

Part **One**

Introduction to Purchasing and Supply Chain Management

Chapter 1 Purchasing and Supply Chain Management

Chapter 2 Purchasing Decisions and Business Strategy

Chapter 3 The Legal Aspects of Purchasing

Chapter One

Purchasing and Supply Chain Management

Learning Objectives

1. Understand the purchasing function's contribution to profitability.
2. Identify the relationship between the purchasing function and other functional areas.
3. Explore the basic historical development of the purchasing function.
4. Understand the evolution of the basic supply management concept.
5. Differentiate between purchasing, supply management, and supply chain management.
6. Understand the relationship between the purchasing function and inventory, ordering, and transportation costs.
7. Discuss the advantages and disadvantages of centralized purchasing organizational designs.
8. Identify various purchasing organizational designs.
9. Learn about careers in purchasing.

INTRODUCTION

After millennia of unchallenged success, businesses and governments around the world are entering a new era of unprecedented openness. The movement to hold corporate officers and politicians accountable is spurred by three powerful forces: economics, technology, and zeitgeist. The entire world is experiencing a deep recession. The Internet, meanwhile, has revolutionized the speed and power of data analysis and dissemination. And financial institutions are being held responsible.

In general, the business world has become increasingly more interconnected. The European Union's (EU) financial crises are having a profound effect on North American and Asian economies. Supply management professionals must learn to adapt to the EU supply chain uncertainty. Given the level of direct investment and the trading relationships between the EU and the two largest economies—the United States and China—in the world, the world could easily slide into world economic crises. Volatile exchange rates, EU member defaults, worker strikes, and social unrest are possible throughout the EU. In order to manage supply chain risk

we must first determine specifically where the risk exists in the supply chain. Any company with a global footprint must evaluate and adapt their supply management function based on the EU realities. Keeping track of the EU financial crises must become a high priority for supply chain professionals. The financial risk of both the EU customers and strategic supplier base must be factored into demand and supply risk. The effective supply chain organization with critical strategic EU suppliers and customers must devise a plan for qualifying alternative strategic supply chain relationships. There is also an urgent need to conduct site visits and keeping a watchful eye on inventory levels.

In certain industries, Asian manufacturers dominate the United States' consumer market. Third-world nations in Central and South America, Southeast Asia, and China continue to attract U.S. manufacturers seeking low wages for laborious tasks. And, in the midst of everything, the United States is a giant consumer base with an enormous command of technology but is steadily losing the infrastructure needed to create jobs.

In addition to significant events that have impacted the world's business environment, individual firms have had to change radically in response to burgeoning technologies. Historically, the management of materials and component parts was the most neglected element in the production process. Only when the cost of materials and subassemblies increased did management attempt to investigate alternative methods to the planning and control of the acquisition and transformation functions in the organization. Instead, most firms emphasized minimizing the cost of capital and labor. The focus on labor was logical because the industrial revolution had generated many labor-intensive manufacturers. Producing large standardized batches represented the norm for some manufacturers. Some firms have embraced new technologies and invested in technology-driven manufacturing systems. Although these new systems are up and running, too frequently they are being operated just like the old models, thus defeating the very purpose the system was designed to achieve. The reality is that technology is rapidly displacing labor. During the next decade, the supply management function is likely to contribute to profits more than any other function in the company.

PURCHASING MANAGERS, BUYERS, AND PURCHASING AGENTS

Supply managers, buyers, and purchasing agents seek to obtain the highest-quality merchandise at the lowest possible purchase cost for their employers. In general, purchasers buy goods and services for use by their business organization. On the other hand, buyers typically buy items for resale. Purchasers and buyers determine which commodities or services are best for the specific requirement, choose the suppliers of the product or service, negotiate the lowest price, and award contracts that ensure that the correct amount of the product or service is received at the appropriate time. In order to accomplish these tasks successfully, purchasing managers, buyers, and purchasing agents identify foreign and domestic suppliers. Purchasing managers, buyers, and agents must become experts on the services, materials, and products they purchase.

Purchasing managers, buyers, and purchasing agents evaluate suppliers on the bases of price, quality, service support, availability, reliability, and selection. To

assist them in their search for the right suppliers, they review catalogs, industry and company publications, directories, and trade journals. Much of this information is now available on the Internet. They research the reputation and history of the suppliers and may advertise anticipated purchase actions in order to solicit bids. At meetings, trade shows, conferences, and suppliers' plants and distribution centers, they examine products and services, assess a supplier's production and distribution capabilities, and discuss other technical and business considerations that influence the purchasing decision. Once all of the necessary information on suppliers is gathered, orders are placed and contracts are awarded to those suppliers who meet the purchaser's needs.

All of these—changing economic and political environments, emerging technology versus labor, and the changing nature of purchasing as a discipline—must influence the role of purchasing and supply management. To become a competitive strategic weapon, purchasing and supply management must abandon fragmented approaches. The same company that invests in a technology-based manufacturing system (hard technology) at the same time must invest in result-oriented training programs (soft technology). The purchasing function must become an integral part of transforming raw materials and component parts into finished goods by utilizing materials, systems, information, and people. Innovative sourcing requires companywide strategies with strong executive engagement that is internally driven and customer focused.

THE EVOLUTION OF THE PURCHASING AND SUPPLY MANAGEMENT FUNCTION

To become a competitive organization in today's global economy, the purchasing and supply management function must become world class. The supply management function is the key to unlocking the value within the organization. Organizations must optimize sourcing assets. As can be seen in Figure 1.1, there are three phases in the optimization of an organization's sourcing assets. Stage 1 involves leveraging through volume discounts. It can easily lead to significant reductions in the total purchasing costs. Stage 2 involves focusing on the value proposition throughout the supply chain among customers and suppliers. Finally, stage 3 is

FIGURE 1.1
Unlocking Sourcing Value

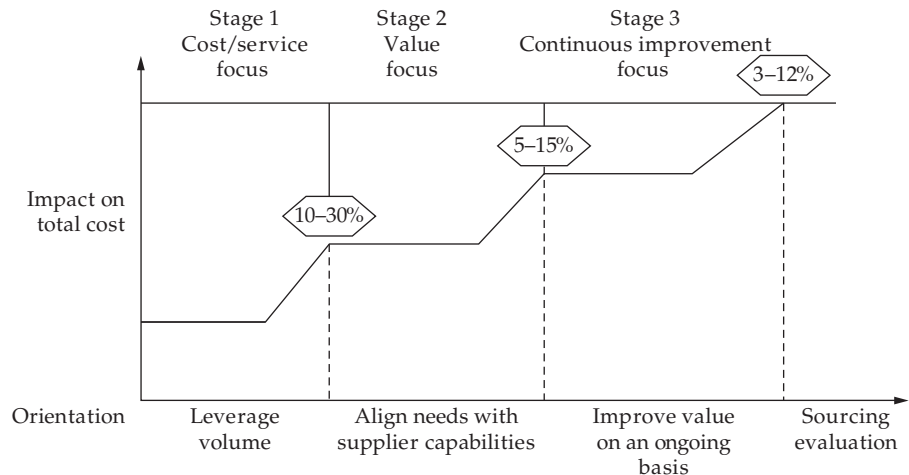


FIGURE 1.2
The Evolution of
the Sourcing
Function

| Traditional Orientation | Current Thinking |
|--|---|
| 1. Focus on prices | 1. Focus on value |
| 2. Total cost of ownership | 2. Total contribution to ownership |
| 3. Process—driver sourcing approach | 3. Strategic intent—driver sourcing approach |
| 4. Compatibility objectives | 4. Differentiation objectives |
| 5. Involvement in specification definition phase | 5. Involvement in strategic decisions |
| 6. Procurement skills | 6. Business skills |
| 7. Sourcing as adversarial zero-sum transaction | 7. Sourcing aligned and intrinsically linked with business stakeholders |

necessary for sustaining the successes in the previous two phases. Practice and high-quality feedback allow the purchasing professional the ability to make adjustments to stages 1 and 2. The organizations that produce excellence are those that continuously improve. In general the purchasing and supply management function has evolved from a pure cost management function to a competitive advantage. See Figure 1.2.

THE SUPPLY MANAGEMENT PROCESS

The primary focus of this text is integrated purchasing and supply management. See Figure 1.3. In the past 25 years, the supply management function has grown from a tactical function of purchasing/procurement into a key strategic role within organizations. Supply management now:

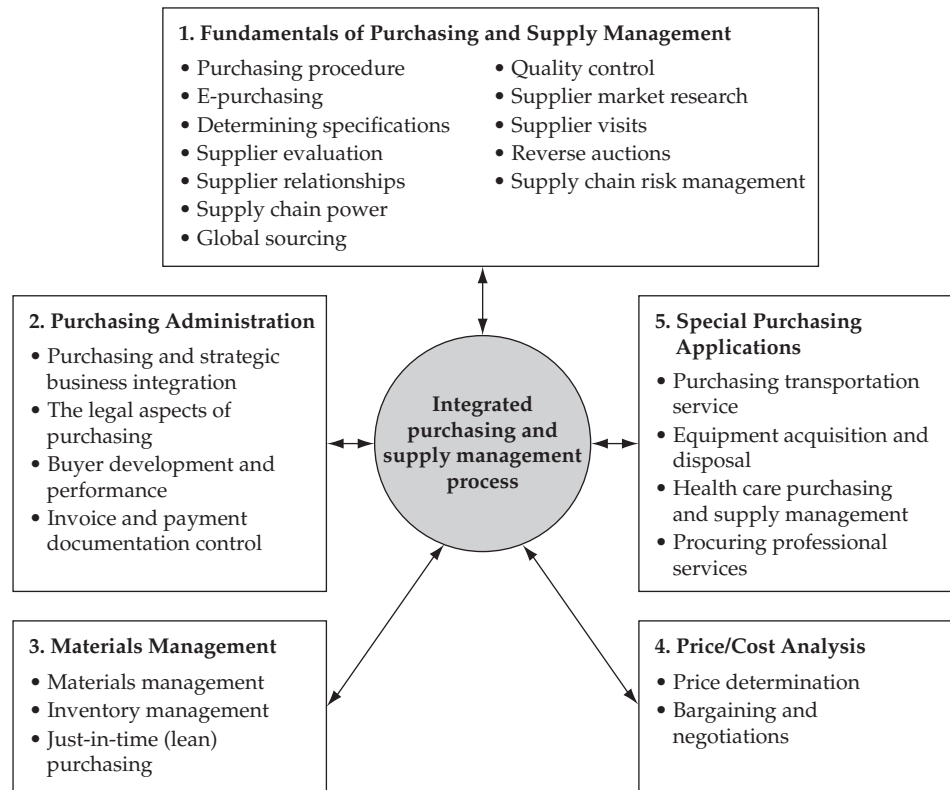
- Contributes to the bottom line.
- Serves as an information source.
- Increases efficiency and productivity.
- Enhances the continuous improvement process.
- Improves competitive position and customer satisfaction.
- Impacts the organization's image and social policy.
- Develops the organization's future leaders.

Supply management exists to explore business opportunities and implement supply strategies that deliver the most value possible to the organization, its suppliers, and its customers. Strategic supply management is the organization's primary source for collecting market intelligence and developing cost-reduction programs. Given the strategic nature of the supply function, the top supply management professional is usually a member of the organization's senior management team. In this leadership role, supply management professionals must be knowledgeable and understand all areas of the business in order to develop strategies consistent with the organization's goals and successful business procedures.

With the increasing technology and demand for global operations, supply management is often involved in finding sources for products and/or services from international suppliers. An understanding of global business concepts is increasingly important for those in the profession.

In most firms, functional managers within each area make independent decisions using similar techniques. The approach introduced in this chapter proposes that the supply management decision should be integrated. Integrative materials

FIGURE 1.3
Integrated
Purchasing and
Supply
Management
Process



management consists of the planning, acquisition, and conversion of raw materials and component parts into finished goods. In this scenario, each functional manager reports to the same superior. What's more, the managers should work for the overall purpose of delivering high-quality products to the customer on time. An important objective of this approach is to provide high-quality customer service while minimizing the cost of producing the service.

Integrative supply management is not related to the size of the firm. Realistically, the purchasing subfunctions must first be integrated before the supply function will be synergistic with other business functions.

The purpose of supply management is to support the transformation of raw materials and component parts into shipped or inventory goods. The function of inventory in general is to decouple the entire transformation process. During the transformation process, materials are combined with labor, information, technology, and capital.

The supply planning system is central to the acquisition of part and component needs in an assemble-to-order environment. The material requirements planning (MRP) function is the most important input into a manufacturing planning and control system. Although many productive companies have embraced just-in-time (JIT) philosophies, they continue to use MRP concepts to enhance the effectiveness of the manufacturing mission. Perhaps the most significant change in the past decade has been in the purchasing function. During the time period 1960–1980, most American manufacturing firms fabricated 60–80 percent of the product's value (see Figure 1.4). On the other hand, in the past decade, a large number of manufacturing firms purchased between 60 and 80 percent of the product's

FIGURE 1.4
Manufacturing Process (1960s–1980s)

Source: Srivastava and Benton (1998).

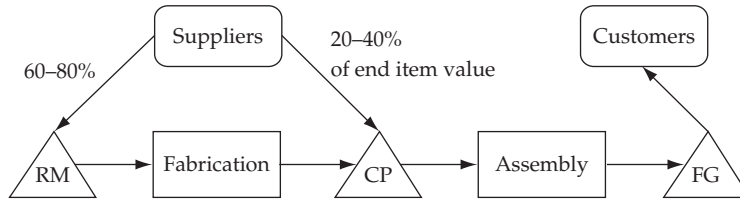
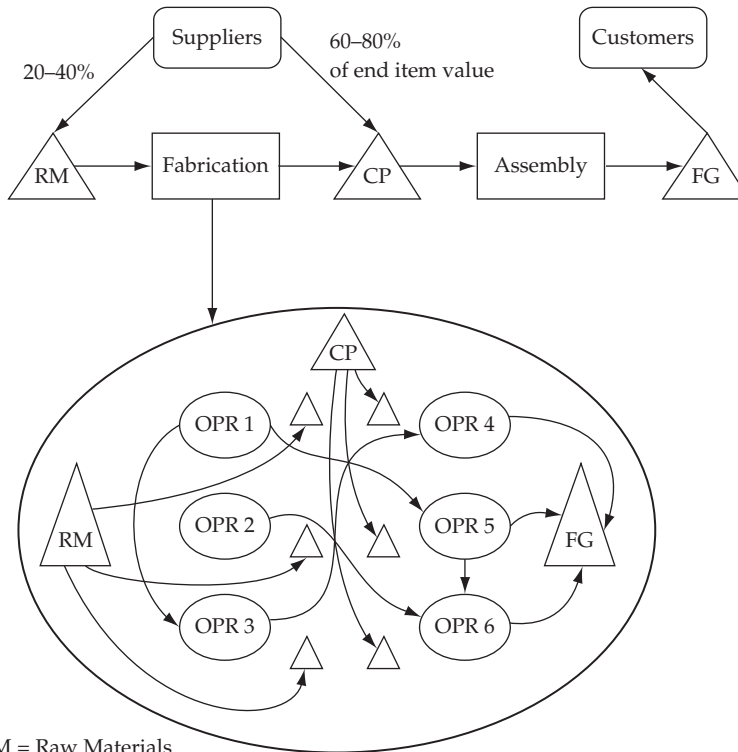


FIGURE 1.5
Manufacturing Process (1980s–now)

Source: Srivastava and Benton (1998).



RM = Raw Materials
 OPR = Operation
 FG = Finished Goods
 CP = Component Parts
 △ = Inventory Storage

value (see Figure 1.5). Since this impressive shift in percentages, the complexity of the manufacturing system has been greatly reduced. As can be seen in Figure 1.5, the complexity in the fabrication operation has been shifted upstream to the supplier. Under the traditional model, the firm transformed significantly more raw materials and labor into the end product. Today, since industrial firms are purchasing more and more subassemblies (component parts), the manufacturing focus is shifted downstream to the assembly operation. This significant shift has elevated the importance and profile of purchasing professionals.

A vice president of purchasing for a Fortune 500 company suggested that the *discount* acceptance decision cannot be made independently from the open order rescheduling decision. He went on to suggest that inventory record accuracy and open order rescheduling were key inputs into determining whether to accept or reject a specific discount schedule.

The expected economic benefit from the creation and continuous improvement of an integrated purchasing and supply management process is supply chain profit maximization. See Figure 1.5.

The global economy has evolved from exclusively manufacturing to services. Thus, it is important to show how the lessons learned from manufacturing supply management can be applied to service systems purchasing. The differences between service supply management systems and the traditional supply management systems must be acknowledged. In service supply management systems, human capital forms a significant source of the value proposition. In addition it is more of a challenge to measure value in service supply management. Chapter 18 focuses on service supply management.

PURCHASING DOLLAR RESPONSIBILITY

The cost of acquiring, storing, and moving materials is an increasingly large fraction of the *cost of goods sold*. To gain a different perspective about the importance of materials-related expenditures, consider the dollar responsibility of one General Motors materials management group:

1. Parts and materials = 10 times direct labor dollars
2. Supply management expenditures = \$100 billion
3. Transportation bill = \$3 billion
4. Purchasing buys 97 percent of all component parts.

The mission of the General Motors supply management group is to manage purchasing, planning, scheduling, and the transportation of material required for specific products in a manner that will provide a *significant competitive* advantage to the division in the production of quality trucks and cars. Integrative purchasing and supply management make possible the production of vehicles in terms of cost and quality that are competitive in the world.

Thus, we see that the dollar responsibility of supply management is very large in both relative and absolute terms. More importantly, supply management is responsible—it contributes to the competitive stance and long-run survival of the firm.

The following are ratios of materials-related costs that are typically cited in fabrication–assembly industries, for example, consumer durable goods.

Cost of purchase = 80 percent of sales

Cost of marketing (sales) = 10 percent of sales

Cost of transportation = 10 percent of sales

These ratios are increasing for various reasons: material shortages, increased use of synthetic materials, inflation, and thoroughly complex high-value products.

1. *Material shortages.* As natural resources are consumed, more costly methods of exploration, extraction, and processing are necessary. Shortages also result from political events. Former colonies of Western nations, once a low-cost and ready source of supply, have gained their independence. As autonomous nations, these new nations manage their resources to achieve economic, social, and nationalistic objectives.

In the early 1960s, nearly all the chrome in Rhodesia (Zimbabwe) was owned by U.S. firms. Rhodesia was described as a very comfortable, placid little British colony. The United States had almost no domestic sources of chromium, a material essential for manufacturing a wide range of products used in everyday life and military defense. Yet during the struggle for Rhodesian independence, the U.S. government placed an embargo on imports of chromium from Rhodesia. Prior to the second Gulf war and after the first Gulf war, there was a similar embargo on oil from Iraq.

Shortages can occur by depletion and by governments. In 1986, the U.S. government wrestled with the question of economic sanctions against the government of South Africa for its apartheid policy.

2. *Synthetic materials.* In our quest for lighter-weight products with sophisticated capabilities, we have turned more and more to man-made materials. These compounds, fabrics, and crystalline structures are the materials from which the marvels of high-tech products are made. For example, automobiles will soon boast rust-free outer skins made of laminates of ferrous and nonferrous materials. They will be powered by an engine built around a ceramic engine block. The design and production costs of such esoteric materials are reflected in their higher cost structure. There are, of course, offsets to higher purchase prices. The operating costs of the products are expected to be lower and their capabilities greater.

3. *Inflation.* During 2005, the materials buyer experienced periodic increases as material prices were adjusted upward in response to the rising costs of energy and labor. Managing materials during inflationary periods, or in developing countries with triple-digit inflation, results in decisions that would make little sense in stable environments.

4. *Complex, high-value products.* Management in the auto industry frequently hears the complaint, "They don't make them like they used to." The industry's response is, "If we did, you wouldn't buy them." Consumers demand ever more reliable and capable products. Our cars now have microprocessors to monitor the vehicle's operation and tell us everything we would want to know about the state of the car. There are seat and steering wheel heaters. There's an instrument that tells us how many miles we can travel with the gasoline inventory on board. Another device talks to us telling us to shut doors, buckle up, and so on. Recently, vehicles with a communications link that communicates with an Earth-orbiting satellite tell the driver exactly where they are. Maps are displayed on a computer monitor with a cursor showing instantaneously the location of the car. Not all products are so esoteric, but generally today's products (and those of tomorrow) will utilize more complex materials and components in more configurations with higher degrees of customization. For all these reasons, you should expect no reversal in the trends of increased dollar responsibility and the strategic importance of supply management. Where else is the potential for cost reduction and competitive advantage so great?

POTENTIAL FOR PROFIT

All supply management activities have potential for cost reduction and, hence, increased profit. The purchase of raw materials is used to illustrate what is called the "profit leverage" argument. We might just as easily have used the distribution or production activities. Suppose a firm has an income statement such as that illustrated in Figure 1.6.

FIGURE 1.6
Income Statement
Example 1

| | |
|------------------------------------|--------------|
| Sales (000s) | \$1,000 |
| Direct materials | 500 |
| Direct labor | <u>200</u> |
| Gross Profit | <u>\$300</u> |
| Selling and administrative expense | <u>250</u> |
| Net Profit | \$50 |

FIGURE 1.7
Income Statement
Example 2

| | |
|------------------------------------|--------------------|
| Sales (000s) | \$1,000 |
| Direct materials | 490 (49% of sales) |
| Direct labor | <u>200</u> |
| Gross Profit | <u>\$310</u> |
| Selling and administrative expense | <u>250</u> |
| Net Profit | \$60 |

At this level of activity, direct materials are $(500/1,000) \times 100$, or 50 percent of sales. Direct labor is 20 percent. Suppose the purchasing manager is able to reduce the cost of materials by 2 percent. Perhaps the manager bargains more skillfully, or substitutes standard materials for custom-made materials. Or perhaps a value analysis program resulted in the purchase of functionally equivalent but less costly materials. Many opportunities exist to reduce the cost of purchases. If the firm's sales remained the same, the effect on profit, given the 2 percent reduction of material cost, would look like that in Figure 1.7. For each \$1 reduction of material cost, there is a \$1 increase in profit. The ratio is 1:1.

What increase in sales would be necessary to increase profit by \$10,000 if material costs were not reduced?

Let x be the required sales; then $0.5x$ is the cost of materials and $0.2x$ is labor cost.

$$\text{Sales} = \text{Variable cost} + \text{Fixed cost} \pm \text{Profit}$$

$$x = 0.5x + 0.2x + 250 + (10 + 50)$$

$$x = \$1,033,333$$

Sales must be increased by \$33,333 to achieve the same \$10,000 increase in profit. The ratio is 3.3:1. Depending on the market, and the firm's competitive position, a sales increase of 3.3 percent may be possible only by exerting considerable effort. This is not to say that cost reductions in purchasing are achieved at no cost, but before trying to increase market share, we need to get our operating cost well in hand. Profit efficiency, not market share, should be our first concern.

INTEGRATED SUPPLY MANAGEMENT (ISM)

Whatever the appeal and promise of integrated supply management, achieving integration is a challenge. In firms with conventionally organized subfunctions, supply managers are primarily concerned with satisfying their own subfunctional objective. Purchasing managers minimize purchasing costs; marketing managers minimize distribution costs; and so on. These objectives are local, not systemwide. The decisions of a production-inventory control (PIC) manager may

maximize utilization of production equipment, yet poorly serve the requirements of the marketing manager.

The decision of the purchasing manager affects not only the purchasing function but other materials functions. It is the objective of ISM to manage the related considerations. Purchasing should consider the nonpurchasing consequences of its decisions.

Suppose a purchasing manager must decide the order quantity for a material with an annual requirement of 200,000 units. The material is consumed by manufacturing at a constant rate. The unit cost of the material is \$1. For transportation purposes, 50,000 units are considered a truckload (TL). Shipments less than 50,000 units are charged at a less-than-truckload (LTL) rate, that is higher per unit.

Asked to state their objectives, the subfunctional managers might respond by saying:

Purchasing manager: "Minimize annual ordering cost."

PIC manager: "Minimize work-in-process inventory."

Traffic manager: "Minimize transportation cost."

If the purchasing manager weighs only the purchasing objective, annual ordering cost is minimized when the annual requirement is ordered once a year. Order cost is the cost to place one order. It is incurred each time an order is placed, or part of an order is scheduled for delivery. Placing a single order for 200,000 units minimizes annual order cost but results in an average inventory of \$100,000. We assume no safety stock, and receipt of the material is at the beginning of the year.

$$\begin{aligned}\text{Average inventory} &= (\text{Beginning inventory} + \text{Ending inventory})/2 \\ &= (200,000)/2 \\ &= 100,000 \text{ units @ } \$1 \text{ per unit, the average} \\ &\quad \text{inventory value held is } \$100,000.\end{aligned}$$

The significance of average inventory is that inventory cost is a function of average inventory. Inventory is an asset. Working capital is tied up in material rather than an alternative asset. Opportunity costs as well as costs of storing, insuring, and handling are incurred when inventory exists.

If the purchasing manager considered PIC's objective (minimize WIP inventory), the order quantities would be 4,000 units, with an order going to the supplier once a week. Assume there are 50 weeks in a year. Because manufacturing requires a uniform flow of material, its weekly requirement is $200,000/50$, or 4,000, units per week. The reduction in average inventory when order quantity changes from 200,000 to 4,000 units is offset by the 50-fold increase in annual ordering cost.

To satisfy the traffic manager, the order quantity should be at least 50,000 units. With that quantity, the TL transportation rate applies and transportation costs are minimized. At 50,000 units, the average annual inventory is \$25,000 and $200,000/50,000$, or 4, orders per year are placed.

Each manager can make a strong case for the order quantity selected. If the purchasing manager ignores the PIC and traffic manager, manufacturing will have to live with a year's supply of material in its stockroom. The purchasing manager should try to quantify the inventory and order costs, and ask about other costs that might be relevant.

Suppose the cost of carrying one unit of material in inventory is \$1/year, and that the order cost is \$100/order. Assume the transportation rates are \$20/CWT LTL and \$10/CWT TL. CWT means "hundred weight," that is, 100 pounds. The

FIGURE 1.8
Integration Trade-off Example

| | Purchasing Cost | Order Quantity | Average Inventory | Orders/Year |
|--------------|-----------------|----------------|-------------------|-------------|
| Purchasing | \$100 | 200,000 | \$100,000 | 1 |
| PIC | \$5,000 | 4,000 | \$2,000 | 50 |
| Distribution | \$400 | 50,000 | \$25,000 | 4 |

weight of the material is 1 pound. In tabular form, the annual costs of the order quantities of 200,000, 4,000, and 50,000 are shown in Figure 1.8.

ANNUAL INVENTORY-ORDERING-TRANSPORTATION COSTS

At least in terms of the costs quantified, and assuming realistic estimates of inventory cost/unit/year, and cost to place an order, the order quantity of 50,000 units minimizes annual costs. A word of caution: There are often costs that have not been identified. For that reason we should not label the sum of the three costs as “total annual cost.” Later we’ll learn that the criterion for decision making in supply management is “total cost of ownership.”

Now, what effects if any does the decision in the preceding example have outside the supply management function? Let’s sample the reactions of other functional managers to the decision to order 50,000 units of the material in question.

Manufacturing manager: “Sounds good to me. I always feel good when I’ve got wall-to-wall inventory, but I don’t want to be charged with inventory in the raw storeroom.”

The point illustrates the manufacturing manager’s knowledge that while he needs to worry about a stockout only four times a year, the cost of manufacturing’s security blanket (inventory) can be high.

Controller: “\$25,000 worth of inventory on the average is just too much. It ties up working capital and money doesn’t grow on trees, you know.”

Plant engineer: “Where do you guys plan to store 50,000 units? We’re already renting warehouse space across town. Besides, this stuff gets liberated (stolen) if it gets out of our sight.”

Sales manager: “I really don’t have anything to say. Just don’t let manufacturing stock out. Keep the stuff coming off the production line. We have backorders by the tons.”

So, you see that a rather routine decision about a purchased item’s order quantity affects a variety of non-materials management people. How can the *best* decision be made—one that provides the desired *customer service* at *minimum cost*? In this example, the customers are manufacturing, sales, distribution, the final consumer, and, of course, purchasing, which is the supplier’s customer. The costs of satisfactory customer service are only partly identifiable and quantifiable. Our knowledge of the opportunity costs of poor customer service is also incomplete. Yet decisions must be made while recognizing that systemwide decision criteria are:

1. Multiple
2. Complex
3. Conflicting

Supply management is a developing discipline and an area of management specialization. Measures of customer service are usually expressed in terms of the *availability* of material. Did the plant ship on time? Was the product on the shelf when the customer entered the shop? While important, availability is only one dimension of customer service.

Purchasing, inventory control, and distribution do not have detailed cost classification and accounting procedures. In manufacturing, we have a history of cost accounting going back to the turn of the century. Elaborate techniques are used to relate costs to output levels. Costs are segregated into variable and fixed portions. Budgeting for manufacturing is done with precision using resource standards produced by work measurement methods perfected many decades ago. Tell us what you want to produce and we'll tell you exactly what amounts of resources you'll need—direct materials, manufacturing supplies, tooling, machining time, setup, and so on.

Standard costs of production are the basis for operating budgets, product prices, and control of production costs. Such is not the case in purchasing, marketing, and transportation. As these areas develop, purchasing and distribution cost accounting will become part of the accounting-information system. Standard costs to create the *time* and *place* utilities will be calculable. Budgeting for materials management activities will have the detail and reliability of budgeting in manufacturing. When supply management costs become more visible, their control becomes more feasible.

ORGANIZING FOR PURCHASING

Supply coordination involves both *structure* and *design* of the organization. Purchasing organizational *structure* is the sum total of the ways in which an organization divides its labor into distinct tasks and then coordinates among them. Organizational *design* is concerned with bringing together a group of interrelated tasks for a common goal. However, organization design alone does not ensure effectiveness or efficiency. It is a well-known fact that most companies' organizational charts do not reflect true lines of authority and responsibility that flow through managers. Too much detail can lead to micro management. On the other hand, a loosely designed organizational structure can lead to a greater risk.

In any purchasing organization, two major problems must first be considered. The first issue, where should the purchasing functions be located in the organization? Second, what level of authority should the purchasing function have? Given the evolution of outsourcing, the purchasing function is expected to gain more authority in the corporate hierarchy.

CENTRALIZED VERSUS DECENTRALIZED PURCHASING

The first issue deals with centralized purchasing of decentralized functions. Centralized purchasing involves coordinating all purchasing activities for the entire plant through one central location. That purchasing department is the only place in the firm where requisitions are processed and suppliers are selected. Decentralized purchasing authority and responsibility for supply-related functions are disposed throughout the organization.

Advantages of Centralized Purchasing

In most cases, centralized purchasing results in lower costs because of the availability of purchase quantity discounts. If all material uses are coordinated into one major purchase, the supplier will work harder to service the buying firm. Large dollar purchase quantities equal buying power. Most manufacturing firms spend more than 70 percent of their total revenue on purchasing materials and component parts. Thus, the effectiveness of a centralized organizational design will have a significant impact on profit. As an example, consider a firm that has several departments that use similar components; they could actually compete against each other for scarce material, resulting in higher prices for each department.

Centralized purchasing promotes the effective use of purchasing professionals because it allows the supply manager more authority and credibility. Each buyer can easily become an expert on associated buys (commodities and noncommodities). Expertise will be developed when there is a critical mass. GM, Dell, Walmart, and IBM all use centralized purchasing and have in-house expertise ranging from engine parts to rental cars to office equipment to pharmaceuticals.

Centralized purchasing enables the buying firm to do a better job of monitoring various changes throughout the industry. Centralized purchasing also lends itself to periodic (1) reviews of purchasing activities, (2) evaluation of suppliers, and (3) development of purchasing training programs. In decentralized purchasing operations, these important strategic activities may not be accomplished.

Centralized purchasing is preferred from the suppliers' point of view. The selling firm can easily determine whom to call on. This will improve efficiency for both parties.

According to a recent Center for Advanced Procurement and Supply (CAPS) study, 59 percent of the firms used a combination centralized–decentralized structure and 28 percent used centralized purchasing. Only 13 percent of the firms responding used decentralized purchasing.

Disadvantages of Centralized Purchasing

There are several arguments against centralization. Most of the resistance is from companies where there are decentralized profit centers. The three main arguments are given below:

1. **High engineering involvement in procurement decision making.** At the early stages of product development, engineering needs to be deeply involved with the design, which can be different with remotely located centralized purchasing.
2. **High need to coordinate purchased parts with production schedules.** This is especially applicable when small amounts are ordered frequently. The supplying firm must be within close geographical proximity or guarantee JIT deliveries. It may not be cost-effective to have centralized purchasing operations in some JIT situations.
3. **High need to buy from local community.** Sometimes it makes good political sense for firms to make purchases in the community where the plant is located.

Because of the profit-leveraging effect, profit center managers feel the need to control purchasing if they are to be held accountable for profits.

Advantages of Decentralized Purchasing

Decentralized purchasing provides for a more streamlined procedure since the department manager's purchasing needs and thus decisions can be made immediately.

TABLE 1.1 The Degree of Centralization Impacts on Purchasing Success

| | Completely Decentralized Purchasing System | Hybrid Purchasing System | Centralized Purchasing System |
|------------------------------|---|---|--|
| Advantages | Business responsiveness | Business responsiveness, increased leverage, some processes | Increased cost savings, enhanced talent management, consistent processes |
| Disadvantages | Loss of leverage, lack of consistent sourcing process | Priority given to business requirements, difficult to control and coordinate activities | Significant focus on cost savings, less focus on business requirements |
| Example Organizations | Heavy highway construction | Universities | Major retailers, automotive manufacturers, and technology |

As an example, if a manager needs to purchase 10 laptops for the business unit, the unit manager can easily make the purchase online or from a local computer store.

Disadvantages of Decentralized Purchasing

The disadvantages of decentralized purchasing are duplication of effort in buying, receiving, inspection, and accounts payable. Decentralized purchasing also prevents the buying organization from taking advantage of volume discounts.

Centralized/Decentralized Hybrid Purchasing Systems

Some organizations adopt a hybrid system that combines both centralized and decentralized purchasing. They use centralized purchasing for larger organization-wide contracts, but give individual business units autonomy to make small purchases for their departments or subsidiaries. Table 1.1 summarizes the three approaches.

THE FUTURE ORGANIZATION CONCEPT

The future outlook is that the majority of significant dollar-valued purchases will continue to be centralized. This trend also will be the result of increased computer-based management information systems. As firms become lean, centralized purchasing will become a major focus. Long-term agreements will be more frequently negotiated to stabilize prices. Honda of America is an excellent example of a firm that uses centralized procurement as a competitive weapon. Approximately 75 percent of the sales dollar for each automobile manufactured in Marysville, Ohio, is purchased from Japanese firms. Moreover, as multinational firms continue to expand and grow, the host government's national interest will increasingly become the focal point of a firm's procurement strategies. An example of geographically centralized purchasing is given in Table 1.2.

TABLE 1.2
Centralized
Purchasing
Examples

A Fortune 500 appliance company is a good example of a company that has great difficulty in centralizing purchasing on a geographical basis. The company has many plants throughout the country. Although each plant makes electrical products, the product lines are diverse. As a result, the company has relatively few common suppliers, and those are widely separated geographically.

In some cases, national pricing contracts have been negotiated on a centralized basis for common items that can be utilized by the individual plants as they see fit, particularly where the vendor has several plants nationwide and can provide adequate delivery. Such items are relatively few, however, and are of a supply rather than a production nature. In no case are actual purchase orders placed from the central location in Cincinnati. At one time, machine tools were purchased in this manner. This practice was later abandoned because of objections by manufacturing.

Even when several plants are located in the same local geographical area, their requirements could be so specialized that they would often prefer to do their own purchasing.

On the other hand, the Columbus, Ohio, plant operates with a centralized purchasing department handling the buying of all raw materials, fabricated component parts, and maintenance repair and operating (MRO) items for four product lines:

- Refrigerators and freezers
- Room air conditioners
- Specialty product (dishwashers)
- Compressors

Each division had its own manufacturing, engineering, and sales departments, all reporting to a general manager. Production control reported to the manufacturing manager in each case. Purchasing reported to the general manager.

REPORTING ASSIGNMENT

The status of the purchasing professional in an organization is determined by the capacity structure. In the majority of the Fortune 500 firms, the purchasing professional reports directly to the manufacturing vice president. This is also true for medium-sized firms. In order to be effective, the purchasing function should never report to another major line activity. If this occurs, the purchasing professional does not have the appropriate authority to make a difference. Of course, the reporting structure must be consistent with the capabilities of the specific person in each position. The purchasing organizational structure also should be different for service-based firms. Purchasing services will be addressed in Chapter 18.

A recent Center for Strategic Supply Management (CAPS) study found that in 16 percent of the firms surveyed, purchasing managers report directly to the president. However, in the majority of the firms, the purchasing manager report directly to the V.P. of Manufacturing/Operations. In smaller firms, more than one-third of the purchasing professionals report to the V.P. of Manufacturing. What's more, in firms with sales between \$5.1 and \$10 billion, 61 percent report to either the President or Executive V.P.

THE SUPPLY MANAGEMENT CONCEPT

The supply management concept is a formal organizational concept that is involved with the flow of materials through a manufacturing firm. The functional areas affected include (1) purchasing, (2) inventory control, (3) traffic, (4) production control,

Careers in Purchasing

Now is the best time for the next generation of managers to pursue a career in purchasing and supply management. Supply management professionals must possess a diverse skill set. First, the successful supply manager must have excellent technology, people, and negotiations skills in order to add value to his or her organization. Supply professionals must also be analytical problem solvers. In today's global business arena, supply management professionals must be able to interact with potential sources of materials and services throughout the world.

ISM SALARY STUDY

The average salary for a supply management professional is \$112,404. One of the major factors affecting salary and professional achievement continues to be education. Those with a bachelor's degree earned an average of \$99,490, while the average for those with a master's degree was \$134,458. Among all degree holders, average salaries were highest for respondents with a technical/engineering degree. They reported an average salary of \$126,013.

An increasing number of supply management professionals are earning salaries that exceed \$100,000. Almost one-third of the respondents to a 2012 ISM

salary survey reported earning a six-figure salary. The median salary was \$900,000, with the highest salary exceeded \$682,000. Most entry-level (less than 3 years) supply management reported an average of \$69,350. The purchasing and supply management salary drivers are job title, experience, education, credentials, annual spend, gender, and size of the organization. A summary of the results of the 2012 ISM salary survey is shown in Table 1.3.

TABLE 1.3 2012 Salary Summary

| | |
|--|------------|
| Overall average for supply management profession | \$ 112,404 |
| Average for those with five or fewer years of experience | \$ 74,911 |
| Average for those with BS/BA in business | \$109,298 |
| Average for those with CPSM certification | \$107,534 |
| Average for those with a master's degree | \$131,458 |

Source: ISM 2012 Salary Survey Results.

For a more comprehensive discussion of purchasing and supply management career opportunities, see www.ism.ws/CareerCenter.

and (5) stores, as shown in Figure 1.9. Approximately 70 percent of the firms surveyed have adopted the supply management concept. The overwhelming acceptance of the supply management concept has created a need for more technical and managerial sophistication from the supply manager.

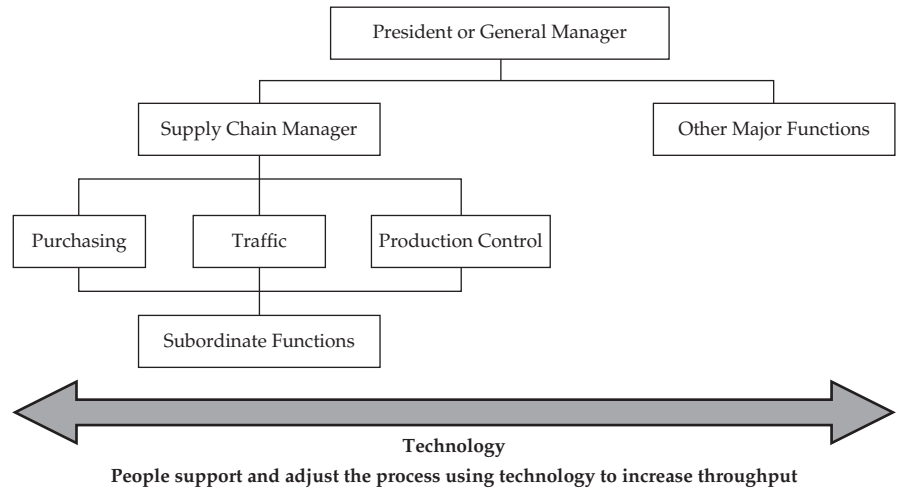
Some emerging organization structure examples of the trend toward the supply management concept are given in Figure 1.9. A common feature of all the organizational examples is that people support and adjust the process using technology to increase throughput.

The examples in this section are by no means conclusive. In summary, designing an organizational structure is dependent upon:

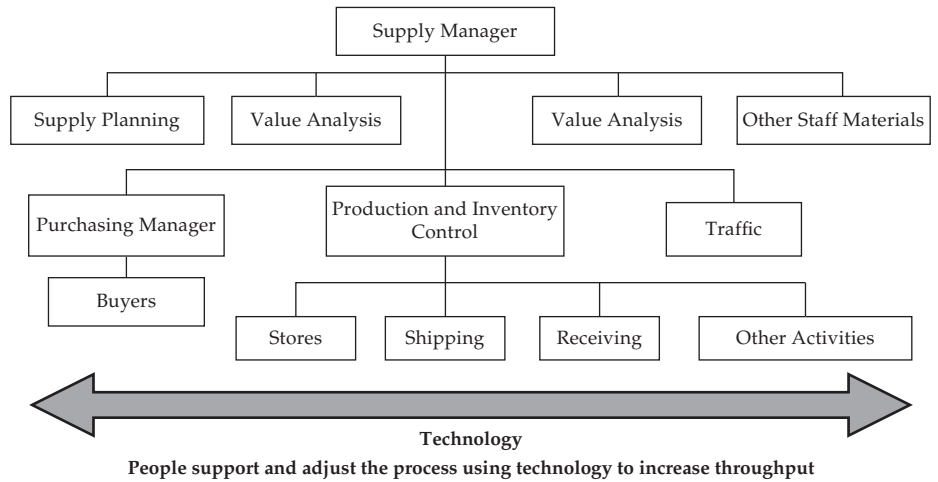
- The kind and quality of information it gathers from its customers, suppliers, and partners:
 - How the company gathers the information.
 - How it interacts with each of these constituents.
- How this information flows through the organizational structures:
 - Who has access to it and who doesn't.
 - How the information is utilized in making decisions.
 - How the information is stored for ease of use and analyzed.
- Whether both the organizational processes and systems reflect and mirror information flow.

FIGURE 1.9
Organizational
Examples

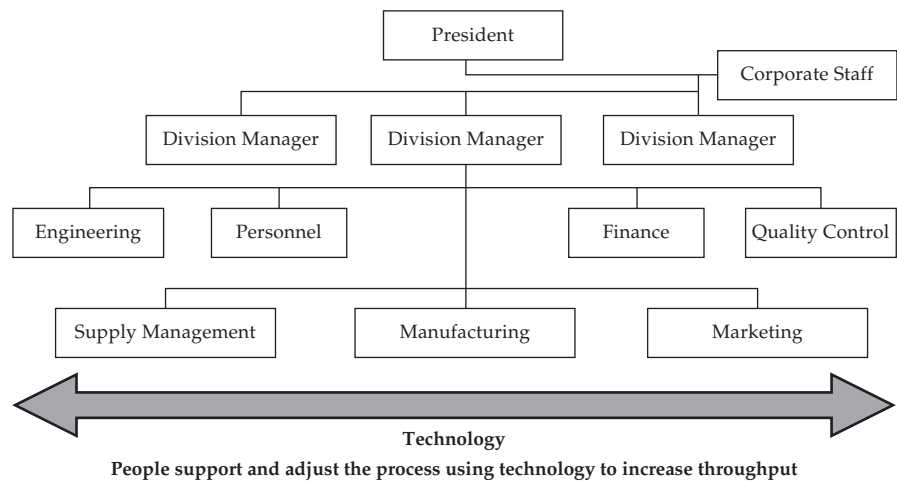
I. Basic Supply Management Organization



II. Supply Management with a Staff Operation



III. Divisional Supply Management



PROFESSIONALISM AND PURCHASING AND SUPPLY MANAGEMENT

As supply chains continue to grow globally, and as products become more complex, the supply chain professional must become more sophisticated. Supply management professionals across all industry sectors must become major players in the organization's decision-making process.

The Institute of Supply Management offers three professional certifications. They are the Certified Professional in Supply Management (CPSM), the Certified Supply Management (CSM), and the Certified Professional Supplier Diversity (CPSD). The CPSM and CSM are similar in that they require the same level of managerial and technical knowledge. The knowledge base for both certifications focuses on effective decision making in an integrated supply management operating environment. Specifically the knowledge base includes financial analysis, strategic sourcing, and international regulations. There are more than 3,700 professionals that have been certified as CPSMs and CSMs. The CPSD was established in 2010. The primary purpose of the CPSD is to show that the organization is committed to diversity throughout the company's supply chain. The 2012 ISM salary survey shows that the average salary for the CPSM credential was \$107,534 compared to \$99,740 for those without the CPSM designation. A summary of the three professional credentials is given in Figure 1.10.

FIGURE 1.10 A Snapshot of Requirements for ISM's Professional Credentials

| | CPSM® | CSM™ | | CPSD™ | |
|-------------------------------|--|--|--|--|--|
| Education Requirement | Bachelor's degree from a regionally accredited institution or international equivalent | No degree requirement | Associate's degree from a regionally accredited institution or international equivalent | No degree requirement | Bachelor's degree from a regionally accredited institution or international equivalent |
| Experience Requirement | 3 years of full-time professional supply management experience (nonclerical, nonsupport) | 5 years of full-time professional supply management experience (nonclerical, nonsupport) | 3 years of full-time professional supply management experience (nonclerical, nonsupport) with associate's degree | 5 years of professional (nonclerical, nonsupport) supplier diversity or supply management experience | 3 years of professional (nonclerical, nonsupport) supplier diversity or supply management experience |
| Testing Requirements | Pass the three CPSM® Exams or, if you are a CPM in good standing, pass the Bridge Exam | Pass the three CSM™ Exams or, if you are a CPM in good standing, pass the Bridge Exam | | Pass two Exams—the CPSD™ Exam and CPSM® or CSM™ Exam 1 | |

Source: *Supply Chain Management*, April 2012.

THE INSTITUTE OF SUPPLY MANAGEMENT EXCELLENCE AWARD

Each year the ISM recognizes organizations that exhibit outstanding achievements within the supply management profession. The winning organizations are recognized in four categories: technology, process, organization/structure, and sustainability. A brief description of each category is given below:

1. **Technology.** Innovative technology is recognized where technology is the key driver and source of substantial contribution to organizational success that is new to the field of supply management.
2. **Process.** Innovation in transforming a supply-related process such as sourcing or supplier relationships, strategic cost management, quality, inventory, transportation, and project management in ways that are new and performance enhancing for the supply management field.
3. **Organization/Structure.** Innovations in organizational change that demonstrate new and more effective supply management roles.
4. **Sustainability.** Excellence and innovation in implementing an organization's sustainability program, including principles of social responsibility.

The 2012 ISM Leaders in Supply Management Excellence are given below:

1. Award category: Technology

Winner: IBM

Website: www.ibm.com

Revenue: U.S. \$106.9 billion (full year 2011)

Number of employees worldwide: 400,000

Company description: IBM invents and integrates hardware, software, and services to help forward-thinking enterprises, institutions, and people succeed on a smarter planet.

Project focus: Supply assurance of IBM's multitier supply chain.

Key successes: Deployment of a global tool and management process to aggregate, monitor, and analyze supply at all levels and nodes in the supply chain; use of the tool to effectively manage supply disruptions.

Key individuals: Joanne Wright, vice president, global demand and supply management; Claudio Cereda, CPMT project coordinator; Martin Ball, supplier data integration; Ken Rudner, global component supply assurance; Don Journey, consulting supply chain manager.

2. Award category: Sustainability

Winner: T-Mobile USA, Inc.

Website: www.t-mobile.com

Revenue: Service revenues of U.S. \$4.67 billion in the third quarter of 2011

Number of employees worldwide: 42,000

Company description: Based in Bellevue, Washington, T-Mobile USA, Inc. is the U.S. wireless operation of Deutsche Telekom AG (OTCOX: DTEGY). By the end of the third quarter of 2011, approximately 129 million mobile customers were served by the mobile communication segments of the Deutsche Telekom group—33.7 million by T-Mobile USA—all via a common technology platform.

Multiple independent research studies continue to rank T-Mobile USA among the highest in numerous regions throughout the United States in wireless customer care and call quality.

Project focus: Inventory reduction and associated cash flow release.

Key successes: (1) Closed the ecosystem and now have cradle-to-grave control of handsets and (2) insurance utilization.

Key individuals: Chris Newell, vice president, logistics; Dennis Pettit, director, reverse logistics; Nancy Yee, director, aftermarket services; Scott Carlson, senior manager, demand planning; Michelle Gross, senior manager, analytics; Brian Stoltz, senior manager, supply planning; Kevin Sweeney, senior manager, vendor management.

3. Award category: Process

Winner: Cisco Systems, Inc.

Website: www.cisco.com

Revenue: U.S. \$44 billion

Number of employees worldwide: 64,000

Company description: Founded in 1984, Cisco Systems is the worldwide leader in networking—transforming how people connect, communicate, and collaborate.

Project focus: Understanding that Cisco's global supply chain risk exposure was broad and pervasive, the Supply Chain Risk Management (SCRM) team was formed to develop and implement processes to mitigate potential risks from new product introduction through sourcing, manufacture, test, and delivery. As part of this mandate, SCRM also orchestrates incident management teams to ensure measured and effective mitigations of actual supply chain disruptions.

Key successes: SCRM's embedded end-to-end resiliency processes delivered results through various crises that threatened supply chains worldwide.

During the financial crisis from late 2008 to mid-2010, SCRM analytics revealed that five critical suppliers faced high-risk disruptions. "Last-time buys" and second sourcing options were instituted so that Cisco was not impacted when all five of the suppliers eventually filed for bankruptcy. During the first 70 days of the 2011 Japan earthquake and tsunami, Cisco was able to mitigate impacts to its supply base, ensure minimal disruption to customer orders, and avoid a large potential revenue exposure stemming from the crisis.

Key individuals: John O'Connor, senior director, business transformation, supply chain operations; James Steele, program director, supply chain risk management, supply chain operations.

4. Award category: Organization/Structure

Winner: The American Red Cross

Website: www.redcross.org

Revenue: Not-for-profit

Number of employees worldwide: 29,000 full-time and part-time employees, and more than 500,000 volunteers

Number of supply management employees worldwide: 60

Company description: Largest U.S.-based nonprofit humanitarian organization.

Project focus: Reinvent and implement a new supply chain management focus and process within a major nonprofit organization.

Key successes: New organizational structure creating synergy with the business units; a simplified way to work with clients and suppliers; and savings in excess of U.S. \$40 million for the first two years in operation.

Key individuals: Jill Bossi, CPM, vice president, and CPO; Charles Yopp, senior director, disaster and chapter sourcing and procurement; Pam Baxter, director, enterprise sourcing and SCM services; Robert Kloak, director, biomedical sourcing; Marshall Ellis, director, real estate management; Jeff Yingling, senior director, technology sourcing.

Summary

In this new millennium, the global impact of the purchasing process for individual firms will be revolutionary. The purchasing function is quickly becoming one of the most important contributions to profitability. The “professional purchasing position” is now a viable career path. To become a competitive strategic weapon, purchasing has abandoned the fragmented approaches of the past. The purchasing function is an integral part of the transformation of raw materials and component parts into finished goods by utilizing materials, systems, information, and people.

Purchasing organization design concepts also were presented. In any purchasing organization, two major problems must be considered. The primary decision has to do with where the purchasing function should be located in the organization, and the second consideration is what level of authority the purchasing function should have. Career opportunities and salary data for purchasing professionals also were presented.

Critical to the implementation of integrated supply management is the issue of *business strategy*. Purchasing actions designed to reinforce the firm’s competitive priorities can give the firm advantages over its competitors. In essence, firms must design their purchasing actions to emphasize the competitive strategy. A framework for linking purchasing decisions with the firm’s competitive strategy will be presented in Chapter 2.

Discussion Questions

1. Compare and contrast the two unique types of purchasing categories in the business world.
2. The purchasing function can easily make a contribution to profitability. Please discuss this statement. What is the profit leverage effect of purchasing?
3. What is meant by “materials management”?
4. What is meant by “supply management”?
5. Describe how purchasing interacts with other functional areas of the firm.
6. Discuss the issue of centralization versus decentralization as it applies to the purchasing function. What are the advantages of centralized purchasing organizations? What are the disadvantages of centralized purchasing?
7. Discuss the specific objectives of purchasing and supply management. Relate these to (1) the automobile industry, (2) a hospital, and (3) a pizza shop.
8. What are some of the careers in purchasing?
9. What are the most well-known professional purchasing associations?

**Suggested
Cases**

Austin Wood Products
Advanced Computer Logic
Carter Systems Canada, Inc.
Great Lakes University

Reference

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“Purchase Quantity Discounts and
Open Order Rescheduling in an
Assemble-to-Order Environment: The

Hidden Economic Tradeoffs.” *European
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