As you can see, all kinds of organizations-Manufacturing firms, service companies, and non profit organizations- need some form of cost accounting, that part of the accounting system that measures costs for the purposes of management decision making and financial reporting. Because it is the most general case, embracing production, marketing, and general administration functions, we will focus on cost accounting in manufacturing setting. Remember, though, that you can apply this framework to any organization.

In this chapter we introduce the concepts of cost and management accounting appropriate to any manufacturing company. We also consider recent changes that have led to what is called the new manufacturing environment. Manufacturing companies are in the midst of great changes. The need to compete in global markets has changed the types of information useful to managers. At the same time technology has changed both the manufacturing processes and information-processing capabilities. Although the basic concepts of management accounting have not changed, their application is significantly different in many companies than it was a decade ago. Management accountants today must be able to develop systems to support globally oriented, technology-intensive companies, often called world-class manufacturing companies.

In addition, we discuss how cost accounting affects and is affected by financial reporting, and how the need to use costs for reported income statements and balance sheets influences the way cost accounting systems are structured.

§ CLASSIFICATIONS OF COSTS

Costs may be classified in many ways-far too many to be covered in a single chapter. This chapter concentrates on the big picture of how manufacturing cost are accumulated and classified. Chapters 13 to 16 give details on how a variety of cost accounting systems measure the costs of products or services. Chapters 13 to 15 may be studied immediately after this chapter without losing continuity. Chapter 16 can be studied after Chapter 8.

COST ACCUMULATION AND COST OBJECTIVES

A cost may be defined as a sacrifice or giving up of resources for a particular purpose. Costs are frequently measured by the monetary units (for example, dollars or francs) that must be paid for goods and services. Costs are initially recorded in elementary form (for example, repairs or advertising). Then these costs are grouped in different ways to help managers make decisions, such as evaluating subordinates and subunits of the organization, expanding or deleting products or territories, and replacing equipment.

To aid decisions, managers want to know the cost of something. This "Something" is called a cost objective or cost object, defined as any activity or resources for which a separate measurement or costs is desired. Examples of cost objectives include departments, products, territories, miles driven, bricks laid, patients seen, tax bill s sent, checks processed, student hours taught, antd library books shelved.

The cost accounting system typically includes two processes:

1. Cost Accumulation: collecting costs by some "natural" classification such as materials or labor.
2. Cost Allocation: tracing and reassigning costs to one or more cost objectives such as departments, customers, or product.

Exhibit 4-1 illustrates these processes. First, the costs of all raw materials are accumulated. Then they are allocated to the departments that use them and further to the specific items made by these departments. The total raw materials cost of a particular product is the sum of the raw materials costs allocated to it in the various departments.

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To make intelligent decisions, managers want reliable measurements, an extremely large U.S. grocery chain, A&P, ran into profit difficulties. It began retrenching by closing many stores. Management's lack of adequate cost information about individual store operations made the closing program a hit or miss affair. A news story reported the following:

> Because of the absence of detailed profit and loss statements, and a cost allocation system that did not reflect true costs, A&P's strategists could not be sure whether an individual store was really unprofitable. For example, distribution cost were shared equally among all the stores in a marketing area without regard to such factors as a store's distance from the warehouse. Says one close observer of the company: "when they wanted to close a store, they had to wing it. They could not make rational decisions, because they did not have a fact basis."

DIRECT AND INDIRECT COST

A major feature of costs in both manufacturing and non manufacturing activities is whether the costs the costs have a direct or an indirect relationship to a particular objective. **Direct costs** can identified specifically and exclusively with a given cost objective in an economically feasible way. In contrast, indirect costs cannot be identified specifically and exclusively with a given cost objective in an economically feasible way.

Whenever it is "economically feasible," managers prefer to classify costs as direct rather than indirect. In this way, managers have greater confidence in the reported costs of products and services. "Economically feasible" means "cost effective," in the sense that managers do not want cost accounting to be too expensive in relation to expected benefits. For example, it may be economically feasible to trace the exact cost of steel and fabric (direct cost) to a specific lot of desk chairs, but it may be economically in feasible to trace the exact cost of rivets or thread (indirect costs) to the chairs.

Other factors also influence whether a cost is considered direct or indirect. The key is the particular cost objective. For example, consider a supervisor's salary in the maintenance department of a telephone company. If the cost objective is the department, the supervisor's salary is a direct cost. In contrast, if the cost objective is a service (the "product" of the company) such as a telephone call, the supervisor's salary is an indirect cost. In general, many more costs are direct when a department is the cost objective the when a service (a telephone call) or a physical product (a razor blade) is the cost objective.

Frequently managers want to know both the costs of running departments and the costs of products, service, activities, or resources. Costs are inevitably allocated to more than one cost objective. Thus a particular cost may simultaneously be direct and indirect. As you have just seen, a supervisor's salary can be both direct (with respect to his or her department) and indirect (with respect to the department's individual products or services).

CATEGORIES OF MANUFACTURING COSTS

Any raw material, labor, or other input used by any organization could, in theory, be identified as a direct or indirect cost, depending on the cost objective. In manufacturing operations, which transform materials into other goods through the use of labor and factory facilities, products are frequently the cost objective. As a result, manufacturing costs are most often divided into three major categories: (1) direct materials, (2) direct labor, and (3) factory overhead.

1. Direct-material costs include the acquisition costs of all materials that are physically identified as a part of the manufactured goods and that may be trace to the manufactured goods in an economically feasible way. Examples are iron castings, lumber, aluminium sheets, and subassemblies. Direct materials often do not include minor items such as tacks or glue because the cost of tracing these items are greater than the possible

benefits of having more precise product costs. Such items are usually called supplies or indirect materials, which are classified as a part of the factory overhead described in this list.

2. Direct-labor costs include the wages of all labor that can be traced specifically and exclusively to the manufactured goods in an economically feasible way. Examples are the wages of machine operators and assemblers. Much labor, such as that of janitors, forklift trucks operators, plant guards, and storeroom clerks, is considered to be indirect labor because it is impossible or economically in feasible to trace such activity to specific products. Such indirect labor is classified as a part of factory overhead. In highly automated factories, there may be no direct labor costs. Why? Because it may be economically infeasible to physically trace any labor cost directly to specific products.
3. Factory-overhead costs include all costs associated with the manufacturing process that are not classified as direct material or direct labor. Other terms used to describe this category are factory burden and manufacturing overhead. Examples are power, supplies, indirect labor, supervisory salaries, property taxes, rent, insurance, and depreciation.

In traditional accounting systems, all manufacturing overhead costs are considered to be indirect. However, computers have allowed modern systems to physically trace many overhead costs to products in an economically feasible manner. For example, meters wired to computer can monitor the electricity use to produce each product, and costs of setting up a batch production run can be traced to the items produced in the run. In general, the more overhead costs that can be traced directly to products, the more accurate the product cost.

PRIME COST, CONVERCION COSTS, AND DIRECT-LABOR COST

Exhibit 4-2 shows that direct labor is sometimes combined with one of the other types of manufacturing costs. The combined categories are prime

costs-direct labor plus direct materials-or conversion costs-direct labor plus factory overhead.

The twofold categorization, direct materials and conversion costs, has replaced the threefold categorization, direct materials, direct labor, and factory overhead, in many modern, automated manufacturing companies. Why? Because direct labor in such as company is a small part of costs and not worth tracing directly to the products. In fact, some companies call their two categories direct materials and factory overhead, and simply include direct labor costs in the factory overhead categories.

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Why so many different systems? As mentioned earlier, accountants and managers weigh the costs and benefits of additional categories when they design their cost accounting systems. When the costs of any single category or item become relatively insignificant, separate tracking may no longer be desirable. For example, in highly automated factories direct labor is often less than 5 % of total manufacturing costs. In such cases, it may make economic sense to combine direct-labor costs with one of the other major cost categories. Such is the case at several Hewlett-packard plants, which collect labor as just another subpart of factory overhead.

To recap, the three major categories for manufacturing product costs are direct material, direct labor, and factory overhead. Some companies, however, have only two categories: direct materials and conversion costs. As information technology improves, some companies may have four or more. For instance, a company might have direct materials., direct labor, other direct cost specifically metered power), and factory overhead.

In addition to direct-material, direct-labor, and factory-overhead costs, all manufacturing companies also incur selling and administrative costs. These costs are accumulated by departments such as advertising and sales departments. However, as you will see later in this chapter, most firm’s

financial statements do not allocate these costs to the physical units produced. In short, these costs do not become a part of the reported inventory cost of the manufactured products. Ti aid in decisions, however, managers often want to know the selling and administrative costs associated with each product. Therefore, management reports often include such costs as product costs.

§ COST ACCOUNTING FOR FINANCIAL REPORTING

Regardless of the type of cost accounting system used, the resulting costs are used in a company's financial statements. This section discusses how financial reporting requirements influence the design of cost accounting systems.

Costs are reported on both the income statement, as cost of goods sold, and the balance sheet, as inventory amounts. If you are not familiar with income statements and balance sheets, or with terms such as cost of goods sold and inventory costs, you will find and overview of them in chapter 17.

PRODUCT COSTS AND PERIOD COST

When preparing both income statements and balance sheets, accountants frequently distinguish between product costs and period costs. Product costs are cost identified with goods produced or purchased for resale. Product costs are initially identified as part of the inventory on hand. These product costs (inventoriable costs) become expenses (in the form of cost of goods sold) only when the inventory is sold. In contrast, period cost s are costs that are deducted as expenses during the current period without going through in inventory stage.

For example, look at the top half of exhibit 4-3. a merchandising company (retailer or wholesaler) acquires goods for resale without changing their basic form. The only product cost is the purchase cost of the merchandise. Unsold goods are held as merchandise inventory cost and are

shown as an asset on a balance sheet. As the goods are sold, their costs become expenses in the form of “cost of goods sold”.

A merchandising company also has a variety of selling and administrative expenses. These costs are period costs because they are deducted from revenue as expenses without ever being regarded as a part of inventory.

The bottom half of exhibit 4-3 illustrates product and period costs in a manufacturing firm. Note that direct materials are transformed into salable form with the help of direct labor and factory overhead. All these costs are product costs because they are allocated to inventory until the goods are sold. As in merchandising accounting, the selling and administrative expenses are not regarded as product costs but are treated as period cost.* (this distinction between product and period costs has a long tradition for both internal and external reporting. During the late 1980s new U.S income tax requirements forced companies to thread many selling and administrative costs as product instead of period costs. These special requirements, however, are confined to reporting to income tax authorities only.

Be sure you are clear on the differences between merchandising accounting and manufacturing accounting for such costs as insurance, depreciation, and wages. In merchandising accounting, all such items are period costs (expenses of the current period). In manufacturing accounting, many of these items are related to production activities and thus, as factory overhead, are product costs (become expenses in the form of cost of goods sold as the inventory is sold).

In both merchandising and manufacturing accounting, selling and general administrative costs are period costs. Thus the inventory cost of a manufactured product excludes sales salaries, sales commissions, advertising, legal, public relations, and the president’s salary. Manufacturing overhead is traditionally regarded as a part of finished-goods inventory cost, whereas selling expenses and general administrative expenses are not.

BALNCE SHEET PRESENTATION

Examining both halves of exhibit 4-3 together, you can see that the balance sheets of manufacturers and merchandisers differ with respect to inventories. The merchandiser's "inventory account" is supplanted in a manufacturing concern by three inventory classes that help managers trace all product costs through the production process to the time of sales.

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These classes are:

- § Direct-materials inventory: materials an hand and awaiting use in the production process
- § Work-in-process inventory: goods undergoing the production process but not yet fully completed. Costs include appropriate amounts of the three major manufacturing costs (direct material, direct labor, and factory overhead)
- § Finished-goods inventory: goods fully completed but not yet sold.

The only essential difference between the structure of the balance sheet of a manufacturer and that of a retailer or wholesaler would appear in their respective current assets sections:

Manufactured		**Retailer or wholesaler**	
Cash	$ 4,000	Cash	$ 4,000
Receivable	25,000	Receivable	25,000
Finished goods $32,000			
Work in process 22,000			
Direct material 23,000			
Total inventory	77,000	Merchandise inventories	77,000
Other current assets	1,000	Other current assets	1,000
Total current assets	$ **107,000**	Total current assets	$ **107,000**

UNITS COST FOR PRODUCT COSTING

Reporting cost of goods sold or inventory values requires costs to be assigned to units of product. Assume the following:

Total cost of goods manufactured	$ 40,000,000
Total units manufactured	10,000,000
Units cost of product for inventory purposes	
($ 40,000,000 : 10,000,000)	**$ 4**

If some of the 10 million units manufactured are still unsold at the end of the period, a part of the $40 million cost of goods manufactured will be "held back" as a cost of the ending inventory of finished goods (and shown as an asset on a balance sheet). The remainder becomes "cost of goods sold" for the current period and is shown as an expense on the income statement.

COSTS AND INCOME STSTEMENT

In income statement, the detailed reporting of selling and administrative expenses is typically the same for manufacturing and merchandising organizations, but the cost of goods sold is different:

Manufacturer	Retailer or wholesaler
Manufacturing cost of goods produced and then sold, usually composed of the three major categories of cost: direct materials, direct labor, and factory overhead.	Merchandise cost of goods sold, usually composed of the purchase cost items, include freight in, that are acquired and then resold.

Consider the additional details as they are presented in the model income statement of the manufacturing company in exhibit 4-4.
The $40 million cost of goods manufactured is subdivided into the major components of direct materials, direct labor, and factory overhead. In contrast, a wholesale or retail company would replace the entire "cost-of-goods-manufactured" section with a single line, "cost of goods purchased".

Sales (8,000,000 units @$10)		$ 80,000,000
Cost of goods manufactured and sold		
Beginning finished-goods inventory	$ ___0___	

The terms “costs” and “expenses” are often used loosely by accountants and managers. “Expense” denote all costs deducted from (match against) revenue in a given period. On the other hand, “cost” is a much broader term and is used to describe both an asset (the cost of inventory) and an expense (the cost of goods sold). Thus manufacturing costs are funnelled into an income statement as an expense (in the form of cost of goods sold) via the multistep inventory procedure shown earlier in exhibit 4-3. In contrast, selling and general administrative costs are commonly deemed expenses immediately as they are incurred.

TRANSACTIONS AFFECTING INVENTORIAS

The three manufacturing inventory accounts are affected by the following transactions:

- Direct materials inventory
  Increased by purchases of direct materials
  Decreases by use of direct materials
- Work-in-process inventory
  Increased by use of direct materials, direct labor, or factory overhead.
  Decreased by transfer of completed goods to finished-goods inventory.