

STUDY UNIT SIXTEEN

PLANNING AND BUDGETING

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Planning is a fundamental managerial function, providing guidelines for the accomplishment of an organization's objectives. At the highest level, strategic planning is part of the strategic management process. However, development of plans, including budgets, is required for every level and function of the organization. Plans are formulated based on objectives, assumptions about the environment in which the plans will be executed, and forecasts about the outcomes and timing of future events. Planning techniques include methods used to manage complex projects.

16.1 STRATEGIC MANAGEMENT

1. Strategic management has a **long-term planning horizon**. Thus, a strategic orientation is traditionally associated with senior management. However, this orientation should pervade the organization because it encourages farsightedness by all employees. Strategic thinking also helps employees understand and implement managerial decisions. Moreover, it is consistent with the modern trend toward cooperation and teamwork and away from authoritarian managerial styles.
2. Strategic management is a process that includes the following steps:
 - a. A **mission statement** should be formalized in a written document. It should define the organization's ultimate purposes. A **grand strategy** is then developed to describe how the organization's mission is to be achieved. It is based on a **situational analysis** that considers organizational **strengths and weaknesses** (a capability profile) and their interactions with environmental **opportunities and threats (SWOT)**.
 - 1) Speed in reacting to environmental changes, introducing new products, etc., is an important competitive advantage. To achieve it, the organization may have to reengineer its processes.
 - b. **Strategic planning** formulates specific and measurable objectives, plans, policies, and budgets.
 - c. **Implementation**. Strategic plans must be filtered down the organizational structure through development of plans at each lower level. This process is most likely to succeed if (1) the structure is compatible with strategic planning, (2) personnel have the necessary abilities, (3) the organizational culture is favorable or can be changed, and (4) controls exist to facilitate implementation.
 - d. **Control**. Strategic controls should be established to monitor progress, isolate problems, identify invalid assumptions, and take prompt corrective action.
 - 1) As plans are executed at each organizational level, control measurements are made to determine whether objectives have been achieved. Thus, objectives flow down the organizational hierarchy, and control measures flow up.

- 2) One category of strategic control measures relates to **external effectiveness**. The organization measures
 - a) Performance in the marketplace (market share, etc.) at the **business-unit level**
 - b) Customer satisfaction and flexibility at the **business-operating-system level**
 - c) Quality and delivery at the **departmental** or **work-center level**
- 3) A second category of strategic control measures relates to **internal efficiency**. The organization measures
 - a) Financial results at the **business-unit level**
 - b) Flexibility (both an external effectiveness and internal efficiency issue) at the **business-operating-system level**
 - c) Cycle time (time to change raw materials into a finished product) and waste at the **departmental** or **work-center level**
3. Strategic management is dependent on **forecasts** of outcomes of events, their timing, and their future values.
4. Strategic management is facilitated when managers think synergistically. **Synergy** occurs when the combination of formerly separate elements has a greater effect than the sum of their individual effects. The following are types of synergy observed in business:
 - a. **Market synergy** arises when products or services have positive complementary effects. Shopping malls reflect this type of synergy.
 - b. **Cost synergy** results in cost reduction. It manifests itself in many ways, for example, in recycling of by-products or in the design, production, marketing, and sales of a line of products by the same enterprise.
 - c. **Technological synergy** is the transfer of technology among applications. For example, technology developed for military purposes often has civilian uses.
 - d. **Management synergy** also entails knowledge transfer. For example, a company may hire a manager with skills that it lacks.
5. Another concept useful in analysis of industry evolution is the **product life cycle**. It has the following stages:
 - a. **Precommercialization** (product development). The strategy in this stage is to innovate by conducting R&D, marketing research, and production tests. During product development, the firm has no sales, but it has high investment costs.
 - b. The **introduction stage** is characterized by slow sales growth and lack of profits because of the high expenses of promotion and selective distribution to generate awareness of the product and encourage customers to try it. Thus, the per-customer cost is high. Competitors are few, basic versions of the product are produced, and higher-income customers (innovators) are usually targeted. Cost-plus prices are charged. They may initially be high to permit cost recovery when unit sales are low. The strategy is to infiltrate the market, plan for financing to cope with losses, build supplier relations, increase production and marketing efforts, and plan for competition.
 - c. In the **growth stage**, sales and profits increase rapidly, cost per customer decreases, customers are early adopters, new competitors enter an expanding market, new product models and features are introduced, and promotion spending declines or remains stable. The firm enters new market segments and distribution channels and attempts to build brand loyalty and achieve the maximum share of the market. Thus, prices are set to penetrate the market, distribution channels are extended, and the mass market is targeted through advertising. The strategy is to advance by these means and by achieving economies of productive scale.

- d. In the **maturity stage**, sales peak but growth declines, competitors are most numerous but may begin to decline in number, and per-customer cost is low. Profits are high for large market-share firms. For others, profits may fall because of competitive price-cutting and increased R&D spending to develop improved versions of the product. The strategy is to defend market share and maximize profits through diversification of brands and models to enter new market segments, still more intensive distribution, cost cutting, advertising and promotions to encourage brand switching, and emphasizing customer service.
 - 1) Some writers identify a separate stage between growth and maturity. During the **shakeout period**, the overall growth rate falls, price cutting occurs, and weaker firms leave the market.
 - e. During the **decline stage**, sales and profits drop as prices are cut, and some firms leave the market. Customers include late adopters (laggards), and per-customer cost is low. Weak products and unprofitable distribution media are eliminated, and advertising budgets are pared to the level needed to retain the most loyal customers. The strategy is to withdraw by reducing production, promotion, and inventory.
 - f. **Criticisms** of the PLC concept are that some stages may be hard to distinguish, and their length may vary substantially among industries. Moreover, sales growth may not follow the pattern described in a. through e., partly because the firm's strategies affect growth. Still another consideration is that industry characteristics (degree of concentration, R&D costs, advertising costs, price competition, etc.) differ among industries. Accordingly, the PLC model is not by itself adequate to analyze industry evolution.
6. Still another approach is Michael Porter's **competitive strategies** model.
- a. **Cost leadership** is the generic strategy favored by enterprises that seek competitive advantage through lower costs and that have a broad competitive scope.
 - b. **Differentiation** is the generic strategy favored by enterprises that seek competitive advantage through providing a unique product and that have a broad competitive scope.
 - c. **Cost focus** is the generic strategy favored by enterprises that seek competitive advantage through lower costs and that have a narrow competitive scope (a regional or smaller market).
 - d. **Focused differentiation** is the generic strategy favored by enterprises that seek competitive advantage through providing a unique product and that have a narrow competitive scope (a regional or smaller market).
7. An **operations strategy** formulates a long-term plan for using enterprise resources to reach strategic objectives. The following are five operations strategies:
- a. A **cost** strategy is successful when the enterprise is the low-cost producer. However, the product (e.g., a commodity) tends to be undifferentiated in these cases, the market is often very large, and the competition tends to be intense because of the possibility of high-volume sales.
 - b. A **quality** strategy involves competition based on product quality or process quality. Product quality relates to design, for example, the difference between a luxury car and a subcompact. Process quality concerns the degree of freedom from defects.
 - c. A **delivery** strategy may permit an enterprise to charge a higher price when the product is consistently delivered rapidly and on time. An example company is UPS.
 - d. A **flexibility** strategy entails offering many different products. This strategy also may reflect an ability to shift rapidly from one product line to another. An example company is a publisher that can write, edit, print, and distribute a book within days to exploit the public's short-term interest in a sensational event.

- e. A **service** strategy seeks to gain a competitive advantage and maximize customer value by providing services, especially post-purchase services such as warranties on automobiles and home appliances.
8. **Customer value and satisfaction** are central concepts in formulating customer management strategies.
- a. A marketer responds to **customer needs** by stating a **value proposition**, that is, the benefits offered to satisfy those needs. The value proposition is an attempt to affect customer **wants** (needs focused on particular satisfiers). It becomes tangible in an **offering**, which may consist of products, services, and other things that are intended to satisfy the needs of target buyers.
 - 1) **Value** is an aggregate of the elements of the **customer value triad**: quality, service, and price. Value increases as quality and service increase and price decreases.
 - 2) Value also may be defined as a **benefits-to-costs ratio**: the sum of functional and emotional benefits divided by the sum of monetary, time, energy, and psychic costs. The value of the offering is increased by any means that increases the ratio, such as lowering benefits by less than a decrease in costs.
 - a) A customer will be indifferent between two offerings with equal ratios.
 - b) **Customer perceived value** is an estimate of a given offering and the alternative. **Total customer value** is what a customer believes to be the financial value of the benefits of an offering. **Total customer cost** is the sum of all costs to the customer related to the offering.
 - b. **Customer satisfaction** is the relation between the offering's perceived performance and the customer's expectations. High customer satisfaction tends to create high customer loyalty that results in repurchases. However, at lower satisfaction levels, customers are more likely to switch when a superior alternative becomes available.
 - 1) **Expectations** are a function of a customer's experience, marketing information, and other factors. Marketers should not raise expectations above the level at which they can be satisfied. However, some superior firms have had great success by adopting a **total customer satisfaction** approach, that is, by elevating expectations and then satisfying them.
 - 2) **High customer loyalty** is an emotional as well as rational bond that develops when a firm provides high customer value. To obtain such loyalty, the firm needs to develop a value proposition that has superior competitiveness in the target market segment. Crucially, it must be supported by an effective **value delivery system**, the accumulation of all the experiences the customer has with the offering. Thus, brand value must be supported by **core business processes** that actually deliver the promised customer value.
 - 3) **Customer satisfaction information** is gathered by
 - a) Complaint and suggestion systems such as websites and hotlines
 - b) Customer surveys
 - c) Lost customer analysis (e.g., exit interviews and determination of the customer loss rate)
 - d) Testing of the treatment customers receive when purchasing the firm's (or competitors') products (ghost shopping)
 - 4) Customer satisfaction must be balanced against the satisfaction level of the firm's **other stakeholders** (e.g., shareholders, employees, suppliers, and retailers). Thus, raising customer satisfaction at the expense of profit or other stakeholders may not be appropriate.

- a) **High-performance business model.** According to Arthur D. Little (a consulting firm), a business should establish satisfaction objectives for **stakeholder groups**. To achieve the objectives, it must devise strategies, reengineer and coordinate its **core processes**, and appropriately allocate resources in accordance with organizational arrangements (structure, culture, etc.).
 - i) The firm may retain its **core resources** and outsource the rest.
 - ii) Core processes and resources are tied to **core competencies**. The competencies provide substantial customer value and therefore are sources of competitive advantage. Moreover, they have many applications and are hard for rivals to emulate.
 - iii) **Distinctive capabilities** provide superiority in certain overall business functions. According to George Day, an organization should have effective market sensing, customer linking, and channel bonding capabilities.
- 5) High **customer satisfaction rankings** may be an effective marketing tool. See, for example, the J.D. Powers rankings of automotive industry performance or the **American Customer Satisfaction Index** measurements applicable to national economies, industries, and sectors as well as firms.
- c. **value creation chain** consists of the activities of a firm that create customer value and incur costs. They consist of five **primary activities** and four support activities. The following is Michael E. Porter's model:
 - 1) **Inbound logistics** activities involve the firms' capture of materials to be processed.
 - 2) **Operations** activities are conversion processes.
 - 3) **Outbound logistics** activities include shipment of products.
 - 4) **Marketing and sales** activities are the promotion and sale of final products.
 - 5) **Service** activities provide customer service.
 - 6) The four **support activities** are infrastructure (e.g., administration, finance, and planning), procurement, human resources, and technology development.
- d. To sustain customer value, the firm must seek **continuous improvement** of value-creating activities. **Benchmarking** the best performance attributes of top firms and emulating their **best practices** is a key continuous improvement technique.
- e. Effective coordination of the following **core business processes** is crucial:
 - 1) **Market sensing** consists of obtaining, distributing, and acting upon market intelligence.
 - 2) **New offering realization** should be timely and efficient. It involves R&D and the launch of products, services, and other elements of offerings.
 - 3) **Customer acquisition** defines target markets and researches for customers.
 - 4) **Customer relationship management** seeks to increase the value of the customer base by developing long-term relationships with individual customers by such methods as customer service, customized (if not personalized) offerings, and choice of marketing messages and media.
 - 5) **Fulfillment management** relates to order processing, on-time delivery, and collection.
- f. The **value-delivery network** is another source of competitive advantage. **Partner relationship management** involves coordinating with suppliers and distributors in this network (**the supply chain**) to provide better customer value.

9. **Customer relationship management (CRM)** is an attempt to tie together three traditionally separate functions: marketing, sales, and service.
- a. CRM employs large databases and integrated information systems to link the three customer relationship functions.
 - 1) **Marketing** seeks out (a) unfulfilled customer needs and (b) customer groups who might be interested in the firm's existing products.
 - 2) **Sales** brings the products to the attention of the targeted customers and closes the sale.
 - 3) **Customer service** provides after-the-sale support, such as product help and account information.
 - b. The firm should seek to minimize **customer churn** (customer loss) because **customer retention** through **customer satisfaction** is a key to profitability.
 - 1) **High customer satisfaction** means a longer relationship with the firm, repeat purchases of new offerings and upgrades, favorable word-of-mouth, and less concern about price and competitors' offerings. Moreover, the highly satisfied repeat customer is less costly than a new customer and is more likely to provide helpful feedback.
 - 2) **The listening process.** Accordingly, the firm should measure customer satisfaction frequently, facilitate complaints and suggestions, and act rapidly on the results.
 - 3) A less effective method of customer retention is to create high **switching costs**, such as loss of discounts.
 - c. The firm should emphasize customer retention because the **customer base** is an important intangible asset.
 - 1) Loss of some customers is unavoidable. For example, a customer may cease operations.
 - 2) Customer retention is far less costly than customer attraction.
 - 3) Increasing the retention rate increases profits exponentially.
 - 4) The longer the customer relationship, the more profitable it is.
 - d. **Analysis of customer loss** entails the following steps:
 - 1) Determining the retention rate
 - 2) Identifying causes that can be managed, such as bad products, lack of service, or uncompetitive prices
 - 3) Approximating the lost profit
 - 4) Calculating the cost of increasing the retention rate
 - e. A firm should estimate **customer lifetime value**, the net present value of the cash flows (purchases – costs of acquiring, selling to, and serving the customer) related to a particular customer. This amount indicates whether a given investment in a customer is justified.
 - f. **Customer equity** is the sum of the customer lifetime values for all firm customers. According to Rust, Zeithaml, and Lemon, it has certain drivers (value, brand, and relationship equity) and subdrivers. A firm must determine the subdrivers that should be improved to increase customer equity and profits.
 - 1) **Value equity** is an estimate of the benefits-to-cost ratio. It is based on the following subdrivers: quality, price, and convenience. Value equity is most important when products are differentiated or require a formal assessment by the buyer.

- 2) **Brand equity** is a subjective evaluation. Subdrivers are the customer's awareness of, and attitude toward, the brand and the customer's belief about brand ethics. Brand equity is most significant when the product is not differentiated but has emotional appeal.
 - 3) **Relationship equity** is the likelihood that customer loyalty is not based on any appraisal of the brand's value. Subdrivers are **programs to build customer loyalty, recognition, community, and knowledge**. This driver is most significant when the supplier-customer relationship is vital or when a customer may simply be habit-bound.
- g. Jill Griffin has described the process of attracting and retaining customers as follows:
- 1) Identifying **suspects** (all potential customers)
 - 2) Separating **prospects** from the suspects
 - 3) Persuading prospects to be **first-time customers**
 - 4) Giving preferred treatment to **repeat customers** to make them clients
 - 5) Creating a membership program to transform clients into **members**
 - 6) Converting members into **advocates** for the firm, its products, and its services
 - 7) Making advocates into **partners**
- h. A firm may be able to **regain lost customers** more cheaply than it could attract new ones using existing information and the results of surveys and exit interviews. A firm must determine the appropriate **investment in building customer relationships**. The levels of investment depend on unit profit margins and the numbers of customers. According to Kotler, the following are the corresponding levels of relationship marketing:
- 1) **Basic marketing** is merely selling (low-margin, many customers).
 - 2) **Reactive marketing** includes encouragement of customer communication (low-to-medium margin and many customers or low margin and medium number of customers).
 - 3) **Accountable marketing** involves seller-initiated communication to ask about problems or suggestions (low margin and few customers, medium margin and medium number of customers, or high margin and many customers).
 - 4) **Proactive marketing** involves seller-initiated communication about new products or uses of old ones (high margin and medium number of customers or medium margin and few customers).
 - 5) **Partnership marketing** entails continuous assistance to big customers (high margin and few customers).
- i. **Strengthening ties with customers** to improve customer satisfaction and retention may be accomplished in the following ways:
- 1) Firm-wide coordination of planning and management of the process
 - 2) Making every business decision from customer as well as a firm perspective
 - 3) Marketing superior offerings
 - 4) Developing a comprehensive and accessible customer database
 - 5) Facilitating customer communications with appropriated firm employees
 - 6) Giving awards for employee achievement
 - 7) Providing financial benefits, such as club memberships and frequent-buyer programs
 - 8) Turning customers into clients through socially sensitive, personalized relationships
 - 9) Creating structural relationships, e.g., by providing equipment, software, or EDI linkages; entering into long-term contracts; or offering bulk discounts

- j. **Customer profitability analysis** determines all revenues and all costs assignable to specific customers. Kotler provides the following classification of customers:
 - 1) **Platinum** – most profitable (highest investment)
 - 2) **Gold** – profitable (high investment, with objective of converting to platinum)
 - 3) **Iron** – low profit but desirable (lower investment with objective of converting to gold)
 - 4) **Lead** – not profitable or desirable (drop or provide low investment while raising prices or lowering costs of serving)

16.2 STRATEGIC PLANNING

1. Planning is the determination of **what** is to be done, and of **how, when, where, and by whom** it is to be done. Plans serve to direct the activities that all organizational members must undertake and successfully perform to move the organization from where it is to where it wants to be (accomplishment of its objectives).
 - a. Planning must be completed before undertaking any other managerial function.
 - 1) **Forecasting** is the basis of planning because it projects the future.
 - b. Planning establishes the **means** to reach organizational **ends** (objectives).
 - 1) This means-end relationship extends throughout the organizational hierarchy and ties together the parts of the organization so that the various means all focus on the same end.
 - 2) One organizational level's ends provide the next higher level's means.
 - a) **EXAMPLE: Management by objectives (MBO)** identifies relationships between an individual's job objectives (ends) and the immediate superior's objectives (ends). Thus, the subordinate can understand how his/her job is the means by which the superior's job is accomplished. See item 16. beginning on page 13 for fuller discussion.
2. **The Planning Process**
 - a. **Long-range (strategic) planning** has a horizon of 1 to 10 years or more. Such planning is difficult because of uncertainty about future events and conditions.
 - 1) Thus, strategic plans tend to be general and exclude operational detail.
 - b. Strategic planning embodies the concerns of senior management. It is based on
 - 1) Identifying and specifying organizational objectives. The future course of the organization should be consistent with the purposes stated in its **mission statement**. They may include industry leadership, business diversification, addition or deletion of products or services, entry into new markets, or service to society.
 - 2) Evaluating the **strengths** (competitive advantages) and **weaknesses** of the organization.
 - 3) Assessing **risk** levels.
 - 4) Identifying and forecasting the effects of **external (environmental) factors** relevant to the organization. For example, market trends, changes in technology, international competition, and social change may provide opportunities, impose limitations, or represent threats.
 - 5) Deriving the best strategy for reaching the objectives, given the organization's strengths and weaknesses and the relevant future trends.

- 6) **Capital budgeting**, a planning process for choosing and **financing** long-term projects and programs.
- 7) **Capacity planning**, an element of planning closely related to capital budgeting that includes, among other things, consideration of business combinations or divestitures.
- c. Strategic plans are translated into measurable and achievable intermediate and operational plans. Thus, intermediate and operational plans must be consistent with, and contribute to achieving, strategic objectives.
 - 1) **Intermediate plans** (6 months to 2 years) are developed by middle management.
 - 2) **Operational plans** (1 week to 1 year) are developed by lower-level managers.
 - 3) Such plans relate to production, materials, procurement, expenses, revenues, cash flows, etc.
- d. Advances in **information technology** and reductions in its cost have increased the use of quantitative models for strategic, intermediate, and operational planning purposes.
 - 1) This effect is particularly evident in large organizations in which quantitative models may be used with greater statistical reliability.
- e. **Contingency planning** is based on different sets of **premises**. It stipulates different sets of actions for management based on these premises.
 - 1) Contingency planning allows for forecasting error.
 - 2) Contingency planning is more expensive than formulating a single plan, so this additional cost must be more than balanced by improved performance.
- f. The **primary general planning principle** is that the lowest possible relevant units in management should be involved in the planning process. This form of **upward communication** is important for several reasons.
 - 1) Lower-level managers are aware of operational details and limitations. Thus, they can contribute to the feasibility and precision of the plan with regard to their individual areas of responsibility.
 - 2) Plans prepared at higher levels, without the participation of the managers who will be involved in their execution, appear to be dictated to the lower-level managers, with a consequent reduction in performance.
- g. **Additional General Planning Principles**
 - 1) Plans should not allocate more than the known available resources.
 - 2) Planning must precede action.
 - 3) Plans must be coordinated among related functions.
 - 4) Plans must be flexible and recognized as subject to change.
 - 5) Plans should be limited to only highly probable future events; it is impossible to include every possible action and consequence.
- 3. **Premises** are the underlying **assumptions** about the expected environment in which the strategic plan will be carried out. Thus, the next step in planning is **premising**, or the generation of planning assumptions.
 - a. Premises should be limited to those crucial to the success of the plans.
 - b. Managers should ask, "What internal and external factors would influence the actions planned for this organization (division, department, program)?" Premises must be considered at all levels of the organization.
 - 1) Thus, capital budgeting plans should be premised on assumptions (forecasts) about economic cycles, price movements, etc.
 - 2) The stores department's plans might be premised on stability of parts prices or on forecasts that prices will rise.

- c. **EXAMPLES:**
 - 1) The general economy will suffer an 11% decline next year.
 - 2) Our closest competitor's new model will provide greater competition for potential sales.
 - 3) Union negotiations will result in a general wage increase of 8%.
 - 4) Over the next 5 years, the cost of our raw materials will increase by 30%.
 - 5) The elasticity of demand for the company's products is 1.2.
- 4. **Objectives and Goals.** The terms objectives and goals are often used interchangeably. However, some writers distinguish between overall organizational objectives and individual, departmental, or subunit goals. Other writers reverse these meanings.
 - a. The determination of organizational objectives is the first step in planning.
 - b. Organizations usually have multiple objectives that are often contradictory.
 - 1) The objective of maximizing profit and the objective of growth could be mutually exclusive within a given year. Maximizing short-term profit might hamper or preclude future growth.
 - 2) Conflict among an organization's objectives is common.
 - c. Objectives vary with the organization's type and stage of development.
- 5. **Management Objectives**
 - a. The primary task of management is to reach organizational objectives effectively and efficiently.
 - 1) **Efficiency** is maximizing the output for a given quantity of input.
 - 2) **Effectiveness** is the degree to which the objective or goal is accomplished.
 - 3) In practice, effectiveness is of prime importance, and efficiency may be secondary because trade-offs are frequently made between efficiency and effectiveness.
 - a) **EXAMPLE:** In a hospital, efficiency is much less important than effectiveness. Reducing the night nursing staff to the theoretical minimum might increase efficiency by reducing payroll, but if even one patient dies because of inadequate care, the hospital has failed to carry out its mission effectively.
 - 4) Efficiency is doing things right. Effectiveness is doing the right things.
 - b. Subordinate objectives of management may include
 - 1) Survival
 - 2) Growth of market influence
 - 3) Employee development
 - 4) Social responsibility
 - 5) Creativity
 - 6) Personal need satisfaction
- 6. Each **subunit of an organization** may have its own objectives.
 - a. Subunit objectives may conflict with overall organizational objectives.
 - b. Subunit objectives unite the efforts of the people in the subunit. Consequently,
 - 1) The people in each subunit are bound by their collective wisdom, training, and experiences. Thus, they may have tunnel vision regarding the organization's purpose.
 - a) **EXAMPLE:** "Why doesn't anybody take the time to see our problems in production? After all, if it weren't for us, they wouldn't have anything to sell!"

- 2) Subunits tend to be designed to make decisions that optimize the results of each subunit, to the possible detriment of the overall organization.
 - a) Decentralized profit centers are the classic illustration.
 - i) **EXAMPLE:** A profit center that buys services from another profit center in the same organization will seek to maximize its own welfare regardless of the consequences for corporate objectives.
 - c. Subunit objectives must be established to translate broad overall corporate objectives into meaningful and measurable terms for the subunit members.
7. Objectives should be
 - a. **Clearly stated in specific terms.** General or poorly defined objectives are not useful for guiding the actions of managers or measuring their performance.
 - b. **Easily communicated to all concerned.** The executives who determine objectives cannot have the desired impact on the organization until they successfully communicate the objectives to all from whom action is required.
 - c. **Accepted by the individuals concerned.** An objective is unlikely to be attained if it is thought to be unachievable by those affected.
8. Broad objectives should be established at the top and retranslated in more specific terms as they are communicated downward in the **means-end hierarchy**.
 - a. **EXAMPLE:**
 - 1) A firm has a socioeconomic purpose, such as providing food.
 - 2) The firm's mission is the accomplishment of its socioeconomic purpose through the production of breakfast cereal.
 - 3) The firm develops long-range or strategic objectives with regard to profitability, growth, or survival.
 - 4) A more specific overall objective might be to provide investors with an adequate return on their investment.
 - 5) Divisional objectives can be developed, e.g., to increase the sales of a certain kind of cereal.
 - 6) Departmental objectives are developed, e.g., to reduce waste in the packaging department.
 - 7) Low-level managers and supervisors then develop personal performance and development objectives.
9. A divergence of opinion exists regarding the determination of organizational objectives.
 - a. One view is that **service** (need satisfaction for the consumer) is primary and that profit results from service.
 - b. Another view is that **profit** or **return on investment (ROI)** is primary and that service results from profit.
 - c. The most relevant view for a given organization is contingent upon its particular situation or environment.
 - 1) **EXAMPLE:** A fast-food company has customer service as its primary objective. It expects profits to result from the satisfaction of consumer needs. On the other hand, a private utility provides service only if a reasonable return on investment attracts the capital needed for system maintenance and expansion. For a utility, service results from profit.

10. Objectives change over time.
 - a. **EXAMPLE:** The 19th-century industrialist's main objectives were to make money and increase personal power. In the 21st century, social responsibility is a significant force that must be accommodated. This change is evidenced by, for example, the expanding pressures for information disclosures to outside parties, for environmental-impact studies, and for training the unemployed.
11. After objectives and premises are formulated, the next step in the planning process is the development of **policies, procedures, and rules**. These elements are necessary at all levels of the organization and overlap both in definition and in practice.
12. Intermediate and operational plans are translated into policies, procedures, and rules, which are standing plans for repetitive situations.
 - a. Policies and procedures provide **feedforward control** because they anticipate and prevent problems and provide guidance on how an activity should be performed to best ensure that an objective is achieved.
13. **Policies** are general statements that guide thinking and action in decision making.
 - a. Policies may be explicitly published by, or implied by the actions of, management.
 - 1) Managers should be certain that their subordinates do not misinterpret minor or unrelated decisions as precedents for policy.
 - b. Policies indicate a preferred method for achieving objectives.
 - c. Policies define a general area within which a manager may exercise discretion.
 - d. Policies should
 - 1) Involve known principles
 - 2) Be consistent with higher-level policies and with those of parallel units in the organization
 - 3) Be clear and comprehensive
 - 4) Be workable
 - 5) Be published
 - e. Difficulties arise in the administration of policies that are not properly
 - 1) Formulated
 - 2) Understood
 - 3) Flexible
 - 4) Communicated
 - 5) Updated
 - 6) Accepted
 - f. A strong **organizational culture** means that the organization's key values are intensely held and widely shared. Hence, the need for formal written policies is minimized.
14. **Procedures** are specific directives that define how work is to be done.
 - a. Procedures
 - 1) Usually consist of a set of specific steps in chronological order
 - 2) Are found at every level of the organization
 - 3) Reduce the need for managerial direction of subordinates in the accomplishment of routine matters
 - 4) Improve efficiency through standardization of actions
 - 5) Facilitate the training of personnel
 - 6) Provide coordination among different departments of the organization

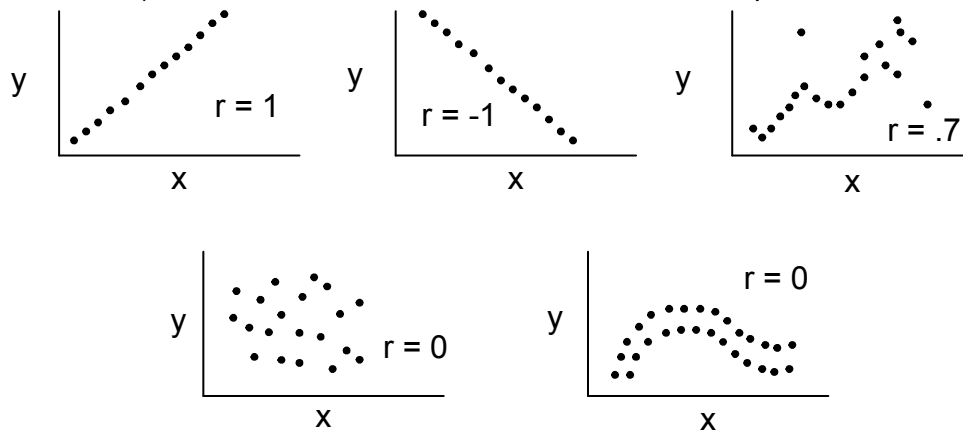
- b. Procedures should be
 - 1) Balanced
 - 2) Efficient in use of resources
 - 3) Subject to organized control
 - 4) Flexible enough to handle most normal situations
 - 5) Clearly defined and easily accessible, as in procedures manuals
- 15. **Rules** are specific, detailed guides that restrict behavior.
 - a. Rules are the simplest plans.
 - b. A rule requires a specific action to be taken with regard to a given situation.
 - c. Rules allow no discretion or flexibility.
 - d. A procedure may contain a sequence of rules, or a rule may stand alone.
 - e. For example, "No smoking in the paint shop. Violators will be dismissed without exception."
- 16. **Management by Objectives (MBO)** is a behavioral, communications-oriented, responsibility approach to management and employee self-direction. It is a comprehensive management approach and therefore is relevant to **planning and control**.
 - a. MBO is based on the **Theory Y** philosophy that employees
 - 1) Want to work hard if they know what is expected
 - 2) Like to understand what their jobs actually entail
 - 3) Are capable of self-direction and self-motivation
 - b. MBO requires
 - 1) **Senior management** participation and commitment to the program. These managers must
 - a) Determine the overall direction and objectives for the organization
 - b) Communicate these effectively in operational or measurable terms
 - c) Coordinate subordinates' objectives with overall objectives
 - d) Follow up at the end of the MBO cycle period to reward performance and review problems
 - 2) **Integration of objectives** for all subunits into a compatible, balanced system directed toward accomplishment of the overall objectives.
 - 3) Provisions for regular periodic **reporting of performance** toward attainment of the objectives.
 - 4) Free and honest **communication** between supervisor and subordinate.
 - 5) A **commitment** to a Theory Y philosophy on the part of supervisors.
 - 6) An **organizational climate** that encourages mutual trust and respect.
 - c. **Steps necessary to implement an MBO program** include establishing objectives and action plans (the planning steps) and periodic review and final appraisal (the control steps).
 - 1) Each subordinate should define his/her job objectives and the specific actions (s)he would like to take over the next time period to help reach those job objectives.
 - 2) The subordinate's objectives and activities should be reviewed within the context of the objectives at higher levels.
 - 3) When the subordinate's objectives are at odds with upper-level objectives, a **coaching session** is necessary.
 - a) This process frequently represents the acid test of MBO because the supervisor must avoid dictating the subordinate's objectives if the spirit of participation is to be preserved.

- b) If the subordinate's objectives are deemed by the supervisor to be inappropriate, and the subordinate cannot be **coached** out of them, the supervisor can either
 - i) Let the subordinate learn by failing in doing the job his/her way, or
 - ii) Overrule on this particular issue.
 - c) A commitment to Theory Y, trust in subordinates, and the supervisor's job security (the confidence to allow subordinates still more latitude) will play important roles.
 - d) The clearer the definition of job and organizational objectives and the greater the degree of trust and communication between supervisor and subordinate, the easier it is to avoid these dilemmas in implementing MBO.
- 4) The supervisor and subordinate should mutually set and agree on a realistic action plan that can be accomplished by the end of the period.
- 5) Flexibility should be maintained during the period to accommodate unforeseen changes. Thus, after developing objectives and action plans, the third step in the MBO cycle is **periodic review**.
 - a) At regular intervals, objectives should be reconsidered to determine whether they are appropriate in the light of changed circumstances. Otherwise, progress toward achievement of the established objectives should be evaluated and feedback provided.
- 6) At the end of the MBO cycle, the supervisor and subordinate should meet for a **final performance appraisal**. They should review the results, analyze and discuss differences, and use the discussion for learning and performance feedback (not for correction or discipline).
- 7) The MBO cycle should then be repeated.

16.3 FORECASTING

1. Forecasts are the basis for business plans, including budgets. They attempt to answer questions about the outcomes of events (e.g., the effect of a war involving a producer of oil on the oil market), the timing of events (e.g., when will unemployment fall), or the future value of a statistic (e.g., sales). In addition to intuition (informed judgment), many quantitative methods are useful in projecting the future from past experience.
 - a. Examples of forecasts include sales projections, inventory demand, cash flow, and future capital needs.
 - 1) Most models are used in the forecasting process. They are used to make decisions that optimize future results.
 - 2) The reliability of the forecast should be determined before using it. No objective method can determine the reliability of judgmental forecasts. When quantitative methods are used, however, measurement of reliability is usually possible, e.g., by calculating the standard error of the estimate.
2. **Correlation analysis** is used to measure the strength of the linear relationship between two or more variables. Correlation between two variables can be seen by plotting their values on a single graph to form a scatter diagram.
 - a. **Scatter diagrams** may be used to demonstrate correlations. Each observation creates a dot that pairs the x and y values. If the points tend to form a straight line, correlation is high. If they form a random pattern, correlation is low. Correlation measures only linear relationships.

- b. In standard notation, the coefficient of correlation is r ; the coefficient of determination is r^2 .
- c. The **coefficient of correlation** measures the relative strength of the linear relationship. It has the following properties:
- 1) The magnitude of r is independent of the scales of measurement of x and y .
 - 2) $-1.0 \leq r \leq 1.0$
 - a) A value of -1.0 indicates a perfectly inverse linear relationship between x and y .
 - b) A value of zero indicates no linear relationship between x and y .
 - c) A value of $+1.0$ indicates a direct relationship between x and y .



- d. The **coefficient of determination (r^2)**, or the coefficient of correlation squared, may be interpreted as the proportion of the total variation in y that is explained or accounted for by the regression equation.
- 1) It is approximately equal to 1 minus the quotient of the unexplained variation divided by the total variation when the sample is large. The following is the formula:

$$r^2 = 1 - \frac{\sum (y_i - \hat{y})^2}{\sum (y_i - \bar{y})^2}$$

If: r^2 = the coefficient of determination

\sum = summation

y_i = an actual data point

\hat{y} = a point on the regression line calculated from the sample linear regression equation

\bar{y} = the mean of the observed data points

- 2) EXAMPLE: The assertion that new car sales are a function of disposable income with a coefficient of correlation of .8 is equivalent to stating that 64% ($.8^2$) of the variation of new car sales (from average new car sales) can be explained by the variation in disposable income (from average disposable income).
- 3) Because r^2 increases as the number of independent variables increases, regardless of whether the additional variables are actually correlated with the dependent variable, r^2 may be adjusted (reduced) to allow for this effect. If k is the number of independent variables and n is the number of observations, the formula for adjusted r^2 is

$$r^2 = \frac{(k - 1)}{(n - k)} \times (1 - r^2)$$

3. **Regression (least squares) analysis** extends correlation to find an equation for the linear relationship among variables. The behavior of the dependent variable is explained in terms of one or more independent variables. Thus, regression analysis determines functional relationships among quantitative variables.

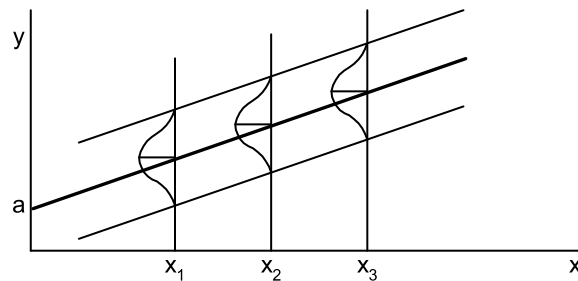
- a. **Simple regression** has one independent variable, and **multiple regression** has more than one.
 - 1) **EXAMPLE:** A dependent variable such as sales is dependent on advertising, consumer income, availability of substitutes, and other independent variables.
 - 2) **Multicollinearity** is the condition in which two or more independent variables are strongly correlated. The effect is greater uncertainty regarding the coefficient of the variables; that is, their standard errors increase. Multicollinearity is a concern in multiple regression.
- b. Regression analysis is used to find **trend lines in business data** such as sales or costs (time series analysis or trend analysis) and to develop models based on the association of variables (cross-sectional analysis, a method that is not time related as is trend analysis). Examples are
 - 1) Trend in product sales
 - 2) Trend in overhead as a percentage of sales
 - 3) Relationship of direct labor hours to variable overhead
 - 4) Relationship of direct material usage to accounts payable
- c. Some reasonable basis should exist for expecting the variables to be related.
 - 1) If they are obviously independent, any association found by regression is mere coincidence.
 - 2) Regression does not determine causality, however. Although x and y move together, the apparent relationship may be caused by some other factor.
 - a) **EXAMPLE:** A strong correlation exists between car-wash sales volume and sunny weather, but sales volume does not cause sunny weather.
 - 3) The statistical relationships revealed by regression and correlation analysis are valid **only** for the range of the data in the sample.
- d. The **simple regression equation** is

$$y = a + bx + e$$

- If: y = the dependent variable
 a = the y-axis intercept (the fixed cost in cost functions)
 b = the slope of the regression line (the variable portion of the total cost in cost functions)
 x = the independent variable
 e = the error term

- 1) **Assumptions of the model** are that
 - a) For each value of x, there is a distribution of values of y. The means of these distributions form a straight line. Hence, x and y are linearly related.
 - b) The error term (e) is normally distributed with a mean or expected value equal to zero.
 - i) The y-intercept (a) and the slope of the regression line (b) also have normal distributions.

- c) Errors in successive observations are statistically independent.
 - i) Thus, the estimators are unbiased.
 - ii) **Autocorrelation (serial correlation)** occurs when the observations are not independent; in other words, later observations may be dependent on earlier ones.
- d) The distribution of y around the regression line is constant for different values of x .
 - i) Thus, the observations are characterized by **homoscedasticity** or **constant variance**. The deviation of points from the regression line does not vary with a change in the size of the independent variable.
 - ii) Graphically, the model is represented by a series of normal distributions (subpopulations of y) around the regression line. As noted above, these subpopulations have the same variance.



- **Heteroscedasticity** is the condition in which the variance of the error term is **not** constant.

- e. From linear algebra, the **equation for a straight line** may be stated as follows:

$$y = a + bx$$

If: a = the y-axis intercept
 b = the slope of the line

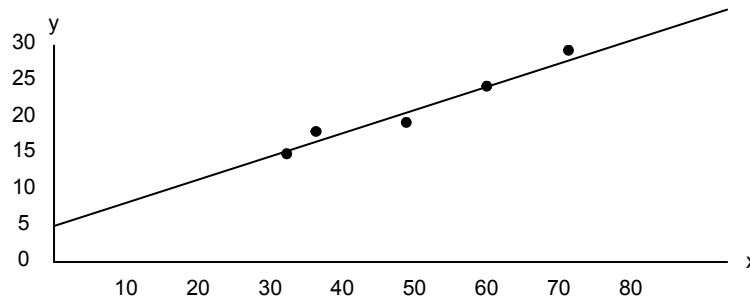
- 1) Regression analysis uses the **method of least squares**, which minimizes the sum of the squares of the vertical distance between each observation point and the regression line.
- 2) **EXAMPLE:** Observations are collected on advertising expenditures and annual sales for a firm.

| <u>Sales (\$000,000s)</u> | <u>Advertising (\$000s)</u> |
|---------------------------|-----------------------------|
| 28 | 71 |
| 14 | 31 |
| 19 | 50 |
| 21 | 60 |
| 16 | 35 |

- a) According to the regression equation that results from using least squares computations, expected sales equal 4.2 plus .31 times the advertising expenditure.

$$y = 4.2 + .31(x)$$

b) The observations are graphed as follows:



- f. Regression analysis is particularly valuable for **budgeting** and cost accounting purposes. For instance, it is almost a necessity for computing the fixed and variable portions of mixed costs for flexible budgeting.
- g. The following **equations** can be used to determine the equation for the least squares regression line (the equation for the line is in the form of $y = a + bx$):

$$\sum y = na + b(\sum x)$$

$$\sum xy = a(\sum x) + b(\sum x^2)$$

- 1) EXAMPLE: The use of the two equations can be illustrated with the following data based on a set of six paired observations ($n = 6$):

| y | x |
|-------------------|-----------------|
| \$ 6 | 2 |
| 7 | 3 |
| 5 | 2 |
| 4 | 1 |
| 8 | 3 |
| 6 | 2 |
| $\Sigma y = \$36$ | $\Sigma x = 13$ |

| xy | x^2 |
|-------------------|-------------------|
| $6 \times 2 = 12$ | 4 |
| $7 \times 3 = 21$ | 9 |
| $5 \times 2 = 10$ | 4 |
| $4 \times 1 = 4$ | 1 |
| $8 \times 3 = 24$ | 9 |
| $6 \times 2 = 12$ | 4 |
| $\Sigma xy = 83$ | $\Sigma x^2 = 31$ |

- a) Substituting into the two equations gives

$$36 = 6a + 13b$$

$$83 = 13a + 31b$$

- b) Solving simultaneously for the two unknowns,

$$1116 = 186a + 403b$$

$$1079 = 169a + 403b$$

$$\underline{\underline{37}} = \underline{\underline{17a}}$$

- c) Thus, $a = 2.176$. Solving for b in the second original equation gives

$$\begin{aligned} 83 &= 13(2.176) + 31b \\ 83 &= 28.288 + 31b \\ 31b &= 54.712 \\ b &= 1.765 \end{aligned}$$

- d) Alternative formulas that are ordinarily simpler to use are given below:

- i) The slope may be expressed as

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$$

- ii) The value of the y-intercept may be expressed as

$$a = \bar{y} - b(\bar{x})$$

- h. The statistical significance of the **slope of the regression line** is important because, if its true value is zero, changes in the independent variable have no effect on the dependent variable.

- 1) Because the distribution of b is normal, the t-distribution may be used to determine whether b is significantly different from zero, that is, whether one can reject the null hypothesis that b equals zero.

- a) One approach is to divide b by the standard error of the estimate of b . (The formula is not given here. The standard error is usually provided in the computer output.) If the result exceeds the critical value of t determinable from a standard table, the conclusion is that b is not zero. For example, this critical value is 2.0 for a sample of 60, 58 degrees of freedom ($60 - 2$ parameters of a and b estimated), and a 95% confidence level.

- b) Another approach is to construct a precision interval ($b \pm t$ multiplied by the standard error of the estimate). If the interval does not contain zero, the null hypothesis may be rejected.

- i) The value of t is the critical value for the given sample size, degrees of freedom, and confidence level used in the first approach.

- i. The **high-low method** is used to generate a regression line by basing the equation on only the highest and lowest of a series of observations.

- 1) **EXAMPLE:** A regression equation covering electricity costs could be developed by using only the high-cost month and the low-cost month. If costs were \$400 in April when production was 800 machine hours and \$600 in September when production was 1,300 hours, the equation would be determined as follows:

| | | | | |
|------------|--------------|-----|------------|-------|
| High month | \$600 | for | 1,300 | hours |
| Low month | 400 | for | 800 | hours |
| Increase | <u>\$200</u> | | <u>500</u> | hours |

Because costs increased \$200 for 500 additional hours, the variable cost is \$.40 per machine hour. For the low month, the total variable portion of that monthly cost is \$320 (\$.40 \times 800 hours). Given that the total cost is \$400 and \$320 is variable, the remaining \$80 must be a fixed cost. The regression equation is $y = 80 + .4x$.

- 2) The major criticism of the high-low method is that the high and low points may be abnormalities not representative of normal events.

4. **Time series or trend analysis** relies on past experience. Changes in the value of a variable (e.g., unit sales of a product) over time may have several possible components.
 - a. In time series analysis, the dependent variable is regressed on time (the independent variable).
 - b. The **secular trend** is the long-term change that occurs in a series. It is represented by a straight line or curve on a graph.
 - c. **Seasonal variations** are common in many businesses. A variety of analysis methods includes seasonal variations in a forecasting model, but most methods make use of a seasonal index.
 - d. **Cyclical fluctuations** are variations in the level of activity in business periods. Although some of these fluctuations are beyond the control of the firm, they need to be considered in forecasting. They are usually incorporated as index numbers.
 - e. **Irregular or random variables** are any variations not included in the categories above. Business can be affected by random happenings (e.g., weather, strikes, fires, etc.).
 - f. The **percentage-of-sales** method is the most widely used for sales forecasting. It adjusts the current level of sales by a specified percentage increase or decrease. This method is a form of trend analysis that is convenient and easy to apply and intuitively appealing to managers. It is also useful for developing **pro forma financial statements** by estimating items that vary directly with sales as percentages of expected sales.
 - 1) This method is based on the assumptions that most items directly correlate with sales and that the current levels of all assets are optimal for the current sales level.
5. **Exponential smoothing** is a technique used to level or smooth variations encountered in a forecast. This technique also adapts the forecast to changes as they occur.
 - a. The simplest form of smoothing is the moving average, in which each forecast is based on a fixed number of prior observations. Exponential smoothing is similar to the moving average.
 - b. Exponential means that greater weight is placed on the most recent data, with the weights of all data falling off exponentially as the data age. The selection of alpha (α), the smoothing factor, is important because a high alpha places more weight on recent data.
 - c. The equation for the forecast (F) for period $t + 1$ is

$$F_{t+1} = \alpha(x_t) + (1 - \alpha)F_t$$

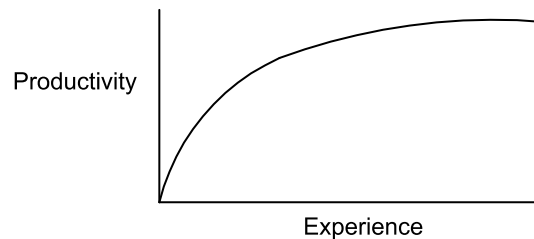
If: x_t = the observation for period t
 t = the most recent period
 α = the smoothing factor ($0 \leq \alpha \leq 1$)
 F_t = the forecast for period t

 - 1) This method weights the observation for period t by α and the forecast for period t by $(1 - \alpha)$.
6. **Learning curves** reflect the increased rate at which people perform tasks as they gain experience. The time required to perform a given task becomes progressively shorter, but this technique is applicable only to the early stages of production or of any new task.
 - a. Ordinarily, the curve is expressed as a percentage of reduced time to complete a task for each doubling of cumulative production. Research has shown learning curve percentages to be approximately 80%. In other words, the time required is reduced by 20% each time cumulative production is doubled.

- 1) One common assumption made in a learning curve model is that the **cumulative average time per unit** is reduced by a certain percentage each time production doubles.
 - a) The alternative assumption is that **incremental unit time** (time to produce the last unit) is reduced when production doubles.
- 2) EXAMPLE: An 80% learning curve would result in the following performance for the lots shown, when run in sequence (top to bottom).

| Cumulative Number of Tasks | Cumulative Average Minutes per Unit |
|-------------------------------|--|
| 100 | 3.0 |
| 200 | 2.4 ($3.0 \times 80\%$) |
| 400 | 1.92 ($2.4 \times 80\%$) |
| 800 | 1.536 ($1.92 \times 80\%$) |
| 1,600 | 1.228 ($1.536 \times 80\%$) |

b. **Graphical Presentation**



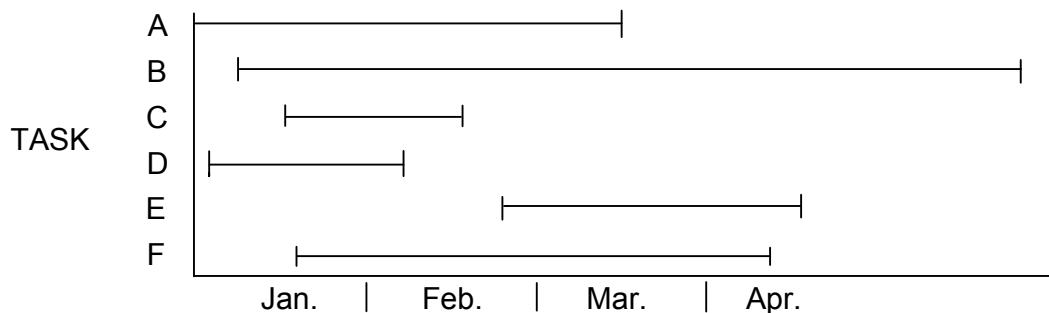
- c. Since the average time for 100 units in the example above would be 3 minutes per unit, the total time would be 300 minutes. At an average time of 2.4 minutes for 200 units, the total time would be 480 minutes. In other words, the additional 100 units would require only 180 minutes ($480 - 300$), or 1.8 minutes per unit.
7. **Simulation** is a technique for experimenting with logical and mathematical models using a computer.
- a. Despite the power of mathematics, many problems cannot be solved by known analytical methods because of the behavior of the variables and the complexity of their interactions, e.g.,
 - 1) Corporate planning models
 - 2) Financial planning models
 - 3) New product marketing models
 - 4) Queuing system simulations
 - 5) Inventory control simulations
 - b. **Experimentation** is neither new nor uncommon in business. Building a mockup of a new automobile, having one department try out new accounting procedures, and test-marketing a new product are all forms of experimentation. In effect, experimentation is organized trial and error using a model of the real world to obtain information prior to full implementation.
 - c. **Models** can be classified as either physical or abstract.
 - 1) Physical models include automobile mockups, airplane models used for wind-tunnel tests, and breadboard models of electronic circuits.
 - 2) Abstract models may be pictorial (architectural plans), verbal (a proposed procedure), or logical-mathematical. Experimentation with logical-mathematical models can involve many time-consuming calculations. Computers have eliminated much of this costly drudgery and have led to the growing interest in simulation for management.

- d. The **simulation procedure** has five steps.
- 1) **Define the objectives.** The objectives serve as guidelines for all that follows. The objectives may be to aid in the understanding of an existing system (e.g., an inventory system with rising costs) or to explore alternatives (e.g., the effect of investments on the firm's financial structure). A third type of objective is estimating the behavior of some new system, such as a production line.
 - 2) **Formulate the model.** The variables to be included, their individual behavior, and their interrelationships must be defined in precise logical-mathematical terms. The objectives of the simulation serve as guidelines in deciding which factors are relevant.
 - 3) **Validate the model.** Some assurance is needed that the results of the experiment will be realistic. This assurance requires validation of the model -- often using historical data. If the model gives results equivalent to what actually happened, the model is historically valid. Some risk remains, however, that changes could make the model invalid for the future.
 - 4) **Design the experiment.** Experimentation is sampling the operation of a system. For example, if a particular policy is simulated on an inventory model for two years, the results are a single sample. With replication, the sample size can be increased and the confidence level raised. The number of runs to be made, length of each run, measurements to be made, and methods for analyzing the results are all part of the design of the experiment.
 - 5) **Conduct the simulation -- evaluate results.** The simulation should be conducted with care. The results are analyzed using appropriate statistical methods.
- e. The **Monte Carlo technique** is often used in simulation to generate the individual values for a random variable. A random number generator is used to produce numbers with a uniform probability distribution (equal likelihoods of occurrence). The second step is to transform these numbers into values consistent with the desired distribution.
- 1) The performance of a quantitative model may be investigated by randomly selecting values for each of the variables in the model (based on the probability distribution of each variable) and then calculating the value of the solution. If this process is performed a large number of times, the distribution of results from the model will be obtained.
 - 2) **EXAMPLE:** A new marketing model includes a factor for a competitor's introduction of a similar product within 1 year. Management estimates a 50% chance that this event will happen. For each simulation, this factor must be determined, perhaps by flipping a coin, or by putting two numbers in a hat and selecting one number. Random numbers between 0 and 1 could be generated. Numbers under .5 would signify introduction of a similar product; numbers over .5 would indicate the nonoccurrence of this event.
- f. The advantages of simulation are as follows:
- 1) Time can be compressed. A corporate planning model can show the results of a policy for 5 years into the future, using only minutes of computer time.
 - 2) Alternative policies can be explored. With simulations, managers can ask what-if questions to explore possible policies, providing management with a powerful new planning tool.
 - 3) Complex systems can be analyzed. In many cases, simulation is the only possible quantitative method for analyzing a complex system such as a production or inventory system, or the entire firm.

- g. The limitations of simulation are as follows:
 - 1) **Cost.** Simulation models can be costly to develop. They can be justified only if the information to be obtained is worth more than the costs to develop the model and carry out the experiment.
 - 2) **Risk of error.** A simulation results in a prediction of how an actual system would behave. As in forecasting, the prediction may be in error.
- h. **Sensitivity analysis.** After a problem has been formulated into any mathematical model, it may be subjected to sensitivity analysis.
 - 1) A trial-and-error method may be adopted in which the sensitivity of the solution to changes in any given variable or parameter is calculated.
 - a) The risk of the project being simulated may also be estimated.
 - b) The best project may be one that is least sensitive to changes in probabilistic (uncertain) inputs.
 - 2) In **linear programming** problems, sensitivity is the range within which a constraint value, such as a cost coefficient or any other variable, may be changed without changing the optimal solution. Shadow price is the synonym for sensitivity in that context.
- 8. A variant of intuitive forecasting by well-informed managers is **scenario analysis** (scenario planning). This technique involves developing formal written descriptions of equally likely future alternatives (usually two to four). It is a qualitative procedure (that may reflect some quantitative input) reflecting an understanding that future events involve many variables not susceptible to quantification.
 - a. A **longitudinal scenario** concerns how future conditions will develop from current conditions.
 - b. The more common **cross-sectional scenario** describes a future state at a certain moment in time.
 - c. Scenario analysis is a long-range forecasting method (often 5 years or more) that is based on **multiple forecasts**. For example, scenarios may be written about how very favorable, normal, or unfavorable economic conditions will affect a particular market, product, or industry. This strategic planning method is beneficial because it **avoids surprise**.
- 9. Well-designed **surveys** using questionnaires or interviews are often used to determine customer preferences, attitudes, and tastes. They also may be used to gather opinions from experts.
- 10. The **Delphi technique** was developed by the RAND Corporation in the late 1960s as a forecasting methodology. Later, the U.S. government enhanced it as a group decision-making tool with the results of Project HINDSIGHT, which established a factual basis for the workability of Delphi. That project produced a tool in which a group of experts could reach a consensus when the decisive factors were subjective, not knowledge-based.

16.4 PROJECT MANAGEMENT

1. Project management techniques are designed to aid the planning and control of large-scale projects having many interrelated activities.
 - a. A **project** is a temporary undertaking with specified objectives that often involves a cross-functional team and working outside customary organizational lines. Hence, interpersonal skills are at a premium in project management because a manager may not have line authority over some team members.
 - b. The **project life cycle** consists of
 - 1) **Conceptualization** (setting overall objectives, budgets, and schedules)
 - 2) **Planning** (obtaining resources, assigning duties, and coordinating activities)
 - 3) **Execution** (monitoring, correcting, meeting expectations, and finishing the project within time and budgetary limits)
 - a) The largest amount of resources are used during this stage.
 - 4) **Termination** (turning the project over to the user and redistributing project resources)
 - c. **Project management software** is available. Among other things, it should
 - 1) Specify and schedule required activities
 - 2) Provide the ability to do sensitivity analysis of the effects of changes in plans
 - 3) Calculate a project's critical path
 - 4) Establish priorities
 - 5) Be able to modify or merge plans
 - 6) Manage all types of project resources
 - 7) Monitor progress, including adherence to time budgets for activities
 - d. **Example applications** include building construction, R&D projects, new product planning, feasibility studies, audit studies, movie production, and conversion to a new computer information system.
2. Three of the more common scheduling techniques are Gantt or bar charts, PERT, and CPM. These techniques are suitable for any project having a target completion date and single start. **Gantt charts** or **bar charts** are simple to construct and use. To develop a Gantt chart, divide the project into logical subprojects called activities or tasks. Estimate the start and completion times for each activity. Prepare a bar chart showing each activity as a horizontal bar along a time scale.



- a. The major advantage of the Gantt chart is its simplicity. It forces the planner to think ahead and define logical activities. As the project progresses, actual completion times can be compared with planned times. Furthermore, the technique requires no special tools or mathematics and can be used on small projects as well as large ones.
- b. The major disadvantage is that interrelationships among activities are not shown. Several special methods have been developed to show these on a Gantt chart, but they are feasible only for simple relationships.

3. **Program Evaluation and Review Technique (PERT)** was developed to aid managers in controlling large-scale, complex projects. PERT diagrams are free-form networks showing each activity as a line between events. A sequence of lines shows interrelationships among activities. PERT diagrams are more complex than Gantt charts, but they have the advantages of incorporating probabilistic time estimates and identifying the critical path.
- Events** are discrete moments in time representing the start or finish of an activity. They consume no resources.
 - Activities** are tasks to be accomplished. They consume resources (including time) and have a duration over time.
 - The **network diagram** is formed by
 - The lines (activities) connected from left to right in the necessary sequence of their accomplishment. They can be marked with time lengths.
 - Circles representing events and numbered for identification.
 - The **critical path** is the longest path in time through the network. It is critical because, if any activity on the critical path takes longer than expected, the entire project will be delayed. Every network has at least one critical path. Some have more than one.
 - The **mean completion time** for the critical path is the sum of the means of the activity times.
 - The **standard deviation of the completion time** for the critical path is the square root of the sum of the variances (squares of the standard deviations) of the activity times.
 - EXAMPLE: If the critical path has two activities, and the standard deviations of the completion times are 3 and 4, the standard deviation for the critical path is

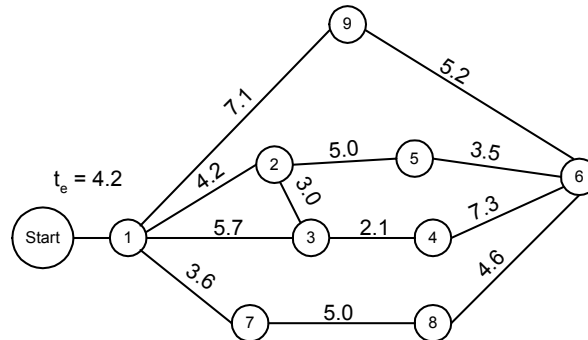
$$\sqrt{3^2 + 4^2} = 5$$
 - Paths that are not critical have **slack time**. One advantage of PERT is that it identifies this slack time, which represents unused resources that can be diverted to the critical path.
 - Several techniques have been developed to include cost information in the analyses. This variation of PERT is often called **PERT-Cost**. It entails combining activities into work packages to facilitate cost control. By estimating costs for each work package, a manager can develop a budget that indicates when costs should be incurred during the project.
 - Activity times** can be expressed probabilistically. Computer programs are available to make the calculations and find critical paths.
 - PERT analysis includes probabilistic estimates of activity completion times. **Three time estimates** are made -- optimistic, most likely, and pessimistic.
 - The time estimates for an activity are assumed to approximate a beta probability distribution. In contrast with the normal distribution, this distribution has finite endpoints (the optimistic and pessimistic estimates) and is unimodal; that is, it has only one mode (the most likely time).
 - PERT approximates the mean of the beta distribution by dividing the sum of the optimistic time, the pessimistic time, and four times the most likely time (the mode) by six.
 - The **standard deviation** is approximated by dividing the difference between the pessimistic and optimistic times by six. The basis for the latter approximation is that various probability distributions have tails that lie about plus or minus three standard deviations from the mean. For example, 99.9% of observations in the normal distribution are expected to lie within this range.

- i. EXAMPLE: If an activity can be completed in 6 days (optimistic time), 10 days (most likely time), or 20 days (pessimistic time), the expected duration is 11 days $\{[6 + (4 \times 10) + 20] \div 6\}$.

1) Thus, the most likely time is weighted the most heavily.

2) The standard deviation is 2.33 $[(20 - 6) \div 6]$.

- j. EXAMPLE:



- 1) For the network above, the following are the paths and path times:

| Path | Time (hours) |
|-----------------|--------------|
| Start-1-9-6 | 16.5 |
| Start-1-2-5-6 | 16.9 |
| Start-1-2-3-4-6 | 20.8 |
| Start-1-3-4-6 | 19.3 |
| Start-1-7-8-6 | 17.4 |

2) Path Start-1-2-3-4-6 is the critical path because it has the longest time.

- k. In the example above, path 1-3 takes only 5.7 hours, whereas the critical path events (1-2-3) take 7.2 hours. The slack time represented by path 1-3 is thus $7.2 - 5.7$, or 1.5. People assigned to path 1-3 have an extra 1.5 hours to help elsewhere.

4. The **critical path method (CPM)** was developed independently of PERT and is widely used in the construction industry. CPM may be thought of as a subset of PERT. Like PERT, it is a network technique. Unlike PERT, it uses deterministic time and cost estimates. Its advantages include cost estimates plus the concept of “crash” efforts and costs.
- Activity times are estimated for normal effort and crash effort. **Crash time** is the time to complete an activity assuming that all available resources were devoted to the task (overtime, extra crew, etc.).
 - Activity costs are also estimated for normal and crash efforts.
 - These estimates allow the project manager to estimate the costs of completing the project if some of the activities are completed on a crash basis.
 - The **network diagram** is constructed in the same manner as PERT diagrams. Once the diagram is constructed, the critical paths are found for normal and crash times. More than one critical path may exist for each diagram.
 - Crashing the network** means finding the minimum cost for completing the project in minimum time.
 - CPM computer programs allow updating of the solution as work proceeds.

5. **Network models** are used to solve managerial problems pertaining to project scheduling, information systems design, and transportation systems design. Networks consisting of nodes and arcs may be created to represent in graphic form problems related to transportation, assignment, and transshipment. The shortest-route, minimal spanning tree, and maximal flow problems are other applications of network models.
 - a. A **shortest-route algorithm** minimizes total travel time from one site to each of the other sites in a transportation system.
 - b. The **maximal flow algorithm** maximizes throughput in networks with distinct entry (source node) and exit (sink node) points. Examples of applications are highway transportation systems and oil pipelines. Flows are limited by capacities of the arcs (e.g., highways or pipes).
 - c. The **minimal spanning tree algorithm** identifies the set of connecting branches having the shortest combined length. A spanning tree is a group of branches (arcs) that connects each node in the network to every other node. An example problem is the determination of the shortest telecommunications linkage among users at remote sites and a central computer.
6. Controlling **job projects** requires attention to their scope, scheduling, quality, and costs. Thus, **variance analysis** is a tool for project management.
 - a. The difference between the actual cost of work performed (CWP) and the budgeted cost of work scheduled (CWS) may be analyzed in terms of two variances:
 - 1) The **job project-performance cost variance** is the difference between the actual CWP and the budgeted CWP. This variance may be further divided into price and efficiency variances. It measures cost overruns or underruns.
 - 2) The **job project-schedule cost variance** is the difference between the budgeted CWP and the budgeted CWS. It measures the extent to which the project is ahead of or behind schedule.

16.5 THE BUDGETING PROCESS

1. A **budget (profit plan)** is a realistic plan for the future expressed in quantitative terms. Senior management can use a budget to plan for the future and communicate objectives to all levels of the organization, to motivate employees, to control organizational activities, and to evaluate performance.
 - a. The annual budget should reflect an organization's objectives. Thus, the annual budget is usually based on a combination of financial, quantitative, and qualitative measures.
 - b. The budget is a **planning** tool.
 - 1) Organizations that prepare budgets anticipate problems before they occur, for example, shortages of materials, merchandise, personnel, or equipment.
 - 2) Objectives in the form of budgets facilitate decision making.
 - 3) **Strategic budgeting** is a form of long-range planning based on identifying and specifying organizational objectives. The strengths and weaknesses of the organization are evaluated and risk levels are assessed. The influences of internal and external factors are forecast to derive the best strategy for reaching the organization's objectives.
 - a) External factors include general economic conditions and their expected trends, governmental regulatory measures, the labor market, and the activities of competitors.

- c. The budget is a **control** tool. A budget helps to control costs by setting cost guidelines to detect efficient or inefficient use of resources.
 - 1) A manager is more likely to control **costs** if (s)he knows that all costs will be compared with the budget. A manager will be accountable if costs for which (s)he is **responsible** exceed budgeted amounts.
 - 2) Budgets also reward highly effective managers. Consequently, employees should not view budgets negatively. A manager also can use a budget as a personal self-evaluation tool.
 - 3) **Budgetary slack** (underestimation of probable performance) must be avoided, however, if a budget is to have its desired effects. The natural tendency of a manager is to negotiate for a less stringent measure of performance so as to avoid unfavorable variances from expectations.
 - 4) For the budgetary process to serve effectively as a control function, it must be **integrated** with the accounting system and the organizational structure. Such integration enhances control by transmitting data and assigning variances to the proper organizational subunits.
 - d. The budget is a **motivational** tool. Employees are particularly motivated if they **participate** in preparing the budget. A budget must be seen as realistic by employees before it can become a good motivational tool.
 - 1) Unfortunately, the budget is not always viewed in a positive manner. Some managers view a budget as a restriction.
 - 2) Employees are more apt to have a positive feeling toward a budget if some degree of flexibility is allowed.
 - e. The budget is a means of **communication**. A budget can help tell employees what objectives and goals the organization is attempting to reach.
 - 1) Absent an overall budget, each subunit may think the organization has different objectives.
 - 2) For example, the sales department may want to keep as much inventory as possible so that no sales will be lost, but the treasurer may want to keep the inventory as low as possible so that cash need not be spent any sooner than necessary. If the budget specifies the amount of inventory, all employees can work toward the same objectives.
- 2. Budgets coordinate the various activities of a firm. An overall budget, often called the **master** or **comprehensive budget**, encompasses both the operating and financial budget processes.
 - 3. A **budget manual** describes how a budget is to be prepared. Items usually appearing in a budget manual include a budget planning calendar and distribution instructions for all budget schedules. Instructions are important because, once a schedule is prepared, other subunits use the schedule to prepare their own budgets. Without these instructions, someone who needs a particular schedule might be overlooked.
 - a. The **budget planning calendar** is the schedule of activities for the development and adoption of the budget. It should include a list of dates indicating when specific information is to be provided to others by each information source.
 - b. The preparation of a master budget usually takes several months. For instance, many firms start the budget for the next calendar year in September, anticipating its completion by the first of December. Because all subunit budgets are based on forecasts prepared by others and the budgets of other subunits, a planning calendar is necessary to integrate the process.

16.6 THE MASTER BUDGET AND ITS COMPONENTS

1. The **master budget** encompasses the organization's operating and financial plans for a specified period (ordinarily a year). The **operating budget** is the part of the master budget that consists of the pro forma income statement and related budgets. Its emphasis is on obtaining and using resources.
2. The **sales budget** (revenues budget) presents sales in units at their projected selling prices and is usually the first budget prepared. Accordingly, accurate **sales forecasts** are crucial. A forecast considers such factors as the trends in sales, conditions in the economy and industry, activities of competitors, credit and pricing policies, marketing methods, and the existence of back orders.
 - a. Given a sales estimate, the next step is to decide how much to produce or purchase.
 - b. Sales are usually budgeted by product or department.
 - c. The sales budget establishes targets for sales personnel.
 - d. Sales volume affects production and purchasing levels, operating expenses, and cash flow.
3. The **production budget** (for a manufacturer) is based on the sales forecast, in **units**, plus or minus the desired inventory change.
 - a. It is prepared for each department and used to plan when items will be produced.
 - b. When the production budget has been completed, it is used in conjunction with the **ending inventory budget** to prepare three additional budgets.
 - 1) Direct materials usage, together with beginning inventory and targeted ending inventory data, determines the **direct materials budget**.
 - 2) The **direct labor budget** depends on wage rates, amounts and types of production, numbers and skill levels of employees to be hired, etc. It may also depend on employee benefits, such as employer contributions to Social Security, insurance, and pensions. Classification of **fringe benefits as direct labor cost** is theoretically sound because these benefits are a necessary part of the acquisition cost of direct labor. Nevertheless, many organizations treat such costs as overhead. Another concern is the effect of **union contracts** on wage rates and the ability to terminate workers.
 - 3) The **factory overhead budget** is a function of how factory overhead varies with particular cost drivers. It should distinguish between overhead items that are fixed and those that are variable.
4. The **cost of goods sold budget** reflects direct materials usage, direct labor, factory overhead, and the change in finished goods inventory.
5. Other budgets prepared during the operating budget process are those for **R&D, marketing, distribution, customer service, and administrative costs**. These budgets also should distinguish between fixed and variable costs. These budgets, the sales budget, and the cost of goods sold budget are needed to prepare a pro forma operating income statement.
6. The **financial budget** is the part of the master budget that includes the cash budget, capital budget, pro forma balance sheet, and pro forma statement of cash flows. Its emphasis is on obtaining the funds needed to purchase operating assets.
7. The **capital budget** is not part of the operating budget because it is not part of normal operations.
 - a. It may be prepared more than a year in advance to allow time to
 - 1) Plan financing of major expenditures for long-term assets such as equipment, buildings, and land
 - 2) Receive custom orders of specialized equipment, buildings, etc.

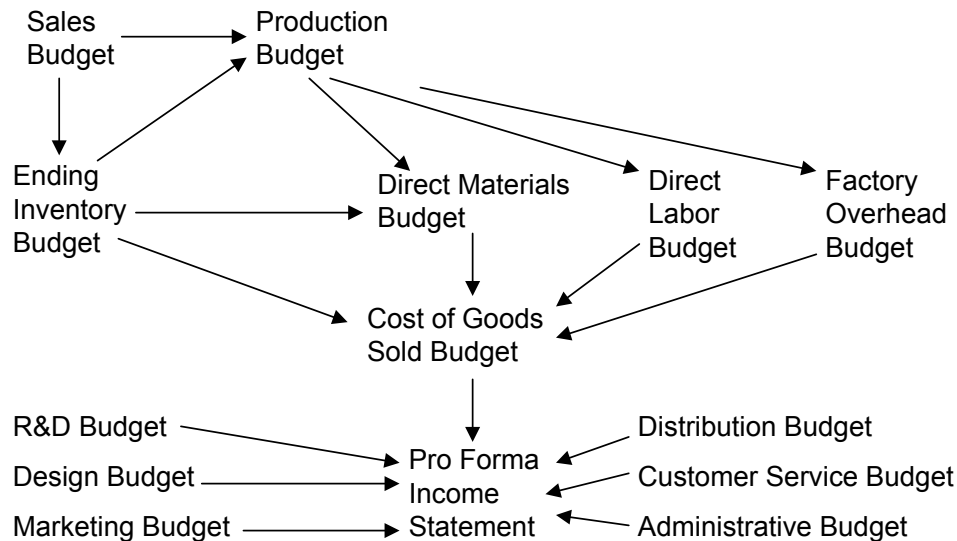
- b. Techniques used in the capital budgeting process include net present value (NPV), internal rate of return (IRR), and payback.
 - 1) NPV and IRR are time-adjusted methods based on present-value tables.
- 8. The **cash budget** is vital because an organization must have adequate cash at all times. Even with plenty of other assets, an organization with a temporary shortage of cash can be driven into bankruptcy. Thus, cash budgets are prepared not only for annual and quarterly periods but also for monthly and weekly periods.
 - a. A cash budget projects cash flows for planning and control purposes. It helps prevent not only cash emergencies but also excessive idle cash.
 - b. It cannot be prepared until the other budgets have been completed.
 - c. Almost all organizations, regardless of size, prepare a cash budget.
 - d. It is particularly important for organizations operating in seasonal industries.
 - e. Cash budgeting facilitates planning for loans and other financing.
 - f. **EXAMPLE:** A company had budgeted sales of \$9,000 for January, \$9,700 for February, and \$13,950 for March. Its monthly cash budgets might appear as follows (payments of principal and interest are assumed not to be due during the quarter):

| <i>Sample Company</i> CASH BUDGET <i>For Quarter Ending March 31</i> | | | |
|---|----------|----------|----------|
| | January | February | March |
| Beginning cash balance | \$ 80 | \$ 20 | \$ 1,957 |
| Receipts: | | | |
| Collection from sales* | 6,800 | 9,350 | 11,825 |
| Total cash available | \$ 6,880 | \$ 9,370 | \$13,782 |
| Payments: | | | |
| Purchases** | \$ 3,150 | \$ 2,760 | \$ 3,960 |
| Sales salaries | 1,350 | 1,455 | 2,093 |
| Supplies | 360 | 388 | 588 |
| Utilities | 120 | 110 | 100 |
| Administrative salaries | 1,800 | 1,800 | 1,800 |
| Advertising | 80 | 80 | 80 |
| Equipment purchases | 0 | 820 | 3,000 |
| Total payments | \$ 6,860 | \$ 7,413 | \$11,591 |
| Desired ending balance | 5,000 | 5,000 | 5,000 |
| Total required | \$11,860 | \$12,413 | \$16,591 |
| Cash available | 6,880 | 9,370 | 13,782 |
| Financing required | \$ 4,980 | \$ 3,043 | \$ 2,809 |

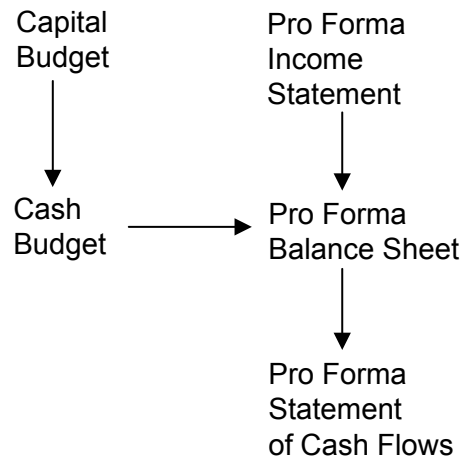
*Sales are 50% cash sales and 50% on credit (net 30). Thus, 50% of each month's sales are collected in the month of the sale, and 50% are collected in the following month. For example, the February collections equaled \$9,350 [(\$9,000 × 50%) + (\$9,700 × 50%)].

**Purchase terms are net 30. Thus, purchases are paid for in the month following the purchase. The amount paid in February (\$2,760) equaled the total purchases for January.

9. The following is a summary of the **operating budget sequence** for a manufacturer that includes all elements of the value chain:



10. The following summarizes the **financial budget sequence**:



11. Once the individual budgets are complete, budgeted financial statements can be prepared. They are often called **pro forma statements** because they are prepared before actual activities commence.
- The **pro forma income statement** culminates the operating budget process. It adjusts pro forma operating income for interest and taxes.
 - It is used to decide whether the budgeted activities will result in an acceptable level of income.
 - The **pro forma balance sheet** is prepared using the cash and capital budgets and the pro forma income statement. Thus, it and the pro forma statement of cash flows culminate the financial budget process. The pro forma balance sheet is the beginning of the period balance sheet updated for projected changes in cash, receivables, payables, inventory, etc.
 - If the balance sheet indicates that a contractual agreement may be violated, the budgeting process must be repeated. For example, some loan agreements require that owners' equity be maintained at some percentage of total debt or that current assets be maintained at a given multiple of current liabilities.

- c. The **pro forma statement of cash flows** classifies cash flows depending on whether they are from operating, investing, or financing activities.
 - 1) The **direct presentation** reports the major classes of gross cash operating receipts and payments and the difference between them.
 - 2) The **indirect presentation** reconciles net income with net operating cash flow. Under GAAP, this reconciliation must be disclosed whichever presentation is chosen. The reconciliation requires balance sheet data, such as the changes in accounts receivable, accounts payable, and inventory, as well as net income.
- d. All the pro forma statements are interrelated. For example, the pro forma cash flow statement will include anticipated borrowing. The interest on this borrowing will appear in the pro forma income statement.

16.7 OTHER BUDGETING CONCEPTS

1. A **flexible budget** is prepared after the budget period ends. It captures the **complexity of the relationships** among input, output, and resource prices.
 - a. The actual level of outputs produced and prices paid for inputs rarely match those that were planned on in the static budget.
 - 1) **Three major variables** in the production process are the quantity of inputs consumed, the price paid for inputs, and the quantity of outputs produced. A difference in any one of these renders the static budget less useful.
 - b. The **flexible budget** consists of the costs that **should have been** incurred given the actual level of production achieved. It is calculated as follows:

$$\begin{aligned} \text{Flexible budget} &= \text{Actual number of outputs produced (AO)} \\ &\times \text{Standard number of inputs per unit of output (SI/O)} \\ &\times \text{Standard price per unit of input (SP)} \end{aligned}$$

 - 1) The product of the first two elements of this equation make up the “**expected quantity (EQ)**.”

$$\text{Expected quantity} = (\text{AO} \times \text{SI/O})$$
 - c. **EXAMPLE:** A manufacturer’s production process uses a single direct material, and it planned to consume 100 pounds costing \$10 per pound last month. The static budget total for raw materials cost was therefore \$1,000 (100 pounds \times \$10).
 - 1) The company planned to produce 90 units of output during the month. Since 100 pounds of raw material were budgeted for this level of output, the standard input usage per unit of output was 1.1111 (100 pounds \div 90 outputs).
 - 2) The actual level of production for the month was 94 units. The “expected” quantity of direct materials was thus 104.4434 units (94 outputs \times 1.1111), and the flexible budget was \$1,044 (104.4434 units \times \$10).
 - 3) In other words, given its standard cost for raw materials, the company would have expected to spend \$1,044, not \$1,000, to produce 94 units of output.
2. **Zero-base budgeting (ZBB)** is a budget and planning process in which each manager must justify his/her entire budget every year (or period). The most notable proponent of this technique in recent years has been President Jimmy Carter (1977-1980), who employed ZBB on the federal level and during his term as governor of Georgia.
 - a. ZBB differs from traditional **incremental budgeting** in which the current budget is simply adjusted to allow for changes planned for the coming period. The managerial advantage of incremental budgeting is that the manager has to make less effort to justify changes in the budget.

- b. Under ZBB, a manager must build the budget every year from a base of zero. All expenditures must be justified regardless of variance from previous years.
 - c. The **objective** is to encourage periodic reexamination of all costs in the hope that some can be reduced or eliminated.
 - d. ZBB begins with the lowest budgetary units of the entity. It requires determination of objectives, operations, and costs for **each activity** and the alternative means of carrying out that activity.
 - e. Different **levels of service (work effort)** are evaluated for each activity, measures of work and performance are established, and activities are ranked according to their importance to the entity.
 - f. For each budgetary unit, a **decision package** is prepared that describes various levels of service that may be provided, including at least one level lower than the current one. ZBB requires managers to justify each expenditure for each period and to review each cost element from a cost-benefit perspective.
3. A **life-cycle budget** estimates a product's revenues and expenses over its entire life cycle, beginning with R&D and ending with the withdrawal of customer support. **Life-cycle budgeting**
- a. Is intended to account for the costs at all stages of the **value chain** (R&D, design, production, marketing, distribution, and customer service). This information is important for **pricing** decisions because revenues must cover costs incurred in each stage of the value chain, not just production.
 - b. Emphasizes the relationships among costs incurred at different value-chain stages, e.g., the effect of reduced design costs on future customer-service costs.
 - c. Highlights the potential for **locking in** (designing in) future costs.
 - d. Is helpful in **target costing and pricing**.
4. **Activity-based budgeting** focuses on the numerous activities necessary to produce and market goods and services. This approach contrasts with the traditional emphasis on functions or spending categories.
- a. Activity-based budgeting provides greater detail, especially regarding indirect costs, because it permits the isolation of numerous cost drivers.
 - b. A cost pool is established for each activity, and a cost driver is identified for each pool.
 - c. The budgeted cost for each pool is determined by multiplying the demand for the activity by the estimated cost of a unit of the activity.
5. A **continuous (rolling) budget** is revised on a regular (continuous) basis. Such a budget is extended for another month or quarter in accordance with new data as the current month or quarter ends. For example, if the budget is for 12 months, a budget for the next 12 months will be available continuously as each month ends.
6. The Japanese term **kaizen** means continuous improvement, and kaizen budgeting assumes the continuous improvement of products and processes. It requires estimates of the effects of improvements and the costs of their implementation.
- a. Kaizen budgeting is based not on the existing system but on changes yet to be made.
 - b. Budget targets cannot be reached unless those improvements occur.

7. **Governmental budgeting** differs from private-sector budgeting. A governmental budget is not only a financial plan and a basis for evaluating performance but also an expression of public policy and a form of control having the force of law.
- a. Thus, a governmental budget is a legal document adopted in accordance with procedures specified by applicable laws.
 - b. A governmental budget must be complied with by the administrators of the governmental unit for which the budget is prepared. By law, the administrators cannot exceed the budget without a formally approved budget amendment.
 - c. The effectiveness and efficiency of governmental efforts are difficult to measure in the absence of the profit-centered activity that characterizes business operations. Thus, the use of budgets in the **appropriation** process is crucial. **Budgetary accounts** are incorporated into the formal accounting systems of governments, and **budgetary comparison schedules** are presented as required supplementary information or in a budgetary comparison statement.