Lt. General William Pagonis used basic planning techniques to handle logistics during Operation Desert Storm.

It was the late fall of 1990. Iraq had invaded Kuwait. The United States, along with a number of its allies, responded with Operation Desert Storm—a military action that involved sending in troops to free Kuwait. In what is now called the Persian Gulf War, several U.S. military men—particularly Generals Colin Powell and H. Norman Schwarzkopf—became national heroes. One officer, Lieutenant General William Pagonis, didn't get much media attention during the war, but he was, nevertheless, a major contributor. As commander of logistics, he was responsible for seeing that the 350,000 U.S. soldiers in the gulf during Operation Desert Storm had sufficient ammunition, food, fuel, and other critical supplies.[1]

The job Pagonis and his staff faced was staggering by almost any standard. Starting from scratch in August 1990, they built a distribution network of 50,000 workers, 100,000 trucks, and numerous massive, temporary warehouses in less than five months. They built a system that provided 1.5 million meals a day, supplied each division with 5,000 tons of ammunition and 500,000 gallons of fuel per day, and that could support the combat troops in the heart of battle for up to 60 days if necessary.

Along the way, Pagonis had to make critical adjustments. For instance, several foreign-flag crews refused to sail into the war zone, forcing Pagonis to order up replacement crews or to get supplies trucked deep into Saudi Arabia from Jedda on the Red Sea. And many of the U.S. ships were brought out of mothballs for the war. They were old. Pagonis had to find crews who could operate their old-fashioned steam turbines. In one case, Pagonis found an eighty-year-old seaman and brought him out of retirement to help. Then there was the trouble with chocolate. The heat made it melt in soldiers' hands, not in their mouths. Pagonis arranged for the Army to buy 12 million heat-resistant chocolate bars.

What kind of planning did Pagonis and his staff do? While some of it was strategic, most of their planning during Operation Desert Storm emphasized more day-to-day planning issues such as budgeting resources, scheduling the flow of supplies, and forecasting the need for trucks and ammunition.

In this chapter, we'll discuss a number of basic planning tools and techniques. We'll begin by looking at three planning techniques to assist managers in assessing their environment—environmental scanning, forecasting, and benchmarking. We'll review the most popular planning tool used by managers: budgets. We'll then discuss scheduling, break-even analysis, and other operational planning tools. Finally, we'll conclude this chapter by offering some ideas to help you in your personal, day-to-day planning. We'll present the key things you need to know about time management.

## Techniques for Assessing the Environment

In Chapter 8, we detailed the strategic management process. In this section, we want to review several techniques that have been developed to help managers with one of the most challenging aspects of this process: assessing their organization's environment. Twenty years ago, environmental analysis was an informal endeavor based on intuitive judgments. Today, using structured techniques such as environmental scanning, forecasting, and benchmarking, a manager's ability to accurately analyze an organization's environment has improved measurably.

### Environmental Scanning

Maria Iriti, who runs a glass company in Massachusetts, put in a bid of $18,000 to repair stained glass windows in a church. She won the bid but lost her shirt. She later found out that the next lowest bid had come in at $76,000. Iriti learned a valuable lesson from her mistake. She now keeps a folder on each competitor, socializes with them at trade shows, and has friends write to competitors for price lists and brochures.[2]

**environmental scanning**
The screening of much information to detect emerging trends and create scenarios.

Managers in both small and large organizations are increasingly turning to **environmental scanning** to anticipate and interpret changes in their environment.[3] The term, as we'll use it, refers to screening large amounts of information to detect emerging trends and create a set of scenarios.

The importance of environmental scanning was first recognized (outside of the national security establishment) by firms in the life insurance industry in the late 1970s.[4] Life insurance companies found that the demand for their product was declining. Yet all the key environmental signals they were receiving strongly favored the sale of life insurance. The economy and population were growing. Baby boomers were finishing school, entering the labor force, and taking on family responsibilities. The market for life insurance should have been expanding, but it wasn't. What the insurance companies had failed to recognize was a fundamental change in family structure in the United States.

Young families, who represented the primary group of buyers of new insurance policies, tended to be dual-career couples who were increasingly choosing to remain childless. The life insurance needs of a family with one income, a dependent spouse,

How do managers go about scanning the environment? How do they ascertain trends? The most effective method is to follow a formal search process. This includes reading mainstream publications such as newspapers, magazines, popular books, and trade journals; fringe literature such as politically extreme publications; and periodicals directed at particular groups such as *Working Woman* and *Ebony*. The objective is to tap into social, technological, economic, and political trends when they're in their infancy.


and a houseful of kids are much greater than those of a two-income family with few, if any, children. That a multibillion-dollar industry could overlook such a fundamental social trend underscored the need to develop techniques for monitoring important environmental developments.

**competitor intelligence**
Environmental scanning activity that seeks to identify who competitors are, what they're doing, and how their actions will affect the focus organization.

One of the fastest-growing areas of environmental scanning is **competitor intelligence.**[5] It seeks basic information about competitors: Who are they? What are they doing? How will what they're doing affect us? As Maria Iriti learned the hard way, accurate information on the competition can allow managers to *anticipate* competitor actions rather than merely *react* to them.

One expert on competitive intelligence emphasizes that 95 percent of the competitor-related information an organization needs to make crucial strategic decisions is available and accessible to the public.[6] In other words, competitive intelligence isn't organizational espionage. Advertisements, promotional materials, press releases, reports filed with government agencies, annual reports, want ads, newspaper reports, and industry studies are examples of readily accessible sources of information. Trade shows and the debriefing of your own sales force can be other good sources of information on competitors. Many firms even regularly buy competitors' products and have their own engineers break them down to learn about new technical innovations.

Extensive environmental scanning is likely to reveal a number of issues and concerns that could affect your organization's current or planned operations. Not all of these are likely to be equally important, so it's usually necessary to focus in on a limited set—say, three or four—that are most important and to develop scenarios based on each of these.

**scenario**
A consistent view of what the future is likely to be.

A **scenario** is a consistent view of what the future is likely to be. If, for instance, scanning uncovers increasing interest in Congress for raising the national minimum wage, McDonald's could create a multiple set of scenarios to assess the possible consequences of such an action. What would be the implications for its labor supply if the minimum were raised to $5.00 an hour? How about $5.50 an hour? What effect would these changes have on labor costs? How might competitors respond? Different assumptions would lead to different outcomes. The intention of this exercise is not to try to predict the future, but to reduce uncertainty by playing out potential situations under different specified conditions.[7] McDonald's could, for example, develop a set of scenarios ranging from optimistic to pessimistic in terms of the minimum-wage issue. It would then be better prepared to initiate changes in its strategy to gain and hold a competitive advantage.



Bell Canada's management has developed a set of scenarios to reflect alternative political futures for Quebec. They range from Quebec continuing as a bilingual province within a unified Canada to it becoming a separate and independent country with its own government, currency, and military.

**forecasts**
Predictions of future outcomes.

**revenue forecasting**
Predicting future revenues.

## Forecasting

Environmental scanning creates the foundation for forecasts. Information obtained through scanning is used to form scenarios. These, in turn, establish premises for **forecasts,** which are predictions of future outcomes.

***Types of Forecasts*** Probably the two most popular outcomes for which management is likely to seek forecasts are future revenues and new technological breakthroughs. However, virtually any component in the organization's general and specific environment can receive forecasting attention.

Sara Lee's sales level drives purchasing requirements, production goals, employment needs, inventories, and numerous other decisions. Similarly, the University of Arizona's income from tuition and state appropriations will determine course offerings, staffing needs, salary increases for faculty, and the like. Both of these examples illustrate that predicting future revenues—**revenue forecasting**—is a critical element of planning for both profit and not-for-profit organizations.

Where does management get the data for developing revenue forecasts? Typically, it begins with historical revenue figures. For example, what were last year's revenues? This figure can then be adjusted for trends. What revenue patterns have evolved over recent years? What changes in social, economic, or other factors in the general

MANAGING FROM A GLOBAL PERSPECTIVE

## The Role of Global Scanning

Increasingly dynamic world markets mean that managers must expand the scope of their scanning efforts in order to gain vital information on those global forces that might impact their organization.[8] As one extreme example, Mitsubishi Trading Company employs over 60,000 market analysts around the world. Those analysts' principal job is to identify and feed market information to the parent company.

The sources that managers typically have used to scan the domestic environment are too limited. Managers need to internationalize their perspectives and information sources. For instance, they can subscribe to clipping services that review newspapers and business periodicals throughout the world and provide summaries. An increasing array of electronic services can provide topic searches and automatic updates in areas of special interest to managers.

The value of global scanning to management is, of course, largely dependent on the extent of the organization's global activity. But in an industry such as telephone communications, where the fastest growth is outside the highly developed countries, global scanning has become a virtual necessity. Some companies, including AT&T and U.S. West, are actively pursuing opportunities in less-developed countries such as Mexico, Brazil, and the Philippines. In such markets, where economic growth is substantial and only a small percentage of the population has telephones, the potential for products and services such as cellular telephones is enormous.

environment might alter the pattern in the future? In the specific environment, what actions can we expect from our competitors? Answers to questions like these provide the basis for revenue forecasts.

Between 1986 and 1990, some firms including Columbia and MCA, saw one of their basic products—vinyl long-playing records—almost disappear. Consumers still wanted to listen to music, but they preferred a new technology: compact discs. The record companies that successfully forecasted this technology and foresaw its impact on their business were able to convert their production facilities, adopt the technology, and beat their competition to the record store racks. Ironically, CDs are already under attack from digital tape technology. Again, those in the music business who accurately forecast when, or if, this technology will become the preferred music medium are likely to score big in the market.

**technological forecasting**
Predicting changes in technology and when new technologies are likely to be economically feasible.

**Technological forecasting** attempts to predict changes in technology and the time frame in which new technologies are likely to be economically feasible. The rapid pace of technological change has seen innovations in lasers, biotechnology, robotics, and data communications dramatically change surgery practices, pharmaceutical offerings, the processes used for manufacturing almost every mass-produced product, and the practicality of cellular telephones. Few organizations are exempt from the possibility that technological innovation might dramatically change the demand for their current products or services. The environmental scanning techniques discussed in the previous section can provide data on potential technological innovations.

***Forecasting Techniques*** Forecasting techniques fall into two categories: quantitative and qualitative. **Quantitative forecasting** applies a set of mathematical rules to a series of past data to predict future outcomes. These techniques are preferred when management has sufficient "hard" data from which to work. **Qualitative forecasting,** on the other hand, uses the judgment and opinions of knowledgeable individuals. Qualitative techniques typically are used when precise data is scarce or difficult to obtain.

**quantitative forecasting**
Applies a set of mathematical rules to a series of past data to predict future outcomes.

**qualitative forecasting**
Uses the judgment and opinions of knowledgeable individuals to predict future outcomes.

Table 9–1 lists some of the better-known quantitative and qualitative forecasting techniques.

***Forecasting effectiveness*** In spite of the importance of forecasting to strategic planning, managers have mixed success in forecasting events and outcomes accurately.[9]

Forecasting techniques are most accurate when the environment is static. The more dynamic the environment, the more likely management is to develop inaccurate forecasts. Forecasting has a relatively unimpressive record in predicting nonseasonal turning points such as recessions, unusual events, discontinuities, and the actions or reactions of competitors.

Although forecasting has a mixed record, research offers some suggestions for improving forecasting effectiveness.[10] First, use simple forecasting techniques. They tend to do as well as, and often better than, complex methods that tend to mistake random data for meaningful information. Second, compare every forecast with "no change." A no-change forecast is very accurate approximately half the time. Third, don't rely on a single forecasting method. Make forecasts with several models and average them, especially when you make longer-range forecasts. Fourth, don't assume that you can accurately identify turning points in a trend. What is typically perceived as a significant turning point is most often an unusual random event. And fifth, accuracy declines with expanding time frames. By shortening the length of forecasts you improve their accuracy.



**TABLE 9–1** Forecasting Techniques

| Techniques | Description | Application |
|---|---|---|
| ***Quantitative*** | | |
| Time-series analysis | Fits a trend line to a mathematical equation and projects into the future by means of this equation | Predicting next quarter's sales based on four years of previous sales data |
| Regression models | Predicts one variable on the basis of known or assumed other variables | Seeking factors that will predict a certain level of sales (for example, price, advertising expenditures) |
| Econometric models | Uses a set of regression equations to simulate segments of the economy | Predicting change in car sales as a result of changes in tax laws |
| Economic indicators | Uses one or more economic indicators to predict a future state of the economy | Using change in GNP to predict discretionary income |
| Substitution effect | Uses a mathematical formulation to predict how, when, and under what circumstances a new product or technology will replace an existing one | Predicting the effect of microwave ovens on the sale of conventional ovens |
| ***Qualitative*** | | |
| Jury of opinion | Combines and averages the opinions of experts | Polling all the company's personnel managers to predict next year's college recruitment needs |
| Sales-force composition | Combines estimates from field sales personnel of customers' expected purchases | Predicting next year's sales of industrial lasers |
| Customer evaluation | Combines estimates from established customers of expected purchases | Surveying of major dealers by a car manufacturer to determine types and quantities of products desired |

## Benchmarking for TQM

**benchmarking**
The search for the best practice among competitors or noncompetitors that lead to their superior performance.

A third strategic planning tool is **benchmarking.** This is the search for the best practices among competitors or noncompetitors that lead to their superior performance.[11] The basic idea underlying benchmarking is that management can improve quality by analyzing and then copying the methods of the leaders in various fields. As such, benchmarking is a very specific form of environmental scanning.

Xerox undertook what is widely regarded as the first benchmarking effort in the United States in 1979. Up to then, the Japanese had been aggressively copying the successes of others by traveling around, watching what others were doing, then

ETHICAL DILEMMAS IN MANAGEMENT

## When Does Competitive Intelligence Become Espionage?

Texas Instruments hires a senior engineering executive from Motorola. While the new executive is certainly well qualified for his new position, so were a dozen or so other candidates. However, they didn't work for Motorola and have up-to-date knowledge of what new microchip products Motorola was developing. Is it unethical for Texas Instruments, one of Motorola's primary microchip competitors, to hire this executive? Is it acceptable to hire this executive but unacceptable to question him about Motorola's plans?

The vice president at a major book publishing company encourages one of her editors to interview for an editorial vacancy at a competing book publisher. The editor isn't interested in the position. The sole purpose of the interview will be to gain as much information as possible on the competitor's near-term publishing list and relay that information back to the vice president. Is going to such an interview unethical? Is asking a subordinate to engage in this intelligence mission unethical?

Neither of these situations involves obtaining publicly available information. Yet tactics like these are practiced by organizations in a number of highly competitive businesses.[12] When does competitive intelligence become espionage? Does any effort to conceal one's real motives when attempting to gather information automatically brand that action as unethical? What do *you* think?

applying their new knowledge to improve their products and processes. Xerox's management couldn't figure out how Japanese manufacturers could sell mid-size copiers in the United States for considerably less than Xerox's production costs. So the company's head of manufacturing took a team to Japan to make a detailed study of their competition's costs and processes. They got most of their information from Xerox's own joint venture, Fuji-Xerox, which knew its competition well. What the team found was shocking. Their Japanese rivals were light-years ahead of Xerox in efficiency. Benchmarking those efficiencies marked the beginning of Xerox's recovery in the copier field. Today, in addition to Xerox, companies such as AT&T, Du Pont, Ford, Eastman Kodak, and Motorola use benchmarking as a standard tool in their quest for quality improvement.

What does the benchmarking process look like? It typically follows four steps:

1. The organization forms a benchmarking planning team. The team's initial task is to identify what is to be benchmarked, identify comparative organizations, and determine data collection methods.
2. The team collects data internally on its own operations and externally from other organizations.
3. The data is analyzed to identify performance gaps and to determine the cause of differences.
4. An action plan is prepared and implemented that will result in meeting or exceeding the standards of others.

Ford Motor Co. used benchmarking in the early 1980s in developing their highly successful Taurus.

To illustrate its use in practice, let's look at its application at Ford Motor Co. Ford used benchmarking in the early 1980s in developing their highly successful Taurus. The company compiled a list of some 400 features its customers said were the most important, and then set about finding the car with the best of each. Then it tried to match or top the best of the competition. When the Taurus was updated in 1992, Ford benchmarked all over again. For instance, the door handles on the latest Taurus were benchmarked against the Chevrolet Lumina, the easy-to-change taillight bulbs against the Nissan Maxima, and the tilt steering wheel against the Honda Accord.



# Budgets

**budget**
A numerical plan for allocating resources to specific activities.

Few of us are unfamiliar with budgets. Most of us learned about them at an early age, when we discovered that unless we allocated our "revenues" carefully, we would consume our weekly allowance before half the week was out.

A **budget** is a numerical plan for allocating resources to specific activities. Managers typically prepare budgets for revenues, expenses, and such capital expenditures as machinery and equipment. It's not unusual, though, for budgets to be used for improving time, space, and the use of material resources. These latter types of budgets substitute nondollar numbers for dollar terms. Such items as person-hours, capacity utilization, or units of production can be budgeted for daily, weekly, or monthly activities. However, we'll emphasize dollar-based budgets in this section.

Why are budgets so popular? Probably because they are applicable to a wide variety of organizations and units within an organization. We live in a world in which almost everything is expressed in monetary units. Dollars, pesos, francs, yen, and the like are used as a common denominator within a country. Even human life has a monetary value. Insurance actuaries regularly compute the value of a lost eye, arm, or leg. While most people argue that life is priceless, American insurance companies and juries regularly convert the loss of human body parts or life itself into dollars and cents. It seems logical, then, that monetary budgets make a useful common denominator for directing activities in such diverse departments as production and marketing research, or at various levels in an organization. Budgets are one planning device that most managers, regardless of level in the organization, help to formulate.

Budgets can be used for control as well as for planning. When a budget is established, it becomes a planning tool because it gives direction. It tells what activities are important and how many resources should be allocated to each activity. A budget becomes a control mechanism when it provides standards against which resource consumption can be measured and compared. Keep in mind that a budget is not only a numerical plan, but also a control device for assessing how well activities are going.

Department Expense Budget
Calendar Year 1993

| Item | Quarter | | | |
|---|---|---|---|---|
| | *1st* | *2nd* | *3rd* | *4th* |
| Salaries/Fixed | $ 93,600 | $ 93,600 | $ 93,600 | $ 93,600 |
| Salaries/Variable | 10,000 | 15,000 | 10,000 | 30,000 |
| Performance Bonuses | | | | 35,000 |
| Office Supplies | 2,500 | 2,500 | 2,500 | 2,500 |
| Photocopying | 3,000 | 3,000 | 3,000 | 3,000 |
| Telephone | 8,000 | 8,000 | 8,000 | 8,000 |
| Mail | 2,500 | 2,500 | 2,500 | 2,500 |
| Travel | 8,000 | 3,000 | 3,000 | 3,000 |
| Library Development | 1,500 | 1,500 | 1,500 | 1,500 |
| Outside Consultants | 0 | 12,000 | 0 | 0 |
| Recruitment/Entertainment | 5,000 | 2,000 | 2,000 | 3,000 |
| Corporate Overhead | 23,500 | 23,500 | 23,500 | 23,500 |
| Total Quarterly Expenses | $157,600 | $166,600 | $149,600 | $205,600 |

## Types of Budgets

There is no shortage of items or areas for which budgets can be used. The following represent the ones managers are most likely to use.

**revenue budget**
A budget that projects future sales.

***Revenue Budgets*** The **revenue budget** is a specific type of revenue forecast. It is a budget that projects future sales. If the organization could be sure of selling everything it produced, revenue budgets would undoubtedly be quite accurate. Managers would need only to multiply the sales price of each product by the quantity it could produce. But such situations rarely exist. Managers must take into consideration their competitors, advertising budget, sales force effectiveness, and other relevant factors, and they must make an estimate of sales volume. Then, on the basis of estimates of demand at various prices, managers must select an appropriate sales price. The result is the revenue budget.

**expense budget**
A budget that lists the primary activities undertaken by a unit and allocates a dollar amount to each.

***Expense Budgets*** While revenue budgets are essentially a planning device for marketing and sales activities, expense budgets are found in all units within a firm and in not-for-profit and profit-making organizations alike. **Expense budgets** list the primary activities undertaken by a unit to achieve its goals and allocate a dollar amount to each. Lower expenses, when accompanied by stable quantity and quality of output, translate into greater efficiency. In times of severe competition, recession, or the like, managers typically look first at the expense budget as a place to make cuts and improve economic efficiencies. Because all expenses do not correspond with volume, they do not decline at the same rate when the demand for products or services drops. Managers therefore give particular attention to so-called fixed expenses—that is, those that remain relatively unchanged regardless of volume. As production drops, the variable expenses tend to control themselves because they fall with volume.

**profit budget**
A budget used by separate units of an organization that combines revenue and expense budgets to determine the unit's profit contribution.

***Profit Budgets*** The units in an organization that have easily determined revenues are often designated as profit centers and use profit budgets for planning and control. **Profit budgets** combine revenue and expense budgets into one. They are typically used in large organizations with multiple plants and divisions. Each manufacturing plant in a corporation, for instance, might charge its monthly expenses plus a charge for corporate overhead against its monthly billing revenues. Some organizations create artificial profit centers by developing transfer prices for interorganizational transactions. As a case in point, the exploration division of Texaco produces oil only for Texaco's refining division, and so the exploration unit has no real sales. However, Texaco has made the exploration unit a profit center by establishing prices for each barrel of oil the division drills and then "sells" to the refining division. The internal transfers create revenue for the exploration division and allow managers in that division to formulate and be evaluated against their profit budget.

**cash budget**
A budget that forecasts how much cash an organization will have on hand and how much it will need to meet expenses.

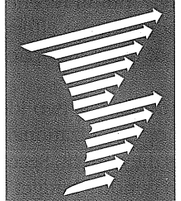
***Cash Budgets*** **Cash budgets** are forecasts of how much cash the organization will have on hand and how much it will need to meet expenses. This budget can reveal potential shortages or the availability of surplus cash for short-term investments.

**capital expenditure budget**
A budget that forecasts investments in property, buildings, and major equipment.

***Capital Expenditure Budgets*** Investments in property, buildings, and major equipment are called *capital expenditures*. These are typically substantial expenditures both in terms of magnitude and duration. For example, Chrysler's decision to build a new production plant would represent a commitment of more than $700 million. It would require an outlay of funds over several years, and it would require many years for management to recoup its investment. The magnitude and duration of these investments can justify the development of separate budgets for these expenditures. Such **capital expenditure budgets** allow management to forecast future capital requirements, to keep on top of important capital projects, and to ensure that adequate cash is available to meet these expenditures as they come due.



THE CHANGING FACE OF MANAGEMENT PRACTICE



## Loosening the Powerful Grip of Budgets

Budgets have long been *the* most popular planning tool of management. But the traditional view of budgets is being rethought. A number of well-managed organizations, including 3M, Emerson Electric, and Franco-British CMB Packaging, are loosening the grip of budgets on their organizational units.[13]

The complaints about budgets tend to center on their limited focus, their inflexibility, their tendency to discourage interunit cooperation, and, too often, their encouragement of idiotic actions in order to "look good" on the numbers.

Budgets assume that everything important can be quantified and translated into this quarter's or this year's dollars. But a lot of important activities don't show up in budgets. For example, a budget can show what a firm spent on customer service, but not what value customers put on it. And organizations have historically made "coming in on budget" a major managerial goal. Yet just because a budget was not overspent doesn't mean it was well spent.

Quarterly and annual budgets often block managers from shifting resources quickly. Instead of becoming guidelines, budgets become rigid restraints that limit flexibility. Someone has a great idea that justifies immediate action but nothing happens because "it's not in the budget." Once formalized, budgets can become ends in themselves.

Because all key units in an organization typically have their own budgets, managers in each unit tend to maximize only their own unit's self-interest, even at the expense of the overall organization. In the 1990s, when organizations are trying to foster interunit cooperation and seeking to break down structural barriers, budgets tend only to increase turf battles. Manufacturing units, for example, become more concerned with minimizing costs through long and stable production runs than with quickly responding to customers' needs for a small quantity of a specific item.

Finally, stories of bizarre behaviors created by budgets are legendary. For example, the use-it-or-lose-it mentality explains why managers can become obsessed with spending everything left in their budgets at the end of a given period, because next year's allocations are based on last year's expenditures. Or a desire to meet a budget explains why a manager would impose a fourth-quarter spending freeze that eventually costs more than it saves.

Acknowledging the downside of budgets doesn't mean that organizations are throwing them out. For the most part, the benefits of budgets exceed their costs. But progressive managements are recognizing that an obsessive emphasis on meeting budgets can discourage new ideas, risk-taking, and flexibility. So managements are downplaying the importance of budgets, making them less binding, and linking unit budgets in order to encourage cooperation.

**fixed budget**
A budget that assumes a fixed level of sales or production.

**variable budget**
A budget that takes into account those costs that vary with volume.

***Variable Budgets*** The budgets previously described are based on the assumption of a single specified volume—that is, they are **fixed budgets.** They assume a fixed level of sales or production volume. Most organizations, however, are not able to predict volume accurately. Moreover, a number of costs—such as labor, material, and some administrative expenses—vary with volume. **Variable budgets** are designed to

deal with these facts. Since plans can change, standards need to be flexible to adjust to these changes. Variable budgets represent flexible standards. They can help managers to better plan costs by specifying cost schedules for varying levels of volume.

## Approaches to Budgeting

There are essentially two approaches managers can take to budgeting. By far the most popular approach is the traditional or *incremental budget*. But in recent years, managers in some organizations have been trying to make budgets more effective by experimenting with the *zero-base budget*. Let's look at each of these approaches.

**incremental budget**
A budget that allocates funds to departments according to allocations in the previous period.

***Incremental Budgets*** The **incremental** (or traditional) **budget** has two identifying characteristics. First, funds are allocated to departments or organizational units. The managers of these units then allocate funds to activities as they see fit. Second, an incremental budget develops out of the previous budget. Each period's budget begins by using the last period as a reference point. Only incremental changes in the budget request are reviewed. Each of these characteristics, however, creates a problem.

When funds are allocated to organizational units, it becomes difficult to differentiate activities within units. Why? Because organizational units typically have a multiple set of goals and hence engage in a number of activities. Incremental budgets don't take this diversity of activities into consideration. They focus on providing funds for units rather than for activities within the units. Given that units have multiple goals, it seems reasonable to conclude that (1) some goals are more important than others, and (2) unit managers have varying degrees of success in achieving these multiple goals. Incremental budgets throw everything into the same pot. Thus, as planning devices, they lack sufficient focus and specificity.

The incremental budget is particularly troublesome when top management seeks to identify inefficiencies and waste. In fact, inefficiencies tend to grow in the incremental budget because they tend to get hidden. In the typical incremental budget, nothing ever gets cut. Each budget begins with the funds allocated for the last period—to which unit managers add a percentage for inflation and requests for those new or expanded activities they seek to pursue. Top management looks only at the requests for incremental changes. The result is that money can be provided for activities long after their need is gone.

**zero-base budgeting (ZBB)**
A system in which budget requests start from scratch, regardless of previous appropriations.

***Zero-Base Budgets*** **Zero-base budgeting (ZBB),** originally developed by Texas Instruments, requires managers to justify their budget requests in detail from scratch, regardless of previous appropriations.[14] It's designed to attack the second drawback we mentioned in incremental budgets: activities that have a way of becoming immortal. Once established, organizational activities can take on lives of their own. This is especially true in public organizations. For instance, one researcher noted that the State of New York's *Temporary* Commission of Investigation had issued its *sixteenth* annual report and that the Federal Metal and Nonmetallic Mine Safety Board of Review was abolished only after its executive secretary admitted in a front-page newspaper interview that he had no work to perform.[15]

ZBB shifts the burden of proof to the manager to justify why his or her unit should get any budget at all. The ZBB process reevaluates all organizational activities to see which should be eliminated, funded at a reduced level, funded at the current level, or increased. As illustrated in Figure 9–1, the process consists of three steps:

1. Each discrete departmental activity is broken down into a decision package.
2. The individual decision packages are ranked according to their benefit to the organization during the budget period.



3. Budget resources are allocated to the individual packages according to preferential rank in the organization.[16]

The *decision package* is a document that identifies and describes a specific activity. Usually prepared by operating managers, it includes a statement of the expected result or purpose of the activity, its costs, personnel requirements, measures of performance, alternative courses of action, and an evaluation of the benefits from performance and consequences of nonperformance from an organizationwide perspective. In more specific terms, each package lists a number of alternative methods of performing the activity, recommends one of these alternatives, and delineates effort levels. These *effort levels* identify spending targets—for instance, how the activity would be completed at 70, 90, and 110 percent of the current budget level. Any large organization that adopts ZBB will have literally thousands of these packages.

Once department managers have completed the decision packages, the packages are forwarded to the top executive group, which determines how much to spend and where to spend it. This is done by ascertaining the total amount to be spent by the organization and then by ranking all packages in order of decreasing benefits to the organization. Packages are accepted down to the spending level. When properly executed, the ZBB process carefully evaluates every organizational activity, assigns it a priority, and results in either the continuation, modification, or termination of the activity.

ZBB is no panacea. Like incremental budgeting, it has its own set of drawbacks.[17] It increases paperwork and requires time to prepare; the important activities that managers want funded tend to have their benefits inflated; and the eventual outcome rarely differs much from what would occur through an incremental budget.

The difficulty and expense of implementing ZBB suggest that it is not for every organization. The politics of large organizations often undermine any potential gain

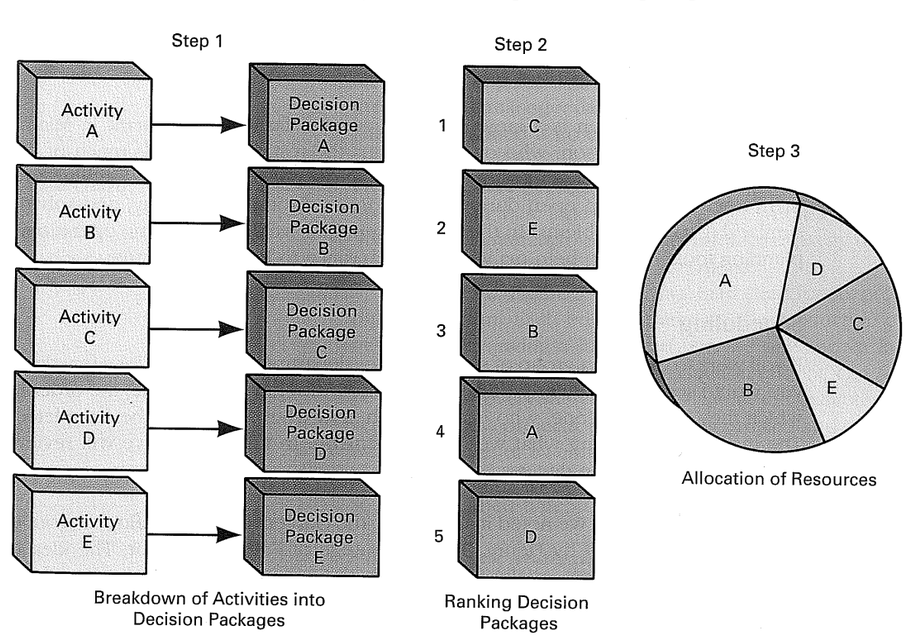
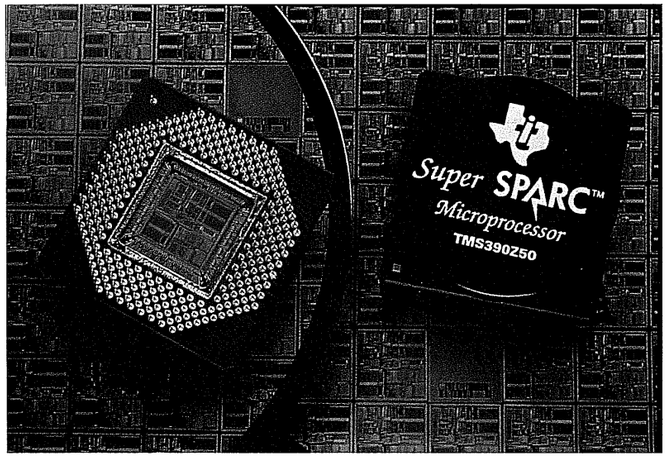



**FIGURE 9–1**
The Zero-Base Budget Process

Texas Instruments introduced zero-base budgeting as a means of prioritizing projects and improving efficiency.




that ZBB might produce. It is possibly most effective in smaller public organizations, in supporting staff units in business firms, or in declining organizations. For example, because the resource requirements of staff units in business firms, which include areas like market research and personnel, are rarely related directly to the firm's output, it's difficult to determine whether their budgets are realistic or denote efficient operation. Thus for this type of unit, ZBB may be a valuable planning and control device. Also, ZBB is compatible with managing declining resources.[18] When organizations face cutbacks and financial restraints, their managers particularly look for devices that allocate limited resources effectively. ZBB can be just such a device.

## Operational Planning Tools

Flo's Take-Out Chicken is a large, highly successful fast-food restaurant in Miami, Florida. Florence Jackson, who owns and runs the restaurant, spends much of her time setting up work schedules for the forty-five people she employs, deciding how many registers to keep open during various times throughout the day, and solving similar day-to-day problems. In the following pages, we'll discuss some operational planning tools that can help managers like Florence to be more effective.

### Scheduling

**scheduling**
A listing of necessary activities, their order of accomplishment, who is to do each, and time needed to complete them.

If you were to observe a group of supervisors or department managers for a few days, you would see them regularly detailing what activities have to be done, the order in which they are to be done, who is to do each, and when they are to be completed. The managers are doing what we call **scheduling.** In this section, we will review some useful scheduling devices.

***The Gantt Chart*** As we noted in Chapter 2, the Gantt chart was developed around the turn of the century by Henry Gantt, a protégé of Frederick Taylor. The idea is inherently simple. It is essentially a bar graph with time on the horizontal axis and the activities to be scheduled on the vertical axis. The bars show output, both planned and actual, over a period of time. The Gantt chart visually shows when tasks are supposed to be done and compares that to the actual progress on each. It is a simple but important device that allows managers to detail easily what has yet to be done to complete a job or project and to assess whether it is ahead of, behind, or on schedule.



**FIGURE 9–2**
A Gantt Chart

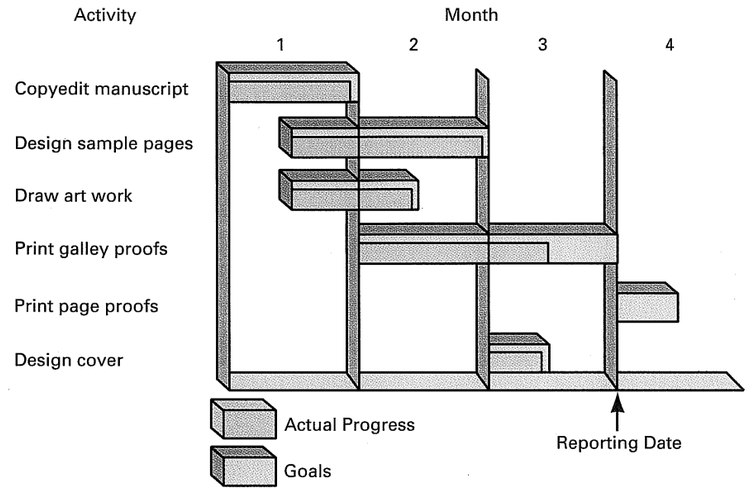



Figure 9–2 depicts a simplified Gantt chart that was developed for book production by a manager in a publishing firm. Time is expressed in months across the top of the chart. The major activities are listed down the left side. The planning comes in deciding what activities need to be done to get the book finished, the order in which they need to be done, and the time that should be allocated to each activity. Where a box sits within a time frame reflects its planned sequence. The shading represents actual progress. The chart becomes a control device when the manager looks for deviations from the plan. In this case, everything has been accomplished on schedule except the printing of galley proofs. This is two weeks behind schedule. Given this information, the manager of this project might want to take some corrective action either to pick up the two lost weeks or to ensure that no further delays will occur. At this point, the manager can expect that the book will be published at least two weeks later than planned if no corrective action is taken.

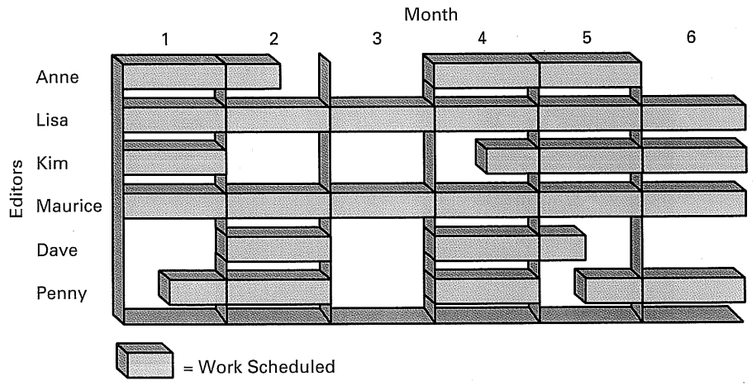
**load chart**
A modified Gantt chart that schedules capacity by work stations.

***The Load Chart*** A **load chart** is a modified Gantt chart. Instead of listing activities on the vertical axis, load charts list either whole departments or specific resources. This allows managers to plan and control for capacity utilization. In other words, load charts schedule capacity by work stations.

For example, Figure 9–3 shows a load chart for six production editors at the same publishing firm. Each editor supervises the production and design of a number of books. By reviewing a load chart like the one shown in Figure 9–3, the executive editor, who supervises the six production editors, can see who is free to take on a new book. If everyone is fully scheduled, the executive editor might decide not to accept any new projects, to accept new projects and delay others, to make the editors work overtime, or to employ more production editors. In Figure 9–3, only Lisa and Maurice are completely booked for the next six months. Since the other editors have some unassigned time, they might be able to accept one or more new projects.

***PERT Network Analysis*** Gantt and load charts are helpful as long as the activities or projects being scheduled are few in number and independent of each other. But, what if a manager had to plan a large project such as a reorganization, the launching of a cost-reduction campaign, or the development of a new product that required coordinating inputs from marketing, production, and product design personnel? Such projects require coordinating hundreds or thousands of activities, some of which must be done simultaneously and some of which cannot begin until earlier activities

**FIGURE 9–3**
A Load Chart




have been completed. If you're constructing a building, you obviously can't start erecting walls until the foundation is laid. How, then, can you schedule such a complex project? You could use the Program Evaluation and Review Technique.

**Program Evaluation and Review Technique (PERT)**
A technique for scheduling complicated projects comprising many activities, some of which are interdependent.

The **Program Evaluation and Review Technique**—usually just called PERT or PERT network analysis—was originally developed in the late 1950s for coordinating the more than 3,000 contractors and agencies working on the Polaris submarine weapon system.[19] This project was incredibly complicated, with hundreds of thousands of activities that had to be coordinated. PERT is reported to have cut two years off the completion date for the Polaris project.

A PERT network is a flowchartlike diagram that depicts the sequence of activities needed to complete a project and the time or costs associated with each activity. With a PERT network, a project manager must think through what has to be done, determine which events depend on one another, and identify potential trouble spots. PERT also makes it easy to compare the effects alternative actions will have on scheduling and costs. Thus PERT allows managers to monitor a project's progress, identify possible bottlenecks, and shift resources as necessary to keep the project on schedule.

To understand how to construct a PERT network, you need to know three terms: *events, activities,* and *critical path*. Let's define these terms, outline the steps in the PERT process, and then develop an example.

**events**
End points that represent the completion of major activities in a PERT network.

**activities**
The time or resources needed to progress from one event to another in a PERT network.

**critical path**
The longest sequence of activities in a PERT network.

**PERT network**
A flowchartlike diagram showing the sequence of activities needed to complete a project and the time or cost associated with each.

**Events** are end points that represent the completion of major activities. **Activities** represent the time or resources required to progress from one event to another. The **critical path** is the longest or most time-consuming sequence of events and activities in a PERT network.

Developing a PERT network requires the manager to identify all key activities needed to complete a project, rank them in order of dependence, and estimate each activity's completion time. This can be translated into five specific steps:

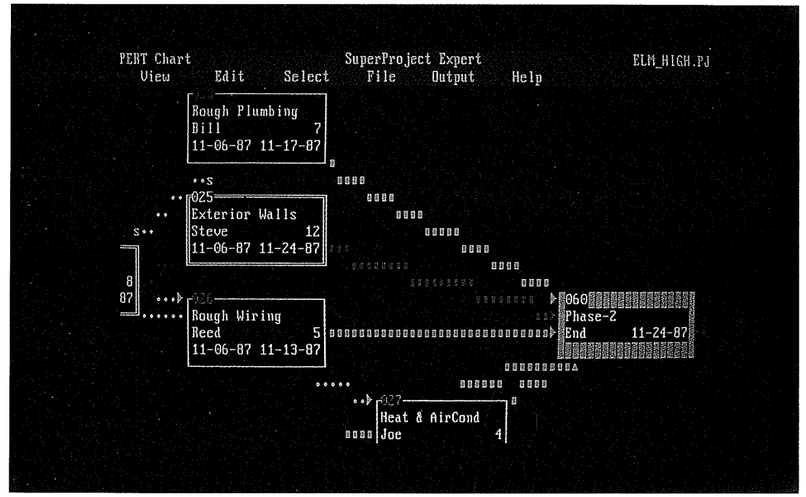
1. Identify every significant activity that must be achieved for a project to be completed. The accomplishment of each activity results in a set of events or outcomes.
2. Ascertain the order in which these events must be completed.
3. Diagram the flow of activities from start to finish, identifying each activity and its relationship to all other activities. Use circles to indicate events and arrows to represent activities. This results in a flowchart diagram that we call the **PERT network.**
4. Compute a time estimate for completing each activity. This is done with a weighted average that employs an *optimistic* time estimate ($t_o$) of how long the activity would take under ideal conditions, a *most-likely* estimate ($t_m$) of the time the activity normally should take, and a *pessimistic* estimate ($t_p$) that represents the time that an activity should take under the worst possible conditions. The formula for calculating the expected time ($t_e$) is then

$$t_e = \frac{t_o + 4t_m + t_p}{6}$$

5. Finally, using a network diagram that contains time estimates for each activity, the manager can determine a schedule for the start and finish dates of each activity and for the entire project. Any delays that occur along the critical path require the most attention because they delay the entire project. That is, the critical path has no slack in it; therefore, any delay along that path immediately translates into a delay in the final deadline for the completed project.



Aerospace and construction firms like General Dynamics and Bechtel regularly use PERT schedules to manage complex projects.



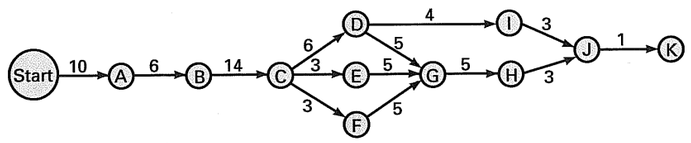

As was noted at the beginning of this section, most PERT projects are quite complicated and may be composed of hundreds or thousands of events. Such complicated computations are best done with a computer using specialized PERT software.[20] But for our purposes, let's work through a simplified example. Assume that you are the superintendent of a construction company. You have been assigned to oversee the construction of an office building. Because time really is money in your business, you must determine how long it will take to put up the building. You have carefully dissected the entire project into activities and events. Table 9–2 outlines the major events in the construction project and your estimate of the expected time required to complete each activity. Figure 9–4 depicts the PERT network based on the data in Table 9–2.

Your PERT network tells you that if everything goes as planned, it will take fifty weeks to complete the building. This is calculated by tracing the network's critical path: A-B-C-D-G-H-J-K. Any delay in completing the events along this path will delay the completion of the entire project. For example, if it took six weeks instead of four to put in the floor covering and paneling (event I), this would have no effect on the final completion date. Why? Because C–D + D–I + I–J equals only thirteen weeks, while C–E + E–G + G–H + H–J equals sixteen weeks. However, if you wanted to cut

**TABLE 9–2** A PERT Network for Erecting an Office Building

| Event | Description | Expected Time (in weeks) | Preceding Event |
|---|---|---|---|
| A | Approve design and get permits | 10 | None |
| B | Dig subterranean garage | 6 | A |
| C | Erect frame and siding | 14 | B |
| D | Construct floors | 6 | C |
| E | Install windows | 3 | C |
| F | Put on roof | 3 | C |
| G | Install internal wiring | 5 | D,E,F |
| H | Install elevators | 5 | G |
| I | Put in floor covering and paneling | 4 | D |
| J | Put in doors and interior decorative trim | 3 | I,H |
| K | Turn over to building management group | 1 | J |

**FIGURE 9–4**
PERT Network Diagram




the fifty-week time frame, you would give attention to those activities along the critical path that could be speeded up.

## Break-Even Analysis

**break-even analysis**
A technique for identifying the point at which total revenue is just sufficient to cover total costs.

How many units of a product must an organization sell in order to break even—that is, to have neither profit nor loss? A manager might want to know the minimum number of units that must be sold to achieve her profit objective or whether a current product should continue to be sold or be dropped from the organization's product line. **Break-even analysis** is a widely used technique for helping managers to make profit projections.[21]

Break-even analysis is a simplistic formulation, yet it is valuable to managers because it points out the relationship between revenues, costs, and profits. To compute the break-even point (*BE*), the manager needs to know the unit price of the product being sold (*P*), the variable cost per unit (*VC*), and total fixed costs (*TFC*).

An organization breaks even when its total revenue is just enough to equal its total costs. But total cost has two parts: a fixed component and a variable component. *Fixed costs* are expenses that do not change, regardless of volume. Examples include insurance premiums and property taxes. Fixed costs, of course, are fixed only in the short term because, in the long run, commitments terminate and are thus subject to variation. *Variable costs* change in proportion to output and include raw materials, labor costs, and energy costs.

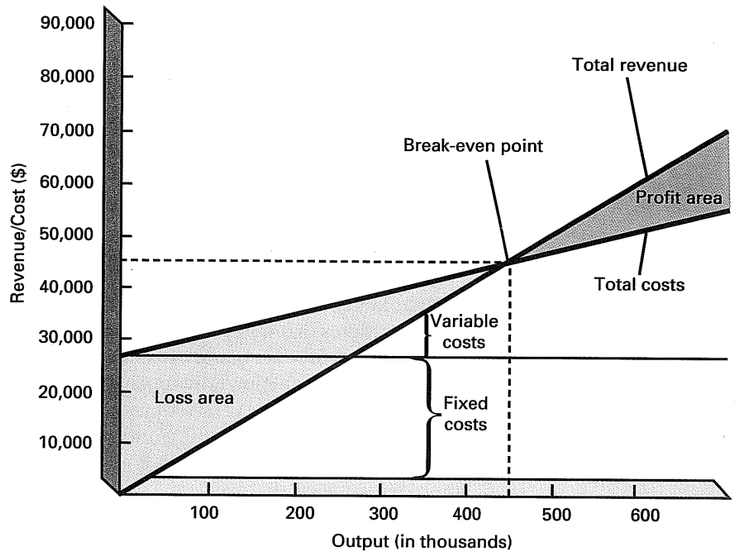
The break-even point can be computed graphically or by using the following formula:

$$BE = \frac{TFC}{P - VC}$$

This formula tells us that (1) total revenue will equal total cost when we sell enough units at a price that covers all variable unit costs and (2) the difference between price and variable costs, when multiplied by the number of units sold, equals the fixed costs.



**FIGURE 9–5**
Break-Even Analysis




For example, assume that Dave's Photocopying Service charges $0.10 per photocopy. If fixed costs are $27,000 a year and variable costs are $0.04 per copy, Dave can compute his break-even point as follows: $27,000/($0.10 − $0.04) = 450,000 copies, or when annual revenues are $45,000. This same relationship is shown graphically in Figure 9–5.

As a planning tool, break-even analysis could help Dave to set his sales objective. For example, he could establish the profit he wants and then work backward to determine what sales level is needed to reach that profit. Break-even analysis could also tell Dave how much volume has to increase to break even if he's currently running at a loss or how much volume he can afford to lose and still break even if he's currently operating profitably. In some cases, such as the management of professional sports franchises, break-even analysis has shown the projected volume of ticket sales required to cover all costs to be so unrealistically high that the best action for management to take is to get out of the business.

## Linear Programming

**linear programming**
A mathematical technique that solves resource allocation problems.

Dan Collier has a manufacturing plant that produces two kinds of firearms, a .38 revolver and a 9-mm semiautomatic pistol. Business is good. He can sell all of the firearms he can produce. This is his dilemma: Given that both pistols go through the same production departments, how many of each type should he make to maximize his profits?

A closer look at Dan's operation tells us that he can use a mathematical technique called **linear programming** to solve his resource allocation dilemma. As we'll show, linear programming is applicable to Dan's problem, but it can't be applied to all resource allocation situations. Besides requiring limited resources and the objective of optimization, it requires that there be alternative ways of combining resources to produce a number of output mixes. There must also be a linear relationship between variables.[22] This means that a change in one variable will be accompanied by an exactly proportional change in the other. For Dan's business, this condition would be met if it took exactly twice the amount of raw materials and hours of labor to produce two of a given firearm as it took to produce one.

**TABLE 9–3** Production Data for Pistols

| Department | Number of Hours Required (per unit) | | Monthly Production Capacity (in hours) |
|---|---|---|---|
| | .38 Revolvers | Semiautomatics | |
| Manufacturing | 2 | 4 | 1,200 |
| Assembly | 2 | 2 | 900 |
| Profit per unit | $100 | $180 | |

What kinds of problems lend themselves to linear programming? Selecting transportation routes that minimize shipping costs, allocating a limited advertising budget among various product brands, making the optimum assignment of personnel among projects, and determining how much of each product to make with a limited number of resources are a few. Let's return to Dan's problem and see how linear programming could help him to solve it. Fortunately, Dan's problem is relatively simple, so we can solve it rather quickly. For complex linear programming problems, there is computer software that has been designed specifically to help develop solutions.

First, we need to establish some facts about Dan's business. Dan has computed the profit margins on the pistols at $100 for the revolver and $180 for the semiautomatic. He can therefore express his *objective function* as: maximum profit = $100$R$ + $180$S$, where $R$ is the number of revolvers produced and $S$ is the number of semiautomatics produced. Additionally, Dan knows the time each pistol must spend in each department and the monthly production capacity (1,200 hours in manufacturing and 900 hours in assembly) for the two departments (see Table 9–3). The production capacity numbers act as *constraints* on his overall capacity. Now Dan can establish his constraint equations:

$$2R + 4S \leq 1{,}200$$
$$2R + 2S \leq 900$$

Of course, since neither pistol can be produced in a volume less than zero, Dan can also state that $R \geq 0$ and $S \geq 0$.

Dan has graphed his solution as shown in Figure 9–6. The shaded area represents the options that don't exceed the capacity of either department. This area represents his *feasibility region*. Dan's optimal resource allocation will be defined at one of the corners within this feasibility region. Point $C$ is the farthest from the origin and provides the maximum profits within the constraints stated. At point $A$, profits would be 0. At points $B$ and $D$, profits would be $54,000 and $45,000, respectively. At point $C$, however, profits would be $57,000.

## Queuing Theory

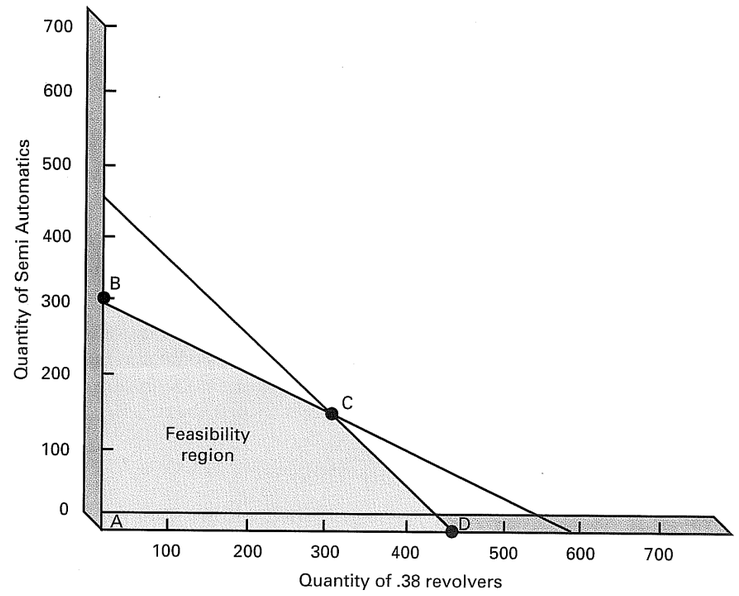
You are a supervisor for the San Francisco Bay Bridge Toll Authority. One of the decisions you have to make is how many of the thirty-six toll booths you should keep open at any given time. Queuing theory, or what is frequently referred to as *waiting-line theory,* could assist you with this problem.

**queuing theory**
A technique that balances the cost of having a waiting line against the cost of service to maintain that line.

Whenever a decision involves balancing the cost of having a waiting line against the cost of service to maintain that line, it can be made easier with **queuing theory.** This includes such common situations as determining how many gas pumps are needed at gas stations, tellers at bank windows, or check-in lines at airline ticket counters. In each situation, management wants to minimize cost by having as few stations open as possible, yet not so few as to test the patience of customers. Referring back to our toll-booth example, during rush hours you could open all thirty-six and



**FIGURE 9–6**
Graphical Solution to Dan Collier's Linear Programming Problem




keep waiting time to a minimum, or you could open only one, minimize staffing costs, and risk a riot.

The mathematics underlying queuing theory is beyond the scope of this book. But you can see how the theory works in a simple example. Assume that you're a bank supervisor. One of your responsibilities is assigning tellers. You have five teller windows, but you want to know whether you can get by with only one window open during an average morning. You consider twelve minutes to be the longest you would expect any customer to wait patiently in line. If it takes four minutes, on average, to serve each customer, the line should not be permitted to get longer than three deep (12 minutes ÷ 4 minutes per customer = 3 customers). If you know from

Queuing theory can help managers balance the costs of a waiting line against the cost of maintaining that line.

past experience that during the morning people arrive at the average rate of two per minute, you can calculate the probability that the line will become longer than any number ($n$) customers as follows:

$$P_n = \left(1 - \frac{\textit{arrival rate}}{\textit{service rate}}\right) \times \left(\frac{\textit{arrival rate}}{\textit{service rate}}\right)^n$$

where $n = 3$ customers, *arrival rate* = 2 per minute, and *service rate* = 4 minutes per customer. Putting these numbers into the above formula generates the following:

$$P_3 = \left(1 - \frac{2}{4}\right) \times \left(\frac{2}{4}\right)^3 = \left(\frac{1}{2}\right)\left(\frac{8}{64}\right) = \frac{8}{128} = .0625$$

What does a $P_3$ of .0625 mean? It tells you that the likelihood of having more than three customers in line during the morning is one chance in sixteen. Are you willing to live with four or more customers in line 6 percent of the time? If so, keeping one teller window open will be enough. If not, you'll need to add windows and assign additional personnel to staff them.

## Probability Theory

**probability theory**
The use of statistics to analyze past predictable patterns and to reduce risk in future plans.

With the help of **probability theory,** managers can use statistics to reduce the amount of risk in plans. By analyzing past predictable patterns, a manager can improve current and future decisions. It makes for more effective planning when, for example, the marketing manager at Porsche/North America, who is responsible for the 968 line, knows that the mean age of his customers is 35.5 years, with a standard deviation of 3.5. If he assumes a normal distribution of ages, the manager can use probability theory to calculate that 95 of every 100 customers are between 28.6 and 42.4 years of age. If he were developing a new marketing program, he could use this information to target his marketing dollars more effectively.

## Marginal Analysis

**marginal analysis**
A planning technique that assesses the incremental costs or revenues in a decision.

The concept of marginal, or incremental, analysis helps decision makers to optimize returns or minimize costs. **Marginal analysis** deals with the additional cost in a particular decision, rather than the average cost. For example, the commercial dry cleaner who wonders whether she should take on a new customer would consider not the total revenue and the total cost that would result after the order was taken, but rather what additional revenue would be generated by this particular order and what additional costs. If the incremental revenues exceeded the incremental costs, total profits would be increased by accepting the order.

## Simulation

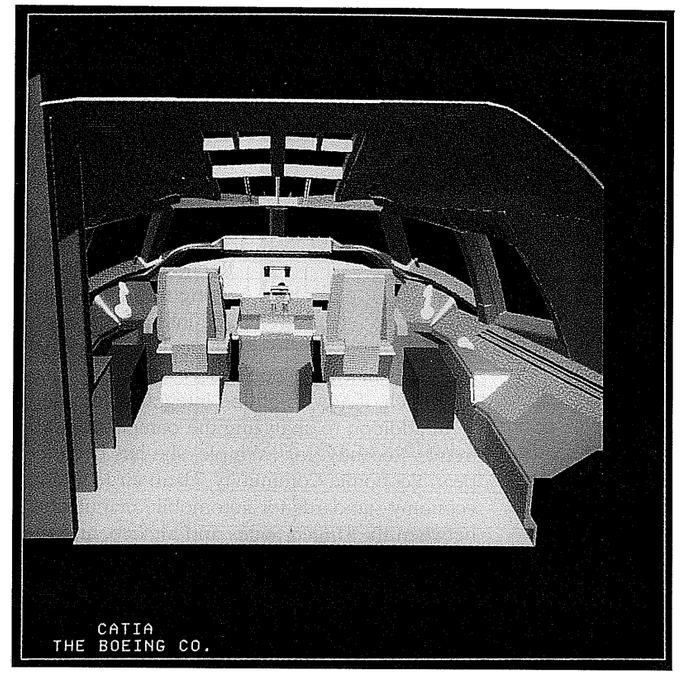
Boeing Co. is designing its 777 airplane on a huge computer system. Engineers iron out bugs on video screens, where changes are easy and cheap to make. By simulating the plane's design on a computer, rather than building a full-size mock-up, Boeing's management hopes to save as much as 20 percent of the estimated $4 billion to $5 billion development costs.[23]

**simulation**
A model of a real-world phenomenon that contains one or more variables that can be manipulated in order to assess their impact.

Managers are increasingly turning to simulation as a means for trying out various planning options. They are using **simulation** to create a model of a real-world phenomenon and then manipulating one or more variables in the model to assess their impact. Simulation can deal with problems addressed by linear programming, but it can also deal with more complex situations.

How might a manager use simulation? Let's see how it was used by a library director at a large university. She was planning the interior design and layout for a new library building. The proper location of certain collections, study areas, offices, and information desks was crucial for the effective operation of the new facility. The director gathered information on the various collections, their usage rates, the demand pattern for periodicals, and the like. Then, with the assistance of a simulation expert, she developed a computer simulation model of the facility. The model expressed, in mathematical terms, the key variables in the library's design and layout. By altering these variables, the simulation model described the possible effects on library operations and cost. Most important, because the entire exercise was simulated on a computer, thousands of options could be plugged in and their probable results evaluated. This allowed for the identification of an optimum design, while minimizing any disruption in the ongoing operations of the library.






Computer simulations of assemblies in the Boeing *777*, such as the cockpit and forward fuselage, allow engineers to spot problems and try various changes with minimal cost.

# Time Management: A Guide for Personal Planning

Do any of the following describe you?

You do interesting things before the uninteresting things?

You do things that are easy before things that are difficult?

You do things that are urgent before things that are important?

You work on things in the order of their arrival?

You wait until a deadline approaches before really moving on a project.[24]

**time management**
A personal form of scheduling time effectively.

If you answered yes to one or more of these questions, you could benefit from time management. In this section, we'll present some suggestions to help you manage your time better. We'll show you that **time management** is actually a

MANAGERS WHO MADE A DIFFERENCE

## Willa Martin at General Motors

Willa Martin began her career at General Motors in the mid-1970s as a buyer in purchasing. Today, she is manager of competitive analysis at GM's AC Rochester division in Flint, Michigan.[25]

Martin's job is to scan the environment for the Rochester division. She analyzes what the competition is doing through extensive investigative research and then she interprets these data for division executives. She is particularly concerned with identifying practices and processes that have been successfully implemented by competitors and determining which, if any, might be integrated into her division's operations.

In addition to analyzing the competition, Martin also closely follows industry trends. Recently, for example, she has been looking at the creation of the European Economic Community, clean air legislation, government-mandated fuel economy standards for automobile manufacturers, the proposed free-trade act between the United States and Mexico, and the ways in which these issues might affect products the Rochester division sells globally.

personal form of scheduling. Managers who use their time effectively know what activities they want to accomplish, the best order in which to take the activities, and when they want to complete those activities.

### Time as a Scarce Resource

Time is a unique resource in that, if it's wasted, it can *never* be replaced. While people talk about *saving time,* the fact is that time can never actually be saved. It can't be stockpiled for use in some future period. If lost, it can't be retrieved. When a minute is gone, it is gone forever.

The positive side of this resource is that all managers have it in equal abundance. While money, labor, and other resources are distributed unequally in this world, thus putting some managers at a disadvantage, every manager is allotted twenty-four hours every day and seven days every week. Some just use their allotments better than others.

### Focusing on Discretionary Time

Managers can't control all of their time. They are routinely interrupted and have to respond to unexpected crises. It's necessary, therefore, to differentiate between response time and discretionary time.[26]

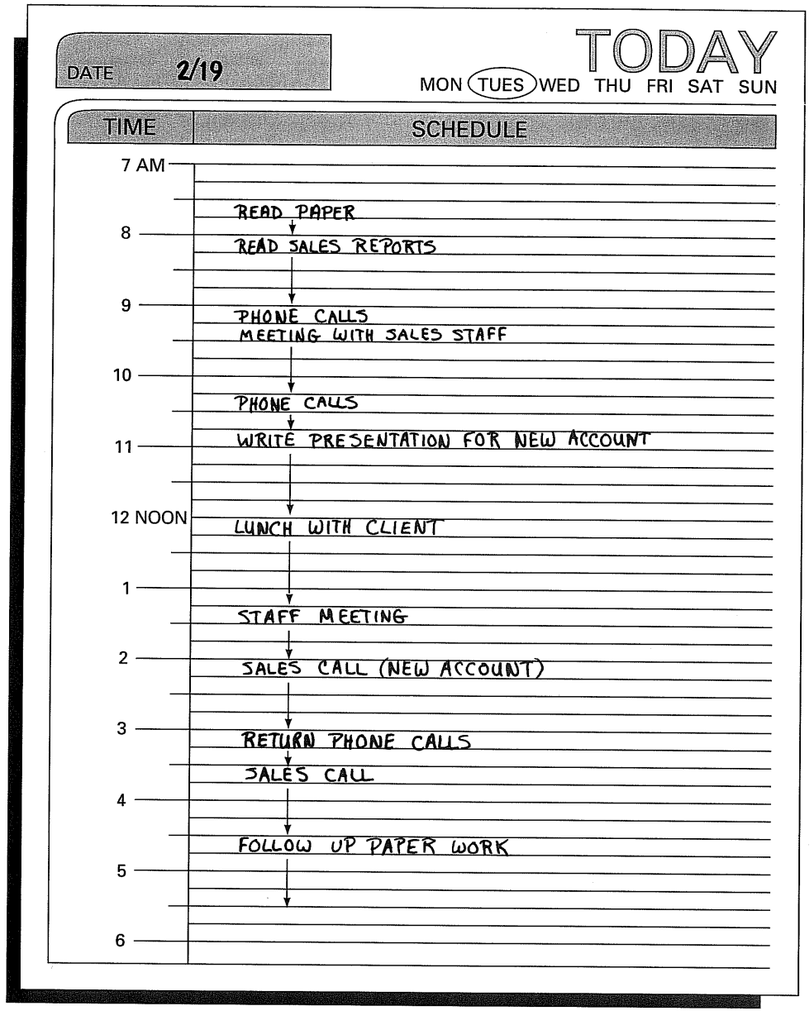
**response time**
Uncontrollable time spent responding to requests, demands, and problems initiated by others.

**discretionary time**
The part of a manager's time that is controllable.

The majority of a manager's time is spent responding to requests, demands, and problems initiated by others. We call this **response time** and treat it as uncontrollable. The portion that *is* under a manager's control is called **discretionary time.** Most of the suggestions offered to improve time management apply to its discretionary component. Why? Because only this part is manageable!

Unfortunately for most managers, particularly those in the lower and middle ranks of the organization, discretionary time makes up only about 25 percent of their work






The best log is a daily diary or calendar broken into fifteen-minute intervals. To get enough information from which to generalize, you need about two weeks' worth of entries. During this two-week period, enter everything you do in the diary in fifteen-minute segments. To minimize memory loss, post the entries as you do them. Keep in mind that honesty is important. You want to record how you *actually* spent your time, not how you *wished* you had spent your time!

hours.[27] Moreover, discretionary time tends to become available in small pieces—five minutes here, five minutes there. Thus it is very difficult to use effectively. The challenge, then, is to know what time is discretionary and then to organize activities so as to accumulate discretionary time in blocks large enough to be useful. Managers who are good at identifying and organizing their discretionary time accomplish significantly more, and the things they accomplish are more likely to be high-priority activities.

### How Do You Use Your Time?

How do managers, or any individuals for that matter, determine how well they use their time? The answer is that they should keep a log or diary of daily activities for a short period of time, then evaluate the data they gather.

Try keeping such a diary. When it is complete, you will have a detailed time and

**TABLE 9–4** Analyzing Activities for Importance and Urgency

| Rate Each Activity for |
|---|
| ***Importance*** |
| A. Very important: must be done |
| B. Important: should be done |
| C. Not so important: may be useful, but is not necessary |
| D. Unimportant: doesn't accomplish anything |
| ***Urgency*** |
| A. Very urgent: must be done now |
| B. Urgent: should be done now |
| C. Not urgent: can be done sometime later |
| D. Time not a factor |

activity log. Then you can analyze how effectively you use your time. Rate each activity in terms of its importance and urgency. (See Table 9–4.) If you find that many activities received C's or D's, you'll find the next sections valuable. They provide detailed guidelines for better time management.[28]

## Five Steps to Better Time Management

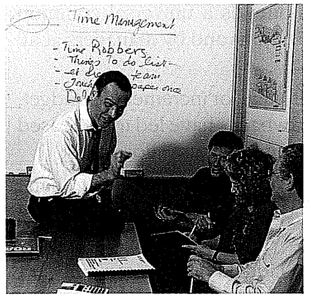
The essence of time management is to use your time effectively. This requires that you know the objectives you want to accomplish, the activities that will lead to the accomplishment of those objectives, and the importance and urgency of each activity. We've translated this into a five-step process.

1. *Make a list of your objectives.* What specific objectives have you set for yourself and the unit you manage? If you're using MBO, these objectives are already in place.
2. *Rank the objectives according to their importance.* Not all objectives are of equal importance. Given the limitations on your time, you want to make sure you give highest priority to the most important objectives.
3. *List the activities necessary to achieve your objectives.* What specific actions do you need to take to achieve your objectives? Again, if you're using MBO, these action plans are already laid out.
4. *For each objective, assign priorities to the various activities required to reach the objective.* This step imposes a second set of priorities. Here, you need to emphasize both importance and urgency. If the activity is not important, you should consider delegating it to someone below you. If it's not urgent, it can usually wait. This step will identify activities that you *must* do, those you *should* do, those you'll get to *when you can,* and those that can be *delegated to others.*
5. *Schedule your activities according to the priorities you've set.* The final step is to prepare a daily plan. Every morning, or at the end of the previous work day, make a list of the five or so most important things you want to do for the day. If the list grows to ten or more activities, it becomes cumbersome and ineffective. Then set priorities for the activities listed on the basis of importance and urgency.

## Some Additional Points to Ponder

***Follow the 10–90 Principle*** Most managers produce 90 percent of their results in only 10 percent of their time. It's easy for managers to get caught up in the activity trap and confuse actions with accomplishments. Those who use their time well make sure that the critical 10 percent gets highest priority.






William Berrios, of Berrios Construction Co. in San Francisco, conducts a time management workshop for his office staff.

***Know Your Productivity Cycle*** Each of us has a daily cycle. Some of us are morning people, while others are late-afternoon or evening people. Managers who know their cycle and schedule their work accordingly, can significantly increase their effectiveness. They handle their most demanding problems during the high part of their cycle, when they are most alert and productive. They relegate their routine and undemanding tasks to their low periods.

***Remember Parkinson's Law*** Parkinson's Law says that work expands to fill the time available. The implication for time management is that you can schedule *too* much time for a task. If you give yourself an excess amount of time to perform an activity, you're likely to pace yourself so that you use up the entire time allocation.

***Group Less Important Activities Together*** Set aside a regular time period each day to make phone calls, do follow-ups, and perform other kinds of busywork. Ideally, this should be during your low cycle. This avoids duplication, waste, and redundancy; it also prevents trivia from intruding on high-priority tasks.

***Minimize Disruptions*** When possible, try to minimize disruptions by setting aside that part of the day when you are most productive as a block of discretionary time. Then, try to insulate yourself. During this time you should limit access to your work area and avoid interruptions. Refuse phone calls or visits during these hours. You can set aside other blocks of time each day when your door is open for unexpected visits and when you can initiate or return all your calls. The ability to insulate yourself depends on your organization's culture, your boss, and how much faith you have in your subordinates. But most critical is your level in the organization. Generally, the higher up you are in an organization, the less crucial it is that you be available for every emergency. In contrast, most supervisors can be out of touch with the work areas they oversee for only short periods of time.

***Beware of Wasting Time in Poorly Run Meetings*** Meetings take up a large proportion of a manager's time. They also tend to run on at length. If you're running a meeting, you should set a time limit at the outset. You should prepare a written agenda for the meeting and stick to it. Another suggestion, which is a bit bizarre but works wonders for keeping meetings brief, is to require all members to remain standing. As soon as people sit down and get comfortable, they lose any motivation to keep a discussion tightly focused on the issues. Some managers have no chairs in their office other than the one they occupy. Visitors are subtly encouraged to avoid wasting the manager's time. Managers usually move important meetings that demand a long and thoughtful discussion to an adjoining conference room that has an ample supply of chairs.

# Summary

*This summary is organized by the chapter-opening learning objectives found on page 241.*

1. Techniques for scanning the environment include reading newspapers, magazines, books, and trade journals; reading competitors' ads, promotional materials, and press releases; attending trade shows; debriefing sales personnel; and reverse engineering of competitor's products.
2. Quantitative forecasting applies a set of mathematical rules to a set of past data in order to predict future outcomes. Qualitative forecasting uses judgments and the opinions of knowledgeable individuals to predict future outcomes.

3. Budgets are popular planning devices because money is a universal common denominator that can be used in all types of organizations and by managers at all levels.
4. The most popular approach to budgeting is the traditional, or incremental, budget, which is based on past allocations. However, its drawbacks have led to increased interest in zero-base budgets, which make no reference to past allocations.
5. Gantt and load charts are scheduling devices. Both are bar graphs. Gantt charts monitor planned and actual activities over time; load charts focus on capacity utilization by monitoring whole departments or specific resources.
6. The five steps in developing a PERT network are: (1) identifying every significant activity that must be achieved for a project to be completed; (2) determining the order in which these activities must be completed; (3) diagramming the flow of activities in a project from start to finish; (4) estimating the time needed to complete each activity; and (5) using the network diagram to determine a schedule for the start and finish dates of each activity and for the entire project.
7. A product's break-even point is determined by the unit price of the product, its variable cost per unit, and its total fixed costs.
8. For linear programming to be applicable, a problem must have limited resources, constraints, an objective function to optimize, alternative ways of combining resources, and a linear relationship between variables.
9. Simulation is an effective planning tool because it allows managers to simulate, on a computer, thousands of potential options at very little cost. By simulating a complex situation, managers can see how changes in variables will affect outcomes.
10. Five steps toward better time management include: (1) making a list of objectives, (2) ranking the objectives in order of importance, (3) listing the activities necessary to achieve the objectives, (4) assigning priorities to each activity, and (5) scheduling activities according to the priorities set.

## Review Questions

1. How is scanning the environment related to forecasting?
2. What is a scenario and how does competitor intelligence help managers to formulate one?
3. How can benchmarking improve the quality of an organization's products or processes?
4. What is a budget? Must it always be based on monetary units?
5. What is the significance of the critical path in a PERT network?
6. What is the value of break-even analysis as a planning tool?
7. Explain probability theory and marginal analysis.
8. How can managers assess how well they currently manage their time?
9. How might a manager use his or her discretionary time more effectively?

## Discussion Questions

1. Assume that you manage a large fast food restaurant in downtown Philadelphia, and you want to know the amount of each type of sandwich to make and the number of cashiers to have on each shift. What type of planning tool(s) do you think will be useful to you? What type of environmental scanning, if any, would you likely do in this management job?
2. "Budgets are both a planning and a control tool." Explain this statement.
3. Develop a Gantt chart for writing a college term paper.
4. "You can't teach time management. People who are good at it tend to be structured and compulsive individuals by nature." Do you agree or disagree? Discuss.
5. "Forecasting is a waste of a manager's time because no one can accurately predict the future." Do you agree or disagree with this statement? Discuss.



## SELF-ASSESSMENT EXERCISE

### Do You Know Your Daily Productivity Cycle?

*Directions:* Please check the response for each item that best describes you.

1. Considering only your own "feeling best" rhythm, at what time would you get up if you were entirely free to plan your day?

| | |
|---|---|
| 5:00–6:30 a.m. | _____(a) |
| 6:30–7:45 a.m. | _____(b) |
| 7:45–9:45 a.m. | _____(c) |
| 9:45–11:00 a.m. | _____(d) |
| 11:00 a.m.–12:00 (noon) | _____(e) |

2. Considering only your "feeling best" rhythm, at what time would you go to bed if you were entirely free to plan your evening?

| | |
|---|---|
| 8:00–9:00 p.m. | _____(a) |
| 9:00–10:15 p.m. | _____(b) |
| 10:15 p.m.–12:30 a.m. | _____(c) |
| 12:30–1:45 a.m. | _____(d) |
| 1:45–3:00 a.m. | _____(e) |

3. Assuming normal circumstances, how easy do you find getting up in the morning? (Check one.)

| | |
|---|---|
| Not at all easy | _____(a) |
| Slightly easy | _____(b) |
| Fairly easy | _____(c) |
| Very easy | _____(d) |

4. How alert do you feel during the first half hour after you wake up in the morning? (Check one.)

| | |
|---|---|
| Not at all alert | _____(a) |
| Slightly alert | _____(b) |
| Fairly alert | _____(c) |
| Very alert | _____(d) |

5. During the first half hour after awakening in the morning, how tired do you feel? (Check one.)

| | |
|---|---|
| Very tired | _____(a) |
| Fairly tired | _____(b) |
| Fairly refreshed | _____(c) |
| Very refreshed | _____(d) |

6. You have decided to engage in some physical exercise. A friend suggests that you do this one hour twice a week and the best time for him is 7:00–8:00 a.m. Bearing in mind nothing else but your own "feeling best" rhythm, how do you think you would perform?

| | |
|---|---|
| Would be in good form | _____(a) |
| Would be in reasonable form | _____(b) |
| Would find it difficult | _____(c) |
| Would find it very difficult | _____(d) |

7. At what time in the evening do you feel tired and, as a result, in need of sleep?

| | |
|---|---|
| 8:00–9:00 p.m. | _____(a) |
| 9:00–10:15 p.m. | _____(b) |
| 10:15 p.m.–12:30 a.m. | _____(c) |
| 12:30–1:45 a.m. | _____(d) |
| 1:45–3:00 a.m. | _____(e) |

8. You wish to be at your peak performance for a test which you know is going to be mentally exhausting and will last for two hours. You are entirely free to plan your day, and considering only your own "feeling best" rhythm, which ONE of the four testing times would you choose?

| | |
|---|---|
| 8:00–10:00 a.m. | _____(a) |
| 11:00 a.m.–1:00 p.m. | _____(b) |
| 3:00–5:00 p.m. | _____(c) |
| 7:00–9:00 p.m. | _____(d) |

9. One hears about "morning" and "evening" types of people. Which ONE of these types do you consider yourself to be?

| | |
|---|---|
| Definitely a morning type | _____(a) |
| More a morning than an evening type | _____(b) |
| More an evening than a morning type | _____(c) |
| Definitely an evening type | _____(d) |

10. When would you prefer to rise (provided you have a full day's work—8 hours) if you were totally free to arrange your time?

| | |
|---|---|
| Before 6:30 a.m. | _____(a) |
| 6:30–7:30 a.m. | _____(b) |
| 7:30–8:30 a.m. | _____(c) |
| 8:30 a.m. or later | _____(d) |

11. If you always had to rise at 6:00 a.m., what do you think it would be like?

| | |
|---|---|
| Very difficult and unpleasant | _____(a) |
| Rather difficult and unpleasant | _____(b) |
| A little unpleasant but no great problem | _____(c) |
| Easy and not unpleasant | _____(d) |

12. How long a time does it usually take before you "recover your senses" in the morning after rising from a night's sleep?

| | |
|---|---|
| 0–10 minutes | _____(a) |
| 11–20 minutes | _____(b) |
| 21–40 minutes | _____(c) |
| More than 40 minutes | _____(d) |



13. Please indicate to what extent you are a morning or evening *active* individual.

| | |
|---|---|
| Pronounced morning active (morning alert and evening tired) | _____(a) |
| To some extent, morning active | _____(b) |
| To some extent, evening active | _____(c) |
| Pronounced evening active (morning tired and evening alert) | _____(d) |

Please turn to page SK-2 for scoring directions and key.

*Source:* Carlla S. Smith, Christopher Reilly, and Karen Midkiff, "Evaluation of Three Circadian Rhythm Questionnaires With Suggestions for an Improved Measure of Morningness," *Journal of Applied Psychology,* October 1989, p. 734. With permission.