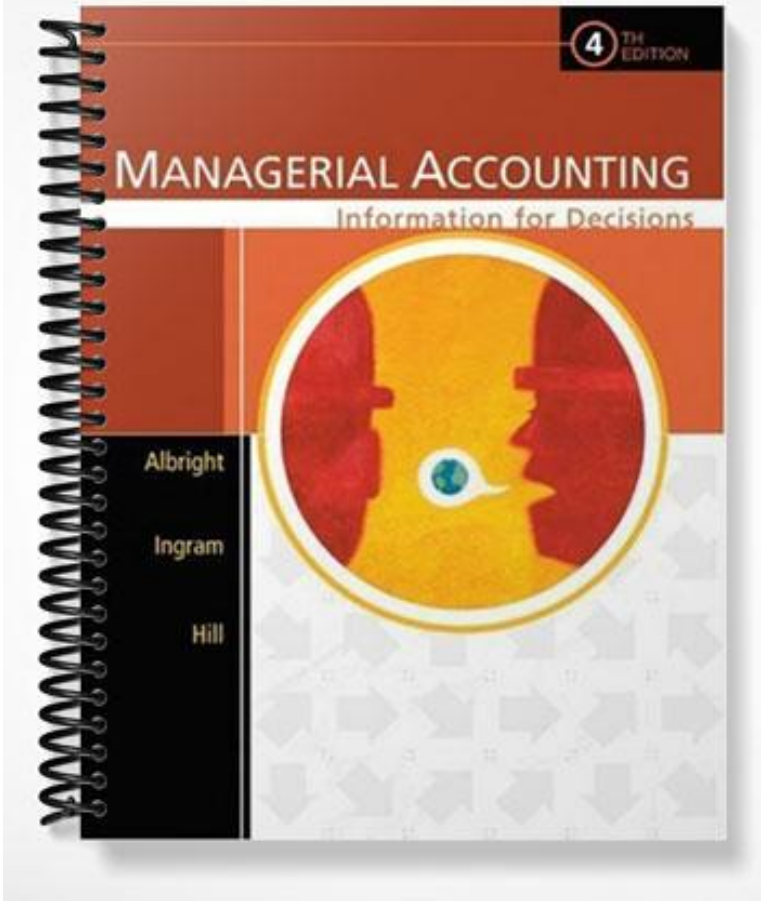
SOLUTIONS MANUAL



CHAPTER M2

Cost Categories and Flows

THINKING BEYOND THE QUESTION

Management uses accounting classifications to help understand and control costs. Target costing is one example. Managers must understand the types of resources consumed by a product before they can develop a program to manage them. A careful study of product and period costs and expenses can help management identify ways to reduce production and marketing costs to meet targets. Target costing helps companies proactively manage costs to help insure long-term profitability.

QUESTIONS

Q2-1 **Direct materials are physically traceable and readily identifiable parts of a product. Accountants often use materiality, or cost vs. benefit, criteria when deciding whether to classify a cost as direct material or overhead.**

Q2-2 **In a manufacturing firm such as Wendell Fromm, the cost of goods sold section of the income statement includes manufacturing costs that have been incurred. These costs include direct materials, direct labor, and manufacturing overhead. These costs are accumulated in the work-in-process inventory account, transferred to Finished Goods Inventory upon completion of the manufacturing process, and then reflected as Cost of Goods Sold at the time of sale.**

Q2-3 **The inventory accounts of Carlton would include Raw Materials Inventory and Work-in-Process Inventory. Since Carlton produces devices for specific patients and ships upon completion, it is unlikely that the company maintains any Finished Goods Inventory. Raw Materials Inventory would include the cost of raw materials purchased and freight costs associated with receiving the inventory as well as any trade discounts from vendors. Work in Process would include the cost of raw materials, direct labor, and manufacturing overhead that have been incurred or applied to the cost of the product.**

Q2-4 **Using terminology introduced in the chapter, nursing care is considered direct labor; drugs are considered direct materials. Both nursing care and drugs are directly traceable to the patient. Depreciation costs associated with the X-ray machine are classified as overhead.**

Q2-5 **Period expenses are recognized in the period in which an expense is incurred. Product costs are recorded as assets until such time as the asset is sold. If product costs were expensed as incurred, the income statement would not measure income accurately. For example, the income statement would report cost of goods sold, for which there are no sales. As you learned in your financial accounting course, proper matching of revenues and expenses requires recording product costs as inventory until the inventory is sold.**

Q2-6 **Yes. For example, resources such as supplies and professional services consumed while providing legal counsel can be inventoried until the engagement is complete. In an accounting office, resources consumed in conducting an audit or providing tax services could be classified as work-in-process until the engagement or tax service is complete.**

Q2-7 **Direct labor costs represent wages of individuals who add value by their direct involvement in producing a product. Indirect labor costs represent wages (or salaries) of individuals who support a manufacturing process. Examples of indirect labor costs include supervision, maintenance, and materials handling.**

Q2-8 **Merchandising companies purchase finished goods for resale, while manufacturing companies purchase raw materials and convert them into finished goods. Partially completed goods are known as work in process. Thus, manufacturing companies report three types of inventory, raw materials, work in process, and finished goods.**

Q2-9 **Conversion costs are the costs of activities required to convert raw materials into finished products. Generally, the conversion process consumes direct labor and overhead costs. Direct labor costs represent labor required to produce a product. Overhead costs represent indirect labor, indirect materials, and a variety of indirect costs such as electricity, manufacturing supplies, factory supervision, and manufacturing insurance.**

Q2-10 **Target costing begins with the selling price and works backward to determine a target cost. Alternatively, the cost-plus approach treats costs as a given and as the basis for the ultimate selling price. The target costing approach takes market conditions into consideration prior to designing and developing a product.**

Q2-11 JIT inventory systems encourage companies to reduce inventory levels and to eliminate waste. Companies often partner with suppliers to help them schedule frequent, small deliveries of inventory in order to reduce the level of inventory. When a company works with suppliers or customers to improve its processes, reduce costs, and improve quality, it is using value chain concepts.

Q2-12 The target costing approach starts with the selling price that customers are willing to pay. Next a required margin is subtracted from the expected selling price to determine the target cost. The cost-plus approach begins with the cost to manufacture a product and adds a markup, or profit margin, to determine a selling price. The market may, or may not, accept this selling price. Thus, target costing allows companies to manage costs proactively to ensure the product has a reasonable chance of success in the marketplace.

EXERCISES

E2-1 Definitions of all terms are listed in the glossary.

E2-2

Cost	Period Expense	Product Cost	
		Direct	Indirect
a. *Example,* Factory depreciation			X
b. Packaging materials			X
c. President's salary	X		
d. Sales commissions	X		
e. Machine lubricants			X
f. Magazine subscriptions, factory break room			X
g. Insurance on finished goods	X		
h. Workers' wages in assembly department		X	
i. Salary of payroll clerk	X		
j. Grounds upkeep	X		
k. Shop rags			X
l. Training program, factory workers			X
m. Ink used in textbook production			X
n. Health insurance, factory workers		X	
o. Glue used in production of wooden chairs			X
p. Life insurance on executives	X		
q. Raw steel, toolbox production		X	
r. Gas for salesperson's car	X		
s. Sales travel expenses	X		
t. Disposal of machine coolants			X

E2-3
a. direct material costs
b. Conversion costs
c. Manufacturing overhead costs
d. value chain
e. Direct labor costs
f. JIT

E2-4 **Product costs are all costs, either direct or indirect, that relate to the manufacturing process. Direct product costs are raw materials and direct labor. Indirect costs are those necessary for the production process that cannot be easily or directly traced to specific items of production.**

Period expenses are all costs that are not production related. This includes administrative and selling costs. Period expenses are matched against income in the period the expense is incurred. Costs related to warehousing finished goods inventory are also considered period expenses.

	Product Cost	Period Expense
a. Wages for factory maintenance workers	x	
b. Direct materials	x	
c. Sales salaries and commissions		x
d. Depreciation expense, office equipment		x
e. Machinery repairs and maintenance	x	
f. Advertising		x
g. Property taxes, factory building	x	
h. Indirect materials	x	
i. Accounting fees		x
j. Warehousing costs for finished goods		x
k. Production supervisor's salary	x	
l. Utilities for plant	x	
m. Rent on factory buildings	x	

E2-5 a. Product costs are the costs of manufacturing a company's products and period expenses are the costs of selling and administrative activities. With respect to this problem, raw materials, labor, raw materials transportation, and overhead are product costs, and finished goods transportation and administrative costs are period expenses. Product costs enter the cost of goods sold calculation, while period costs go below the gross margin calculation.

Sales revenue		**$1,300**
CGS:		
R/M	**$375**	
R/M transportation	**110**	
Labor	**90**	
O/H	**200**	**(775)**
GM		**$ 525**

Using the GM stated above, the salesperson's commission should be 525 × 29% = $152.25. Obviously, the salesperson has been shortchanged. The company overstated the components of CGS by misclassifying period expenses as product costs. The result is overstatement of cost of goods sold and the understatement of gross margin. Because commission is based on gross margin, and gross margin was understated, the salesperson's commission was also understated.

b. Management wants salespersons to promote *profitable* products and to negotiate *profitable* sales terms, not merely to generate sales.

E2-6

Wages for factory maintenance workers	**overhead**	**Indirect cost of production**
Direct materials	**direct materials**	**Direct production cost**
Machinery repairs and maintenance	**overhead**	**Indirect cost of production**
Property taxes, factory building	**overhead**	**Indirect cost of production**
Indirect materials	**overhead**	**Indirect cost of production**
Production supervisor's salary	**overhead**	**Indirect cost of production**
Utilities for plant	**overhead**	**Indirect cost of production**
Rent on factory buildings	**overhead**	**Indirect cost of production**

E2-7 The cost of acquiring raw materials is considered part of the raw materials cost. Alternatively, transporting finished goods to a customer is considered a selling or administrative expense because the conversion process has been completed.

E2-8 Exercise 2-8 requires students to find missing values. Material used in production is computed first, based on the amount required to make the ending WIP balance equal $15,000. Next, raw material purchases is computed by finding the missing value that will make the ending raw materials balance equal $2,000. Finally, finished goods inventory is determined by totaling the finished goods column, based on information provided in the problem.

	Raw Materials	WIP	Finished Goods	Cost of Goods Sold
Beginning	$ 5,000	$ 5,000	$ 15,000	
		+ 18,000		
		+ 15,000		
		(45,000)	45,000	
			– 40,000	
				$40,000
	(22,000)	22,000		
	19,000			
	$ 2,000	$ 15,000	$ 20,000	$40,000

E2-9 a.

Raw Materials		Work in Process	
Beg. Balance	+ $ 550,000	Beg. Balance	+ $ 900,000
Pur.	+ 1,350,000	R/M	+ 1,150,000
Trans to WIP	– 1,150,000	Labor	+ 2,250,000
End. Balance	$ 750,000	O/H	+ 3,000,000
		Trans to F/G	– 6,050,000
		End. Balance	$1,250,000

Finished Goods	
Beg. Balance	+ $ 650,000
WIP	+ 6,050,000
To CGS	– 6,550,000
End. Balance	$ 150,000

b. In aggregate, the company has not been successful in reducing inventory balances:
($750,000 + $1,250,000 + $150,000) = $2,150,000
($550,000 + $900,000 + $650,000) = $2,100,000
$2,150,000 > $2,100,000

The only category where the firm has made some progress is in finished goods; however, note the increases in raw materials and work-in-process.

c. Carrying costs (cost of holding inventory over an extended period of time) include obsolescence, damage, and capital costs.

E2-10

Selling price	**$450**
Less required margin	**(75)**
Target cost	**$375**

Rowflex should pursue the project if management believes the product can be produced at a cost at or below $375. If costs exceed $375 while the selling price remains $450, the project will not provide adequate returns.

E2-11

Item Description	Target Unit Cost	Target Margin	Target Margin %	Selling Price
Item A	$15.0	$ 5.0	25.0%	$20
Item B	72.0	12.0	14.0	84
Item C	59.5	10.5	15.0	70
Item D	42.0	6.0	12.5	48
Item E	84.0	12.0	12.5	96

E2-12 The product cost of this item is calculated as follows:

Direct materials	**$ 50**
Direct labor	**35**
Manufacturing overhead	**15**
Total cost	**$100**

The markup in dollars is:

Sales price	**$160**
Total cost	**100**
Margin	**$ 60**

Margin as a percentage of sales = $60 ÷ $160 = 37.5%

E2-13 Required margin = 0.30 × $160 = $48.00

Selling price – Required margin = Target cost
$160 – $48.00 = $112.00

The existing cost is $120. The target cost that results in a 30% margin is $112.00. Therefore, the product cost needs to be decreased by $8.00 ($120.00 – $112.00 = $8.00) to meet that margin requirement.

PROBLEMS

P2-1 Period expenses should appear on the income statement in the period in which the expense is incurred. However, product costs do not affect the income statement until such time as the product is sold. Thus, management boosted the company's earnings by inappropriately recording an expense as an asset account on the balance sheet. The cost would not appear as an expense until the inventory was sold.

P2-2 A. The company reduced expenses, and simultaneously increased earnings, by recording period expenses as a long-term asset on the balance sheet. However, the expenses should have affected the current period's income. Thus, the accounting irregularity resulted in a significant over-reporting of current period income.

B. Yes. In this case, management appears to have manipulated the financial statements to mislead investors.

P2-3 A. Tim's salary would be considered a manufacturing expense and would be classified as indirect labor. Tim provides support for direct labor by creating tools needed in the production process, but he does not work directly in the production process himself. Accordingly, his efforts are indirect to the manufacturing process.

B. Ann's salary is nonmanufacturing and would be considered a selling expense of Georgia Industries. The commissions she earns are nonmanufacturing selling expenses as well.

P2-4 A.

Raw Materials		Work in Process	
Beg. Bal.	$10,000	Beg. Bal.	$ 20,000
(2)	+34,000	(1)	+96,000
(5)	–34,000	(3)	+119,000
	$10,000	(5)	+34,000
		Compute	–229,000
			$ 40,000

Finished Goods		Cost of Goods Sold	
Beg. Bal.	$ 10,000		+$225,000
(4) Cost of goods sold	–225,000		$225,000
Compute	+229,000		
(6)	$ 14,000		

The finished goods value is given at $14,000. Thus, the transfer to finished goods must be $229,000.

B. Bank officers may use inventory information to assess credit risk. Inventory is a current asset that will eventually become cash. Bank officers may evaluate how fast inventory is converted into cash by using turnover ratios (cost of goods sold ÷ average inventory). They also may use inventory balances to calculate current ratios and to analyze assets in aggregate. Production managers would use this information to evaluate whether acquisitions of resources are needed and whether production should be increased or decreased. Sales managers would use the data to evaluate whether they have enough stock to satisfy demand. Information from the sales department is sent to the production manager to evaluate whether more inventory is needed.

C. WIP and finished goods inventory balances have increased, while the raw materials balance remains the same. Overall, inventory balances are greater at the end of the period than at the beginning.

D. If sales are supposed to remain flat or to decline, management should reduce all levels of inventory. Production decreases also will be necessary as part of the inventory reduction strategy.

P2-5 A.

Sand and chemical inventory		WIP
$ 18,000		$ 75,000
+190,000		+175,000
–175,000	to WIP	+200,000
C. $ 33,000		+300,000
		+80,000
		+65,000
		B. –835,000 to finished goods
		$ 60,000

Finished Goods		
$ 90,000		
+835,000		
B. – 795,000	cost of goods sold	
C. $ 130,000		

D. **Production Manager**

A production manager would like to understand the various components of product cost, materials, labor, and overhead. In addition, he/she would compare costs across time to understand trends. Production managers should be alert to opportunities for improving processes that would result in cost savings.

Marketing Manager

Marketing managers want to understand costs and profitability across the product line. Having such information enables them to make decisions about product pricing and which products to emphasize (or de-emphasize).

P2-6 A. **Product cost classification**

Secretarial salaries—Overhead
Partner salaries—Direct labor
Various overhead accounts—Overhead
Professional accountant salaries—Direct labor
Comp. supplies—Direct materials

B.

Work in Process		Finished Services	
Beg. Balance	$ 20,000	Beg. Balance	$ 5,000
Product Costs	+56,000	From WIP	61,000
To F.S.	–61,000	CSS	–59,000
End. Inventory	$ 15,000	End. Inventory	$ 7,000

Cost of services provided = $59,000

C. **Cost of goods sold % = $\frac{\$59,000}{\$95,000} = 62\%$**

Gross margin % = 38% [($95,000 – $59,000)/$95,000]

D. **Our analysis attempts to explain profitability at various levels on the income statement. We can explore the cost of providing services (product costs) as well as costs of administration (period expenses). Partners may compare gross margin and net income percentages over time. Additionally they may wish to calculate a variety of return measures such as return on assets, return on investment, or return on equity.**

P2-7 A. **Ford Motor Company probably had raw materials inventories consisting of windshields, motors, tires, and other components used to assemble its vehicles.**

B. **A partially complete vehicle is an example of work-in-process at Ford. Inventories at all levels have increased from 2001 to 2002. It is possible that management purchased materials and produced inventory to support sales that did not meet expectations.**

P2-8 A.

Beginning raw materials inventory	$ 870,000
Purchases	+ 3,550,000
Used	– 3,720,000
Ending raw materials inventory	$ 700,000

Beginning work-in-process inventory	$ 1,390,000
Materials used	+ 3,720,000
Labor	+ 2,490,000
Overhead	+ 1,380,000
Less transfer to finished goods	– 7,410,000
Ending work-in-process inventory	$ 1,570,000

Beginning finished goods inventory	**$ 620,000**
Plus transfer from WIP	**+ 7,410,000**
Less transfer to COGS	**– 7,500,000**
Ending finished goods inventory	**$ 530,000**

B. O'Neill has been successful in reducing raw material and finished goods inventory levels. However, the WIP inventory level is higher at the end of the period than at the beginning. Total beginning raw materials, WIP, and finished goods inventory were valued at $2,880,000. At the end of the period, these inventories were valued at $2,800,000. Thus, O'Neill has been successful in reducing its overall investment in inventory by $80,000.

P2-9 A.

Selling price	**$225.00**
Required margin (225 × 30%) =	**67.50**
Target cost	**$157.50**

B. Go-yo's management can evaluate ways to remove costs from the design of the product or from the manufacturing process. Perhaps they can work with suppliers in the value chain to find ways to reduce raw materials costs. The company should organize a cross-functional team that represents marketing, accounting, finance, production, purchasing, and engineering. The team should investigate inefficiencies throughout the value chain and examine ways to reduce costs.

P2-10 A.

SP	**$270,000**
Margin (15%)	**– 40,500**
Target cost	**$229,500**

B. As production volume changes, some costs will increase or decrease (variable), while other costs will not vary (fixed). Thus, unit costs may be sensitive to changes in demand.

C. If the estimated cost is $240,000, managers must determine ways to remove costs to ensure the product earns an adequate margin. Actions may include redesigning the product or manufacturing process to eliminate costs. For example, less expensive materials may be substituted for more expensive materials if product quality would not be adversely affected.

D. A team of individuals representing accounting, marketing, production, and purchasing would be selected to identify ways to trim costs and to achieve the cost target.

- **An accounting team member would be chosen for his/her expertise in the area of product costing.**
- **A marketing team member would be chosen to provide input concerning customer expectations and possible reactions to product changes.**
- **A production team member would provide insights about the manufacturability of the product following possible design changes. Also, he/she may suggest more cost effective ways to produce the product.**
- **A purchasing agent would be involved because of his/her relationship with suppliers. In fact, suppliers often are involved in discussions with customers when cost reduction strategies are discussed.**

P2-11 A. To evaluate the just-in-time manufacturing system, managerial accountants should measure defect rates, production and delivery times, order accuracy percentages, and the percentage of planned production that was actually produced.

B. The level of detail of the information collected should be determined by weighing the benefits of the information's accuracy against the costs required to collect the information. Happy PC should determine the intended use of the information, the amount of accuracy needed, and the costs of obtaining that information to reach a conclusion on the amount of detail required.

P2-12 A. Jenny could compare the warranty costs with the cost of purchasing a higher-quality device from suppliers. However, Jenny should be careful because accounting systems cannot capture all costs associated with defective products. For example, many customers may not submit their defective products for a warranty claim. Instead, they may never purchase another product manufactured by Jenny's company. In addition, they may advise others to do the same.

B. Jenny could meet with the supplier and investigate ways to improve quality and reduce costs. The supplier also should have an interest in investigating failures of the device. Perhaps by sharing information about the types of defects and circumstances under which the devices failed, the provider may improve the process.

P2-13

	CD Inventory	Container Inventory	Cellophane Inventory
Beginning	8,000.00	1,800.00	2,500.00
Purchases	355,000.00	60,000.00	3,000.00
To production	(350,000.00)	(45,000.00)	(5,000.00)
Ending	13,000.00	16,800.00	500.00

	Copying WIP	Packaging WIP	Finished Goods	Cost of Goods Sold
Beginning	—	—	—	—
Materials	350,000.00	80,000.00		
Labor	40,000.00	60,000.00		
Overhead	20,000.00	6,000.00		
Transferred in	0.00	410,000.00	556,000.00	520,000.00
Transferred out	(410,000.00)	(556,000.00)	(520,000.00)	
Ending	—	—	36,000.00	520,000.00

P2-14
1. a
2. c
3. c
4. c
5. d
6. d
7. c
8. b
9. a
10. d

CASE

C2-1 A. **General Mills' supply chain includes suppliers that produce and deliver grain and other raw materials used in cereal and other products produced by the company. The supply chain extends beyond the company to a variety of customers including grocery and convenience stores, foodservice distributors, bakeries, and vending companies.**

B. **The supply chain has become more complex as a result of acquiring Pillsbury. The company's brands have expanded to include Pillsbury Doughboy, Progresso, Totino's, Green Giant, and Old El Paso. As a**

result, additional relationships with suppliers and customers will be developed. The supply chain will become larger and more complex.

C. General Mills reported a dramatic increase in the first two types of inventory (raw materials, work in process and supplies and finished goods) between 2001 and 2002. The acquisition of Pillsbury is the most likely explanation. Raw materials inventory most likely includes ingredients, such as sugar, milk, and flour, used to produce the company's products. Work-in-process inventory includes partially completed products. Supplies include various resources used to produce the company's products and probably include items such as packaging materials. Finished goods includes completed products that have been produced but not sold to customers. The company's inventory of grain increased only slightly between 2001 and 2002.