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CHAPTER 2
BASIC COST MANAGEMENT CONCEPTS

DISCUSSION QUESTIONS

1. An accounting information system is a system consisting of interrelated manual and computer parts, using processes such as collecting, recording, classifying, summarizing, analyzing, and managing data to provide output information to users.

2. The financial accounting information system is primarily concerned with producing outputs for external users using well-specified economic events as inputs and processes that meet certain rules. The cost management system, on the other hand, produces outputs for internal users, and the criteria that govern inputs and processes are directly related to management objectives. As a result, the cost management system is more flexible than the financial system.

3. The three broad objectives of a cost management information system are: (1) to cost out products, services, and other cost objects; (2) to provide information for planning and control; and (3) to provide information for decision making.

4. The cost accounting information system is a cost management subsystem designed to assign costs to products, services, and other objects as management needs specify. The operational control information system is a cost management information subsystem designed to provide accurate and timely feedback concerning the performance of managers and others relative to their planning and control of activities.

5. A cost object is anything for which costs are measured and assigned. Examples include: activities, products, plants, and projects.

6. An activity is a basic unit of work performed within an organization. Examples include materials handling, inspection, purchasing, billing, and maintenance.

7. A direct cost is a cost that can be easily and accurately traced to a cost object. An indirect cost is a cost that cannot be easily and accurately traced to cost objects.

8. Traceability is the ability to assign a cost directly to a cost object in an economically feasible way using physical observation or a causal relationship.

9. Allocation is the assignment of indirect costs to cost objects based on convenience or assumed linkages.

10. Driver tracing uses drivers based on a causal relationship to trace costs to cost objects. Often, this means that costs are first traced to activities using resource drivers and then to cost objects using activity drivers.

11. Tangible products are goods that are made by converting raw materials into a final product through the use of labor and capital inputs.

12. A service is a task or activity performed for a customer or an activity performed by a customer using an organization's products or facilities. Services differ from tangible products on three important dimensions: intangibility, perishability, and inseparability. Intangibility means that buyers of services cannot see, feel, taste, or hear a service before it is bought. Perishability means that services cannot be stored. Inseparability means that producers of services and buyers of services must be in direct contact (not true for tangible products).

13. Three examples of product cost definitions are value-chain, operating, and traditional definitions. The value-chain definition includes cost assignments for research and development, production, marketing, and customer service (all value-chain activities). Operational product costs include all costs except for research and development. Traditional product costs include only production costs. Different costs are needed because they serve different managerial objectives.

14. The three cost elements are direct materials, direct labor, and overhead.

15. The income statement for a service firm does not need a supporting cost of goods manufactured schedule. Since services cannot be stored, the cost of services produced equals the cost of services sold (not necessarily true for a manufacturing firm).

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CORNERSTONE EXERCISES

Cornerstone Exercise 2.1

1. **Unit prime cost**
   = (Direct materials + Direct labor)/Units
   = ($120,000 + $60,000)/50,000
   = $3.60

2. **Unit conversion cost**
   = (Direct labor + Variable overhead + Fixed overhead)/Units
   = ($60,000 + $25,000 + $220,000)/50,000
   = $6.10

3. **Unit variable product cost**
   = (Direct materials + Direct labor + Variable overhead)/Units
   = ($120,000 + $60,000 + $25,000)/50,000
   = $4.10

4. **Unit product cost**
   = (Direct materials + Direct labor + Variable overhead + Fixed overhead)/Units
   = ($120,000 + $60,000 + $25,000 + $220,000)/50,000
   = $8.50

5. **Total direct materials, total direct labor, and total variable overhead would all increase by 10 percent since the units increased by 10 percent and these are strictly variable costs. Total fixed overhead would remain the same. Unit prime cost would increase by 10 percent since both direct materials and direct labor are strictly variable, and 10 percent more units would require 10 percent more variable cost. However, unit conversion cost would increase by less than 10 percent because of the presence of fixed costs.**

   New unit product cost
   = [($120,000 + $60,000 + $25,000)(1.10) + $220,000)]/55,000
   = $8.10

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Cornerstone Exercise 2.2

1. **Pietro Frozen Foods, Inc.**
Statement of Cost of Goods Manufactured
For the Coming Year

Direct materials		
Beginning inventory	$ 5,600	
Add: Purchases	119,300	
Materials available	$124,900	
Less: Ending inventory	4,900	
Direct materials used in production		$120,000
Direct labor		60,000
Manufacturing (Factory) overhead		245,000
Total manufacturing costs added		$425,000
Add: Beginning work in process		12,500
Less: Ending work in process		14,600
Cost of goods manufactured		$422,900

2. If the ending inventory of direct materials were $2,000 higher, then the direct materials used in production would be $2,000 smaller, the total manufacturing costs added would be $2,000 lower, and the cost of goods manufactured would be $2,000 lower. No other line items would be affected.

Cornerstone Exercise 2.3

1. **Pietro Manufacturing, Inc.**
Statement of Cost of Goods Sold
For the Coming Year

Cost of goods manufactured	$422,900
Add: Beginning finished goods	42,500
Cost of goods available for sale	$465,400
Less: Ending finished goods	34,000
Cost of goods sold	$431,400

2. If beginning finished goods were $5,000 lower, then the cost of goods sold would be $5,000 lower.

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Cornerstone Exercise 2.4

Pietro Manufacturing, Inc.
Income Statement
For the Coming Year

			Percent
Sales ($12.50 × 49,300)		$616,250	100.00
Cost of goods sold		431,400	70.00
Gross margin		$184,850	30.00
Less operating expenses:			
Selling expenses	$ 26,000		
Administrative expenses	134,000	160,000	25.96
Operating income		$ 24,850	4.03

2. If the cost of goods sold has been 65 percent of sales for the past few years, managers would probably be concerned. Cost of goods sold has risen by 5 percent, and profit has probably declined. Managers should investigate to see why the increase occurred and take steps to decrease product costs or increase price, if possible, in the coming year.

Cornerstone Exercise 2.5

1. Unit prime cost
   = (Direct materials + Direct labor)/Units
   = ($27,000 + $472,500)/15,000
   = $33.30
2. Unit conversion cost
   = (Direct labor + Variable overhead + Fixed overhead)/Units
   = ($472,500 + $15,000 + $18,000)/15,000
   = $33.70
3. Unit variable services production cost
   = (Direct materials + Direct labor + Variable overhead)/Units
   = ($27,000 + $472,500 + $15,000)/15,000
   = $34.30
4. Unit services production cost
   = (Direct materials + Direct labor + Variable overhead + Fixed overhead)/Units
   = ($27,000 + $472,500 + $15,000 + $18,000)/15,000
   = $35.50

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Cornerstone Exercise 2.5, (Concluded)

5. Since office rent is a fixed cost, no variable cost would be affected, and prime cost and total variable cost stay the same. Since conversion cost includes the new higher fixed overhead, it would increase. Similarly, total unit service cost would increase as shown below.

   Unit services production cost
   = ($27,000 + $472,500 + $15,000 + $19,500)/15,000
   = $35.60

Cornerstone Exercise 2.6

1. **Happy Home Helpers, Inc.**
Statement of Cost of Services Produced
For the Coming Year

Direct materials		
Beginning inventory	$ 4,000	
Add: Purchases	25,600	
Materials available	$29,600	
Less: Ending inventory	2,600	
Direct materials used in production		$ 27,000
Direct labor		472,500
Cleaning overhead		33,000
Total services production costs added		$532,500
Add: Beginning work in process*		0
Less: Ending work in process		0
Cost of services produced		$532,500

* The beginning and ending work-in-process amounts could clearly be eliminated. They are shown here to reinforce the concept that for this firm, with no work in process, total services production cost equals cost of services produced.

2. If purchases of direct materials increased to $30,000, and materials inventories remained unchanged, then the direct materials used in production, the total services production costs added, and the cost of services produced would all increase by $4,400 ($30,000 – $25,600).

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Cornerstone Exercise 2.7

1. **Happy Home Helpers, Inc.**
Statement of Cost of Services Sold
For the Coming Year

Cost of services produced	$532,500
Add: Beginning finished goods*	0
Less: Ending finished goods	0
Cost of services sold	$532,500

*The beginning and ending finished goods amounts could clearly be eliminated. They are shown here to reinforce the concept that for this firm, with no finished goods inventory, total cost of services produced equals the cost of services sold.

2. Unlike a service firm, we would expect a manufacturing firm to have beginning and ending finished goods inventory.

Cornerstone Exercise 2.8

1. **Happy Home Helpers, Inc.**
Income Statement
For the Coming Year

Sales ($45 × 15,000)		$675,000
Cost of services sold		532,500
Gross margin		$142,500
Less operating expenses:		
Selling expenses	$22,000	
Administrative expenses	53,000	75,000
Operating income		$ 67,500

2. If the price increased to $50, sales would be $750,000, a $75,000 increase. This would increase gross margin and operating income by $75,000. The new operating income would be $142,500.

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EXERCISES

Exercise 2.9

1. The objective of the dishwashing system is to provide clean, germ-free dishes, glasses, and silverware. Processes include: scraping uneaten food off dishes into disposal, loading the racks, washing the dishes, and unloading the racks.

2. The items are classified as follows:
   a. Automatic dishwasher—interrelated part
   b. Racks to hold the dirty glasses, silverware, and dishes—interrelated part
   c. Electricity—input
   d. Water—input
   e. Waste disposal—interrelated part
   f. Sinks and sprayers—interrelated parts
   g. Dish detergent—input
   h. Gas heater to heat water to 180 degrees Fahrenheit—interrelated part
   i. Conveyor belt—interrelated part
   j. Persons 1, 2, 3, and 4—interrelated parts
   k. Clean, germ-free dishes—outputs
   l. Dirty dishes—inputs
   m. Half-eaten dinner—inputs
   n. Aprons—interrelated parts

3. Operational Model: Dishwashing System

Inputs:	*Processes:*	*Output:*
Dish detergent	Scraping off food	Clean dishes
Water	Loading racks	
Electricity	Washing	
Dirty dishes	Unloading	
Half-eaten dinner		

4. The cost management information system is similar in that it has interrelated parts: processes, objectives, inputs, and outputs. The differences are: inputs are economic events and there are users of information. The output of the cost management system produces user actions. Output can act as the basis for action or can confirm that actions already taken had the intended effects.

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Exercise 2.10

1. a. Interrelated parts: Cost accounting personnel, computer, printer
   b. Processes: Cost assignment: materials, labor, and overhead
   c. Objectives: Costing out of products
   d. Inputs: Direct materials, direct labor, depreciation, power and materials handling
   e. Outputs: Product cost report
   f. User actions: Submission of a bid, make-or-buy decision

2. Operational Model: Cost Accounting System

Inputs:	*Processes:*	*Output:*
Direct materials	Cost assignment:	Product cost
Direct labor	Direct materials	Bidding decision
Depreciation	Direct labor	Make-or-buy decision
Power	Overhead	
Materials handling		

3. The inputs consist of only production costs suggesting a traditional product cost definition.

Exercise 2.11

a. Direct tracing
b. Allocation
c. Direct tracing
d. Direct tracing
e. Driver tracing; potential driver—machine hours or maintenance hours
f. Direct tracing
g. Direct tracing
h. Allocation
i. Driver tracing; potential driver—number of orders
j. Driver tracing; potential driver—number of engineering hours
k. Allocation
l. Driver tracing; potential driver—number of employees or direct labor hours
m. Allocation
n. Allocation

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Exercise 2.12

a. *Value-chain.* This is a strategic decision and involves activities and costs throughout the entire value chain.

b. *Operating*. At this point, the costs of design and development are sunk costs; the decision to produce should consider the costs of production, marketing, and servicing the product.

c. *Value-chain*. The price needs to cover all product costs, including the costs of developing, selling, and servicing.

d. *Product*. This approach is mandated for external reporting.

e. *Value-chain*. Product mix decisions should consider all costs, and the mix that is the most profitable in the long run should be selected.

f. *Operating*. The designs should be driven by the effect they have on production, marketing, and servicing costs. Thus, the operating cost definition is the most relevant.

g. *Product*. This approach is mandated for external reporting.

h. *Operating*. Research and design costs are not relevant for a price decision involving an existing product. Production, marketing, and servicing costs are relevant, however.

i. *Operating*. Any special order should cover its costs, which potentially include production, marketing, and servicing costs.

Exercise 2.13

1. Direct materials used = $25,900 + $256,900 – $18,000 = $264,800

2.

Direct materials	$264,800
Direct labor	176,000
Overhead	308,400
Total manufacturing cost	$749,200
Add: Beginning WIP	44,700
Less: Ending WIP	(22,700)
Cost of goods manufactured	$771,200

Unit cost of goods manufactured = $771,200/40,000 = $19.28

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Exercise 2.13, (Concluded)

3. Direct labor = Product cost – Direct materials – Overhead
   = $19.28 – $6.62 – $7.71 = $4.95

   Prime cost = Direct materials + Direct labor
   = $6.62 + $4.95 = $11.57

   Conversion cost = Direct labor + Overhead
   = $4.95 + $7.71 = $12.66

Exercise 2.14

1. Beginning inventory + Purchases – Ending inventory = Direct materials used
   $2,500 + $78,300 – Ending inventory = $73,500
   Ending inventory = $7,300

2. Units in beginning finished goods inventory = $3,422/$5.90 = 580

   Since 14,000 units were manufactured and 580 were in beginning finished goods inventory, 14,580 units were available for sale. But 14,120 units were sold, so ending finished goods inventory is 460.

3. Cost of goods manufactured = $349,000 + $116,000 – $117,300 = $347,700

4. Prime cost = $55 = Direct materials + Direct labor
   Direct materials = $55 – Direct labor

   Conversion cost = $84 = Direct labor + Overhead
   Overhead = $84 – Direct labor

   Product cost = ($55 – Direct labor) + Direct labor + ($84 – Direct labor) = $105
   Direct labor = $34

   Direct materials + Direct labor = $55
   Direct materials + $34 = $55
   Direct materials = $21

5. Total manufacturing costs + BWIP – EWIP = COGM
   $412,000 + $76,000 – EWIP = $434,000
   EWIP = $54,000

   Prime cost + Overhead = Total manufacturing costs
   $64,000 + Overhead = $412,000
   Overhead = $348,000

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Exercise 2.15

1.

LeMans Company
Statement of Cost of Goods Manufactured
For the Month of June

Direct materials:		
Beginning inventory	$ 62,400	
Add: Purchases	346,000	
Materials available	$408,400	
Less: Ending inventory	63,000	
Direct materials used in production		$345,400
Direct labor		143,000
Manufacturing overhead		375,800
Total manufacturing costs added		$864,200
Add: Beginning work in process		33,900
Less: Ending work in process		(37,500)
Cost of goods manufactured		$860,600

2.

LeMans Company
Statement of Cost of Goods Sold
For the Month of June

Cost of goods manufactured	$860,600
Add: Beginning finished goods inventory	55,600
Cost of goods available for sale	$916,200
Less: Ending finished goods inventory	50,800
Cost of goods sold	$865,400

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Exercise 2.16

1. Units ending finished goods = 3,400 + 30,000 – 31,000
   = 2,400

   Finished goods ending inventory = 2,400 × $39* = $93,600

   *Since the unit cost of beginning finished goods and the unit cost of current production both equal $39, the unit cost of ending finished goods must also equal $39.

2. Kildeer Company
   Statement of Cost of Goods Sold
   For the Year Ended December 31

Cost of goods manufactured ($39 × 30,000)	$1,170,000
Add: Beginning finished goods inventory	132,600
Cost of goods available for sale	$1,302,600
Less: Ending finished goods inventory	93,600
Cost of goods sold	$1,209,000

3. Kildeer Company
   Income Statement: Absorption Costing
   For the Year Ended December 31

			Percent
Sales (31,000 × $52)		$1,612,000	100.00
Cost of goods sold		1,209,000	75.00
Gross margin		$ 403,000	25.00
Less operating expenses:			
Commissions (31,000 × $1.30)	$ 40,300		
Advertising co-pays	95,000		
Administrative expenses	183,000	318,300	19.75
Operating income		$ 84,700	5.25

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Exercise 2.17

1.

Anglin Company
Statement of Cost of Goods Manufactured
For the Year Ended December 31

Direct materials:		
Beginning inventory	$ 37,200	
Add: Purchases	378,890	
Freight-in on materials	7,500	
Materials available	$423,590	
Less: Ending inventory	34,600	
Direct materials used in production		$ 388,990
Direct labor		495,900
Manufacturing overhead:		
Factory supplies	$ 18,500	
Factory utilities	54,000	
Factory supervision and indirect labor	165,000	
Materials handling	16,900	
Total overhead costs		254,400
Total manufacturing costs added		$1,139,290
Add: Beginning work in process		201,000
Less: Ending work in process		(117,400)
Cost of goods manufactured		$1,222,890

2.

Anglin Company
Statement of Cost of Goods Sold
For the Year Ended December 31

Cost of goods manufactured	$1,222,890
Add: Beginning finished goods inventory	59,200
Cost of goods available for sale	$1,282,090
Less: Ending finished goods inventory	62,700
Cost of goods sold	$1,219,390

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Exercise 2.18

1.	Beginning inventory, materials	$ 1,050
	+ Purchases	11,450
	– Ending inventory, materials	(950)
	Materials used in service provision	$11,550

2. Prime cost = $11,550 + $25,570 = $37,120

3. Conversion cost = $25,570 + $18,130 = $43,700

4.	Direct materials	$11,550
	Direct labor	25,570
	Overhead	18,130
	Cost of services	$55,250

5. Send It Packing
Income Statement
For the Month Ended May 31

Sales revenues	$102,100
Cost of services sold	55,250
Gross margin	$ 46,850
Operating expenses:	
Advertising	(2,750)
Franchise fee (0.05 × $102,100)	(5,105)
Other administrative expenses	(3,650)
Operating income	$ 35,345

6. Clearly, the rent, insurance, and utilities are indirect costs. No matter how many packages Lakeesha and her workers package and send off for delivery, the rent, utilities, and insurance will be the same. The amount paid to UPS and FedEx, however, for the package delivery is a direct cost. This amount, which is collected by Send It Packing, is a direct cost of each package. It will change from month to month according to the number and type of packages that customers drop off.

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Exercise 2.19

1. **Shelly is interested in the manufacturing costs of Glaxane. In particular, the costs of direct materials, direct labor, and overhead will be calculated to budget for Glaxane production.**

2. **Leslie will be concerned with all costs along the value chain. Clearly, the after-sale costs will be an important factor in pricing since the potential for fatal side effects will lead to both lawsuits and the withdrawal of Glaxane from the market. However, Leslie must also be concerned with the costs of research, development, and production since pharmaceutical companies attempt to link all of these costs to a drug to justify their pricing strategies.**

3. **Dante will be primarily concerned with the overall research and development costs and the eventual revenue from the successful drugs. Any individual potential drug can turn out to have no value as long as some drug projects are successful and can justify the total efforts.**

Exercise 2.20

1. **Given the description provided, it appears that Jazon uses a traditional cost management system. First, product costs are determined only by production costs. Apparently, the financial accounting system is driving the type of product cost information being produced. Second, only direct labor hours, a unit-based driver, are used to assign overhead costs. Since many overhead costs are likely to be caused by non-unit drivers, this suggests a strong reliance on allocation for cost assignment. Third, the company's control system focuses on departmental, rather than firm-wide, performance and relies on financial measures.**

2. **Product costing accuracy can be improved by placing more emphasis on tracing and less on allocation. There is enough information provided to reveal that the two products make quite different demands on certain activities. Setup, receiving, and purchasing resources are consumed differently by the two products, and it is doubtful that direct labor hours would have anything to do with the two products' patterns of resource consumption for these three activities. Thus, using activity drivers that better reflect the differential resource consumption would improve the cost assignments. Jazon would need to assign costs to the activities using direct tracing and resource drivers and then assign the cost of the activities to the two products using activity drivers. Jazon also should consider the possibility of computing different—more managerially relevant—product costs such as value-chain costs and operational costs.**

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Exercise 2.20, (Concluded)

3. **Jazon would need to change its control focus from managing costs to managing activities. This would entail shifting emphasis from departmental performance maximization to system-wide performance maximization. To bring about this change, Jazon will need to provide detailed information concerning activities. Since activities cause costs, managing activities is a more logical approach to controlling costs.**

Exercise 2.21

1. **Direct materials used = $68,000 + $278,000 – $70,400 = $275,600**

2.

Direct materials	$275,600
Direct labor	189,000
Overhead	523,000
Total manufacturing cost	$987,600
Add: Beginning work in process	29,400
Less: Ending work in process	(40,000)
Cost of goods manufactured	$977,000

Unit cost of goods manufactured = $977,000/100,000 = $9.77

3. **Direct labor per unit = $9.77 – $2.70 – $5.30 = $1.77**
Prime cost = $2.70 + $1.77 = $4.47
Conversion cost = $1.77 + $5.30 = $7.07

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Exercise 2.22

1.	Cost of goods manufactured	$977,000
	Add: Beginning finished goods inventory	43,200
	Less: Ending finished goods inventory	42,100
	Cost of goods sold	$978,100

2.

Ellerson Company
Income Statement
For the Year Ended December 31

Sales	$1,312,000
Cost of goods sold	978,100
Gross margin	$ 333,900
Less: Selling and administrative expenses	204,600
Operating income	$ 129,300

MULTIPLE CHOICE EXERCISES

Exercise 2.23

a.

Direct materials used = $19,300 + $275,800 – $16,000 = $279,100

Direct materials	$279,100
Direct labor	153,000
Overhead	267,300
Total manufacturing cost	$699,400
Add: Beginning WIP	41,200
Less: Ending WIP	(30,600)
Cost of goods manufactured	$710,000

Unit cost of goods manufactured = $710,000/25,000 = $28.40

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Exercise 2.24

b. Units ending finished goods = 4,000 + 25,000 – 26,500 = 2,500

Direct materials	$16.00
Direct labor	5.30
Variable overhead	2.90
Fixed overhead ($320,000/25,000)	12.80
Total unit variable cost	$37.00

Finished goods ending inventory = 2,500 × $37* = $92,500

***Since the unit cost of beginning finished goods ($148,000/4,000 = $37) and the unit cost of current production both equal $37, the unit cost of ending finished goods must also equal $37.**

Exercise 2.25

d. Sales (26,500 × $60)	$1,590,000
Cost of goods sold	980,500
Gross margin	$ 609,500

Gross margin percentage = $609,500/$1,590,000 = 0.3833 or 38.33%

Exercise 2.26

b.

Exercise 2.27

c. Direct materials	$ 80,000
Direct labor	40,000
Factory overhead	74,000
Total manufacturing costs	$194,000

Cost of goods manufactured equals $194,000 since beginning and ending inventories of work in process were zero.

Ending finished goods inventory = $194,000 + $9,650 – $174,600 = $29,050

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PROBLEMS

Problem 2.28

1. Direct materials = $124,000 + $250,000 – $102,000 = $272,000

2. Prime cost = $272,000 + $140,000 = $412,000

3. First, calculate total overhead cost:

Depreciation on factory equipment	$ 45,000
Depreciation on factory building	30,000
Factory insurance	15,000
Factory property taxes	20,000
Factory utilities	34,000
Indirect labor salaries	156,000
Total overhead	$300,000

Conversion cost = $140,000 + $300,000 = $440,000

4. Brody Company
Statement of Cost of Goods Manufactured
For Last Year

Direct materials	$ 272,000
Direct labor	140,000
Overhead	300,000
Total manufacturing cost	$ 712,000
Add: Beginning work in process	124,000
Less: Ending work in process	(130,000)
Cost of goods manufactured	$ 706,000

Unit product cost = $706,000/100,000 units = $7.06

5. Brody Company
Statement of Cost of Goods Sold
For Last Year

Cost of goods manufactured	$706,000
Add: Beginning inventory, Finished goods	84,000
Less: Ending inventory, Finished goods	(82,000)
Cost of goods sold	$708,000

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Problem 2.28, (Concluded)

6. First, compute selling expense and administrative expense:

Utilities, sales office	$ 1,800
Sales office salaries	90,000
Sales commissions ($1,200,000 × 0.05)	60,000
Selling expense	$151,800
Depreciation on headquarters building	$ 50,000
Property taxes, headquarters	18,000
Administrative salaries	150,000
Administrative expense	$218,000

Brody Company
Income Statement
For Last Year

		Percent
Sales	$1,200,000	100.00
Cost of goods sold	708,000	59.00
Gross margin	$ 492,000	41.00
Less: Operating expenses		
Selling expenses	$ 151,800	12.65
Administrative expenses	218,000	18.17
Operating income	$ 122,200	10.18

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Problem 2.29

1. **The decision to add plastic cups was made assuming that the fixed cost pool would remain unchanged. However, management failed to realize that additional demands on activities would be made by the new product line. Their failure to recognize this was due to the fact that they did not understand that costs can be driven by factors that are unrelated to the number of units produced. For example, materials handling costs are apparently driven by the number of moves, inspection costs by the number of batches, purchasing costs by the number of orders, and accounting costs by the number of transactions. Demand for these activities increased and so supply of the activities had to be increased; each activity evidently did not have enough idle capacity to handle the increased demands.**

2. **An activity-based cost management system provides information about both unit-based and non-unit-based drivers and is concerned with tracing these costs to the individual product lines. Using this system, the need for additional resources would have been revealed, leading to a better decision. Because previously, the factory had made only one type of product, it surely did not have an ABC system, and did not need one. Now, it is unlikely that the significant cost of installing such a system would be worth it. Instead, the company's accountant could use his/her knowledge of ABC concepts to work with all departments to figure out which activities and costs would increase due to the addition of the plastic cups line. This way, the heads of production, the materials storeroom, purchasing, inspection, and accounting could have suggested the need for additional resources. These resource costs could then have been incorporated into the planning for the additional product, leading to a better decision.**

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Problem 2.30

1. **Traditional Cost System:**
   a. **Interrelated parts:** Cost accounting staff, computer, printer
   b. **Processes:** Cost assignment:
      - Direct tracing: Materials, labor
      - Driver tracing: None
      - Allocation (using direct labor hours for assignment): Setup costs, purchasing costs, materials handling costs, plant depreciation
   c. **Objectives:** Costing out of products
   d. **Inputs:** Direct materials cost, direct labor cost, setup cost, purchasing cost, materials handling cost, plant depreciation
   e. **Outputs:** Product cost report
   f. **User actions:** Submission of a bid, make-or-buy decision

   Note: **A traditional system would not use non-unit-drivers such as number of setups, moves, and orders to assign overhead costs to products. This leaves direct labor hours, a unit-based driver, as the only possibility. Since direct labor hours is not a good driver for the overhead activities listed, then allocation is the principal means of cost assignment. Furthermore, a traditional cost system would not assign sales or service costs to products, so these two items cannot be inputs for the system.**

   Activity-Based Cost System:
   a. **Interrelated parts:** Cost accounting staff, computer, printer
   b. **Processes:** Cost assignment:
      - Direct tracing: materials, labor
      - Driver tracing: Setup costs (number of setups), purchasing costs (number of orders), materials handling costs (number of moves), commissions (units sold), service costs (number of complaints)
      - Allocation: Plant depreciation (direct labor hours)
   c. **Objectives:** Costing out of products
   d. **Inputs:** Direct materials cost, direct labor cost, setup cost, purchasing cost, materials handling cost, commissions, customer service cost, plant depreciation
   e. **Outputs:** Product cost report
   f. **User actions:** Submission of a bid, make-or-buy decision

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Problem 2.30, (Continued)

2. **The differences between the two systems are found in the processes. The ABC system is driver-intensive; non-unit drivers are used to trace costs to products, whereas this is not part of the traditional system (which is allocation-intensive). The ABC system also assigns marketing and customer service costs to products, giving a more comprehensive view of product costs. Thus, although both systems provide product cost reports, the content of the reports will differ. The increased accuracy of cost assignments because of driver tracing and the additional marketing and customer service cost information provided by the ABC system should increase the quality of the bidding and make-or-buy decisions (i.e., reduce the error in decisions of this type).**

3. **Operational Model: Traditional Cost Accounting System**

Inputs	***Processes***	***Output***
Costs of:		
Direct materials		
Direct labor	**Direct tracing:**	
Setups	**Direct materials**	
Purchasing	**Direct labor**	
Materials handling	**Allocation:**	
Plant depreciation	**Overhead**	**Costing out product**

Feedback ⟶ **Actions** ⟶ **Evaluation**

Users

Bidding decision, Make-or-buy decision

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Problem 2.30, (Concluded)

Operational Model: ABC Cost Accounting System

Inputs	*Processes*	*Output*
Costs of:	Direct tracing:	
Direct materials	Direct materials	
Direct labor	Direct labor	
	Allocation:	
Plant depreciation	Plant depreciation	
	Driver tracing:	
Setups	Setups	
Purchasing	Purchasing	
Materials handling	Materials handling	
Commissions	Commissions	
Customer service	Customer service	Costing out product

Feedback ⟶ Actions ⟶ Evaluation

Users

Bidding decision, Make-or-buy decision

4. The operational models reveal that the ABC cost system is more complex, requires more inputs, and uses more complicated processes to transform the inputs. Thus, we would expect this system to be more costly to operate. On the other hand, the increased complexity provides increased accuracy and a richer set of possible product cost definitions. The ABC system can provide both traditional and operating product cost information. Both these factors should provide an advantage when it comes to managerial decision making. (The cost of making bad decisions is reduced.) Choosing the ABC system depends on whether the benefits of improved decision making outweigh the increased measurement costs.

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Problem 2.31

Traditional Control System:

Actions	Justification
a	Performance, organizational subunit; managing costs
b	Rewards manager for subunit performance
d	Emphasizes performance of organizational subunit
g	Emphasis on controlling costs
j	Reward based on controlling costs (subunit performance)
l	Emphasis on controlling costs
o	Emphasis on subunit performance; controlling costs

Activity-Based Control System:

Actions	Justification
c	Activity-based cost used as input for activity control
e	Emphasis on activity analysis
f	Emphasis on managing activities (activity analysis)
h	Managing activities
i	Driver analysis
k	Driver analysis; activity management
m	Nonfinancial measure of performance
n	Driver analysis; activity performance

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Problem 2.32

Spencer Company
Statement of Cost of Goods Manufactured
For the Year Ended December 31

1. Direct materials:		
Beginning inventory	$ 290,000	
Add: Purchases	2,350,000	
Materials available	$2,640,000	
Less: Ending inventory	112,000	
Direct materials used in production		$2,528,000
Direct labor		1,100,000
Manufacturing overhead:		
Indirect labor	$ 334,000	
Depreciation, factory building	525,000	
Depreciation, factory equipment	416,000	
Property taxes on factory	65,000	
Utilities, factory	150,000	
Insurance on factory	200,000	1,690,000
Total manufacturing costs added		$5,318,000
Add: Beginning work in process		450,000
Less: Ending work in process		(750,000)
Cost of goods manufactured		$5,018,000

2. Unit cost = $5,018,000/200,000 = $25.09

3. **Spencer Company**
Income Statement: Absorption Costing
For the Year Ended December 31

			Percent
Sales (191,000* × $36)		$ 6,876,000	100.00
Cost of goods sold:			
Cost of goods manufactured	$5,018,000		
Add: Beg. finished goods inventory	107,500		
Goods available for sale	$5,125,500		
Less: End. finished goods inventory	488,750	4,636,750	67.43
Gross margin		$ 2,239,250	32.57
Less: Salary, sales supervisor	$ 85,000		
Commissions, salespersons	216,000		
Advertising	500,000	801,000	11.65
Administrative expenses		390,000	5.67
Operating income		$1,048,250	15.25

* 2,500 + 200,000 – 11,500 = 191,000 units sold

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Problem 2.33

1.

Mythic, Inc.
Statement of Cost of Goods Manufactured
For the Previous Year

Direct materials	$ 5,000
Direct labor	30,000[a]
Manufacturing overhead	110,000[a]
Total current manufacturing costs	$145,000
Add: Beginning work in process	15,000[b]
Less: Ending work in process	(6,000)[b]
Cost of goods manufactured	$154,000

[a] Conversion cost = 4 × Prime cost
$140,000 = 4 (Direct materials + Direct labor)
$140,000 = 4($5,000 + Direct labor) = $20,000 + 4(Direct labor)
Direct labor = $30,000

Overhead = Conversion cost – Direct labor
Overhead = $140,000 – $30,000
Overhead = $110,000

[b] Ending WIP = 0.4 × Beginning WIP
($5,000 + $30,000 + $110,000) + Beg. WIP – (0.4 × Beg. WIP) = $154,000
Beginning WIP = $15,000; Ending WIP = 0.4 × $15,000 = $6,000

2.

Mythic, Inc.
Statement of Cost of Goods Sold
For the Previous Year

Cost of goods manufactured	$154,000
Add: Beginning finished goods	22,400
Cost of goods available for sale	$176,400
Less: Ending finished goods	7,000[a]
Cost of goods sold	$169,400[b]

[a] Ending finished goods = $176,400 – $169,400 = $7,000
[b] Cost of goods sold = 1.10 × $154,000 = $169,400

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Problem 2.34

1.

Mason, Durant, and Westbrook
Statement of Cost of Services Sold
For the Year Ended June 30

Direct materials used*	$ 46,500*
Direct labor	1,400,000
Overhead	100,000
Total service costs added	$1,546,500
Add: Beginning work in process	44,000
Less: Ending work in process	(13,000)
Cost of services sold	$1,577,500

* Because all other data for the statement are given, you can work backward from the cost of services sold to get the direct materials used. In this type of firm, direct materials probably includes supplies such as paper, toner, file folders, envelopes, etc.

2. The dominant cost is direct labor (for the 15 professionals). Although labor is the major cost of providing many services, it is not always the case. For example, the dominant cost for some medical services may be overhead (e.g., CAT scans). In some services, the dominant cost may be materials (e.g., funeral services).

3.

Mason, Durant, and Westbrook
Income Statement
For the Year Ended June 30

Sales (3,000 × $850)		$2,550,000
Cost of services sold		1,577,500
Gross margin		$ 972,500
Less operating expenses:		
Selling expenses	$ 65,000	
Administrative expenses	257,000	322,000
Operating income		$ 650,500

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Problem 2.34, (Concluded)

4. **Services have three attributes that are not possessed by tangible products: (1) intangibility, (2) perishability, and (3) inseparability. Intangibility means that the buyers of services cannot see, feel, hear, or taste a service before it is bought. Perishability means that services cannot be stored. Therefore, there will never be any finished goods inventories, making the cost of services produced equal to cost of services sold. Inseparability means that providers and buyers of services must be in direct contact for an exchange to take place.**

   The average cost of preparing one tax return last year was $526 ($1,577,500/3,000 returns). However, it will be difficult for MDW to use this figure in budgeting. Some of its accountants are no doubt more experienced than others, capable of completing a return in less time and with less research. The returns themselves differ in complexity. In addition, the seemingly continual changes in the tax law may affect certain of its clients more than others, making those clients' returns more difficult to prepare.

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Problem 2.35

1.

Orman Company
Statement of Cost of Goods Manufactured
For Last Year

Direct materials:		
Beginning inventory	$ 3,450	
Add: Purchases	183,750	
Less: Ending inventory	(2,700)	
Direct materials used in production		$184,500
Direct labor		138,000
Manufacturing overhead:		
Plant depreciation	$ 19,500	
Salary, production supervisor	47,000	
Indirect labor	68,300	
Utilities, factory	15,700	
Depreciation, factory equipment	32,000	
Supplies (0.4 × $18,000)	7,200	189,700
Total manufacturing costs added		$512,200
Add: Beginning work in process		13,250
Less: Ending work in process		(28,250)
Cost of goods manufactured		$497,200

2.

Orman Company
Income Statement: Absorption Costing
For Last Year

Sales (90,500 × $10.50)		$950,250
Cost of goods sold:		
Beginning finished goods inventory	$113,000	
Add: Cost of goods manufactured	497,200	
Goods available for sale	$610,200	
Less: Ending finished goods inventory	85,000	525,200
Gross margin		$ 425,050
Less operating expenses:		
Selling expenses*	$171,400	
Administrative expenses	168,000	339,400
Operating income		$ 85,650

*$42,000 + (0.6 × $18,000) + $75,000 + $43,600 = $171,400

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2.36 PRODUCT COST DEFINITIONS ETHICS CASE

1. **The consumer groups are using a cost definition that relies on manufacturing costs. The pharmaceutical companies' definition of cost is based on the value chain. They include the costs of research and development, and possibly the cost of selling and post-sales service. It seems quite reasonable to include the costs of research and development when discussing the cost of a drug. For the cost of a life-saving drug, such as Betaseron, the cost of marketing would not be relevant. Either a patient has a disease that would be helped by the drug or not.**

2. **As the accountant compiling costs for the drug, it is reasonable to include all costs related to research, development, and manufacture of the drug. The relevant cost of selling and delivering the drug would also be included. Allocation of costs across the corporation would be less defensible. For example, the company no doubt has advertising expenditures that are more general and benefit the company as a whole. These would be difficult to trace to the drug under consideration. This is a case that supports the need for direct and driver tracing. As a result, the IMA Statement of Ethical Professional Practice (see Chapter 1) would come into play. In particular, competence and credibility would be important. Competence requires the accountant to continually develop knowledge and skills. Credibility requires the accountant to disclose all information that could affect the user's understanding of the information and the ability to make decisions based on that information.**

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CYBER-RESEARCH CASE

2.37

Answers will vary.

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CORNERSTONES OF COST MANAGEMENT, 4E

HANSEN/MOWEN

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BASIC COST MANAGEMENT CONCEPTS

CHAPTER 2

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LEARNING OBJECTIVES

1. Describe a cost management information system, its objectives, and its major subsystems, and indicate how it relates to other operating and information systems
2. Explain the cost assignment process
3. Define tangible and intangible products, and explain why there are different product cost definitions

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LEARNING OBJECTIVES (CONTINUED)

4. Prepare income statements for manufacturing and service organizations
5. Explain the differences between traditional and contemporary cost management systems

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SYSTEMS FRAMEWORK

- **System**: Set of interrelated parts that performs one or more processes to accomplish specific objectives
  - Works by using processes to transform inputs into outputs

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SYSTEMS FRAMEWORK
(CONTINUED)

- **Accounting information system**
  - Provides information to people in a company
  - Collects, classifies, summarizes, analyzes, and manages data to provide information to users
  - Inputs are usually economic events
  - Operational model is critically involved with the user of information
  - Two major subsystems
    - Financial accounting information system
    - Cost management information system

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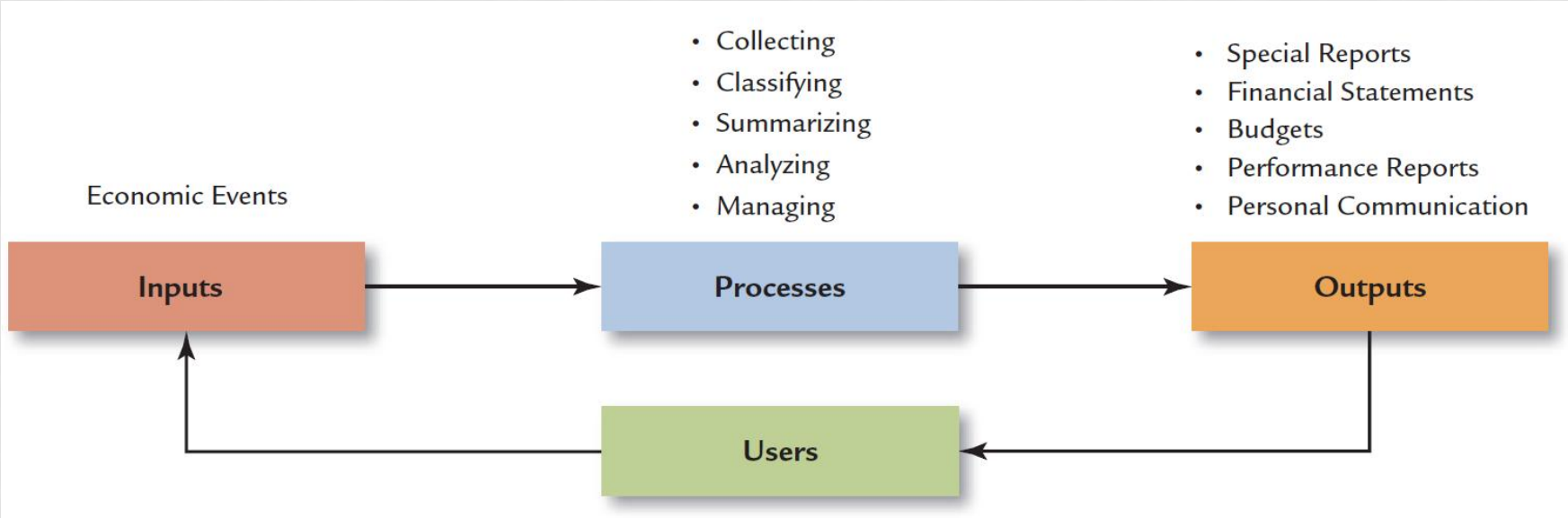
EXHIBIT 2.2 - OPERATIONAL MODEL OF AN ACCOUNTING INFORMATION SYSTEM



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FINANCIAL ACCOUNTING INFORMATION SYSTEM

- Primarily concerned with producing outputs for external users
- Inputs - Well-specified economic events
- Inputs and processes - Governed by rules and conventions established by the SEC, FASB, and IASB
- Outputs - Financial statements for external users

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COST MANAGEMENT INFORMATION SYSTEM

- Primarily concerned with producing outputs for internal users using inputs and processes needed to satisfy management objectives
- Inputs and processes - Set by management and not bound by externally imposed criteria
- Provides information for:
  - Cost services, products, and other objects
  - Planning and control
  - Decision making

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VALUE CHAIN

- Set of activities required to design, develop, produce, market, deliver, and provide post-sales service for the products and services sold to customers

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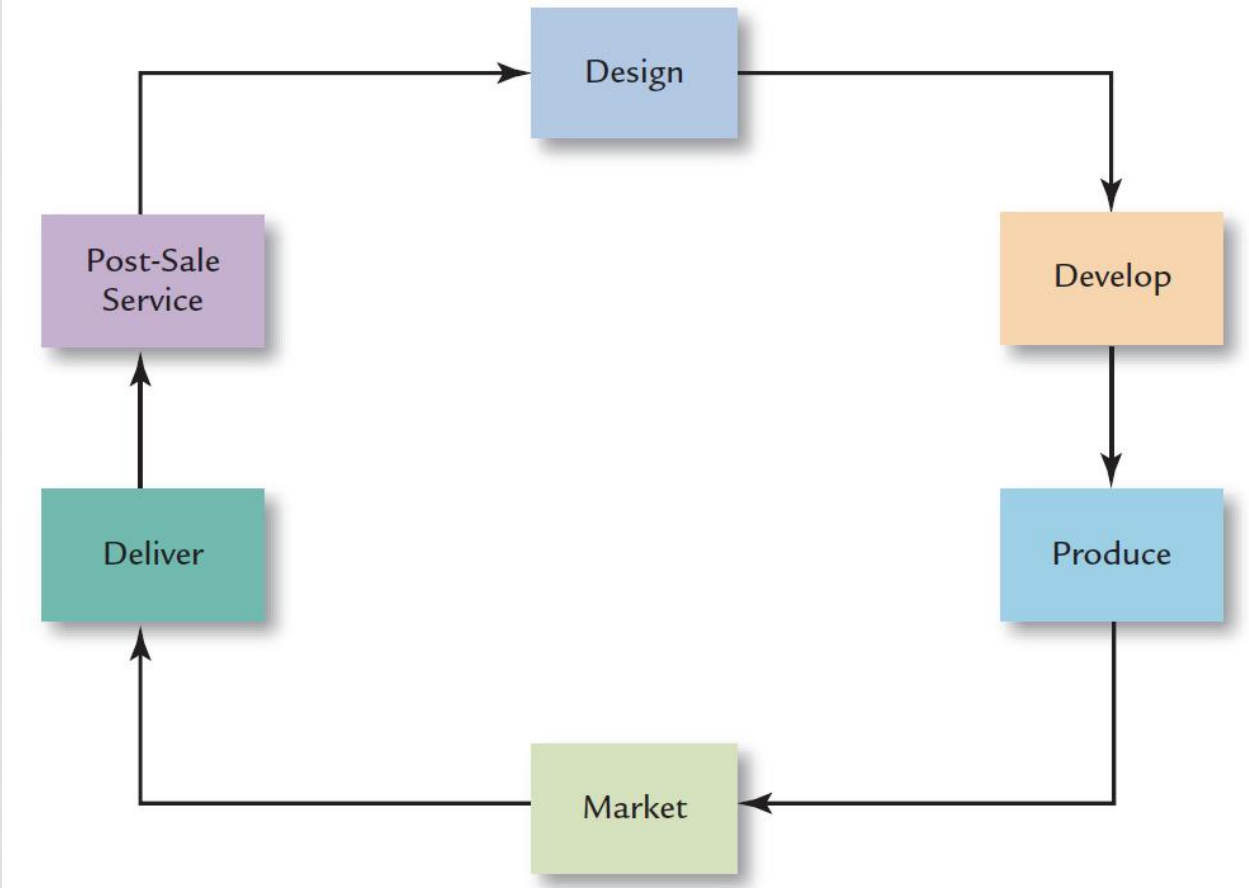
EXHIBIT 2.3 - VALUE CHAIN



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RELATIONSHIP TO OTHER OPERATIONAL SYSTEMS AND FUNCTIONS

- An integrated cost management system receives information from and provides information to all operational systems
- Enterprise resource planning systems
  - Integrative, cross-functional systems that coordinate information to facilitate timely and accurate reporting and decision making

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DIFFERENT SYSTEMS FOR DIFFERENT PURPOSES

- **Cost accounting information system**: Assigns costs to individual products and services and other objects of interest to managers
- **Operational control information system**: Provides accurate and timely feedback concerning the performance of managers and others relative to their planning and control of activities
  - Identifies opportunities for improvement

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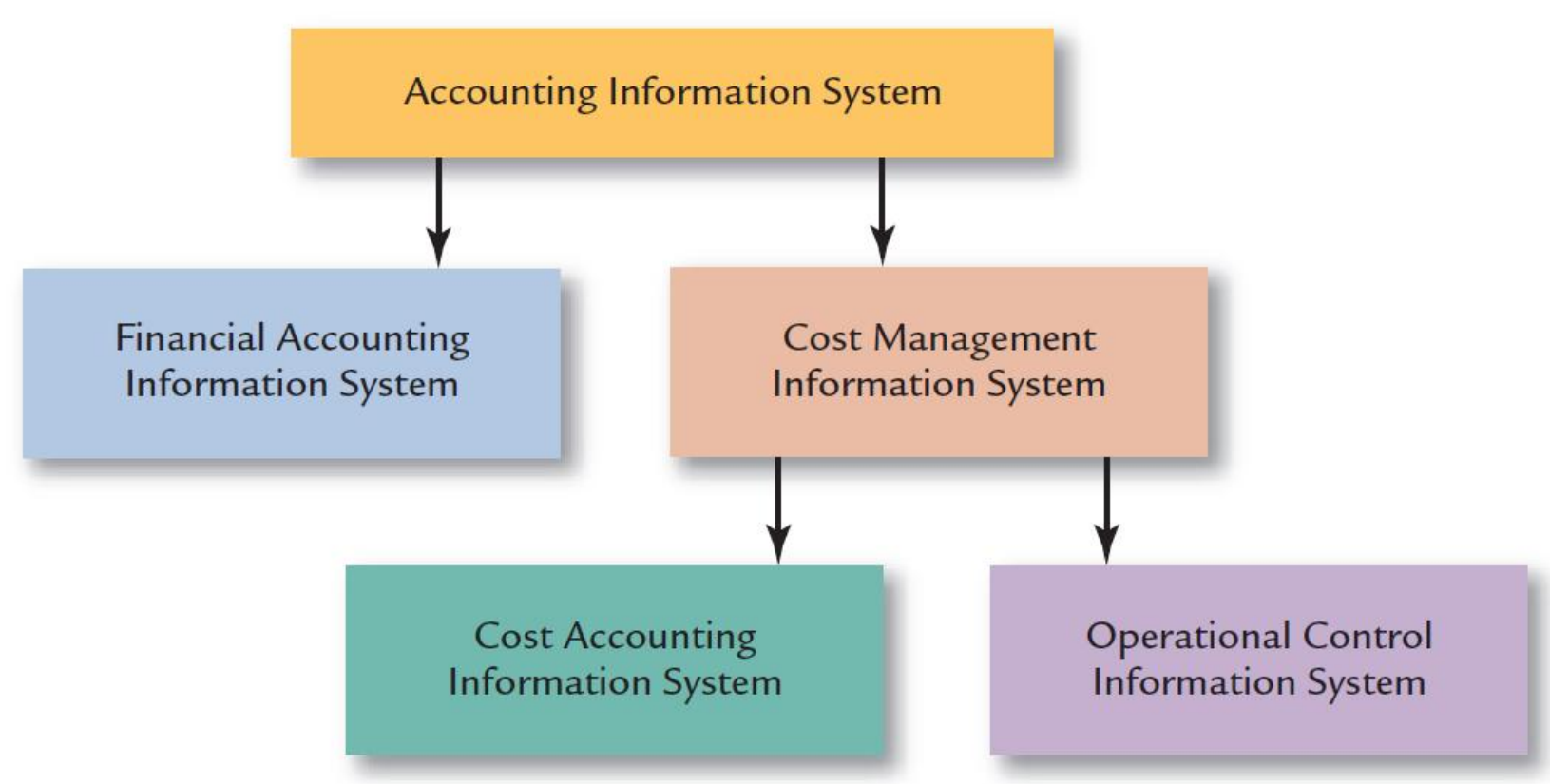
EXHIBIT 2.4 - SUBSYSTEMS OF THE ACCOUNTING INFORMATION SYSTEM



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COST ASSIGNMENT: DIRECT TRACING, DRIVER TRACING, AND ALLOCATION

- **Cost**: Cash or cash equivalent value sacrificed for goods and services that are expected to bring a current or future benefit
- **Expenses**: Expired costs that are deducted from revenues on the income statement
- **Loss**: Cost that expires without producing any revenue benefit
- **Assets**: Unexpired costs that appear on the balance sheet

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COST ASSIGNMENT: DIRECT TRACING, DRIVER TRACING, AND ALLOCATION (CONTINUED 1)

- **Cost objects**
  - Things for which costs are measured and assigned
  - Include products, customers, departments, projects, activities, etc.
- **Activity**
  - Basic unit of work performed within an organization
  - Plays a prominent role in assigning costs to other cost objects

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COST ASSIGNMENT: DIRECT TRACING, DRIVER TRACING, AND ALLOCATION (CONTINUED 2)

- **Traceability**: Ability to assign cost directly to a cost object in an economically feasible way by means of a causal relationship
  - **Indirect costs**: Costs that cannot be traced easily and accurately to a cost object
  - **Direct costs**: Costs that can be traced easily and accurately to a cost object

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COST ASSIGNMENT: DIRECT TRACING, DRIVER TRACING, AND ALLOCATION (CONTINUED 3)

- Methods of tracing
  - **Direct tracing**: Process of identifying and assigning costs to a cost object that are specifically or physically associated with the cost object
  - **Driver tracing**: Use of drivers to assign costs to cost objects
    - **Drivers**: Factors that cause changes in resource usage, activity usage, costs, and revenues

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ASSIGNING INDIRECT COSTS

- **Allocation**: Assignment of indirect costs to cost objects
  - Arbitrarily allocating indirect costs to cost objects reduces the overall accuracy of the cost assignments

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PRODUCT AND SERVICE COSTS

- **Tangible products**: Goods produced by converting raw materials into finished products
- **Services**: Tasks or activities performed for a customer or an activity performed by a customer using an organization's products or facilities

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PRODUCT AND SERVICE COST
(CONTINUED)

- Services differ from tangible products on the following important dimensions:
  - **Intangibility**: Buyers of services cannot see, feel, hear, or taste a service before it is bought
  - **Perishability**: Services cannot be stored
  - **Inseparability**: Producers of services and buyers of services must usually be in direct contact for an exchange to take place

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EXHIBIT 2.5 - EXAMPLES OF PRODUCT COST DEFINITIONS

Product Cost Definition	Value-Chain Product Costs	Operating Product Costs	Traditional Product Costs
	Research and Development		
	Production	Production	Production
	Marketing	Marketing	
	Customer Service	Customer Service	
Managerial Objectives Served	Pricing Decisions Product Mix Decisions Strategic Profitability Analysis	Strategic Design Decisions Tactical Profitability Analysis	External Financial Reporting

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PRODUCT COSTS AND EXTERNAL FINANCIAL REPORTING

- **Production (**or **product) costs**: Costs associated with manufacturing goods or providing services
  - Also known as manufacturing costs
- **Nonproduction costs**: Costs associated with the functions of selling and administration
  - Also known as nonmanufacturing costs

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PRODUCT COSTS AND EXTERNAL FINANCIAL REPORTING

(CONTINUED 1)

- **Direct materials**: Materials traceable to the goods or services being produced
- **Direct labor**: Labor that is traceable to the goods or services being produced
- **Overhead**: Production costs other than direct materials and direct labor
  - **Supplies**: Materials necessary for production that do not become part of the finished product
  - **Indirect materials**: Direct materials that form an insignificant part of the final product that are lumped together

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PRODUCT COSTS AND EXTERNAL FINANCIAL REPORTING

(CONTINUED 2)

- **Prime cost**: Sum of direct materials cost and direct labor cost
- **Conversion cost**: Sum of direct labor cost and overhead cost

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PRODUCT COSTS AND EXTERNAL FINANCIAL REPORTING

(CONTINUED 3)

- Nonproduction costs are divided into:
  - **Marketing (selling) costs**: Costs necessary to market and distribute a product or service
    - Example - Advertising, storage costs, and shipping
    - Also referred to as order-getting and order-filling costs
  - **Administrative costs**: Costs that cannot be reasonably assigned to either marketing or production
    - Example - Top-executive salaries, legal fee, and research and development

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PRODUCT COSTS AND EXTERNAL FINANCIAL REPORTING

(CONTINUED 4)

- **Period costs**: Marketing and administrative costs that are not inventoried
  - Expensed in the period in which they are incurred

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EXTERNAL FINANCIAL STATEMENTS

- Income statement - Manufacturing firm
  - Income statement prepared for external parties follows the standard format
  - Referred to as **absorption-costing income** or **full-costing income** because all manufacturing costs are fully assigned to the product
    - Expenses are separated according to function and then deducted from revenues to arrive at operating income
    - Two major functional categories of expense are cost of goods sold and operating expenses

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EXTERNAL FINANCIAL STATEMENT
(CONTINUED)

- **Cost of goods manufactured**: Total manufacturing cost of goods completed during the current period
  - Only costs assigned are the manufacturing costs of direct materials, direct labor, and overhead
    - Statement of cost of goods manufactured – Supporting schedule that has the details of the cost assignment
- **Cost of goods sold**: Manufacturing cost of the units that were sold during the period

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TRADITIONAL AND ACTIVITY-BASED COST MANAGEMENT SYSTEMS

- Traditional cost accounting
  - Assumes that all costs can be classified as fixed or variable with respect to changes in the units or volume of product
  - Uses only unit-based activity drivers to assign costs
- **Traditional operation control system**
  - Assigns costs to organizational units
  - Holds the organizational unit manager responsible for controlling the assigned costs
  - Traces costs to individuals who are responsible for costs

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ACTIVITY-BASED COST MANAGEMENT SYSTEMS

- **Activity-based cost (ABC) system**
  - Emphasizes tracing over allocation
  - Uses both unit- and non-unit-based activity drivers
- Activity-based cost control
  - Focuses on accountability for activities rather than costs
  - **Activity-based management (ABM)**
    - Focuses on the management of activities with the objective of improving the value received by the customer and the profit received by the company in providing this value

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EXHIBIT 2.7 - ACTIVITY-BASED MANAGEMENT MODEL

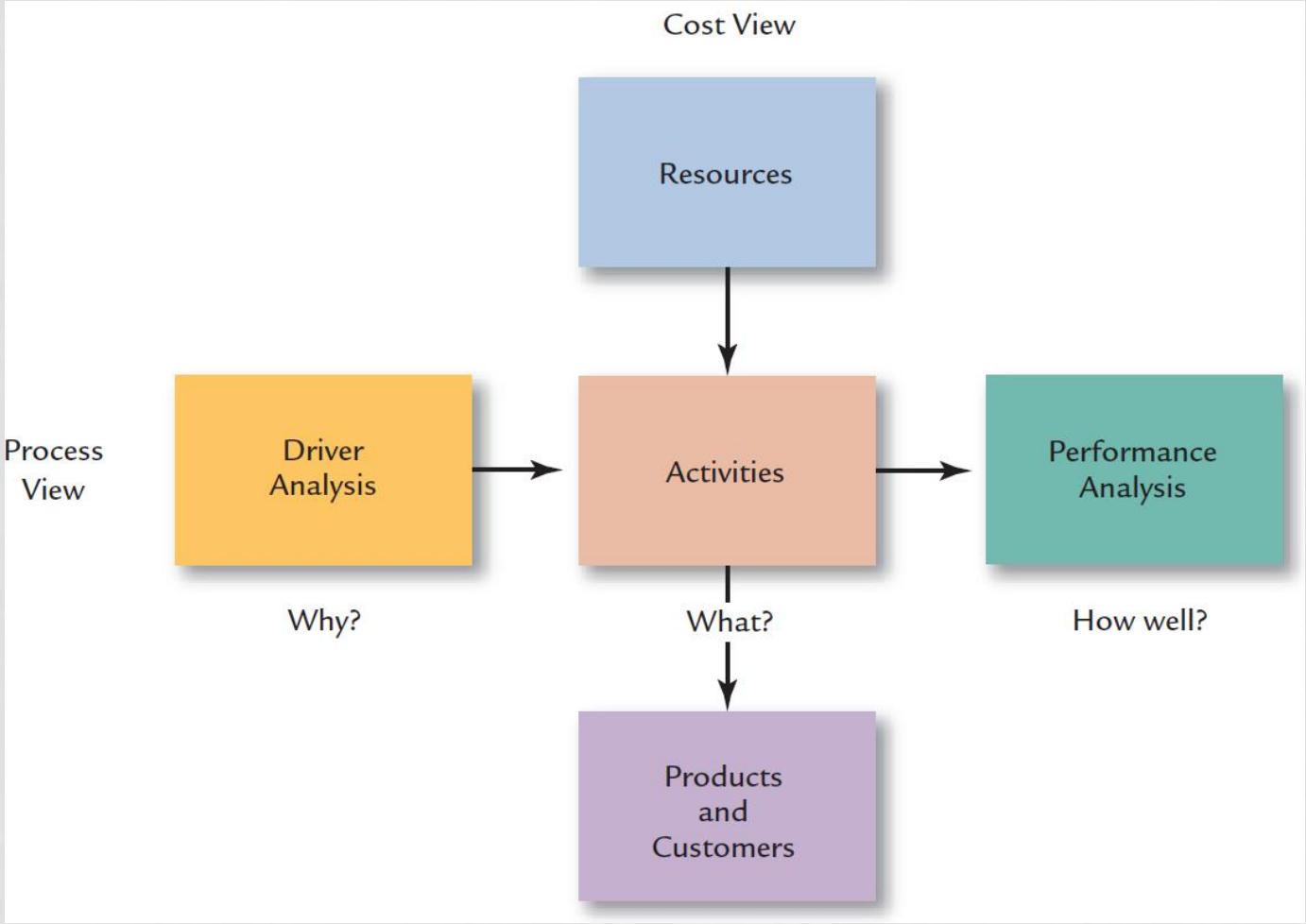

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EXHIBIT 2.8 - COMPARISON OF TRADITIONAL AND ACTIVITY-BASED COST MANAGEMENT SYSTEMS

Traditional	Activity-Based
Unit-based drivers	Unit- and non-unit-based drivers
Allocation intensive	Tracing intensive
Narrow and rigid product costing	Broad, flexible product costing
Focus on managing costs	Focus on managing activities
Sparse activity information	Detailed activity information
Maximization of individual unit performance	Systemwide performance maximization
Uses financial measures of performance	Uses both financial and nonfinancial measures of performance

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CHOICE OF A COST MANAGEMENT SYSTEM

- Activity-based cost management system offers significant benefits that includes:
  - Greater product costing accuracy
  - Improved decision making
  - Enhanced strategic planning
  - Increased ability to manage activities

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CHOICE OF A COST MANAGEMENT SYSTEM (CONTINUED)

- **Measurement costs**: Costs associated with the measurements required by the cost management system
- **Error costs**: Costs associated with making poor decisions based on bad cost information

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EXHIBIT 2.9 - TRADE-OFF BETWEEN MEASUREMENT AND ERROR COSTS

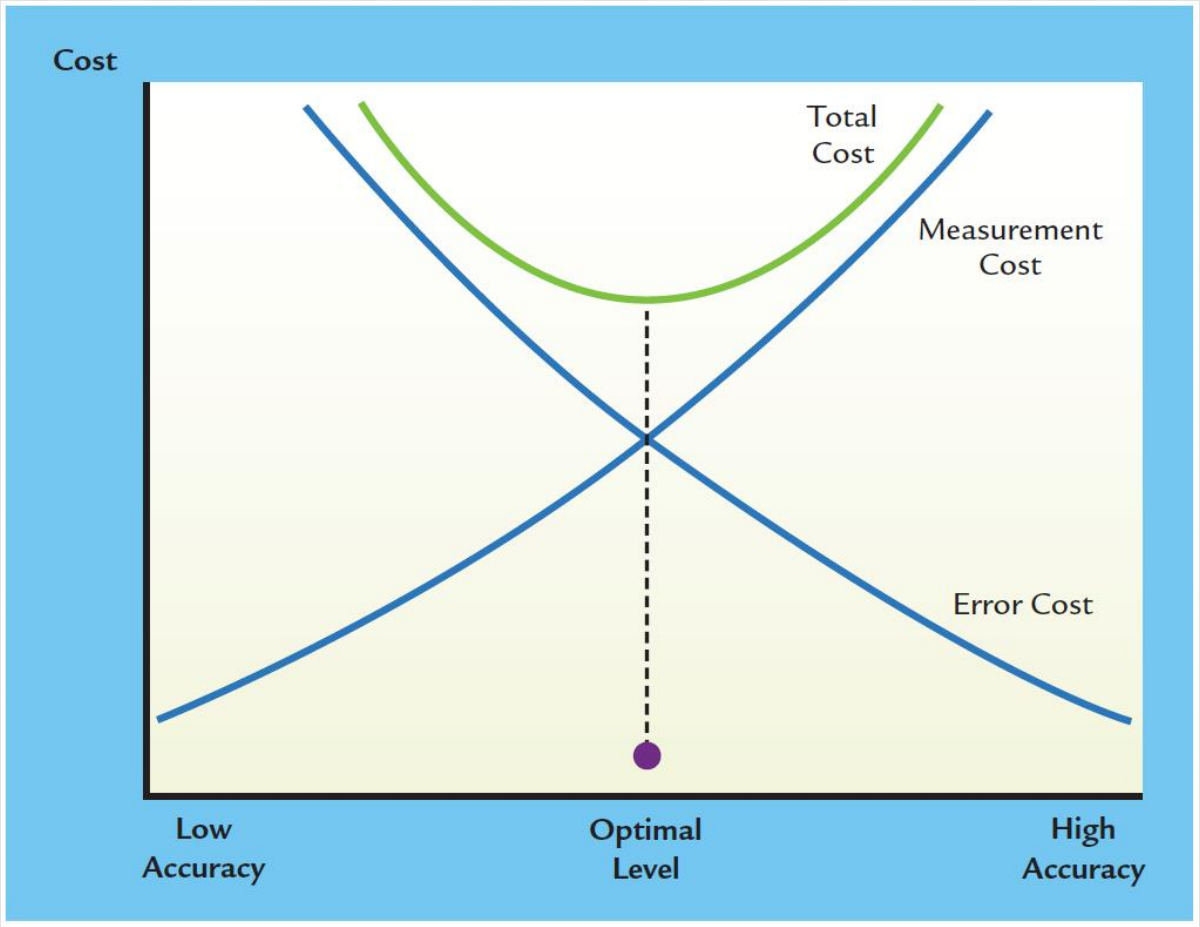

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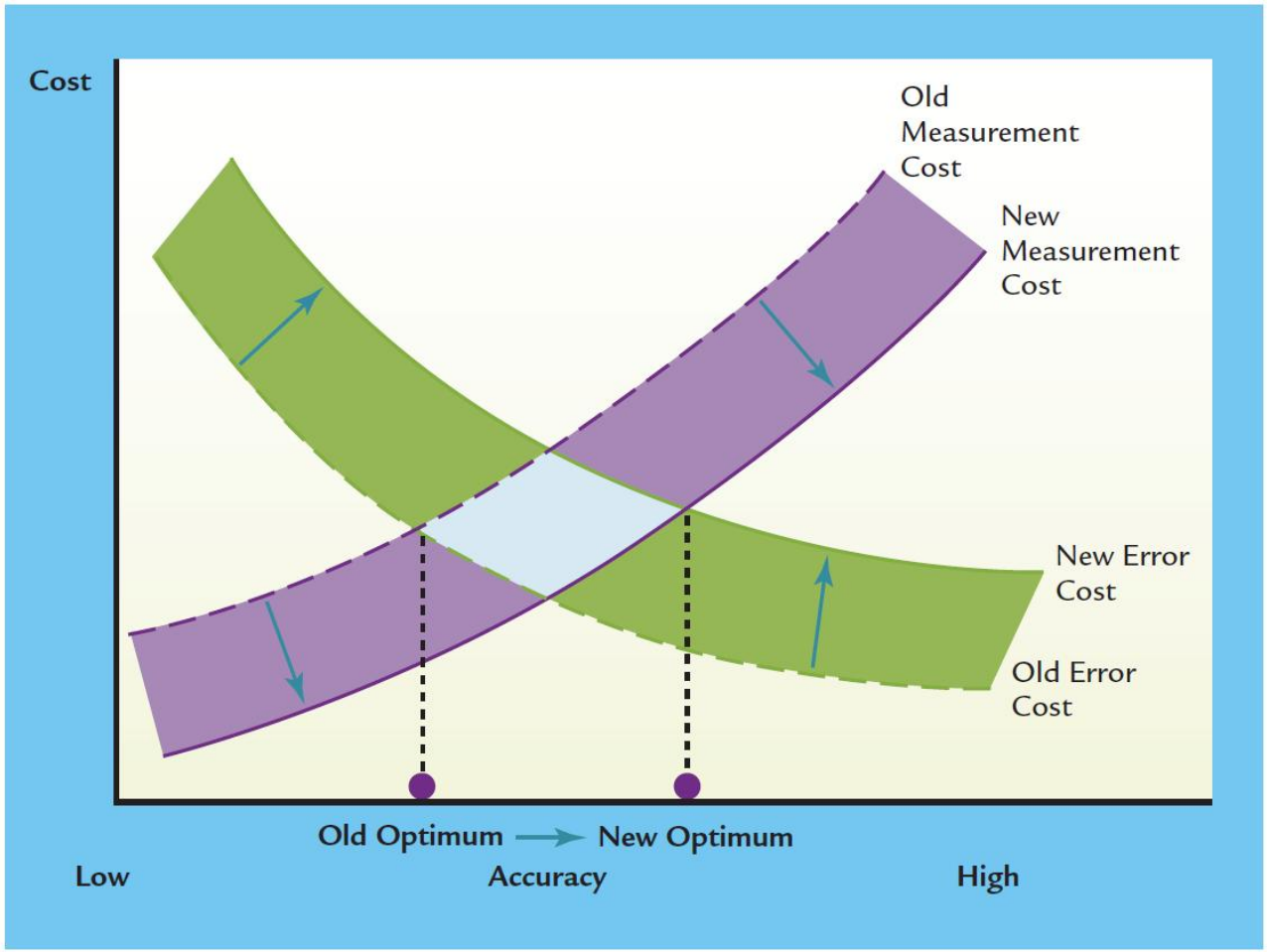
EXHIBIT 2.10 - SHIFTING MEASUREMENT AND ERROR COSTS



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END OF CHAPTER 2

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