

# STUDY UNIT SEVENTEEN

## BUSINESS PERFORMANCE

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This study unit concerns performance by business organizations and their subunits. A pervasive consideration is the pursuit of **quality** in all aspects of the organization's activities. Quality management has been recognized by the **International Organization for Standardization**, which has issued quality assurance standards. Another aspect of the measurement of organization performance is responsibility accounting, which encompasses the establishment of responsibility centers, common cost allocation, and transfer pricing. This study unit also addresses various issues, behavioral and otherwise, regarding performance feedback.

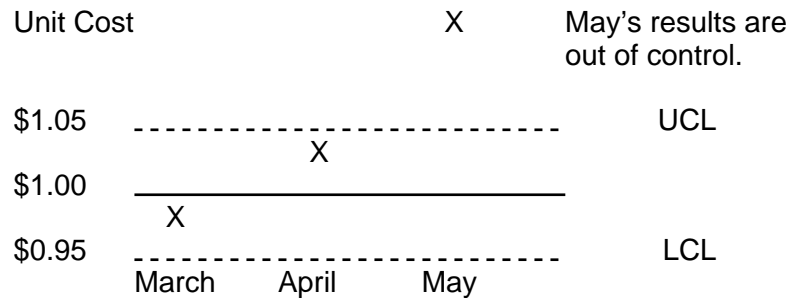
### 17.1 QUALITY CONSIDERATIONS

1. Overall, an organization must assess quality in **two fundamental areas**: process quality and product quality. **Process quality** assesses the effectiveness and efficiency of the organization's internal operations. **Product quality** focuses on the conformance of the organization's output to customer expectations.
  - a. **Product quality** is best viewed from **multiple perspectives**: (1) attributes of the product (performance, serviceability, durability, etc.), (2) customer satisfaction, (3) conformity with specifications, and (4) value (relation of quality and price).
    - 1) One of the dimensions of quality is **conformance**, or how well a product and its components meet applicable standards. The traditional view is that conforming products are those with characteristics that lie within an acceptable specified range of values that includes a target value. This view also regards a certain percentage of defective (nonconforming) units as acceptable.
      - a) The traditional view was superseded by the **zero-defects (goalpost conformance) approach**. It seeks to eliminate nonconforming output.
      - b) An extension of this approach is the **robust quality (absolute quality conformance) concept**. Its goal is to reach the target value in every case. The purpose is to eliminate the hidden quality costs that occur when output varies from the target, even though the units are within specifications.
2. Management **Processes** for the Improvement of Quality
  - a. **Policy deployment** is the systematic planning of corporate objectives and the detailed ways in which organizational subunits will approach the accomplishment of their related objectives. The purpose is for the objectives of the organization, its subunits, and its employees to be consistent.
  - b. **Quality function deployment** ensures that customer requirements are translated into design requirements at each step in product development. It is an umbrella concept most useful in an environment in which the **Plan-Do-Check-Act (PDCA) cycle** (the Deming Wheel) is used at all levels.

- 1) PDCA is a “management by fact,” or scientific-method, approach to continuous improvement. PDCA creates a process-centered environment because it involves (a) studying the current process, (b) collecting and analyzing data to identify causes of problems, (c) planning for improvement, and (d) deciding how to measure improvement (Plan).
- 2) The plan is then implemented on a small scale if possible (Do).
- 3) The next step is to determine what happened (Check).
- 4) If the experiment was successful, the plan is fully implemented (Act).
- 5) The cycle is then repeated using what was learned from the preceding cycle.
- c. **Kaizen** is the Japanese word for the continuous pursuit of improvement in every aspect of organizational operations.
  - 1) For example, a kaizen budget projects costs based on future improvements. The possibility of such improvements must be determined, and the cost of implementation and the savings must be estimated.
- d. **Employee involvement** means training and empowering employees to harness their creativity for problem solving. Quality control circles are used to obtain input from employees and to locate the best perspective on problem solving.
- e. **Suppliers’ management** is the careful selection of suppliers and the cultivation of long-term relationships based on the consistent ability to meet mutual expectations.
- f. **Competitive benchmarking** involves continuously evaluating the practices of the best organizations and adapting company processes to incorporate the best of these practices.
- g. **Quality training** familiarizes all employees with the means for preventing, detecting, and eliminating nonquality. The educational processes are tailored to each group.
- h. **Reward and recognition** for quality improvement should be group oriented. They should be based on quality measures.
3. Several **tools for analyzing quality problems** are available.
  - a. **Statistical quality control** is a method of determining whether the shipment or production run of units lies within acceptable limits.
    - 1) It is also used to determine whether production processes are out of control.
    - 2) **Statistical control charts** are graphic aids for monitoring the status of any process subject to random variations.
      - a) Originally developed to control the quality of production processes, they also have applications of direct interest to the management accountant, for example, unit cost of production, direct labor hours used, ratio of actual expenses to budgeted expenses, number of calls by sales personnel, and total accounts receivable.
      - b) The chart consists of three horizontal lines plotted on a horizontal time scale.
      - c) The center line represents the average or mean value for the process being controlled.
      - d) The other two lines are the upper control limit (UCL) and the lower control limit (LCL).
      - e) The processes are measured periodically, and the values are plotted on the chart (X).
        - i) If the value falls within the control limits, no action is taken.
        - ii) If the value falls outside the limits, the process is considered out of control, and an investigation is made for possible corrective action.

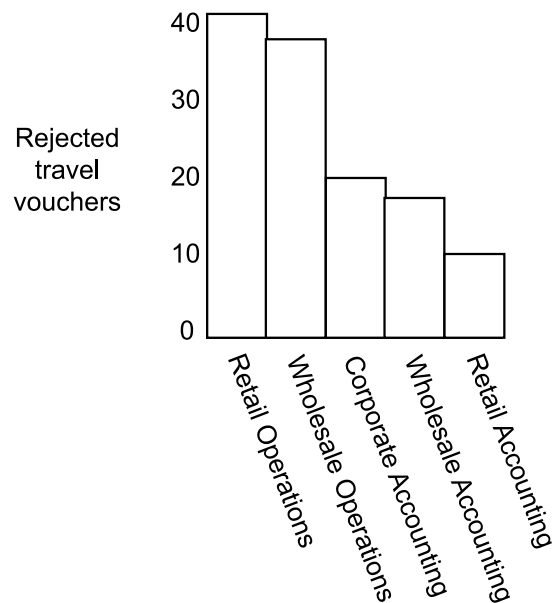
f) Another advantage of the chart is that it makes trends visible.

g) EXAMPLE:

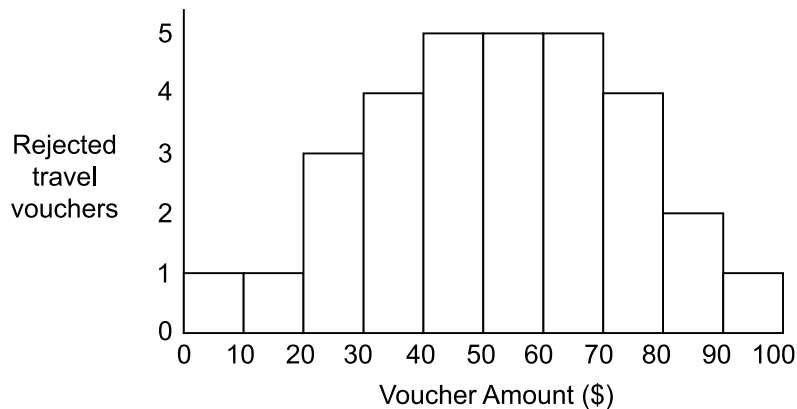


- 3) **P charts** are based on an attribute (acceptable/not acceptable) rather than a measure of a variable. Specifically, they show the percentage of defects in a sample.
  - 4) **C charts** are also attribute control charts. They show defects per item.
  - 5) An **R chart** shows the range of dispersion of a variable, such as size or weight.
  - 6) An **X-bar chart** shows the sample mean for a variable.
- b. Variations in the value of some process parameter may have several causes.
- 1) **Random variations** occur by chance. Present in virtually all processes, they are not correctable because they will not repeat themselves in the same manner. Excessively narrow control limits will result in many investigations of what are simply random fluctuations.
  - 2) **Implementation deviations** occur because of human or mechanical failure to achieve target results.
  - 3) **Measurement variations** result from errors in the measurements of actual results.
  - 4) **Model fluctuations** can be caused by errors in the formulation of a decision model.
  - 5) **Prediction variances** result from errors in forecasting data used in a decision model.
- c. A **Pareto diagram** is a bar chart that assists managers in what is commonly called 80:20 analysis.
- 1) The **80:20 rule**, formulated by management theorist Joseph M. Juran, holds that 80% of all effects are the result of only 20% of all causes.
  - 2) In the context of quality control, managers optimize their time by focusing their effort on the handful of areas from which most defects arise.
    - a) The independent variable, plotted on the X axis, is the factor selected by the manager as the area of interest: department, time period, geographical location, etc. The frequency of occurrence of the defect (dependent variable) is plotted on the Y axis.
    - b) The occurrences of the independent variable are ranked from highest to lowest, allowing the manager to see at a glance which areas are of most concern.

- c) **EXAMPLE:** The chief administrative officer wants to know which departments are generating the most travel vouchers that have to be returned to the submitter because of incomplete documentation.

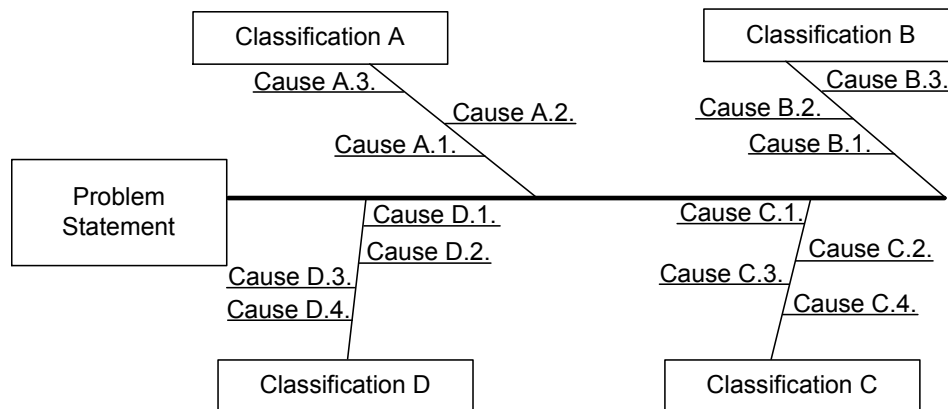


- d. A **histogram** is similar in presentation to a Pareto diagram. The major distinction is that histograms display a continuum for the independent variable.
- 1) **EXAMPLE:** The CAO wants to know how many travel reimbursement dollars are being held up by a typical returned travel voucher.



- e. A **fishbone diagram** (also called a **cause-and-effect diagram** or an **Ishikawa diagram**) is a total quality management process improvement technique that is useful in studying causation (why the actual and desired situations differ).
- 1) This format organizes the analysis of causation and helps to identify possible interactions among causes.
  - 2) The head of the skeleton represents the statement of the problem.
  - 3) The principal classifications of causes are represented by lines (bones) drawn diagonally from the heavy horizontal line (the spine).
  - 4) Smaller horizontal lines are added in their order of probability in each classification.

## 5) EXAMPLE:



- f. The **Taguchi quality loss function** is a measure of the departure from absolute quality conformance (robust quality).

- 1) It is based on the principle that quality losses occur even when items are within specified limits or tolerances. Thus, any variation from a quality target for a characteristic results in hidden quality costs.
- 2) The basic formula is

$$L = k(x - T)^2$$

If: L = the quality costs per unit

k = a constant based on the entity's external failure cost experience

x = actual measure of the quality variable

T = target value of the quality variable

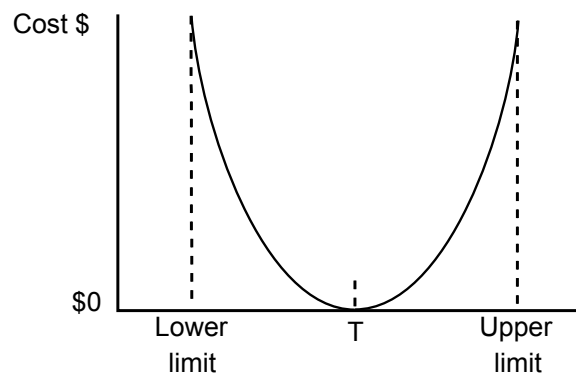
- a) The estimate of the constant is

$$k = c \div d^2$$

If: c = the loss at a specification limit

d = the difference between the target value and the specification limit

- b) The following is the graph of a Taguchi loss function (the quality cost at the target value is \$0):



4. **Measures** for the assessment of quality.

- a. Customer retention is a vitally important measure of service quality. Loyal customers spend more, refer new customers, and are less costly to service.
- b. Examples of **nonfinancial measures of internal performance** are (1) manufacturing cycle efficiency (value-added production time  $\div$  total manufacturing cycle time), (2) ratio of good output to total output, (3) defects per product line, (4) the half-life method (time required to reduce the defect ratio by 50%), and (5) new product development time.
- c. Examples of **nonfinancial measures of customer satisfaction** are (1) percentage of defective goods shipped, (2) customer complaints, (3) customer response time, (4) on-time deliveries, (5) survey data, and (6) market share.

5. The **costs of quality** must be assessed in terms of relative costs and benefits.

- a. Thus, an organization should attempt to **minimize its total cost of quality**. Moreover, nonquantitative factors also must be considered. For example, an emphasis on quality improves competitiveness, enhances employee expertise, and generates goodwill.
- b. Costs of quality are generally divided into two major categories and **four subcategories**:
  - 1) **Conformance costs** include costs of prevention and costs of appraisal, which are financial measures of internal performance.
    - a) **Prevention** attempts to avoid defective output. These costs include (1) preventive maintenance, (2) employee training, (3) review of equipment design, and (4) evaluation of suppliers.
    - b) **Appraisal** embraces such activities as statistical quality control programs, inspection, and testing.
  - 2) **Nonconformance costs** include internal failure costs (a financial measure of internal performance) and external failure costs (a financial measure of customer satisfaction).
    - a) **Internal failure** costs occur when defective products are detected before shipment. Examples are scrap, rework, tooling changes, and downtime.
    - b) The costs of **external failure**, e.g., warranty costs, product liability costs, and loss of customer goodwill, arise when problems occur after shipment.
      - i) Environmental costs also are external failure costs, e.g., fines for nonadherence to environmental law and loss of customer goodwill.
- c. An example of a **cost of quality report** is presented below:

Prevention costs	\$35,000
Appraisal costs	5,000
Internal failure costs	17,500
External failure costs	9,500
<b>Total costs of quality</b>	<b><u>\$67,000</u></b>

- d. **Quality cost indices** measure the cost of maintaining a given level of quality, for example, total quality costs divided by direct labor costs.
  - 1) **EXAMPLE:** To continue the previous example, if total direct labor costs were \$201,000, the quality cost index for the month was 33.3% ( $\$67,000 \div \$201,000$ ).

6. **Quality and productivity** do not necessarily have an inverse relationship. The robust quality view is that improving quality and reducing costs in each category may be possible if the most efficient prevention methods are applied.
  - a. For example, selection of a supplier meeting high quality standards regarding defect rates and delivery times may drive down not only failure costs, but also the prevention and appraisal costs incurred when supplier performance was less reliable.
7. **Management of time** is important to any quality improvement program.
  - a. **Product development time** is a crucial factor in the competitive equation. A company that is first in the market with a new product has obvious advantages.
    - 1) Reducing development time is also important because product life cycles are becoming shorter.
    - 2) Companies need to respond quickly and flexibly to new technology, changes in consumer tastes, and competitive challenges.
  - b. One financial measure of product development is **breakeven time**. It is the time from management approval of the project to the time when the cumulative present value of cash inflows equals the cumulative present value of cash outflows.
    - 1) The most popular method of determining breakeven time calculates the time required for the present value of the cumulative cash flows to equal zero.
      - a) An alternative that results in a longer breakeven time is to consider the time required for the present value of the cumulative cash inflows to equal the present value of all the expected future cash outflows.
  - c. **Customer-response time** is the delay from placement of an order to delivery of the good or service. Response time is a function of time drivers. A change in a time driver causes a change in the time required for an activity. Such changes reflect uncertainty about arrivals of customers in the queue and bottlenecks (points at which capacity is reached or exceeded).
    - 1) Response time consists of order receipt time (delay between the customer's placement of an order and its receipt by the production facility), manufacturing lead or cycle time (delay from the order's receipt by the production facility to its completion), and order delivery time.
    - 2) Manufacturing lead or cycle (throughput) time equals order waiting time plus manufacturing time.

## 17.2 BENCHMARKING, TQM, AND THE ISO FRAMEWORK

1. **Benchmarking** is a primary tool used in quality management. It is a means of helping organizations with productivity management and business process analysis.
  - a. Benchmarking involves **analysis and measurement of key outputs** against those of the best organizations. This procedure also involves identifying the underlying key actions and causes that contribute to the performance difference.
    - 1) **Best practices** are recognized by authorities in the field and by customers for generating outstanding results. They are generally innovative technically or in their management of human resources.
    - 2) Benchmarking is an ongoing process that requires quantitative and qualitative measurement of the difference between the performance of an activity and the performance by the benchmark. This entity need not be a competitor.

- b. The following are **kinds of benchmarking**:
  - 1) Competitive benchmarking studies an organization in the same industry.
  - 2) Process (function) benchmarking studies operations of organizations with similar processes regardless of industry. Thus, the benchmark need not be a competitor or even a similar entity.
    - a) This method may introduce new ideas that provide a significant competitive advantage.
  - 3) Strategic benchmarking is a search for successful competitive strategies.
  - 4) Internal benchmarking is the application of best practices in one part of the organization to its other parts.
- c. The **first phase** in the benchmarking process is to select and prioritize benchmarking projects.
  - 1) An organization must understand its critical success factors and business environment to identify key business processes and drivers and to develop parameters defining what processes to benchmark. The criteria for selecting what to benchmark relate to the reasons for the existence of a process and its importance to the entity's mission, values, and strategy. These reasons relate in large part to satisfaction of end user or customer needs.
- d. The **next phase** is to organize benchmarking teams. A team organization is appropriate. It permits an equitable division of labor, participation by those responsible for implementing changes, and inclusion of a variety of functional expertise and work experience.
  - 1) Team members should have (a) knowledge of the function to be benchmarked, (b) respected positions in the organization, (c) good communication skills, (d) teaming skills, (e) motivation to innovate and to support cross-functional problem solving, and (f) project management skills.
  - 2) The team must thoroughly **investigate and document the organization's internal processes**. The organization is a series of processes, not a fixed structure.
    - a) A process is a network of related and independent activities joined by their outputs. One way to determine the primary characteristics of a process is to trace the path a request for a product or service takes through the organization.
    - b) The team must develop a family of measures that are true indicators of process performance. It also must develop a process taxonomy, that is, a set of process elements, measures, and phrases that describes the process to be benchmarked.
    - c) The development of key indicators for performance measurement in a benchmarking context is an extension of the basic evaluative function of internal auditors. Internal auditors evaluate governance, risk management, and control processes. Evaluation requires establishment of adequate criteria by management. In the absence of these criteria, internal auditors must work with management to develop "appropriate evaluation criteria" (Performance Standard 2120.A4).
- e. Researching and identifying **best-in-class performance** is often the most difficult phase. The critical steps are
  - 1) Setting up databases,
  - 2) Choosing information-gathering methods (internal sources, external public domain sources, and original research),
  - 3) Formatting questionnaires (lists of questions prepared in advance), and
  - 4) Selecting benchmarking partners.



- f. Data analysis identifies **performance gaps**, obtains an understanding of the reasons they exist, and prioritizes the key activities that will facilitate the behavioral and process changes needed. Sophisticated statistical and other methods may be needed when the study involves many variables, testing of assumptions, or quantified results.
    - g. **Leadership** is most important in the implementation phase because the team must be able to justify its recommendations. Moreover, the process improvement teams must manage the implementation of approved changes.
- 2. The emergence of the **total quality management (TQM)** concept is one of the most significant developments in managerial accounting.
  - a. TQM was developed in the mid-1940s by statistician W. Edwards Deming, who aided Japanese industry in its recovery from World War II.
  - b. The Deming Prize is awarded by the Union of Japanese Scientists and Engineers for outstanding contributions to the study or application of TQM.
- 3. **TQM** recognizes that quality improvement can increase revenues and decrease costs significantly. The following are TQM's **core principles** or **critical factors**:
  - a. Emphasis on the **customer**
    - 1) Satisfaction of external customers
    - 2) Satisfaction of internal customers
    - 3) Requirements for external suppliers
    - 4) Requirements for internal suppliers
  - b. **Continuous improvement** as a never-ending process, not a destination.
  - c. **Engaging every employee** in the pursuit of total quality because avoidance of defects in products or services and satisfaction of external customers requires that all internal customers be satisfied.
- 4. **TQM** is a **comprehensive approach** to quality.
  - a. It treats the pursuit of quality as a **basic organizational function** that is as important as production or marketing.
  - b. TQM is the continuous pursuit of quality in every aspect of organizational activities through a philosophy of doing it right the first time, employee training and empowerment, promotion of teamwork, improvement of processes, and attention to satisfaction of customers, both internal and external.
    - 1) TQM emphasizes the supplier's relationship with the customer, identifies customer needs, and recognizes that everyone in a process is at some time a customer or supplier of someone else, either within or without the organization.
    - 2) Thus, TQM begins with external customer requirements, identifies internal customer-supplier relationships and requirements, and establishes requirements for external suppliers.
    - 3) Organizations tend to be vertically organized, but TQM requires strong horizontal linkages.
  - c. The management of quality is not limited to quality management staff, engineers, production personnel, etc.
    - 1) The role of **management accountants** includes assisting in designing and operating quality information, measurement, and reporting systems.
      - a) In particular, they can contribute to problem solving through measuring and reporting quality costs.

5. **Implementation of TQM** cannot be accomplished by application of a formula, and the process is lengthy and difficult. The following phases are typical:
  - a. Establishing an executive-level quality council of senior managers with strong involvement by the CEO.
  - b. Providing quality training programs for senior managers.
  - c. Conducting a quality audit to evaluate the success of the process for gathering background information to develop the strategic quality improvement plan.
    - 1) The quality audit also may identify the best improvement opportunities and the organization's strengths and weaknesses compared with its benchmarked competitors.
  - d. Preparing a gap analysis to ascertain what is necessary to bridge the gap between the organization and the quality leaders in its industry and to establish a database for the development of the strategic quality improvement plan.
  - e. Developing strategic quality improvement plans for the short and long term.
  - f. Conducting employee communication and training programs.
  - g. Establishing quality teams, which ensure that goods and services conform to specifications.
  - h. Creating a measurement system and setting goals.
  - i. Revising compensation, appraisal, and recognition systems.
  - j. Reviewing and revising the entire effort periodically.
6. In 1987, the International Organization for Standardization (ISO) introduced ISO 9000, a "family" of 11 standards and technical reports that provide guidance for establishing and maintaining a **quality management system (QMS)**. The ISO's rules specify that its standards be revised every 5 years in light of technological and market developments. NOTE: ISO is not an acronym. It means equal, suggesting that entities certified under ISO 9001:2000 have equal quality.)
  - a. The current standards (ISO 9000:2000) were issued in December 2000. For specific and up-to-date information, see the ISO's website ([www.iso.org](http://www.iso.org)).
  - b. The intent of the standards is to ensure the quality of the **process, not the product**. The marketplace determines whether a product is good or bad.
    - 1) For this reason, the ISO deems it unacceptable for phrases referring to ISO certification to appear on individual products or packaging.
  - c. Only one of the standards is a certification standard.
    - 1) **ISO 9001:2000, Quality Management Systems – Requirements**, is the standard that provides a model for quality assurance programs.
    - 2) For this reason, "ISO 9001:2000 certified" is the only acceptable formulation. There is no such thing as "ISO 9000 certification."
    - 3) ISO 9000:2005 was issued recently. It applies to (a) entities implementing a QMS, (b) entities seeking assurance about products provided by suppliers, (c) users of the products, (d) everyone needing an understanding of quality terminology, (e) those who assess QMSs, (f) those who provide advice or training relative to a QMS, and (g) standard setters.
7. The following are the **objectives** of applying the standards:
  - a. Achieving and continuously improving quality relative to requirements.
  - b. Improving operations to meet all needs of stakeholders (interested parties).
  - c. Giving confidence to employees that quality requirements are met and improvement is occurring.
  - d. Giving confidence to stakeholders that quality of delivered products is achieved.
  - e. Providing confidence that the quality system meets expectations.

8. QMS standards are founded on the **quality management principles** defined in ISO 9000:2000 and ISO 9004:2000, as follows:
  - a. Customer focus means understanding needs, meeting requirements, and trying to surpass expectations.
  - b. Leadership develops unity of purpose by maintaining an environment that permits full involvement in reaching entity objectives.
  - c. Involvement of people in the fullest sense allows their abilities to be used for the entity's benefit.
  - d. A process approach to managing activities and resources is the efficient way to obtain desired results.
  - e. A systems approach to management integrates and aligns processes to obtain desired results more efficiently and effectively.
  - f. Continual improvement of overall performance should be a permanent objective.
  - g. A factual approach to decision making is based on data and information.
  - h. Mutually beneficial supplier relationships increase all parties' value creation.
9. The following are the **basic requirements of a QMS**:
  - a. **Key processes** affecting quality must be identified and included.
    - 1) A process management approach must be used. It manages the entity as a set of linked processes that are controlled for continuous improvement.
  - b. **General requirements.** The entity must have a quality policy and quality goals. It also must design a QMS to control process performance. Quality goals are measurable and specific.
    - 1) The QMS is documented in the (a) quality policy, (b) quality manual, (c) procedures, (d) work instructions, and (e) records.
  - c. **Management responsibility.** Management (1) reviews the quality policy, (2) analyzes data about QMS performance, and (3) assesses opportunities for improvement and the need for change.
    - 1) Management ensures that systems exist to determine and satisfy customer requirements.
  - d. **Resource management.** The resources needed to improve the QMS and satisfy customer requirements must be provided.
    - 1) Human resources (employees) should be qualified and trained for their specific jobs.
    - 2) The infrastructure (physical resources needed for quality output) and the work environment should be sufficient.
  - e. **Product realization processes** result in products or services received by customers. These processes must be planned and controlled. Issues are (1) means of control, (2) objectives, (3) documentation and records needed, and (4) acceptance criteria.
    - 1) Design and development also must be planned and controlled.
    - 2) Purchasing evaluates suppliers of materials and services, and the entity's materials and products must be clearly identified at all times. Moreover, customer property must be protected.
    - 3) Product quality must be preserved during handling, storage, and delivery.

- f. **Measurement, analysis, and improvement.** The entity must have processes for (1) inspection, (2) testing, (3) measurement, (4) analysis, and (5) improvement.
  - 1) Thus, customer satisfaction must be measured.
  - 2) Substandard materials and products must be controlled so that they do not reach customers.
  - 3) Internal audits measure and monitor QMS performance.
  - 4) All employees should use corrective and preventive action systems.
  - 5) Work instructions must identify measuring and monitoring requirements.
- 10. Some companies are obtaining ISO 9000 certification because of fear that the **European Union** will require compliance with the standards in an attempt to restrict imports.
  - a. The standards are not yet mandatory except among regulated products (for which health and safety are concerns), such as medical devices, telecommunications equipment, and gas appliances.
  - b. Some customers demand that suppliers register.
  - c. ISO 9000 registration may be a key to remaining competitive. It makes customers more comfortable with suppliers' products and services.
  - d. Many companies implementing the standards uncover internal process and quality improvements as a result. ISO 9000 forces companies to share information and understand who internal customers and users are.
- 11. A **registrar, or external auditor**, must be selected. Registrars are usually specialists within certain Standard Industrial Classification (SIC) codes. Certification by a registrar avoids the need for each customer to audit a supplier.
  - a. Following an on-site visit, the registrar, if convinced that a quality system conforms to the selected standard, issues a certificate describing the scope of the registration. Registration is usually granted for a 3-year period.
  - b. Some companies have preliminary audits by official registrars.
  - c. All employees are subject to being audited. They must have the ability to "say what they do" and to demonstrate that they "do what they say."
- 12. The ISO also has issued a set of **environmental standards** known as **ISO 14000**. These standards are comparable in purpose to ISO 9000 but concern environmental quality systems. Although they have not been as widely adopted as the ISO 9000 standards, they may become a necessity for conducting international business.
  - a. ISO 14000 establishes internationally recognized standards that will diminish barriers to trade and make it easier to do business across borders.
  - b. Some companies feel that adherence to ISO 14000 standards will reduce monitoring and inspection by regulatory agencies.
  - c. A survey of managers found that failure to obtain ISO 14000 certification could constitute a potential nontariff trade barrier because customers will require it.
  - d. At present, the main benefit of adopting ISO 14000 standards is internal. Companies learn how well their environmental management system operates relative to those of other companies.
  - e. Some companies have decided to seek ISO 14000 certification because they found that ISO 9000 was beneficial.
  - f. Some European countries already have environmental systems standards in place, and how these single-country standards will mesh with ISO 14000 is not clear. However, individual countries' standards are typically more strict.
  - g. Some are concerned that regulators may use voluntary ISO audits or self-audits as a basis for punitive action. To allay these fears in the U.S., the Environmental Protection Agency has issued new audit guidelines that are intended to avoid such self-incrimination.

13. The scope of ISO 19011:2002 extends to (a) the principles of auditing, (b) managing audit programs, (c) conducting QMS audits and environmental management system audits, and (d) the competence of QMS and environmental management system auditors.
  - a. It applies to all entities that must perform internal or external audits of QMSs or environmental management systems or manage an audit program.
  - b. ISO 19011 may apply to other types of audits if due consideration is given to identifying the competencies required of the auditors.
14. ISO 10012:2003 is a generic standard. It addresses the management of measurement processes and confirmation of measuring equipment used to support compliance with required measures.
  - a. It states quality management requirements of a measurement management system (MMS) that can be used as part of the overall management system.
  - b. It is not to be used as a requirement for demonstrating conformance with other standards. Interested parties may agree to use ISO 10012:2003 as an input for satisfying MMS requirements in certification activities. However, other standards apply to specific elements affecting measurement results, e.g., details of measurement methods, competence of personnel, or comparisons among laboratories.

### 17.3 RESPONSIBILITY CENTERS, COMMON COSTS, AND TRANSFER PRICING

1. Managerial performance ordinarily should be evaluated based on factors that can be influenced by the manager, such as revenues, costs, or investment. For example, a controllable cost may be defined as one directly regulated by a specific manager at a given level of production within a given time span or one that the manager can significantly influence. A well-designed responsibility accounting system establishes responsibility centers (also called **strategic business units**) for the purpose of encouraging managerial effort to attain organizational objectives, motivating managers to make decisions consistent with those objectives, and providing a basis for determining managerial compensation.
  - a. A **cost center**, e.g., a maintenance department, is responsible for costs only. Hence, evaluations are related to the cost drivers of what is measured. A disadvantage of a cost center is the potential for cost shifting, for example, replacement of variable costs for which a manager is responsible with fixed costs for which (s)he is not. Another disadvantage is that long-term issues may be disregarded when the emphasis is on, for example, annual cost amounts. Yet another issue is allocation of service department costs to cost centers.
  - b. A **revenue center**, e.g., a sales department, is responsible for revenues only. Thus, revenue drivers are relevant to performance measurement of revenue centers. They are factors that influence unit sales, such as changes in prices and products, customer service, marketing efforts, and delivery terms.
  - c. A **profit center**, e.g., an appliance department in a retail store, is responsible for revenues and expenses. Thus, use of profit centers promotes goal congruence by (1) encouraging cooperation among organizational functions (production, marketing, and support), (2) influencing managers to think of their products or services as salable outside the firm, and (3) encouraging managers to find new ways to earn profits.
  - d. An **investment center**, e.g., a branch office, is responsible for revenues, expenses, and invested capital. The advantage of an investment center is that it permits an evaluation of performance that can be compared with that of other responsibility centers or other potential investments on a return on investment basis, i.e., on the basis of the effectiveness of asset usage.

- e. **Service centers** exist primarily and sometimes solely to provide specialized support to other organizational subunits. They are usually operated as cost centers. A maintenance department is an example.
2. **Controllability** is not an absolute basis for responsibility. For example, responsibility may be assigned based on knowledge of how a cost is incurred rather than the ability to control it directly. An assignment also may be made to influence a manager's behavior. In principle, controllability is proportionate to, but not coextensive with, responsibility.
  - a. Controllability is difficult to isolate because few things are under the sole influence of one manager. Thus, separating the effects of current management's decisions from those of former management is difficult.
  - b. If responsibility exceeds the extent to which a manager can influence an activity, the result may be reduced morale, a decline in managerial effort, and poor performance. Such a manager encounters greater risk because his/her success depends on uncontrollable factors. Thus, a manager in these circumstances should be compensated for the incremental risk assumed.
  - c. However, if a manager is accountable solely for activities over which (s)he has extensive influence, the manager may develop too narrow a focus.
    - 1) For example, the manager of a cost center may make decisions based only on cost efficiency and ignore the overall effectiveness objectives of the organization. By extending the manager's responsibility to profits as well as costs, the organization may encourage desirable behavior congruent with overall objectives, such as improved coordination with marketing personnel, even though the manager still does not control revenues.
    - 2) A manager who does not control an activity may nevertheless be the person best informed about it. Thus, a purchasing agent may be in the best position to explain price variances even though (s)he cannot control them.
  - d. Accordingly, a successful system is dependent upon the proper delegation of responsibility and the commensurate authority.
3. **Management by objectives (MBO)** is a related concept. It is a behavioral, communications-oriented, responsibility approach to employee self-direction. Under MBO, a manager and his/her subordinates agree upon objectives and the means of attaining them. The plans that result are reflected in responsibility accounting and in the budgeting process.
4. The purpose of a responsibility system is to motivate management performance that adheres to overall organizational objectives (**goal congruence**).
  - a. **Suboptimization** occurs when one segment takes action that is in its own best interests but is detrimental to the organization as a whole.
5. The alignment of managerial with organizational goals requires assigning **responsibility** for activities, delegating the **authority** to perform necessary tasks, and establishing **accountability**. The result is a structure within which individual efforts can be coordinated to attain ultimate organizational goals.
  - a. Larger organizations are usually divided into multiple segments, with the amount of autonomy of the divisions reflecting the degree of **decentralization**.
    - 1) Along with enhancing managerial morale and development, decentralization allows senior management to concentrate on a long-range focus and encourages division managers to look outside the organization to meet operational needs.
    - 2) Disadvantages include greater difficulty in achieving goal congruence, duplication of effort, and lack of communication among segment managers.

6. **Common costs** are the costs of products, activities, facilities, services, or operations shared by two or more cost objects.
  - a. The term “joint costs” is frequently used to describe the common costs of a single process that yields two or more joint products.
7. Common costs are **indirect costs** whose allocation may be arbitrary.
  - a. A direct **cause-and-effect relationship** between a common cost and the actions of the cost object to which it is allocated is desirable. Such a relationship promotes acceptance of the allocation by managers who perceive the fairness of the procedure, but identification of cause and effect may not be feasible.
  - b. An alternative allocation criterion is the **benefit received**. For example, advertising costs that do not relate to particular products may increase sales of all products. Allocation based on the increase in sales by organizational subunits is likely to be accepted as equitable despite the absence of clear cause-and-effect relationships.
  - c. Two specific approaches to common cost allocation are in general use.
    - 1) The **stand-alone method** allocates a common cost on a proportionate basis using data regarding each cost object. For example, if the common cost of providing service to customers A and B is \$10,000, and the stand-alone costs of servicing customers A and B are \$6,000 and \$6,000, respectively, A and B should be assigned \$5,000 of common costs each.
    - 2) The **incremental method** requires ranking the users of the cost object. The primary party is then allocated its stand-alone cost, with the secondary party receiving the balance of the common costs. In the preceding example, if customer A is deemed to be the primary user, the allocation will be \$6,000 to A and \$4,000 to B.
8. Cost allocation is necessary for making **economic decisions**, e.g., the price to charge for a product or whether to make or buy a part.
9. Cost allocation is also necessary for **external financial reporting** and for calculation of reimbursements, such as those involved in governmental contracting.
10. Furthermore, cost allocation serves as a **motivator**. For example, designers of products may be required to include downstream costs, such as servicing and distribution, in their cost projections to fix their attention on how their efforts affect the total costs of the company.
  - a. Typically, the motivational effects of cost allocation is that it tends to encourage marketing personnel to emphasize products with large contribution margins.
11. A persistent problem in large organizations is the treatment of the costs of headquarters and other **central support costs**. Such costs are very frequently allocated.
  - a. Research has shown that central support costs are allocated to departments or divisions for the following reasons:
    - 1) The allocation reminds managers that support costs exist and that the managers would incur these costs if their operations were independent.
    - 2) The allocation also reminds managers that profit center earnings must cover some amount of support costs.
    - 3) Departments or divisions should be motivated to use central support services appropriately.
    - 4) Managers who must bear the costs of central support services that they do not control may be encouraged to exert pressure on those who do. Thus, they may be able to restrain such costs indirectly.

- b. The allocation is usually based on budgeted revenue or contribution margin (CM).
    - 1) If allocation is based on actual sales or CM, responsibility centers that increase their sales (or CM) will be charged with increased overhead.
    - 2) If central support or other fixed costs are not allocated, responsibility centers might reach their revenue (or CM) goals without covering all fixed costs (which is necessary to operate in the long run).
    - 3) Allocation of overhead, however, is motivationally negative; central support or other fixed costs may appear noncontrollable and be unproductive.
    - 4) A much preferred alternative is to budget a certain amount of CM earned by each responsibility center to cover the central support costs based on negotiation. The hoped-for result is for each subunit to see itself as contributing to the success of the overall entity rather than carrying the weight (cost) of central support.
      - a) Central administration can then make the decision whether to expand, divest, or close responsibility centers.
- 12. Negative **behavioral effects** may arise from arbitrary cost allocations.
  - a. Managers' morale may suffer when allocations depress operating results.
  - b. Dysfunctional conflict may arise among managers when costs controlled by one are allocated to others.
  - c. Resentment may result if cost allocation is perceived to be arbitrary or unfair. For example, an allocation on an ability-to-bear basis, such as operating income, penalizes successful managers and rewards underachievers and may therefore have a demotivating effect.
- 13. **Transfer prices** are the amounts charged by one segment of an organization for goods and services it provides to another segment of the same organization. Thus, transfer pricing policy affects **performance measurement** of organizational segments.
  - a. Transfer prices are used by **profit and investment centers**, but a cost center's costs are allocated to producing departments.
    - 1) The problem is the determination of the transfer price when one responsibility center purchases from another.
    - 2) In a **decentralized system**, each responsibility center theoretically may be completely separate. Thus, Division A should charge the same price to Division B as would be charged to an outside buyer. The reason for decentralization is to motivate managers, and the best interests of Division A may not be served by giving a special discount to Division B if the goods can be sold at the regular price to outside buyers. However, having A sell at a special price to B may be to the organization's advantage.
- 14. A transfer price should permit a segment to operate as an independent entity and achieve its objectives while functioning in the best interests of the company. Hence, transfer pricing should motivate managers; it should encourage goal congruence and managerial effort.
  - a. **Goal congruence** is agreement regarding the objectives of the organization or the segment by both supervisors and subordinates. Performance is assumed to be optimized when the parties understand that personal and segmental objectives should be consistent with those of the organization.
  - b. **Managerial effort** is the extent to which a manager attempts to accomplish a goal. Managerial effort may include psychological as well as physical commitment to an objective.
  - c. **Motivation** is the desire of managers to attain a specific objective (goal congruence) and the commitment to accomplish the objective (managerial effort). Managerial motivation is therefore a combination of managerial effort and goal congruence.



15. Transfer prices can be determined in a number of ways. They may be based on
- a. A **market price**, assuming that a market exists
  - b. **Differential outlay cost plus opportunity cost** to the seller
    - 1) For example, if a good costing \$4 can be sold for \$10, the outlay cost is \$4 and the seller's opportunity cost is \$6 (given no idle capacity).
  - c. **Full absorption cost**
    - 1) Full-cost price includes materials, labor, and full allocation of manufacturing overhead.
  - d. **Cost plus** a lump sum or a markup percentage
    - 1) Cost may be either the standard or the actual cost. The former has the advantage of isolating variances. Actual costs give the selling division little incentive to control costs.
    - 2) A cost-based price ignores market prices and may not promote long-term efficiencies.
  - e. **Negotiation**
    - 1) A negotiated price may result when organizational subunits are free to determine the prices at which they buy and sell internally. Hence, a transfer price may simply reflect the best bargain that the parties can strike between themselves. It need not be based directly on particular market or cost information. A negotiated price may be especially appropriate when market prices are subject to rapid fluctuation.
16. The choice of a transfer pricing policy (which type of transfer price to use) is normally decided by senior management. The decision will typically include consideration of the following:
- a. **Goal congruence factors.** Will the transfer price promote the objectives of the organization as a whole?
  - b. **Segmental performance factors.** The segment making the transfer should be allowed to recover its incremental cost plus its opportunity cost of the transfer. The opportunity cost is the benefit forgone by not selling to an outsider.
    - 1) For this purpose, the transfer should be at market price.
    - 2) The selling manager should not lose income by selling within the company.
    - 3) Properly allocating revenues and expenses through appropriate transfer pricing also facilitates evaluation of the performance of the various segments.
  - c. **Negotiation factors.** If the purchasing segment could purchase the product or service outside the company, it should be permitted to negotiate the transfer price.
    - 1) The purchasing manager should not have to incur greater costs by purchasing within the company.
  - d. **Capacity factors.** Does the seller have excess capacity?
    - 1) If Division A has excess capacity, it should be used for producing products for Division B.
    - 2) If Division A is operating at full capacity and selling its products at the full market price, profitable work should not be abandoned to produce for Division B.
  - e. **Cost structure factors.** What portions of production costs are variable and fixed?
    - 1) If Division A has excess capacity and an opportunity arises to sell to Division B at a price in excess of the variable cost, the work should be performed for Division B because a contribution to cover the fixed costs will result.

- f. **Tax factors.** Many tax issues on the interstate and international levels may arise, e.g., income taxes, sales taxes, value-added taxes, inventory and payroll taxes, and other governmental charges.
  - 1) In the international context, exchange rate fluctuations, threats of expropriation, and limits on transfers of profits outside the host country are additional concerns.
17. **EXAMPLE:** Division A produces a small part at a cost of \$6 per unit. The regular selling price is \$10 per unit. If Division B can use the part in its production, the cost to the company (as a whole) will be \$6. Division B has another supplier who will sell the item to B at \$9.50 per part. Division B wants to buy the \$9.50 part from the outside supplier instead of the \$10 part from Division A, but making the part for \$6 is in the company's best interest. What amount should Division A charge Division B?
  - a. The answer is complicated by many factors. For example, if Division A has excess capacity, B should be charged a lower price. If it is operating at full capacity, B should be charged \$10.
  - b. Another question to consider is what portion of Division A's costs is fixed. For example, if a competitor offered to sell the part to B at \$5 each, can Division A advantageously sell to B at a price lower than \$5? If Division A's \$6 total cost is composed of \$4 of variable costs and \$2 of fixed costs, it is beneficial for all concerned for A to sell to B at a price less than \$5. Even at a price of \$4.01, the parts would be providing a contribution margin to cover some of A's fixed costs.
18. **Dual pricing** is another internal price-setting alternative. For example, the seller could record the transfer to another segment at the usual market price that would be paid by an outsider. The buyer, however, would record a purchase at the variable cost of production.
  - a. Each segment's performance would be improved by the use of a dual-pricing scheme.
  - b. The organization would benefit because variable costs would be used for decision-making purposes. In a sense, variable costs would be the relevant price for decision-making purposes, but the regular market price would be used for evaluation of production divisions.
  - c. Under a dual-pricing system, the profit for the company will be less than the sum of the profits of the individual segments.
  - d. In effect, the seller is given a corporate subsidy under the dual-pricing system.
  - e. The dual-pricing system is rarely used because the incentive to control costs is reduced. The seller is assured of a high price, and the buyer is assured of an artificially low price. Thus, neither manager must exert much effort to show a profit on segmental performance reports.

## 17.4 THEORY OF CONSTRAINTS AND THE BALANCED SCORECARD

1. The **theory of constraints (TOC)**, devised by Israeli physicist and business consultant Eliyahu Goldratt (b. 1948), is a system to improve human thinking about problems. It has been greatly extended to include manufacturing operations.
  - a. The basic premise of TOC as applied to business is that improving any process is best done not by trying to maximize efficiency in every part of the process, but by focusing on the **slowest part of the process**, called the **constraint**.
    - 1) **EXAMPLE:** During the early days of the American Civil War, several units calling themselves legions were formed, consisting of combined infantry, artillery, and cavalry. This arrangement did not last because the entire unit could only maneuver as fast as the slowest part. The artillery was the constraint.

- 2) Increasing the efficiency of processes that are not constraints merely creates backup in the system.
2. The **steps in a TOC analysis** are as follows (they are described in more detail under item 3. below):
  - a. **Identify** the constraint.
  - b. **Determine** the most profitable product mix given the constraint.
  - c. **Maximize** the flow through the constraint.
  - d. **Increase** capacity at the constraint.
  - e. **Redesign** the manufacturing process for greater flexibility and speed.
3. The detailed steps in performing a TOC analysis are described below:
  - a. **Identify the constraint.**
    - 1) The **bottleneck operation** can usually be identified as the one where work-in-process backs up the most.
    - 2) A more sophisticated approach is to analyze available resources (number and skill level of employees, inventory levels, time spent in other phases of the process) and determine which phase has negative slack time, i.e., the phase **without enough resources** to keep up with input.
  - b. **Determine the most profitable product mix** given the constraint.
    - 1) A basic principle of TOC analysis is that short-term profit maximization requires maximizing the contribution margin **through the constraint**, called the **throughput margin** or throughput contribution.
      - a) TOC thus helps managers to recognize that the product they should produce the most of is not necessarily the one with the highest contribution margin per unit, but the one with the **highest throughput margin per unit**; i.e., managers must make the most profitable use of the bottleneck operation.
    - 2) **Throughput costing**, sometimes called **supervariable costing**, recognizes **only direct materials costs** as being truly variable and thus relevant to the calculation of throughput margin. All other manufacturing costs are ignored because they are considered fixed in the short run.
 
$$\text{Throughput margin} = \text{Sales} - \text{Direct materials}$$
    - 3) To determine the most profitable use of the bottleneck operation, a manager next calculates the throughput margin **per unit of time spent in the constraint**.
      - a) **Profitability is maximized** by keeping the bottleneck operation busy with the product with the highest throughput margin per unit of time.
  - c. **Maximize the flow** through the constraint.
    - 1) **Production flow** through a constraint is managed using the **drum-buffer-rope (DBR)** system.
      - a) The **drum** (i.e., the beat to which a production process marches) is the bottleneck operation. The constraint sets the pace for the entire process.
      - b) The **buffer** is a minimal amount of work-in-process input to the drum that is maintained to ensure that it is always in operation.
      - c) The **rope** is the sequence of activities preceding and including the bottleneck operation that must be coordinated to avoid inventory buildup.

d. **Increase capacity** at the constraint.

- 1) In the short-run, TOC encourages a manager to make the best use of the bottleneck operation. The medium-term step for improving the process is to increase the **bottleneck operation's capacity**.

e. **Redesign** the manufacturing process for greater flexibility and speed.

- 1) The **long-term solution** is to reengineer the entire process. The firm should take advantage of new technology, product lines requiring too much effort should be dropped, and remaining products should be redesigned to ease the manufacturing process.
  - a) **Value engineering** is useful for this purpose because it explicitly balances product cost and the needs of potential customers (product functions).

4. **Extended Example**

a. **Identify the constraint.**

- 1) A company makes three products: an airborne radar unit, a seagoing sonar unit, and a ground sonar unit. Under the current setup, the hours spent by each product in the two phases of the manufacturing process are as follows:

Product	Assembly	Testing
Airborne Radar	3	4
Seagoing Sonar	8	10
Ground Sonar	5	5

- 2) The company has 150 hours available every month for testing. Under the current setup, therefore, the testing phase is the constraint.

b. **Determine the most profitable product mix** given the constraint.

- 1) The company calculates the throughput margin on each product and divides by the hours spent in testing:

	Radar	Seagoing Sonar	Ground Sonar
Price	\$200,000	\$600,000	\$300,000
Less: Materials costs	(100,000)	(400,000)	(250,000)
Throughput margin	\$100,000	\$200,000	\$ 50,000
Divided by: Constraint time	÷ 4	÷ 10	÷ 5
<b>Throughput margin per hour</b>	<b>\$ 25,000</b>	<b>\$ 20,000</b>	<b>\$ 10,000</b>

- 2) The crucial factor in determining the optimal product mix is not which product is the most profitable product in terms of absolute throughput margin (the seagoing sonar), but which one generates the **highest margin per time spent** in the bottleneck operation (the radar).
- 3) To derive the most profitable product mix given finite resources, **customer demand** must be taken into account. The company has determined that it can sell 12 units of radar, 6 units of seagoing sonar, and 22 units of ground sonar per month.

- 4) The **available time in the bottleneck operation** is first devoted to the product with the highest throughput margin (TM), then in descending order until the company is unable to meet demand.

- a) In the calculation below, the hours remaining after assignment to each product are the hours which can be devoted to the next product.

	Highest TM:	2nd Highest TM:	Lowest TM:
Product	Radar	Seagoing Sonar	Ground Sonar
Demand in unit	12	6	22
Hours per unit in bottleneck	$\times 4$	$\times 10$	$\times 5$
Hours needed to fulfill demand	48	60	110
Hours available	150	102	42
Hours remaining	<u>102</u>	<u>42</u>	<u>(68)</u>

- 5) Applying the principles of TOC, the company will forgo some sales of the ground sonar in favor of products that are more profitable given the current constraint.

- c. **Maximize the flow** through the bottleneck operation.

- 1) The company will apply a drum-buffer-rope system to ensure that the bottleneck operation stays busy on high-TM products while keeping work-in-process inventory to a minimum.

- d. **Increase capacity** at the bottleneck operation.

- 1) The company will hire and train more employees for the testing department.

- e. **Redesign the manufacturing process** for greater flexibility and speed.

- 1) The company will examine its markets and new manufacturing technology to determine which products it wants to continue selling, whether to add new ones, and whether to retool the production line.

5. A **TOC report** should present relevant performance measures for such critical success factors as throughput contribution, elimination of bottlenecks, reduction of average lead times, and number of unfilled orders.

- a. **EXAMPLE:** Below is a TOC report for a manufacturer of bathroom fixtures. In reviewing it, it appears that inventory levels are low for brass fixtures which provide a healthy margin. However, no immediate action may be needed because they require only a day's setup time. Also, the excess inventory in aluminum fixtures may be acceptable since they have the longest time through the bottleneck.

	Brass	Chrome	Nickel	Aluminum
Demand	Medium	Low	High	Medium
Units in unfilled orders	10	20	40	60
Average lead time in days	1	2	2	2
Price	\$ 250	\$ 220	\$ 375	\$ 400
Less: Materials costs	(180)	(165)	(310)	(280)
Throughput contribution	\$ 70	\$ 55	\$ 65	\$ 120
Divided by: Machining time in hours	$\div 4$	$\div 5$	$\div 4$	$\div 6$
<b>Throughput contribution per hour</b>	<u><b>\$ 18</b></u>	<u><b>\$ 11</b></u>	<u><b>\$ 16</b></u>	<u><b>\$ 20</b></u>

- b. **TOC** has a **short-term focus** based on costs of materials and product mix.

6. Effective management control requires performance measurement and feedback. This process affects allocation of resources to organizational subunits. It also affects decisions about managers' compensation, advancement, and future assignments.
  - a. Furthermore, evaluating their performance serves to motivate managers to optimize the measures in the **performance evaluation model**. However, that model may be inconsistent with the organization's model for managerial decision making.
    - 1) To achieve **goal congruence**, the models should be synchronized. For example, if senior management wishes to maximize results over the long term, subordinates should be evaluated over the long term.
    - 2) Unfortunately, **information systems** seldom provide information on the outcomes of individual decisions, and senior managers may be unaware of desirable options not chosen. Moreover, performance feedback usually applies to specific responsibility centers for specific periods. The result is that use of the same criteria for decision making and managerial evaluation may be difficult.
7. Feedback regarding managerial performance may take the form of **financial and nonfinancial measures** that may be **internally or externally generated**. Moreover, different measures have a long-term or short-term emphasis.
  - a. An example of an external financial measure is stock price.
  - b. Examples of external nonfinancial measures are market share, customer satisfaction, and delivery performance.
  - c. Examples of internal financial measures are cost variances, return on investment, residual income, return on sales, and other financial ratios.
  - d. Examples of internal nonfinancial measures are product quality, new product development time, and manufacturing lead time (cycle time).
8. Many forms of performance feedback are based on **accounting information**. The particular measures to be chosen are dependent on a five-stage process:
  - a. Senior management must determine what measure is consistent with its **objectives**.
  - b. The **elements** of the measure must be specified; e.g., calculation of residual income requires a definition of the items to be included in investment. A manager will therefore be motivated to avoid actions that increase the investment base.
  - c. The basis for determining the **dollar values** of the elements of the measure must also be specified. For example, in a residual income calculation based on an investment base defined as total assets, present value, current cost, current disposal price, or historical cost may be the attribute used to specify the dollar value of the investment.
    - 1) **Historical cost** creates comparability issues because returns on significantly depreciated assets may be higher than those on newer assets that have been acquired using inflated dollars. Thus, otherwise similarly situated managers may report different operating results. Moreover, managers may be reluctant to replace aging assets.
  - d. A standard must be established to provide a **basis for comparison**.
    - 1) One issue is the difficulty of the standard.
    - 2) A second issue is whether individual managers should have unique performance goals. Because different managers may face widely varying problems, establishing challenging but attainable goals tailored to individual circumstances is preferable.
  - e. The **frequency** of performance feedback depends on many factors, such as the nature of the information, its cost, the design of the accounting information system, the level of management receiving the feedback, and the usefulness of the information.

9. Organizational mechanisms for performance feedback should satisfy the behavioral criteria of **goal congruence and managerial effort**. However, they should not encroach on the desired level of autonomy granted to a subunit manager.
10. Senior management should be aware of the **limitations of accrual-accounting** measures. For example, cash-based and accrual-based measures may yield different results, so a manager may reject a project with a positive net present value because its effect on accounting income is initially negative.
11. The trend in performance evaluation is the **balanced scorecard** approach to managing the implementation of the firm's strategy. It is an accounting report that connects the firm's **critical success factors (CSFs)** determined in a strategic analysis to measurements of its performance. CSFs are financial and nonfinancial measures of the elements of firm performance that are vital to competitive advantage.
  - a. A firm identifies its CSFs by means of a **SWOT analysis** that addresses internal factors (strengths and weaknesses) and external factors (opportunities and threats).
    - 1) The firm's greatest strengths are its **core competencies**. These are the basis for its competitive advantages and strategy.
    - 2) **Strengths and weaknesses** are internal resources or a lack of them, for example, technologically advanced products, a broad product mix, capable management, leadership in R&D, modern production facilities, and a strong marketing organization.
    - 3) **Opportunities and threats** arise from such externalities as government regulation, advances in technology, and demographic changes. They may be reflected in such competitive conditions as
      - a) Raising or lowering of barriers to entry into the firm's industry by competitors
      - b) Changes in the intensity of rivalry within the industry, for example, because of overcapacity or high exit barriers
      - c) The relative availability of substitutes for the firm's products or services
      - d) Bargaining power of customers, which tends to be greater when switching costs are low and products are not highly differentiated
      - e) Bargaining power of suppliers, which tends to be higher when suppliers are few
    - 4) The SWOT analysis and identification of CSFs helps the firm to determine its competitive strategy.
    - 5) The SWOT analysis tends to highlight the basic factors of cost, quality, and the speed of product development and delivery.
  - b. Once the firm has identified its CSFs, it must establish **specific measures** for each CSF that are both relevant to the success of the firm and reliably stated. Thus, the balanced scorecard varies with the strategy adopted by the firm, for example, product differentiation or cost leadership either in a broad market or a narrowly focused market (a focus strategy). These measures provide a basis for implementing the firm's **competitive strategy**.
  - c. By providing measures that are nonfinancial as well as financial, long-term as well as short-term, and internal as well as external, the balanced scorecard deemphasizes short-term financial results and focuses attention on CSFs.

- d. The **development and implementation** of a comprehensive balanced scorecard requires active support and participation by senior management. This involvement will in turn assure the cooperation of lower-level managers in the identification of objectives, appropriate measures, targeted results, and methods of achieving the results.
  - 1) The scorecard should contain measures at the detail level to permit everyone to understand how his/her efforts affect the firm's results.
  - 2) The scorecard and the strategy it represents must be communicated to all managers and used as a basis for compensation decisions.
  - 3) The scorecard should include **lagging indicators** (such as output and financial measures) and **leading indicators** (such as many types of nonfinancial measures). The latter should be used only if they are predictors of ultimate financial performance.
  - 4) The scorecard should permit a determination of whether certain objectives are being achieved at the expense of others. For example, reduced spending on customer service may improve short-term financial results at a significant cost suggested by a decline in customer satisfaction measures.
- e. The following are **problems in implementation** of the balanced scorecard approach:
  - 1) Using too many measures, with a consequent loss of focus on CSFs
  - 2) Failing to evaluate personnel on nonfinancial as well as financial measures
  - 3) Including measures that will not have long-term financial benefits
  - 4) Not understanding that subjective measures (such as customer satisfaction) are imprecise
  - 5) Trying to achieve improvements in all areas at all times
  - 6) Not being aware that the hypothesized connection between nonfinancial measures and ultimate financial success may not continue to be true
- f. A typical balanced scorecard includes measures in four categories:
  - 1) **Financial**
    - a) The **CSFs** may be sales, fair value of the firm's stock, profits, and liquidity.
    - b) **Measures** may include sales, projected sales, accuracy of sales projections, new product sales, stock prices, operating earnings, earnings trend, revenue growth, gross margin percentage, cost reductions, economic value added, return on investment (or any of its variants), cash flow coverage and trends, turnover (assets, receivables, and inventory) and interest coverage.
  - 2) **Customer**
    - a) The **CSFs** may be customer satisfaction, customer retention rate, dealer and distributor relationships, marketing and selling performance, prompt delivery, and quality.
    - b) **Measures** may include returns, complaints, survey results, coverage and strength of distribution channels, market research results, training of marketing people, sales trends, market share and its trend, on-time delivery rate, service response time and effectiveness, and warranty exposure.
  - 3) **Internal Business Processes**
    - a) The **CSFs** may be quality, productivity (an input-output relationship), flexibility of response to changing conditions, operating readiness, and safety.



- b) **Measures** may include rate of defects, amounts of scrap and rework, returns, survey results, field service reports, warranty costs, vendor defect rate, cycle (lead) time, labor and machine efficiency, setup time, scheduling effectiveness, downtime, capacity usage, maintenance, and accidents and their results.

4) **Learning and Growth**

- a) The **CSFs** may be development of new products, promptness of their introduction, human resource development, morale, and competence of the workforce.
- b) **Measures** may include new products marketed, amount of design changes, patents and copyrights registered, R&D personnel qualifications, actual versus planned shipping dates, hours of training, skill set levels attained, personnel turnover, personnel complaints and survey results, financial and operating results, technological capabilities, organizational learning, and industry leadership.

12. **EXAMPLE** of a balanced scorecard.

- a. Each **objective** is associated with one or more **measures** that permit the organization to gauge progress toward the objective.
- b. Note that achievement of the objectives in each **perspective** makes it possible to achieve the objectives in the next higher perspective.

<b><u>Financial Perspective</u></b>	
<b>Objective:</b> Increase shareholder value	<b>Measures:</b> Increase in common stock price Reliability of dividend payment
<b><u>Customer Perspective</u></b>	
<b>Objective:</b> Increase customer satisfaction	<b>Measures:</b> Greater market share Higher customer retention rate Positive responses to surveys
<b><u>Internal Business Process Perspective</u></b>	
<b>Objective:</b> Improve product quality	<b>Measures:</b> Achievement of zero defects
<b>Objective:</b> Improve internal processes	<b>Measures:</b> Reduction in delivery cycle time Smaller cost variances
<b><u>Learning and Growth Perspective</u></b>	
<b>Objective:</b> Increase employee confidence	<b>Measures:</b> Number of suggestions to improve processes Positive responses to surveys
<b>Objective:</b> Increase employee competence	<b>Measures:</b> Attendance at internal and external training seminars

13. The **development and implementation** of a comprehensive balanced scorecard requires active support and participation by senior management. This involvement will in turn assure the cooperation of lower-level managers in the identification of objectives, appropriate measures, targeted results, and methods of achieving the results.
- a. The scorecard should contain measures at the detail level that permits everyone to understand how his/her efforts affect the firm's results.
  - b. The scorecard and the strategy it represents must be communicated to all managers and used as a basis for compensation decisions.

- c. The following are **problems in implementation** of the balanced scorecard approach:
- 1) Using too many measures, with a consequent loss of focus on CSFs
  - 2) Failing to evaluate personnel on nonfinancial as well as financial measures
  - 3) Including measures that will not have long-term financial benefits
  - 4) Not understanding that subjective measures (such as customer satisfaction) are imprecise
  - 5) Trying to achieve improvements in all areas at all times
  - 6) Not being aware that the hypothesized connection between nonfinancial measures and ultimate financial success may not continue to be true