Chapter 8

Financial Reporting and Management Reporting Systems

LEARNING OBJECTIVES

After studying this chapter, you should:

- Understand the purpose of data coding and be able to identify the respective features, advantages, and disadvantages of the various numeric and alphabetic coding schemes.
- Understand the operational features of the GLS, FRS, and MRS.
- Be able to identify the principle operational controls governing the GLS and FRS.
- Understand the factors that influence the design of the MRS.
- Understand the elements of a responsibility accounting system.

The chapter begins with a review of data coding techniques used in transaction processing systems and for general ledger design. It explores several coding schemes and their respective advantages and disadvantages. Next, the chapter examines the objectives, operational features, and control issues of two related systems: the general ledger system (GLS) and the financial reporting system (FRS). Finally, the management reporting system (MRS) is examined. The MRS is distinguishable from the FRS in one key respect: financial reporting is mandatory and management reporting is discretionary. Management reporting information is needed for planning and controlling business activities. Organization management implements MRS applications at their discretion, based on internal user needs.

Data Coding Schemes

In previous chapters we saw how primary and secondary keys link together transaction and master records for file updating. This is one application of data coding. We delve more deeply into this subject here to examine various types of data coding schemes and how they are used in data processing systems. To emphasize the importance of data codes, we first consider a hypothetical system that does not use them.

A System without Codes

Firms process large volumes of transactions that are similar in their basic attributes. For instance, a firm's accounts receivable (AR) file may contain accounts for several different customers with the same name and similar addresses. To process transactions accurately against the correct accounts, the firm must be able to distinguish one John Smith from another. This task becomes particularly difficult as the number of similar attributes and items in the class increase.

Consider the most elemental item a machine shop wholesaler firm might carry in its inventory—a machine nut. Assume that the total inventory of nuts has only three distinguishing attributes: size, material, and thread type. As a result, this entire class of inventory must be distinguished on the basis of these three features, as follows:

1. The size attribute ranges from ¼ inch to 1¾ inches in diameter in increments of $^1/_{64}$ of an inch, giving 96 sizes of nuts.
2. For each size subclass, four materials are available: brass, copper, mild steel, and case-hardened steel.
3. Each of these size and material subclasses come in three different threads: fine, standard, and coarse.

By these assumptions, this class of inventory could contain 1,152 separate items ($96 \times 4 \times 3$). The identification of a single item in this class thus requires a description featuring these distinguishing attributes. To illustrate, consider the following journal entry to record the receipt of $1,000 worth of half-inch, case-hardened steel nuts with standard threads supplied by Industrial Parts Manufacturer of Cleveland, Ohio.

	DR	CR
Inventory—nut, 1/2 inch, case-hardened steel, standard thread	1,000	
AP—Industrial Parts Manufacturer, Cleveland, Ohio		1,000

This uncoded entry takes a great deal of recording space, is time consuming to record, and is obviously prone to many types of errors. The negative effects of this approach may be seen in many parts of the organization:

1. *Sales staff.* Properly identifying the items sold requires the transcription of large amounts of detail onto source documents. Apart from the time and effort involved, this tends to encourage clerical errors and incorrect shipments.
2. *Warehouse personnel.* Locating and picking goods for shipment are impeded and shipping errors will likely result.
3. *Accounting personnel.* Postings to ledger accounts will require searching through the subsidiary files using lengthy descriptions as the key. This will be painfully slow, and postings to the wrong accounts will be common.

A System with Codes

These problems are solved, or at least greatly reduced, by using codes to represent each item in the inventory and supplier accounts. Let's assume the inventory item in our previous example had been assigned the numeric code 896, and the supplier in the AP account is given the code number 321. The coded version of the previous journal entry can now be greatly simplified:

ACCOUNT	DR	CR
896	1,000	
321		1,000

This is not to suggest that detailed information about the inventory and the supplier is of no interest to the organization. Obviously it is! These facts will be kept in reference files and used for such purposes as the preparation of parts lists, catalogs, bills of material, and mailing information. The inclusion of such details, however, would clutter the task of transaction processing and could prove dysfunctional, as this simple example illustrates. Other uses of data coding in Accounting Information Systems (AIS) are to:

1. Concisely represent large amounts of complex information that would otherwise be unmanageable.
2. Provide a means of accountability over the completeness of the transactions processed.
3. Identify unique transactions and accounts within a file.
4. Support the audit function by providing an effective audit trail.

The following discussion examines some of the more commonly used coding techniques and explores their respective advantages and disadvantages.

Numeric and Alphabetic Coding Schemes

Sequential Codes

As the name implies, **sequential codes** represent items in some sequential order (ascending or descending). A common application of numeric sequential codes is the prenumbering of source documents. At printing, hard-copy documents are each given a unique sequential code number. This number becomes the transaction number that allows the system to track each transaction processed and to identify any lost or out-of-sequence documents. Digital documents are similarly assigned a sequential number by the computer when they are created.

Advantages. Sequential coding supports the reconciliation of a batch of transactions, such as sales orders, at the end of processing. If the transaction processing system detects any gaps in the sequence of transaction numbers, it alerts management to the possibility of a missing or misplaced transaction. By tracing the transaction number back through the stages in the process, management can eventually determine the cause and effect of the error. Without sequentially numbered documents, problems of this sort are difficult to detect and resolve.

Disadvantages. Sequential codes carry no information content beyond their order in the sequence. For instance, a sequential code assigned to a raw material inventory item tells us nothing about the attributes of the item (type, size, material, warehouse location, and

so on). Also, sequential coding schemes are difficult to change. Inserting a new item at some midpoint requires renumbering the subsequent items in the class accordingly. In applications where record types must be grouped together logically and where additions and deletions occur regularly, this coding scheme is inappropriate.

Block Codes

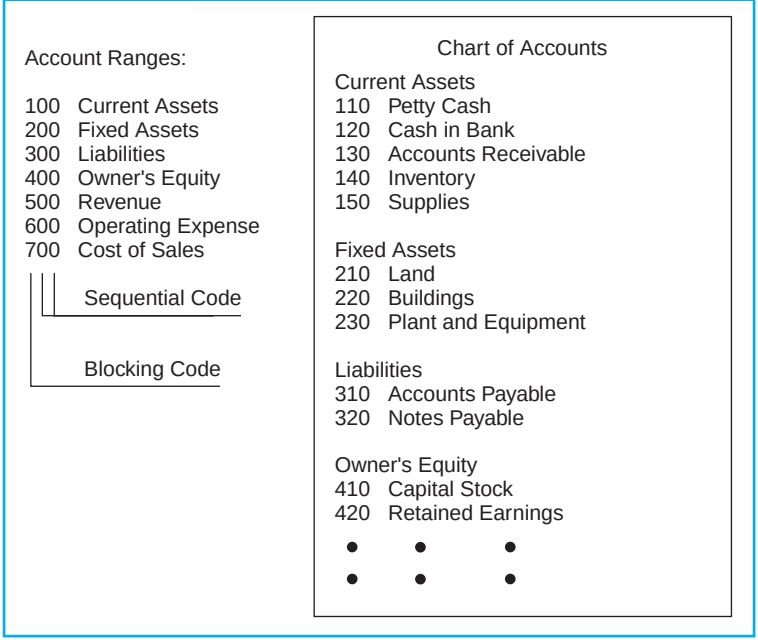
A numeric **block code** is a variation on sequential coding that in part remedies the disadvantages just described. This approach can be used to represent whole classes of items by restricting each class to a specific range within the coding scheme. A common application of block coding is the construction of a **chart of accounts**.

A well-designed and comprehensive chart of accounts is the basis for the general ledger and is thus critical to a firm's financial and management reporting systems. The more extensive the chart of accounts, the more precisely a firm can classify its transactions and the greater the range of information it can provide to internal and external users. Figure 8-1 presents an example of accounts using block codes.

Notice that each account type is represented by a unique range of codes or blocks. Thus balance sheet and income statement account classifications and subclassifications can be depicted. In this example, each of the accounts consists of a three-digit code. The first digit is the blocking digit and represents the account classification, for example, current assets, liabilities, or operating expense. The other digits in the code are sequentially assigned.

Advantages. Block coding allows for the insertion of new codes within a block without having to reorganize the entire coding structure. For example, if advertising expense is account number 626, the first digit indicates that this account is an operating expense. As new types of expense items are incurred and have to be specifically accounted for, they

FIGURE 8-1 **Chart of Accounts**



may be added sequentially within the 600 account classification. This three-digit code accommodates 100 individual items (X00 through X99) within each block. Obviously, the more digits in the code range, the more items that can be represented.

Disadvantages. As with the sequential codes, the information content of the block code is not readily apparent. For instance, account number 626 means nothing until matched against the chart of accounts, which identifies it as advertising expense.

Group Codes

Numeric **group codes** are used to represent complex items or events involving two or more pieces of related data. The code consists of zones or fields that possess specific meaning. For example, a department store chain might code sales order transactions from its branch stores as follows:

Store Number	Dept. Number	Item Number	Salesperson
04	09	476214	99

Advantages. Group codes have a number of advantages over sequential and block codes.

1. They facilitate the representation of large amounts of diverse data.
2. They allow complex data structures to be represented in a hierarchical form that is logical and more easily remembered by humans.
3. They permit detailed analysis and reporting both within an item class and across different classes of items.

Using the previous example to illustrate, Store Number 04 could represent the Hamilton Mall store in Allentown; Dept. Number 09 represents the sporting goods department; Item Number 476214 is a hockey stick; and Salesperson 99 is Jon Innes. With this level of information, a corporate manager could measure profitability by store, compare the performance of similar departments across all stores, track the movement of specific inventory items, and evaluate sales performance by employees within and between stores.

Disadvantages. Ironically, the primary disadvantage of group coding results from its success as a classification tool. Because group codes can effectively present diverse information, they tend to be overused. Unrelated data may be linked simply because it can be done. This can lead to unnecessarily complex group codes that cannot be easily interpreted. Finally, overuse can increase storage costs, promote clerical errors, and increase processing time and effort.

Alphabetic Codes

Alphabetic codes are used for many of the same purposes as numeric codes. Alphabetic characters may be assigned sequentially (in alphabetical order) or may be used in block and group coding techniques.

Advantages. The capacity to represent large numbers of items is increased dramatically through the use of pure alphabetic codes or alphabetic characters embedded within numeric codes (**alphanumeric codes**). The earlier example of a chart of accounts using a three-digit code with a single blocking digit limits data representation to only 10 blocks

of accounts—0 through 9. Using alphabetic characters for blocking, however, increases the number of possible blocks to 26—A through Z. Furthermore, whereas the two-digit sequential portion of that code has the capacity of only 100 items (10^2), a two-position alphabetic code can represent 676 items (26^2). Thus by using alphabetic codes in the same three-digit coding space, we see a geometric increase in the potential for data representation

(10 blocks × 100 items each) = 1,000 items

to

(26 blocks × 676 items each) = 17,576 items

Disadvantages. The primary drawbacks with alphabetic coding are (1) as with numeric codes, there is difficulty rationalizing the meaning of codes that have been sequentially assigned and (2) users tend to have difficulty sorting records that are coded alphabetically.

Mnemonic Codes

Mnemonic codes are alphabetic characters in the form of acronyms and other combinations that convey meaning. For example, a student enrolling in college courses may enter the following course codes on the registration form:

Course Type	*Course Number*
Acctg	101
Psyc	110
Mgt	270
Mktg	300

This combination of mnemonic and numeric codes conveys a good deal of information about these courses; with a little analysis, we can deduce that Acctg is accounting, Psyc is psychology, Mgt is management, and Mktg is marketing. The sequential number portion of the code indicates the level of each course. Another example of the use of mnemonic codes is assigning state codes in mailing addresses:

Code	*Meaning*
NY	New York
CA	California
OK	Oklahoma

Advantages. The mnemonic coding scheme does not require the user to memorize meaning; the code itself conveys a high degree of information about the item that is being represented.

Disadvantages. Although mnemonic codes are useful for representing classes of items, they have limited ability to represent items within a class. For example, the entire class of accounts receivable could be represented by the mnemonic code AR, but we would quickly exhaust meaningful combinations of alphabetic characters if we attempted to represent the individual accounts that make up this class. These accounts would be represented better by sequential, block, or group coding techniques.

The General Ledger System

Figure 8-2 characterizes the GLS as a hub connected to the other systems of the firm through spokes of information flows. Transaction cycles process individual events that are recorded in special journals and subsidiary accounts. Summaries of these transactions flow into the GLS and become sources of input for the MRS and financial reporting system. The bulk of the flows into the GLS come from the transaction processing subsystems. Note, however, that information also flows from the FRS as feedback into the GLS. We shall explore this point more thoroughly later. In this section we review key elements of the GLS.

The Journal Voucher

The source of input to the general ledger is the journal voucher illustrated in Figure 8-3. A journal voucher, which can be used to represent summaries of similar transactions or a single unique transaction, identifies the financial amounts and affected GL accounts. Routine transactions, adjusting entries, and closing entries are all entered into the general ledger via journal vouchers. Because a responsible manager must approve journal vouchers, they offer a degree of control against unauthorized GL entries.

FIGURE 8-2 **Relationship of GLS to Other Information Subsystems**

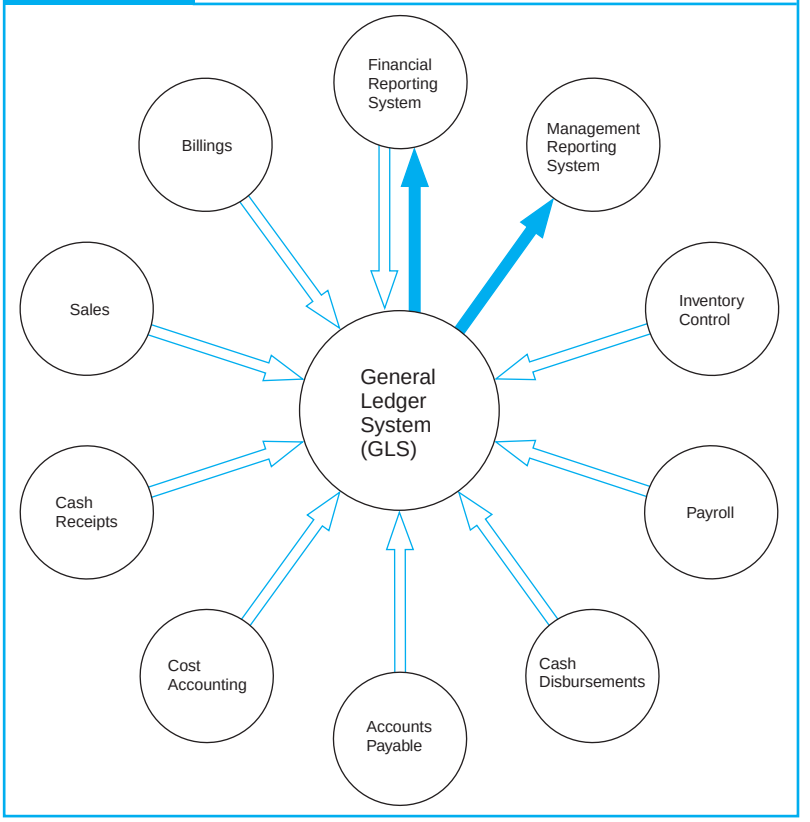


FIGURE 8-3 **Journal Voucher**

Journal Voucher

Number: JV6 - 03
Date: 6/26/07

Acct Num	Account Name	Amount DR.	Amount CR.
130	Accts Rec.	$5,500	
502	Sales		$5,500

Explanation: To Record Total Credit Sales for 6/26/07.

Approved By: J. A. Martin

Posted By: S. D. Smith

The GLS Database

The GLS database includes a variety of files. Whereas these will vary from firm to firm, the following examples are representative.

The **general ledger master file** is the principle file in the GLS database. This file is based on the organization's published chart of accounts. Each record in the general ledger master is either a separate GL account (for example, sales) or the control account (such as AR—control) for a subsidiary ledger in the transaction processing system. Figure 8-4 illustrates the structure of a typical GL master file. The FRS draws upon the GL master to produce the firm's financial statements. The MRS also uses this file to support internal information reporting.

The **general ledger history file** has the same format as the GL master. Its primary purpose is to provide historic financial data for comparative financial reports.

The **journal voucher file** is the total collection of the journal vouchers processed in the current period. This file provides a record of all general ledger transactions and replaces the traditional general journal.

The **journal voucher history file** contains journal vouchers for past periods. This historic information supports management's stewardship responsibility to account for resource

FIGURE 8-4 **Record Layout for a General Ledger Master File**

Account Number	Account Description	Acct Class A = Asset L = Liab R = Rev E = Expense OE = Equity	Normal Balance D = Debit C = Credit	Beginning Balance	Total Debits This Period	Total Credits This Period	Current Balance

utilization. Both the current and historic journal voucher files are important links in the firm's audit trail.

The **responsibility center file** contains the revenues, expenditures, and other resource utilization data for each responsibility center in the organization. The MRS draws upon these data for input in the preparation of responsibility reports for management.

Finally, the **budget master file** contains budgeted amounts for revenues, expenditures, and other resources for responsibility centers. These data, in conjunction with the responsibility center file, are the basis for responsibility accounting, which is discussed later in the chapter.

GLS Procedures

As we have seen in previous chapters, certain aspects of GLS update procedures are performed as either a separate operations or integrated within transaction processing systems. Our focus in the next section is on the interrelationship between the GLS and financial reporting. This involves additional updates in the form of reversing, adjusting, and closing entries. Let's now turn our attention to the financial reporting system.

The Financial Reporting System

The law dictates management's responsibility for providing stewardship information to external parties. This reporting obligation is met via the financial reporting system (FRS). Much of the information provided takes the form of standard financial statements, tax returns, and documents required by regulatory agencies such as the Securities and Exchange Commission.

The primary recipients of financial statement information are external users, such as stockholders, creditors, and government agencies. Generally speaking, outside users of information are interested in the performance of the organization as a whole. Therefore, they require information that allows them to observe trends in performance over time and to make comparisons between different organizations. Given the nature of these needs, financial reporting information must be prepared and presented by all organizations in a manner that is generally accepted and understood by external users.

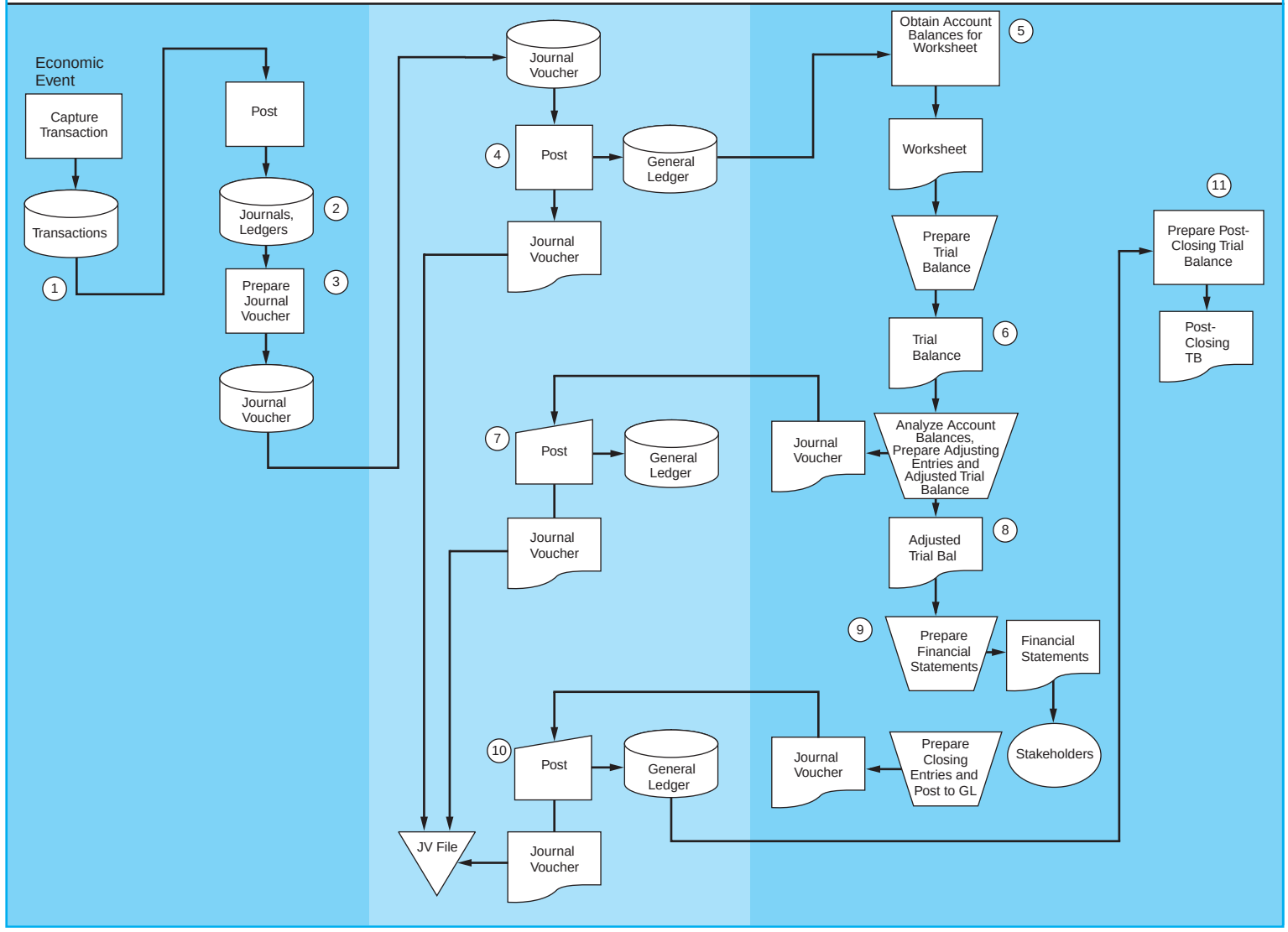
Sophisticated Users with Homogeneous Information Needs

Because the community of external users is vast and their individual information needs may vary, financial statements are targeted at a general audience. They are prepared on the proposition that the audience comprises **sophisticated users** with relatively homogeneous information needs. In other words, it is assumed that users of financial reports understand the conventions and accounting principles that are applied and that the statements have information content that is useful.

Financial Reporting Procedures

Financial reporting is the final step in the overall accounting process that begins in the transaction cycles. Figure 8-5 presents the FRS in relation to the other information subsystems. The steps illustrated and numbered in the figure are discussed briefly in the following section.

FIGURE 8-5 **Financial Reporting Process**



The process begins with a clean slate at the start of a new fiscal year. Only the balance sheet (permanent) accounts are carried forward from the previous year. From this point, the following steps occur:

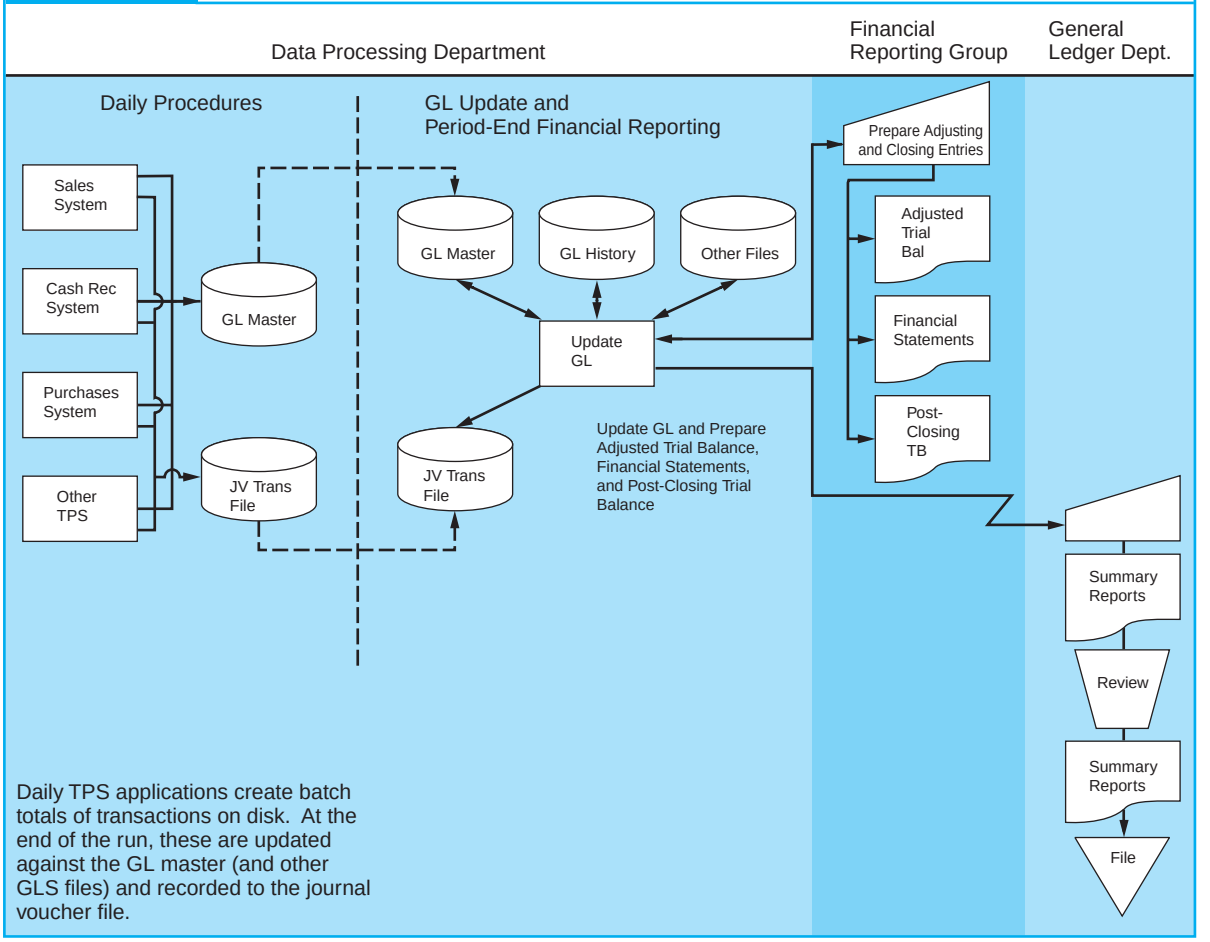
1. *Capture the transaction.* Within each transaction cycle, transactions are recorded in the appropriate transaction file.
2. *Record in special journal.* Each transaction is entered into the journal. Recall that frequently occurring classes of transactions, such as sales, are captured in special journals. Those that occur infrequently are recorded in the general journal or directly on a journal voucher.
3. *Post to subsidiary ledger.* The details of each transaction are posted to the affected subsidiary accounts.
4. *Post to general ledger.* Periodically, journal vouchers, summarizing the entries made to the special journals and subsidiary ledgers, are prepared and posted to the general ledger accounts. The frequency of updates to the general ledger will be determined by the degree of system integration.
5. *Prepare the unadjusted trial balance.* At the end of the accounting period, the ending balance of each account in the general ledger is placed in a worksheet and evaluated in total for debit–credit equality.
6. *Make adjusting entries.* Adjusting entries are made to the worksheet to correct errors and to reflect unrecorded transactions during the period, such as depreciation.
7. *Journalize and post adjusting entries.* Journal vouchers for the adjusting entries are prepared and posted to the appropriate accounts in the general ledger.
8. *Prepare the adjusted trial balance.* From the adjusted balances, a trial balance is prepared that contains all the entries that should be reflected in the financial statements.
9. *Prepare the financial statements.* The balance sheet, income statement, and statement of cash flows are prepared using the adjusted trial balance.
10. *Journalize and post the closing entries.* Journal vouchers are prepared for entries that close out the income statement (temporary) accounts and transfer the income or loss to retained earnings. Finally, these entries are posted to the general ledger.
11. *Prepare the post-closing trial balance.* A trial balance worksheet containing only the balance sheet accounts may now be prepared to indicate the balances being carried forward to the next accounting period.

The periodic nature of financial reporting in most organizations establishes it as a batch process, as illustrated in Figure 8-5. This often is the case for larger organizations with multiple streams of revenue and expense transactions that need to be reconciled before being posted to the general ledger. Many organizations, however, have moved to real-time general ledger updates and financial reporting systems that produce financial statements on short notice. Figure 8-6 presents an FRS using a combination of batch and real-time computer technology.

Controlling the FRS

Sarbanes-Oxley legislation requires that management design and implement controls over the financial reporting process. This includes the transaction processing systems that feed data into the FRS. In previous chapters we studied control techniques necessary for the

FIGURE 8-6 GL/FRS Using Database Technology



various transaction systems. Here we will examine only the controls that relate to the FRS. The potential risks to the FRS include:

1. A defective audit trail.
2. Unauthorized access to the general ledger.
3. General ledger accounts that are out of balance with subsidiary accounts.
4. Incorrect general ledger account balances because of unauthorized or incorrect journal vouchers.

If not controlled, these risks may result in misstated financial statements and other reports, thus misleading users of this information. The potential consequences are litigation, significant financial loss for the firm, and sanctions specified by SOX legislation.

COSO/SAS 78 Control Issues

This discussion of FRS physical controls will follow the COSO/SAS 78 framework, which by now is familiar to you.

Transaction Authorization

The journal voucher is the document that authorizes an entry to the general ledger. Journal vouchers have numerous sources, such as the cash receipts processing, sales order processing, and the financial reporting group. It is vital to the integrity of the accounting records that the journal vouchers be properly authorized by a responsible manager at the source department.

Segregation of Duties

In previous chapters, we have seen how the general ledger provides verification control for the accounting process. To do so, the task of updating the general ledger must be separate from all accounting and asset custody responsibility within the organization. Therefore, individuals with access authority to general ledger accounts should not:

1. Have record-keeping responsibility for special journals or subsidiary ledgers.
2. Prepare journal vouchers.
3. Have custody of physical assets.

Notice that in Figure 8-6 transactions are authorized, processed, and posted directly to the general ledger. To compensate for this potential risk, the system should provide end users and general ledger departments with detailed listings of journal voucher and account activity reports. These documents advise users of the automated actions taken by the system so that errors and unusual events, which warrant investigation, can be identified.

Access Controls

Unauthorized access to the general ledger accounts can result in errors, fraud, and misrepresentations in financial statements. Sarbanes-Oxley explicitly addresses this area of risk by requiring organizations to implement controls that limit database access to only authorized individuals. A number of IT general controls designed to serve this purpose are presented in Chapter 16.

Accounting Records

The audit trail is a record of the path that a transaction takes through the input, processing, and output phases of transaction processing. This involves a network of documents, journals, and ledgers designed to ensure that a transaction can be accurately traced through the system from initiation to final disposition.

An audit trail facilitates error prevention and correction when the data files are conveniently and logically organized. Also, the general ledger and other files that constitute the audit trail should be detailed and rich enough to (1) provide the ability to answer inquiries, for example, from customers or vendors; (2) be able to reconstruct files if they are completely or partially destroyed; (3) provide historical data required by auditors; (4) fulfill government regulations; and (5) provide a means for preventing, detecting, and correcting errors.

Independent Verification

In previous chapters we have portrayed the general ledger function as an independent verification step within the AIS. The FRS produces two operational reports—journal voucher listing and the general ledger change report—that provide proof of the accuracy of this process. The **journal voucher listing** provides relevant details about each journal voucher posted to the GL. The **general ledger change report** presents the effects of journal voucher postings to the general ledger accounts. Figure 8-7 and Figure 8-8 present examples of these reports.

FIGURE 8-7 **Journal Voucher Listing**

Journal Voucher Listing

Date	JV Num	Description	Account Number	Debit	Credit
6/26/07	JV6 - 01	Cash receipts	10100	109,000	
			20100		50,000
			10600		44,000
			10900		15,000
6/26/07	JV6 - 02	Credit sales	20100	505,000	
			50200		505,000
6/26/07	JV6 - 03	Inventory usage	30300	410,000	
			17100		410,000
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
6/26/07	JV - 12	Cash disbursements	90310	102,100	
			10100		102,100
				6,230,000	6,230,000

The Management Reporting System

Management reporting is often called discretionary reporting because it is not mandated as is financial reporting. One could take issue with the term *discretionary*, however, and argue that an effective management reporting system (MRS) is mandated by SOX legislation, which requires that all public companies monitor and report on the effectiveness of internal controls over financial reporting. Indeed, management reporting has long been recognized as a critical element of an organization's internal control structure. An MRS that directs management's attention to problems on a timely basis promotes effective management and thus supports the organization's business objectives.

Factors that Influence the MRS

Designing an effective MRS requires an understanding of the information managers need to deal with the problems they face. This section examines several topics that provide insight into factors that influence management information needs. These are: management

FIGURE 8-8 General Ledger Change Report

General Ledger Change Report

Date	Acct	Description	JV Ref	Balance	Debits	Credits	Net Change	New Balance
6/26/07	10100	Cash receipts	JV6 - 01 JV6 - 12	1,902,300	109,000	102,100	6,900	1,909,200
6/26/07	20100	Cash receipts Credit sales	JV6 - 01 JV6 - 02	2,505,600	505,000	50,000	455,000	2,960,600
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
6/26/07 6/26/07	90310 17100	Cash disburs. Inven. usage	JV6 - 12 JV6 - 03	703,500 1,600,500	102,100	410,000	102,100 410,000	805,600 2,010,500

Control Totals:

	Debits	Credits
Previous Balance	23,789,300	23,789,300
Total Net Change	6,230,000	6,230,000
Current Balance	30,019,300	30,019,300

principles; management function, level, and decision type; problem structure; types of management reports; responsibility accounting; and behavioral considerations.

Management Principles

Management principles provide insight into management information needs. The principles that most directly influence the MRS are formalization of tasks, responsibility and authority, span of control, and management by exception.

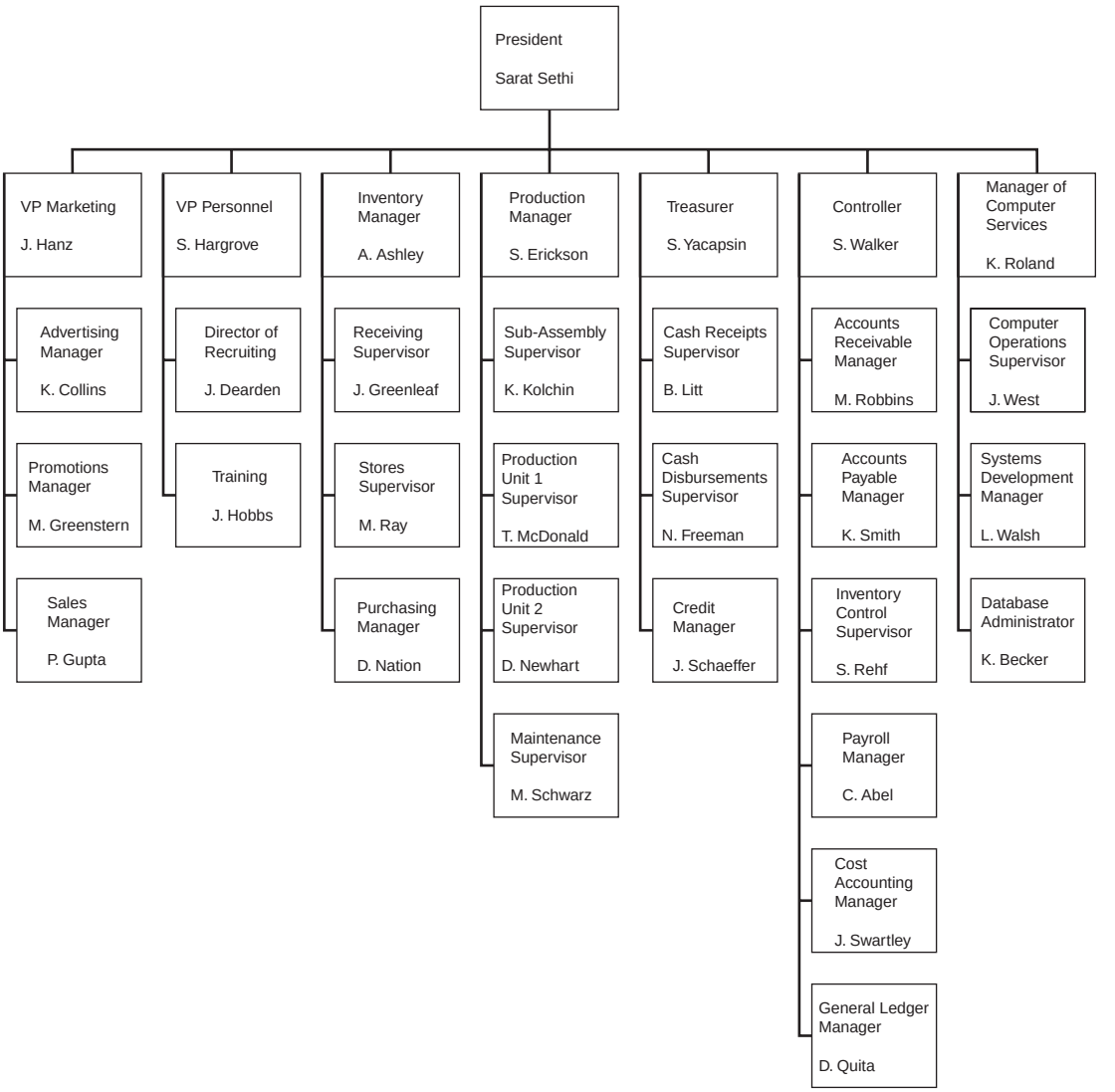
Formalization of Tasks

The **formalization of tasks** principle suggests that management should structure the firm around the tasks it performs rather than around individuals with unique skills. Under this principle, organizational areas are subdivided into tasks that represent full-time job positions. Each position must have clearly defined limits of responsibility.

The purpose of formalization of tasks is to avoid an organizational structure in which the organization's performance, stability, and continued existence depend on specific individuals. The **organizational chart** in Figure 8-9 shows some typical job positions in a manufacturing firm.

Although a firm's most valuable resource is its employees, it does not own the resource. Sooner or later, key individuals leave and take their skills with them. By formalizing tasks,

FIGURE 8-9 **Organizational Chart for a Manufacturing Firm**



the firm can more easily recruit individuals to fill standard positions left open by those who leave. In addition, the formalization of tasks promotes internal control. With employee responsibilities formalized and clearly specified, management can construct an organization that avoids assigning incompatible tasks to an individual.

Implications for the MRS. Formalizing the tasks of the firm allows formal specification of the information needed to support the tasks. Thus when a personnel change occurs, the information the new employee will need is essentially the same as for his or her predecessor. The information system must focus on the task, not the individual performing the task. Otherwise, information requirements would need to be reassessed with the

appointment of each new individual to the position. Also, internal control is strengthened by restricting information based on need as defined by the task, rather than the whim or desire of the user.

Responsibility and Authority

The principle of **responsibility** refers to an individual's obligation to achieve desired results. Responsibility is closely related to the principle of **authority**. If a manager delegates responsibility to a subordinate, he or she must also grant the subordinate the authority to make decisions within the limits of that responsibility. In a business organization, managers delegate responsibility and authority downward through the organizational hierarchy from superior to subordinates.

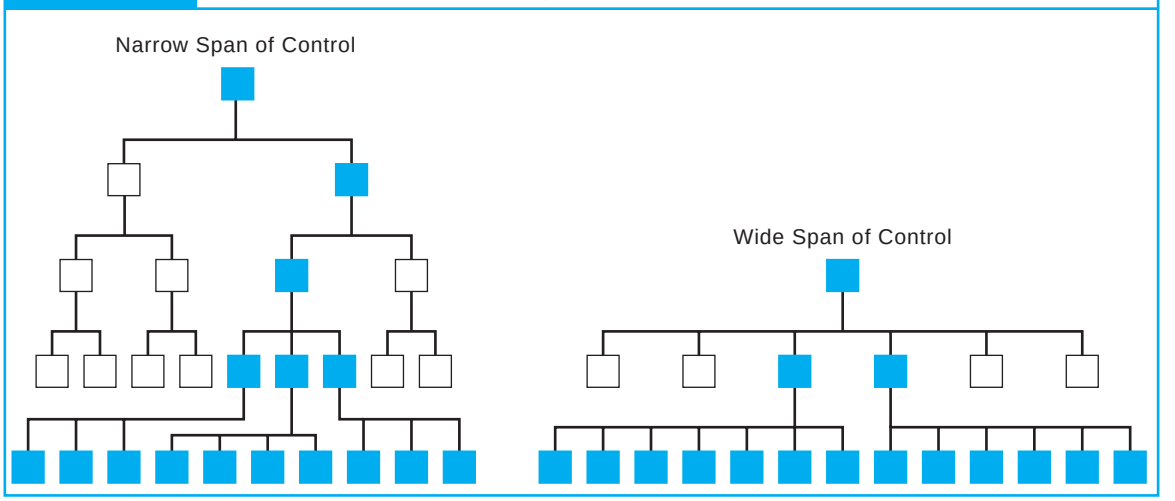
Implications for the MRS. The principles of responsibility and authority define the vertical reporting channels of the firm through which information flows. The manager's location in the reporting channel influences the scope and detail of the information reported. Managers at higher levels usually require more summarized information. Managers at lower levels receive information that is more detailed. In designing a reporting structure, the analyst must consider the manager's position in the reporting channel.

Span of Control

A manager's **span of control** refers to the number of subordinates directly under his or her control. The size of the span has an impact on the organization's physical structure. A firm with a narrow span of control has fewer subordinates reporting directly to managers. These firms tend to have tall, narrow structures with several layers of management. Firms with broad spans of control (more subordinates reporting to each manager) tend to have wide structures, with fewer levels of management. Figure 8-10 illustrates the relationship between span of control and organizational structure.

Organizational behavior research suggests that wider spans of control are preferable because they allow more employee autonomy in decision making. This may translate into better employee morale and increased motivation. An important consideration in setting the span of control is the nature of the task. The more routine and structured the task,

FIGURE 8-10 **Impact of Span of Control on Organizational Structure**



the more subordinates one manager can control. Therefore, routine tasks tend to be associated with a broad span of control. Less structured or highly technical tasks often require a good deal of management participation on task-related problems. This close interaction reduces the manager's span of control.

Implications for the MRS. Managers with narrow spans of control are closely involved with the details of the operation and with specific decisions. Broad spans of control remove managers from these details. These managers delegate more of their decision-making authority to their subordinates. The different management approaches require different information. Managers with narrow spans of control require detailed reports. Managers with broad control responsibilities operate most effectively with summarized information.

Management by Exception

The principle of **management by exception** suggests that managers should limit their attention to potential problem areas (that is, exceptions) rather than being involved with every activity or decision. Managers thus maintain control without being overwhelmed by the details.

Implications for the MRS. Managers need information that identifies operations or resources at risk of going out of control. Reports should support management by exception by focusing on changes in key factors that are symptomatic of potential problems. Unnecessary details that may draw attention away from important facts should be excluded from reports. For example, an inventory exception report may be used to identify items of inventory that turn over more slowly or go out of stock more frequently than normal. Management attention must be focused on these exceptions. The majority of inventory items that fluctuate within normal levels should not be included in the report.

Management Function, Level, and Decision Type

The management functions of planning and control have a profound effect on the management reporting system. The planning function is concerned with making decisions about the future activities of the organization. Planning can be long range or short range. Long-range planning usually encompasses a period of between one and five years, but this varies among industries. For example, a public utility may plan 15 years ahead in the construction of a new power plant, while a computer manufacturer deals in a time frame of only one or two years in the planning of new products. Long-range planning involves a variety of tasks, including setting the goals and objectives of the firm, planning the growth and optimum size of the firm, and deciding on the degree of diversification among the firm's products.

Short-term planning involves the **implementation** of specific plans that are needed to achieve the objectives of the long-range plan. Examples include planning the marketing and promotion for a new product, preparing a production schedule for the month, and providing department heads with budgetary goals for the next three months.

The control function ensures that the activities of the firm conform to the plan. This entails evaluating the operational process (or individual) against a predetermined standard and, when necessary, taking corrective action. Effective control takes place in the present time frame and is triggered by feedback information that advises the manager about the status of the operation being controlled.

Planning and control decisions are frequently classified into four categories: strategic planning, tactical planning, managerial control, and operational control. Figure 8-11 relates these decisions to managerial levels.

Strategic Planning Decisions

Figure 8-11 shows that top-level managers make **strategic planning decisions,** including:

- Setting the goals and objectives of the firm.
- Determining the scope of business activities, such as desired market share, markets the firm wishes to enter or abandon, the addition of new product lines and the termination of old ones, and merger and acquisition decisions.
- Determining or modifying the organization's structure.
- Setting the management philosophy.

Strategic planning decisions have the following characteristics:

- They have long-term time frames. Because they deal with the future, managers making strategic decisions require information that supports forecasting.
- They require highly summarized information. Strategic decisions focus on general trends rather than detail-specific activities.
- They tend to be nonrecurring. Strategic decisions are usually one-time events. As a result, there is little historic information available to support the specific decision.
- Strategic decisions are associated with a high degree of uncertainty. The decision maker must rely on insight and intuition. Judgment is often central to the success of the decision.
- They are broad in scope and have a profound impact on the firm. Once made, strategic decisions permanently affect the organization at all levels.
- Strategic decisions require external as well as internal sources of information.

FIGURE 8-11 Management Level and Decision Type

Tactical Planning Decisions

Tactical planning decisions are subordinate to strategic decisions and are made by middle management (see Figure 8-11). These decisions are shorter term, more specific, recurring, have more certain outcomes, and have a lesser impact on the firm than strategic decisions. For example, assume that the president of a manufacturing firm makes the strategic decision to increase sales and production by 100,000 units over the prior year's level. One tactical decision that must result from this is setting the monthly production schedule to accomplish the strategic goal.

Management Control Decisions

Management control involves motivating managers in all functional areas to use resources, including materials, personnel, and financial assets, as productively as possible. The supervising manager compares the performance of his or her subordinate manager to pre-established standards. If the subordinate does not meet the standard, the supervisor takes corrective action. When the subordinate meets or exceeds expectations, he or she may be rewarded.

Uncertainty surrounds **management control decisions** because it is difficult to separate the manager's performance from that of his or her operational unit. We often lack both the criteria for specifying management control standards and the objective techniques for measuring performance. For example, assume that a firm's top management places its most effective and competent middle manager in charge of a business segment that is performing poorly. The manager's task is to revitalize the operations of the unit, and doing so requires a massive infusion of resources. The segment will operate in the red for some time until it establishes a foothold in the market. Measuring the performance of this manager in the short term may be difficult. Traditional measures of profit, such as return on investment (which measures the performance of the operational unit itself), would not really reflect the manager's performance. We shall examine this topic in more depth later in the chapter.

Operational Control Decisions

Operational control ensures that the firm operates in accordance with pre-established criteria. Figure 8-11 shows that operations managers exercise operational control. **Operational control decisions** are narrower and more focused than tactical decisions because they are concerned with the routine tasks of operations. Operational control decisions are more structured than management control decisions, more dependent on details than planning decisions, and have a shorter time frame than tactical or strategic decisions. These decisions are associated with a fairly high degree of certainty. In other words, identified symptoms tend to be good indicators of the root problem, and corrective actions tend to be obvious. This degree of certainty makes it easier to establish meaningful criteria for measuring performance. Operational control decisions have three basic elements: setting standards, evaluating performance, and taking corrective action.

Standards. Standards are pre-established levels of performance that managers believe are attainable. Standards apply to all aspects of operations, such as sales volume, quality control over production, costs for inventory items, material usage in the production of products, and labor costs in production. Once established, these standards become the basis for evaluating performance.

Performance Evaluation. The decision maker compares the performance of the operation in question against the standard. The difference between the two is the **variance**.

For example, a price variance for an item of inventory is the difference between the expected price—the standard—and the price actually paid. If the actual price is greater than the standard, the variance is said to be unfavorable. If the actual price is less than the standard, the variance is favorable.

Taking Corrective Action. After comparing the performance to the standard, the manager takes action to remedy any out-of-control condition. Recall from Chapter 3, however, that we must apply extreme caution when taking corrective action. An inappropriate response to performance measures may have undesirable results. For example, to achieve a favorable price variance, the purchasing agent may pursue the low-price vendors of raw materials and sacrifice quality. If the lower-quality raw materials result in excessive quantities being used in production because of higher-than-normal waste, the firm will experience an unfavorable material usage variance. The unfavorable usage variance may completely offset the favorable price variance to create an unfavorable total variance.

Table 8-1 classifies strategic planning, tactical planning, management control, and operational control decisions in terms of time frame, scope, level of details, recurrence, and certainty.

Problem Structure

The structure of a problem reflects how well the decision maker understands the problem. Structure has three elements.[1]

1. Data—the values used to represent factors that are relevant to the problem.
2. Procedures—the sequence of steps or decision rules used in solving the problem.
3. Objectives—the results the decision maker desires to attain by solving the problem.

When all three elements are known with certainty, the problem is structured. Payroll calculation is an example of a **structured problem**:

1. We can identify the data for this calculation with certainty (hours worked, hourly rate, withholdings, tax rate, and so on).

TABLE 8-1 Classification of Decision Types by Decision Characteristics

	DECISION TYPE			
DECISION CHARACTERISTIC	**Strategic Planning**	**Tactical Planning**	**Management Control**	**Operational Control**
Time frame	Long term	Medium	Medium	Short
Scope	High impact	Medium impact	Lower impact	Lowest impact
Level of details	Highly summarized	Detailed	Moderately summarized	Highly detailed
Recurrence	Nonrecurring	Periodic recurring	Periodic recurring	Frequent recurring
Certainty	Uncertain	Highly certain	Uncertain	Highly certain

1 Adapted from F. L. Luconi, T. W. Malone, and M. S. Scott Morton, "Expert Systems: The Next Challenge for Managers," *Sloan Management Review* (Summer 1986). Reprinted in P. Gray, W. R. King, E. R. McLean, and H. J. Watson, *MOIS: Management of Information Systems* (Chicago: Dryden Press, 1989): 69–84.

2. Payroll procedures are known with certainty:

   Gross pay = Hours worked × Pay rate

   Net pay = Gross pay − Taxes − Withholdings

3. The objective of payroll is to discharge the firm's financial obligation to its employees.

Structured problems do not present unique situations to the decision maker and, because their information requirements can be anticipated, they are well suited for traditional data processing techniques. In effect, the designer who specifies the procedures and codes the programs solves the problem.

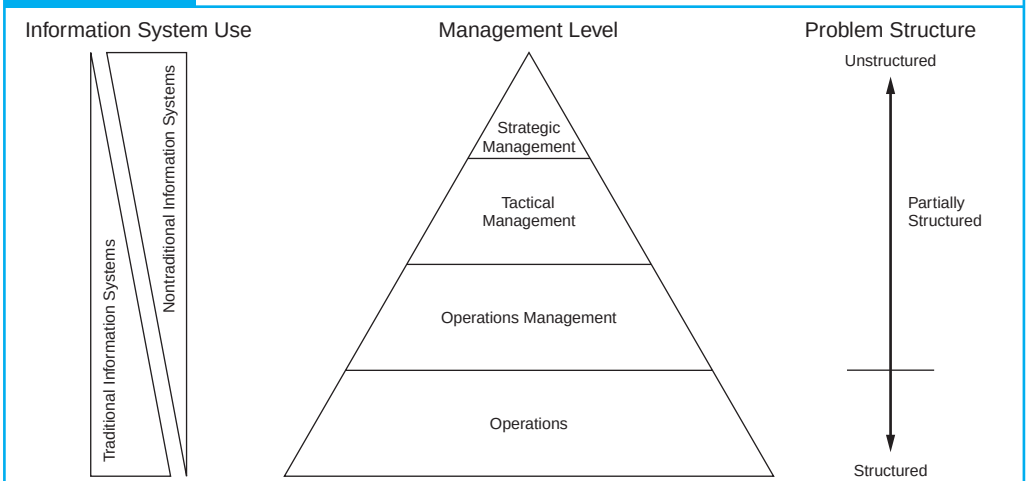
Unstructured Problems

Problems are unstructured when any of the three characteristics identified previously are not known with certainty. In other words, an **unstructured problem** is one for which we have no precise solution techniques. Either the data requirements are uncertain, the procedures are not specified, or the solution objectives have not been fully developed. Such a problem is normally complex and engages the decision maker in a unique situation. In these situations, the systems analyst cannot fully anticipate user information needs, rendering traditional data processing techniques ineffective.

Figure 8-12 illustrates the relationship between problem structure and organizational level. We see from the figure that lower levels of management deal more with fully structured problems, whereas upper management deals with unstructured problems. Middle-level managers tend to work with partially structured problems. Keep in mind that these structural classifications are generalizations. Top managers also deal with some highly structured problems, and lower-level managers sometimes face problems that lack structure.

Figure 8-12 also shows the use of information systems by different levels of management. The traditional information system deals most effectively with fully structured problems. Therefore, operations management and tactical management receive the greatest benefit from these systems. Because management control and strategic planning

FIGURE 8-12 **Problem Structure Management Level and Information System Usage**



decisions lack structure, the managers who make these decisions often do not receive adequate support from traditional systems alone.

Types of Management Reports

Reports are the formal vehicles for conveying information to managers. The term *report* tends to imply a written message presented on sheets of paper. In fact, a **management report** may be a paper document or a digital image displayed on a computer terminal. The report may express information in verbal, numeric, or graphic form, or any combination of these.

Report Objectives

Chapter 1 made the distinction between information and data. Recall that information leads the user to an action. Therefore, to be useful, reports must have **information content**. Their value is the effect they have on users. This is expressed in two general reporting objectives: (1) to reduce the level of uncertainty associated with a problem facing the decision maker and (2) to influence the decision maker's behavior in a positive way. Reports that fail to accomplish these objectives lack information content and have no value. In fact, reliance on such reports may lead to dysfunctional behavior (discussed later). Management reports fall into two broad classes: programmed reports and ad hoc reports.

Programmed Reporting

Programmed reports provide information to solve problems that users have anticipated. There are two subclasses of programmed reports: scheduled reports and on-demand reports. The MRS produces **scheduled reports** according to an established time frame. This could be daily, weekly, quarterly, and so on. Examples of such reports are a daily listing of sales, a weekly payroll action report, and annual financial statements. **On-demand reports** are triggered by events, not by the passage of time. For example, when inventories fall to their pre-established reorder points, the system sends an inventory reorder report to the purchasing agent. Another example is an accounts receivable manager responding to a customer problem over the telephone. The manager can, on demand, display the customer's account history on the computer screen. Note that this query capability is the product of an anticipated need. This is quite different from the ad hoc reports that we discuss later. Table 8-2 lists examples of typical programmed reports and identifies them as scheduled or on-demand.

Report Attributes

To be effective, a report must possess the following attributes: relevance, summarization, exception orientation, accuracy, completeness, timeliness, and conciseness. Each of these **report attributes** is discussed in the following section.

Relevance. Each element of information in a report must support the manager's decision. Irrelevancies waste resources and may even be dysfunctional by distracting a manager's attention from the information content of the report.

Summarization. Reports should be summarized according to the level of the manager within the organizational hierarchy. In general, the degree of summarization becomes greater as information flows from lower management upward to top management.

TABLE 8-2 Examples of Programmed Reports

Type of Report	Scheduled	On-Demand
Planning reports:		
Financial budgets	X	
Materials requirements reports		X
Sales forecast reports	X	
Production schedules		X
Projected cash flows reports	X	
Control reports:		
Cost center reports	X	
Profit center reports	X	
Profitability by line of product	X	
Quality control reports		X
Labor distribution reports	X	
Inventory exception reports		X
Equipment utilization reports	X	

Exception Orientation. Control reports should identify activities that are at risk of going out of control and should ignore activities that are under control. For example, consider a purchasing agent with ordering responsibility for an inventory of 10,000 different items. If the agent received a daily report containing the actual balances of every item, he or she would search through 10,000 items to identify a few that need reordering. An exception-oriented report would identify only those inventory items that have fallen to their reorder levels. From this report, the agent could easily prepare purchase orders.

Accuracy. Information in reports must be free of material errors. A material error will cause the user to make the wrong decision (or fail to make a required decision). We often sacrifice accuracy for timely information. In situations that require quick responses, the manager must factor this trade-off into the **decision-making process.**

Completeness. Information must be as complete as possible. Ideally, no piece of information that is essential to the decision should be missing from the report. Like the attribute of accuracy, we sometimes must sacrifice completeness in favor of timely information.

Timeliness. If managers always had time on their side, they may never make bad decisions. However, managers cannot always wait until they have all the facts before they act. Timely information that is sufficiently complete and accurate is more valuable than perfect information that comes too late to use. Therefore, the MRS must provide managers with timely information. Usually, information can be no older than the period to which it pertains. For example, if each week a manager decides on inventory acquisitions based on a weekly inventory status report, the information in the report should be no more than a week old.

Conciseness. Information in the report should be presented as concisely as possible. Reports should use coding schemes to represent complex data classifications and provide all the necessary calculations (such as extensions and variances) for the user. In addition, information should be clearly presented with titles for all values.

Ad Hoc Reporting

Managers cannot always anticipate their information needs. This is particularly true for top and middle management. In the dynamic business world, problems arise that require new information on short notice, and there may be insufficient time to write traditional computer programs to produce the required information. In the past, these needs often went unsatisfied. Now database technology provides direct inquiry and report generation capabilities. Managers with limited computer background can quickly produce **ad hoc reports** from a terminal or PC, without the assistance of data processing professionals.

Increases in computing power, point-of-transaction scanners, and continuous reductions in data storage costs have enabled organizations to accumulate massive quantities of raw data. This data resource is now being tapped to support ad hoc reporting needs through a concept known as data mining

Data mining is the process of selecting, exploring, and modeling large amounts of data to uncover relationships and global patterns that exist in large databases but are hidden among the vast amount of facts. This involves sophisticated techniques such as database queries and artificial intelligence that model real-world phenomena from data collected from a variety of sources, including transaction processing systems, customer history databases, and demographics data from external sources such as credit bureaus. Managers employ two general approaches to data mining: verification and discovery

The **verification model** uses a drill-down technique to either verify or reject a user's hypothesis. For example, assume a marketing manager needs to identify the best target market, as a subset of the organization's entire customer base, for an ad campaign for a new product. The data mining software will examine the firm's historical data about customer sales and demographic information to reveal comparable sales and the demographic characteristics shared by those purchasers. This subset of the customer base can then be used to focus the promotion campaign.

The **discovery model** uses data mining to discover previously unknown but important information that is hidden within the data. This model employs inductive learning to infer information from detailed data by searching for recurring patterns, trends, and generalizations. This approach is fundamentally different from the verification model in that the data are searched with no specific hypothesis driving the process. For example, a company may apply discovery techniques to identify customer buying patterns and gain a better understanding of customer motivations and behavior.

A central feature of a successful data mining initiative is a **data warehouse** of archived operational data. A data warehouse is a relational database management system that has been designed specifically to meet the needs of data mining. The warehouse is a central location that contains operational data about current events (within the past 24 hours) as well as events that have transpired over many years. Data are coded and stored in the warehouse in detail and at various degrees of aggregation to facilitate identification of recurring patterns and trends.

Management decision making can be greatly enhanced through data mining, but only if the appropriate data have been identified, collected, and stored in the data warehouse. Because many of the important issues related to data mining and warehousing require an understanding of relational database technology, these topics are examined further in Chapters 9 and 11.

Responsibility Accounting

A large part of management reporting involves **responsibility accounting**. This concept implies that every economic event that affects the organization is the responsibility of and

can be traced to an individual manager. The responsibility accounting system personalizes performance by saying to the manager, "This is your original budget, and this is how your performance for the period compares to your budget." Most organizations structure their responsibility reporting system around areas of responsibility in the firm. A fundamental principle of this concept is that responsibility area managers are accountable only for items (costs, revenues, and investments) that they control.

The flow of information in responsibility systems is both downward and upward through the information channels. Figure 8-13 illustrates this pattern. These top-down and bottom-up information flows represent the two phases of responsibility accounting: (1) creating a set of financial performance goals (budgets) pertinent to the manager's responsibilities and (2) reporting and measuring actual performance as compared to these goals.

Setting Financial Goals: The Budget Process

The **budget** process helps management achieve its financial objectives by establishing measurable goals for each organizational segment. This mechanism conveys to the segment managers the standards that senior managers will use for measuring their performance. Budget information flows downward and becomes increasingly detailed as it moves to lower levels of management. Figure 8-14 shows the distribution of budget information through three levels of management.

Measuring and Reporting Performance

Performance measurement and reporting takes place at each operational segment in the firm. This information flows upward as **responsibility reports** to senior levels of management. Figure 8-15 shows the relationship between levels of responsibility reports. Notice how the information in the reports becomes increasingly summarized at each higher level of management.

Responsibility Centers

To achieve accountability, business entities frequently organize their operations into units called **responsibility centers**. The most common forms of responsibility centers are cost centers, profit centers, and investment centers.

FIGURE 8-13 Upward and Downward Flow of Information

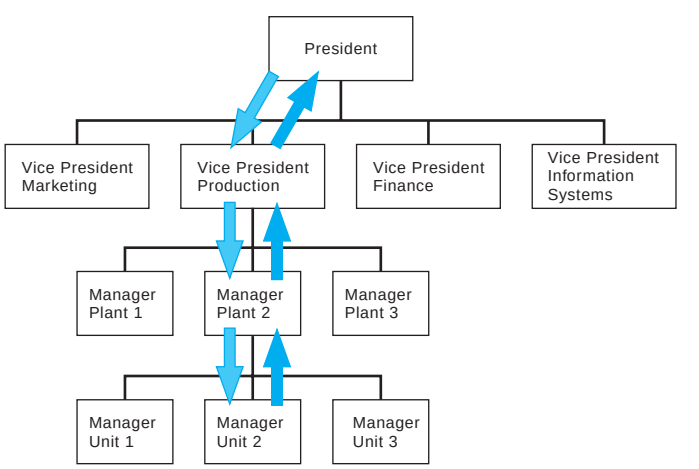


FIGURE 8-14 Top-Down Flow of Budget Information

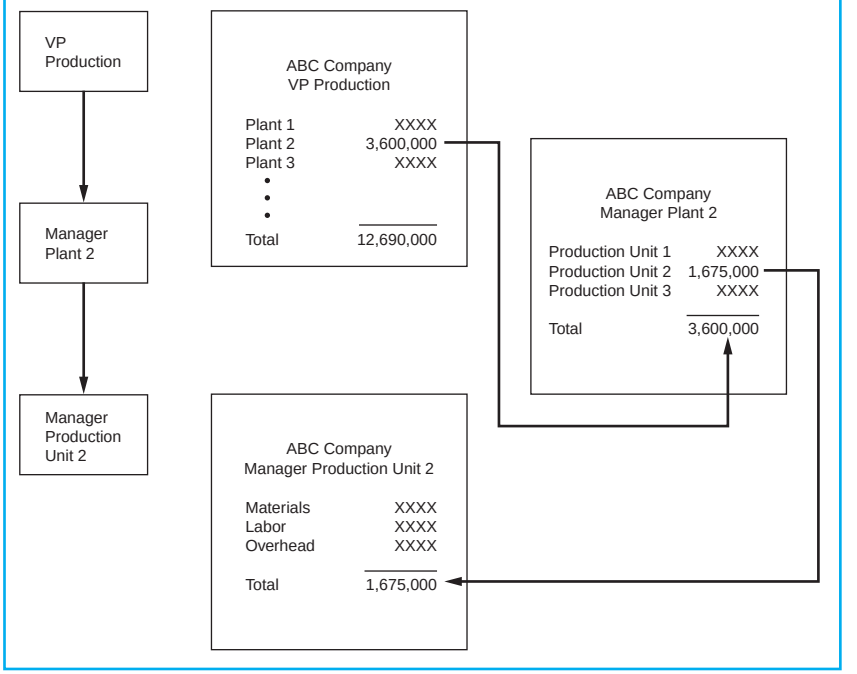
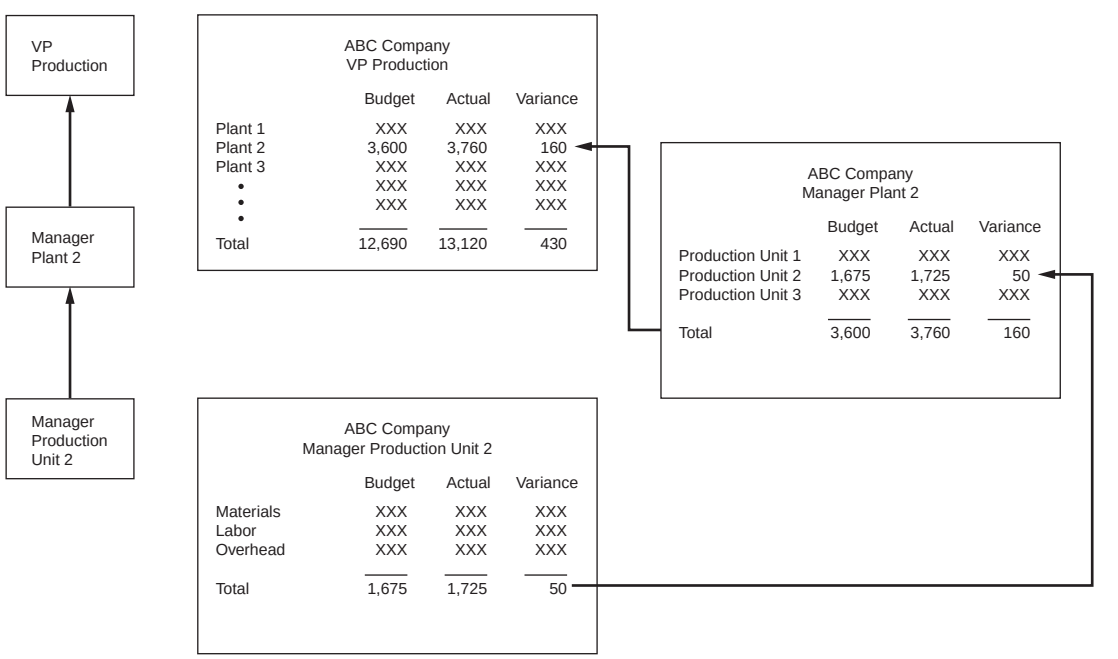


FIGURE 8-15 The Bottom-Up Flow of Performance Information



Cost Centers. A **cost center** is an organizational unit with responsibility for cost management within budgetary limits. For example, a production department may be responsible for meeting its production obligation while keeping production costs (labor, materials, and overhead) within the budgeted amount. The performance report for the cost center manager reflects its controllable cost behavior by focusing on budgeted costs, actual costs, and variances from budget. Figure 8-16 shows an example of a cost center performance report. Performance measurements should not consider costs that are outside of the manager's control, such as investments in plant equipment or depreciation on the building.

Profit Centers. A **profit center** manager has responsibility for both cost control and revenue generation. For example, the local manager of a national department store chain may be responsible for decisions about:

- Which items of merchandise to stock in the store.
- What prices to charge.
- The kind of promotional activities for products.
- The level of advertising.
- The size of the staff and the hiring of employees.
- Building maintenance and limited capital improvements.

The performance report for the profit center manager is different from that of the cost center. Nevertheless, the reporting emphasis for both should be on controllable items. Figure 8-17 is an example of a profit center report. Whereas only controllable items are

FIGURE 8-16 Cost Center Performance Report

PLANT UNIT 2
CONTROLLABLE COST REPORT

PLANTWIDE CONTROLLABLE COSTS

	Budget	Actual	Variance
Materials			
Drilling Dept.	XXX	XXX	XX
Milling Dept.	XXX	XXX	XX
Assembly Ship	XXX	XXX	XX
Direct Labor			
Drilling Dept.	XXX	XXX	XX
Milling Dept.	XXX	XXX	XX
Assembly Ship	XXX	XXX	XX
Controllable Overhead			
Drilling Dept.	XXX	XXX	XX
Milling Dept.	XXX	XXX	XX
Assembly Ship	XXX	XXX	XX
Total Controllable Costs	XXXXX	XXXXX	XXX

FIGURE 8-17 **Profit Center Performance Report**

XYZ COMPANY PROFIT STATEMENT

Sales		XXX	
Less:			
Cost of goods sold	XXX		
Gross profit		XXX	
Less controllable costs:		XXX	
Controllable overhead	XXX		
Controllable operating expenses	XXX		
Controllable operating profit		XXX	(Measure of management performance)
Depreciation on noncontrollable fixed assets	XXX		
Contribution after noncontrollable costs		XXX	(Measure of profit center performance)

used to assess the manager's performance, the profit center itself is assessed by its contribution after noncontrollable costs.

Investment Centers. The manager of an **investment center** has the general authority to make decisions that profoundly affect the organization. Assume that a division of a corporation is an investment center with the objective of maximizing the return on its investment assets. The division manager's range of responsibilities includes cost management, product development, marketing, distribution, and capital disposition through investments of funds in projects and ventures that earn a desired rate of return. Figure 8-18 illustrates the performance report for an investment center.

Behavioral Considerations

Goal Congruence

Earlier in this chapter, we touched on the management principles of authority, responsibility, and the formalization of tasks. When properly applied within an organization, these principles promote **goal congruence**. Lower-level managers pursuing their own objectives contribute in a positive way to the objectives of their superiors. For example, by controlling costs, a production supervisor contributes to the division manager's goal of profitability. Thus as individual managers serve their own best interests they also serve the best interests of the organization.

A carefully structured MRS plays an important role in promoting and preserving goal congruence. On the other hand, a badly designed MRS can cause dysfunctional actions that are in opposition to the organization's objectives. Two pitfalls that cause managers to act dysfunctionally are information overload and inappropriate performance measures.

FIGURE 8-18 Investment Center Performance Report

XYZ COMPANY DIVISION INCOME STATEMENT

Sales		XXX	
Less:			
Cost of goods sold	XXX		
Gross profit		XXX	
Less controllable costs:		XXX	
Controllable overhead	XXX		
Depreciation on noncontrollable fixed assets	XXX		
Controllable operating profit		XXX	(Measure of management performance)
Less noncontrollable costs:			
Divisional overhead	XXX		
Allocated centralized charges	XXX		
Net income before taxes		XXX	(Measure of investment center performance)

Information Overload

Information overload occurs when a manager receives more information than he or she can assimilate. This happens when designers of the reporting system do not properly consider the manager's organizational level and span of control. For example, consider the information volume that would flow to the president if the reports were not properly summarized (refer to Figure 8-13). The details required by lower-level managers would quickly overload the president's decision-making process. Although the report may have many of the information attributes discussed earlier (complete, accurate, timely, and concise), it may be useless if not properly summarized.

Information overload causes managers to disregard their formal information and rely on informal cues to help them make decisions. Thus the formal information system is replaced by heuristics (rules of thumb), tips, hunches, and guesses. The resulting decisions run a high risk of being suboptimal and dysfunctional.

Inappropriate Performance Measures

Recall that one purpose of a report is to stimulate behavior consistent with the objectives of the firm. When **inappropriate performance measures** are used, however, the report can have the opposite effect. Let's see how this can happen using a common performance measure—return on investment (ROI).

Assume that the corporate management of an organization evaluates division management performance solely on the basis of ROI. Each manager's objective is to maximize ROI. Naturally, the organization wants this to happen through prudent cost

management and increased profit margins. However, when ROI is used as the single criterion for measuring performance, the criterion itself becomes the focus of attention and object of manipulation. We illustrate this point with the multiperiod investment center report in Figure 8-19. Notice how actual ROI went up in 2006 and exceeded the budgeted ROI in 2007. On the surface, this looks like favorable performance. However, a closer analysis of the cost and revenue figures gives a different picture. Actual sales were below budgeted sales for 2007, but the shortfall in revenue was offset by reductions in discretionary operating expenditures (employee training and plant maintenance). The ROI figure is further improved by reducing invest ments in inventory and plant equipment (fixed assets) to lower the asset base.

The manager took actions that increased ROI but were dysfunctional to the organization. Usually, such tactics can succeed in the short run only. As the plant equipment starts to wear out, customer dissatisfaction increases (because of stock-outs), and employee dissent becomes epidemic. The ROI figure will then begin to reflect the economic reality. By that time, however, the manager may have been promoted based on the perception of good performance, and his or her successor will inherit the problems left behind.

FIGURE 8-19 **Multiperiod Investment Center Report**

	ACTUAL			BUDGET
YEAR	**2005**	**2006**	**2007**	**2007**
Sales	1,780.0	2,670.0	3,204.0	3,560.0
Less segment variable costs:				
Materials	445.0	667.5	801.0	890.0
Labor	89.0	133.5	89.0	178.0
Supplies	35.6	53.4	64.1	71.2
Less discretionary costs				
employee training	53.4	62.3	44.5	71.2
Maintenance	89.0	97.9	71.2	106.8
Less segment committed costs:				
Depreciation	213.6	284.8	284.8	356.0
Rent	142.4	178.0	195.8	249.2
Total cost	1,068.0	1,477.4	1,550.4	1,922.4
Contribution	712.0	1,192.6	1,653.6	1,637.6
Investment in assets				
Accounts receivable	178.0	267.0	320.4	356.0
Inventory	356.0	534.0	480.6	712.0
Fixed assets	2,830.2	4,565.7	4,984.0	6,016.4
Less accounts payable	(267.0)	(400.5)	(623.0)	(534.0)
Net investment	3,097.2	4,966.2	5,162.0	6,550.4
Return on investment	23%	24%	32%	25%

The use of any single criterion performance measure can impose personal goals on managers that conflict with organizational goals and result in dysfunctional behavior.

Consider the following examples:

1. The use of price variance to evaluate a purchasing agent can affect the quality of the items purchased.
2. The use of quotas (such as units produced) to evaluate a supervisor can affect quality control, material usage efficiency, labor relations, and plant maintenance.
3. The use of profit measures such as ROI, net income, and contribution margin can affect plant investment, employee training, inventory reserve levels, customer satisfaction, and labor relations.

Performance measures should consider all relevant aspects of a manager's responsibility. In addition to measures of general performance (such as ROI), management should measure trends in key variables such as sales, cost of goods sold, operating expenses, and asset levels. Nonfinancial measures such as product leadership, personnel development, employee attitudes, and public responsibility may also be relevant in assessing management performance.

Summary

This chapter began by examining the GLS and the financial reporting system, two operationally interdependent systems that are vital to the economic activities of the organization. We first learned the importance of data coding schemes and their role in the general ledger and transaction processing systems as a means of coordinating and managing a firm's transactions. In examining the major types of numeric and alphabetic coding schemes, we saw how each has certain advantages and disadvantages. We then turned to a more direct examination of the GLS, focusing on the files that typically make up a GLS database and on standard GLS procedures. Turning to the FRS, we examined how financial information is provided to both external and internal users. A step-by-step outline of the financial reporting process was presented.

Next, the GLS and the FRS were examined as a single, integrated physical system (GL/FRS). Our principal focus here was on the standard operational controls that govern this system and on the use of computer technology for improved efficiency in reporting and record keeping.

This chapter then examined discretionary reporting systems. Discretionary reporting is not subject to the professional guidelines and legal statutes that govern nondiscretionary financial reporting. Rather, it is driven by several factors, including management principles, management function, level, decision type, problem structure, responsibility accounting, and behavioral considerations The chapter investigated the impact of each factor on the design of the management reporting system.

Key Terms

ad hoc reports (405)
alphabetic codes (385)
alphanumeric codes (385)
authority (397)
block code (384)
budget (406)
budget master file (389)
chart of accounts (384)
cost center (408)
data mining (405)
data warehouse (405)
decision-making process (404)
discovery model (405)
formalization of tasks (395)
general ledger change report (393)
general ledger history file (388)
general ledger master file (388)
goal congruence (409)
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tactical planning decisions (400)
unstructured problem (402)
variance (400)
verification model (405)

Review Questions

1. What are some of the more common uses of data codes in AIS?
2. Compare and contrast the relative advantages and disadvantages of sequential, block, group, alphabetic, and mnemonic codes.
3. What information is contained in a journal voucher?
4. How are journal vouchers used as a control mechanism?
5. What information is contained in the general ledger master file?
6. What is the purpose of the general ledger history file?
7. What is the purpose of a responsibility center file?
8. List the primary users of the FRS and discuss their information needs.
9. What are the 11 steps, in order, of the financial reporting process?
10. What assumption is made regarding the external users of financial statements?
11. When are adjusting entries made to the worksheet and what is their purpose? When are the corresponding voucher entries made?
12. What are the purposes of an audit trail? What is meant by a defective audit trail? How can a defective audit trail be prevented?

13. What tasks should the general ledger clerk not be allowed to do?
14. What are two operational reports produced by the FRS that provide proof to the accuracy of the process?
15. Explain which of the four potential exposures in the FRS may be controlled better by a close examination of the journal voucher listing.
16. Explain how the formalization of tasks promotes internal control.
17. Explain why it is important that both responsibility and authority are appropriately assigned to employees.
18. Distinguish between narrow and wide span of control. Give an example of tasks appropriate to each type.
19. How does management by exception help to alleviate information overload by a manager?
20. Identify instances for which feedback becomes useless in helping to control activities.
21. Contrast the four decision types—strategic planning, tactical planning, management control, and operational control—by the five decision characteristics—time frame, scope, level of details, recurrence, and certainty.
22. What are the three elements that distinguish structured and unstructured problems? Give an example of each type of problem. Which type of problem is more suitable to a transaction processing system?
23. What management levels are more likely to deal with unstructured problems? With structured problems? Why?
24. What are two objectives that enable reports to be considered useful?
25. List and define the seven report attributes.
26. What is responsibility accounting?
27. What are the two phases of responsibility accounting?
28. What are the three most common forms of responsibility centers?
29. What is goal congruence?
30. What is data mining?
31. What is a data warehouse?
32. What is information overload?
33. Explain some reporting techniques that may cause dysfunctional behavior by a manager.
34. Explain how ad hoc reports have allowed managers to make more timely and better-quality decisions. Give an example.
35. Explain how exception reporting would be invaluable to the manager of a credit department.
36. What types of variances are found on cost center reports? Explain what each variance is measuring and why this information is important.
37. Distinguish between a profit center and an investment center. Draw a diagram illustrating the relationship between cost, profit, and investment centers.

Discussion Questions

1. Discuss some of the problems associated with general ledger systems that do not have data coding schemes.
2. For each of the following items, indicate whether a sequential, block, group, alphabetic, or mnemonic code would be most appropriate (you may list multiple methods; give an example and explain why each method is appropriate):
   a. state codes
   b. check number
   c. chart of accounts
   d. inventory item number
   e. bin number (inventory warehouse location)
   f. sales order number
   g. vendor code
   h. invoice number
   i. customer number

3. Discuss any separation of duties necessary to control against unauthorized entries to the general ledger. What other control procedures regarding the general ledger should be employed?
4. Discuss the various sources of data for the FRS output and how these data are processed into information (output) for the different external users.
5. Explain how erroneous journal vouchers may lead to litigation and significant financial losses for a firm.
6. Ultimately, is the purpose of an audit trail to follow a transaction from its input through its processing and finally to the financial statements or vice versa? Explain your answer.
7. Discuss the benefits that may be realized in switching from a computerized batch processing system to a direct access storage system. Also, discuss any additional control implications.
8. Controls are only as good as the predetermined standard on which they are based. Discuss the preceding comment and give an example.
9. If management control and strategic planning decisions do not receive a high level of support from traditional information systems, then how do they get the support?
10. In terms of decision-making capabilities, which type of report do you think is generally more important—scheduled reports or on-demand reports? Explain your answer and give an example of each type of report.
11. Scheduled reports may contain some information that is relevant to some decisions and irrelevant to other decisions. Why are some scheduled reports designed this way, rather than multiple reports being generated for various decision-making purposes?
12. Sometimes a trade-off must be made between information accuracy and timeliness. Give an example where it is imperative to make an estimate now, rather than wait a couple of weeks for an exact number.
13. Figure 8-13 illustrates both upward and downward flows of information. What are the downward flows and their purpose? What about the upward flows? Are the downward and upward flows related?
14. Distinguish between the verification model and the discovery model approaches to data mining.
15. Explain how a data warehouse database is fundamentally different from a transaction processing database.
16. Why are cost centers considered to be more appropriate than profit centers for production departments?
17. Explain how a production quota used to evaluate a supervisor can adversely affect quality control, material usage efficiency, and labor relations.
18. Explain and give an example as to how a manager can manipulate the return on investment figure in the short run. Why are these manipulations bad for the company in the long run? Suggest some alternative performance evaluation and compensation schemes.
19. Comment on the following statement: "More information is always preferred to less; you can never have too much information."

Multiple-Choice Questions

1. Sequential access means that
   a. data are stored on magnetic tape.
   b. the address of the location of data is found through the use of either an algorithm or an index.
   c. to read any record on the file, all of the preceding records must first be read.
   d. each record can be accessed in the same amount of time.
2. A chart of accounts would best be coded using a(n) _____ coding scheme.
   a. alphabetic
   b. mnemonic

c. block
d. sequential

3. Which of the following statements is NOT true?
   a. Sorting records that are coded alphabetically tends to be more difficult for users than sorting numeric sequences.
   b. Mnemonic coding requires the user to memorize codes.
   c. Sequential codes carry no information content beyond their order in the sequence.
   d. Mnemonic codes are limited in their ability to represent items within a class.
4. Which file has as its primary purpose to present comparative financial reports on a historic basis?
   a. journal voucher history file
   b. budget master file
   c. responsibility file
   d. general ledger history file
5. Which of the following statements is true?
   a. Journal vouchers detailing transaction activity flow from various operational departments into the GLS, where they are independently reconciled and posted to the journal voucher history file.
   b. Journal vouchers summarizing transaction activity flow from the accounting department into the GLS, where they are independently reconciled and posted to the general ledger accounts.
   c. Journal vouchers summarizing transaction activity flow from various operational departments into the GLS, where they are independently reconciled and posted to the general ledger accounts.
   d. Journal vouchers summarizing transaction activity flow from various operational departments into the GLS, where they are independently reconciled and posted to the journal voucher history file.
6. Which of the following statements best describes a computer-based GL/FRS?
   a. Most firms derive little additional benefit from a real-time FRS.
   b. Batch processing is typically not appropriate for transaction processing of GLS.
   c. The sequential file approach is an inefficient use of technology.
   d. A batch system with direct access files recreates the entire database each time the file is updated.
7. A coding scheme in the form of acronyms and other combinations that convey meaning is a(n)
   a. sequential code.
   b. block code.
   c. alphabetic code.
   d. mnemonic code.
8. Which of the following is NOT a potential exposure of the FRS?
   a. a defective audit trail
   b. general ledger accounts that are out of balance with subsidiary accounts
   c. unauthorized access to the check register
   d. unauthorized access to the general ledger
9. Which task should the general ledger perform?
   a. update the general ledger
   b. prepare journal vouchers
   c. have custody of physical assets
   d. have record-keeping responsibility for special journals of subsidiary ledgers
10. The Ozment corporation uses a performance reporting system that shows one line of data for each subordinate who reports to a supervisor. The data presented show the actual costs incurred during the period, the budgeted costs, and all variances from budget for that subordinate's department. The name of this system of reporting is
    a. contribution accounting.
    b. responsibility accounting.
    c. flexible budgeting.
    d. program budgeting.
    e. cost-benefit accounting.
11. Which of the following is not a characteristic of the strategic planning process?
    a. emphasis on both the short and long run
    b. analysis of external economic factors

c. review of the attributes and behavior of the organization's competition
d. analysis and review of departmental process
e. analysis of consumer demand

12. The following are all output reports of the financial reporting system, EXCEPT
a. variance analysis report.
b. statement of cash flows.
c. tax return.
d. comparative balance sheet.

13. Which of the following budgeting processes is LEAST likely to motivate managers toward organizational goals?
a. setting budget targets at attainable levels
b. participation by subordinates in the budgetary process
c. use of management by exception
d. holding subordinates accountable for the items they control
e. having top management set budget levels

14. Which of the following would normally be considered in a strategic plan?
a. setting a target of 12 percent return on sales
b. maintaining the image of the company as the industry leader
c. setting a market price per share of stock outstanding
d. distributing monthly reports for departmental variance analysis
e. tightening credit terms for customers to 2/10, n/30

15. At what level of management is the long-range planning function most important?
a. at top management levels
b. at middle management levels
c. at lower management levels
d. for staff functions
e. for line functions

16. Which of the following is the basic purpose of a responsibility accounting?
a. variance analysis
b. motivation
c. authority
d. budgeting
e. pricing

17. Which statement below best describes a profit center?
a. The authority to make decisions affecting the major determinants of profit, including the power to choose its markets and sources of supply.
b. The authority to make decisions affecting the major determinants of profit, including the power to choose its markets, sources of supply, and significant control over the amount of invested capital.
c. The authority to make decisions over the most significant costs of operations, including the power to choose the sources of supply.
d. The authority to provide specialized support to other units within the organization.
e. The responsibility for combining the raw materials, direct labor, and other factors of production into a final product.

18. Which statement below best describes an investment center?
a. The authority to make decisions affecting the major determinants of profit, including the power to choose its markets and sources of supply.
b. The authority to make decisions affecting the major determinants of profit, including the power to choose its markets and sources of supply, and significant control over the amount of invested capital.
c. The authority to make decisions over the most significant costs of operations, including the power to choose the sources of supply.
d. The authority to provide specialized support to other units within the organization.
e. The responsibility for developing markets for and selling of the output of the organization.

Problems

1. General Ledger System Overview

Draw a diagram depicting the relationship between the general ledger master file, control accounts, subsidiary files, and financial statements.

2. Financial Reporting Process

The following contains the various steps of the financial reporting process. Place these steps in the proper order and indicate whether each step is a function of the TPS, GLS, or FRS.

- Record transaction in special journal
- Make adjusting entries
- Capture the transaction
- Prepare the post-closing trial balance
- Prepare the adjusted trial balance
- Prepare the financial statements
- Journalize and post the adjusting entries
- Post to the subsidiary ledger
- Post to the general ledger
- Journalize and post the closing entries
- Prepare the unadjusted trial balance

3. Coding Scheme

Devise a coding scheme using block and sequential codes for the following chart of accounts for Jensen Camera Distributors.

Cash
Accounts Receivable
Office Supplies Inventory
Prepaid Insurance
Inventory
Investments in Marketable Securities
Delivery Truck
Accumulated Depreciation—Delivery Truck
Equipment
Accumulated Depreciation—Equipment
Furniture and Fixtures
Accumulated Depreciation—Furniture and Fixtures
Building
Accumulated Depreciation—Building
Land
Accounts Payable
Wages Payable
Taxes Payable
Notes Payable
Bonds Payable
Common Stock
Paid-In Capital in Excess of Par
Treasury Stock
Retained Earnings
Sales
Sales Returns and Allowances
Dividend Income
Cost of Goods Sold
Wages Expense
Utility Expense
Office Supplies Expense
Insurance Expense
Depreciation Expense
Advertising Expense
Fuel Expense
Interest Expense

4. Coding Scheme

Devise a coding scheme for the warehouse layout on the next page. Be sure to use an appropriate coding scheme that allows the inventory to be located efficiently from the picking list.

5. Internal Control

Leslie Epstein, an employee of Bormack Manufacturing Company, prepares journal vouchers for general ledger entries. Due to the large number of voided journal vouchers caused by errors, the journal vouchers are not prenumbered by the printer; rather, Leslie numbers them as she prepares each journal voucher. She does, however, keep a log of all journal vouchers written so that she does not assign the same number to two journal vouchers. Biweekly, Leslie posts the journal vouchers to

Problem 4:
Coding Scheme

WAREHOUSE LAYOUT

Three warehouse locations—Warehouses 1, 2, and 3
Each warehouse is organized by aisles.

Aisle A

Aisle B

Aisle C

Aisle D

Aisle E

WAREHOUSE LAYOUT—(CONT.)

Each aisle is separated into a right and left side, with 7 shelves of goods and 17 partitions, with each storage area called a "bin."

7																
6																
5																
4																
3																
2																
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

the general ledger and any necessary subsidiary accounts. Bimonthly, she reconciles the subsidiary accounts to their control accounts in the general ledger and makes sure the general ledger accounts balance.

Required:
Discuss any potential control weaknesses and problems in this scenario.

6. Database GL System

Crystal Corporation processes its journal vouchers using batch procedures similar to the process outlined in Figure 8-5. To improve customer satisfaction, the sales system is going to be converted to a real-time system. Redraw Figure 8-5 to reflect this change in the financial reporting process.

7. Database GL System

The top management team at Olympia, Inc., wishes to have real-time access to the general ledger. Currently the general ledger is updated nightly via a batch processing system, similar to Figure 8-5 in the text. Adjust Figure 8-5 to accommodate this request by top management, assuming that the nightly updates to the general ledger are sufficient.

8. Internal Control

Expand Figure 8-6 to incorporate the journal voucher listing and general ledger change report as control mechanisms. Also discuss the specific controls they impose on the system.

9. Organizational Chart

Prepare an organizational chart for your university. (Your campus phone directory catalog may be helpful.)

10. Decision Level

Classify the following decisions as being characteristic of strategic planning, tactical planning, managerial control, or operational control.

- Determining the mix of products to manufacture this year
- Examining whether the number of defective goods manufactured is within a certain range
- Expanding a product line overseas
- Determining the best distribution route
- Examining whether the cost of raw materials is within a certain range
- Examining whether personnel development cost is rising
- Employing more automated manufacturing this year
- Examining whether the amount of scrap material is acceptable
- Building a new plant facility
- Examining whether employees' attitudes are improving
- Examining whether production levels are within a predicted range
- Making purchasing arrangements with a new supplier
- Increasing production capabilities this year by purchasing a more efficient piece of machinery
- Closing a plant

11. Report Categorization

Classify the following reports as being either scheduled or on-demand reports.

- Cash disbursements listing
- Overtime report
- Customer account history
- Inventory stock-out report
- Accounts receivable aging list
- Duplicate paycheck report
- Cash receipts listing
- Machine maintenance report
- Vendor delivery record report
- Journal voucher listing
- Investment center report
- Maintenance cost overrun report

12. CMA Adapted—Organizational Structure and Span of Control

Relco Industries recently purchased Arbeck, Inc., a manufacturer of electrical components that the construction industry uses. Roland Ford has been appointed as chief financial officer of Arbeck, and the president of Relco, Martha Sanderson, has asked him to prepare an organizational chart for his department at Arbeck. The chart that Ford has prepared is shown on the following page.

Ford believes that the treasurer's department should include the following employees: assistant treasurer; manager of accounts receivable and four subordinates; manager of investments and three subordinates; and manager of stockholder relations and two subordinates—a total of 13 employees besides the treasurer. The controller's department should consist of an assistant controller; a manager of general accounting and four subordinates; a manager of fixed asset control and three subordinates; and a manager of cost accounting with four subordinates—a total of 15 employees besides the controller.

When Ford presented his plans (Chart A) to Sanderson, she told him that she believed the organizational structure was too tall and showed him, by drawing Chart B, how she had envisioned his department at Arbeck. There would be a reduction in personnel, and 10 employees would report directly to the treasurer, while 13 employees would report directly to the controller.

Ford replied that he believed the span of control was too broad for both the treasurer and the controller and would create problems.

Problem 12:
Organizational Structure and Span of Control

Chart A

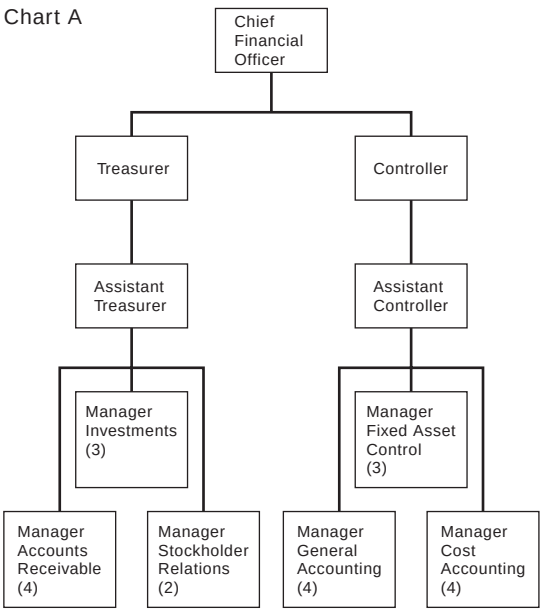
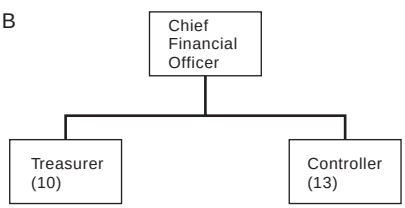


Chart B



Sanderson said that she preferred a flat organizational structure, as she believed that its benefits outweighed the problems that could arise from too great a span of control.

Required:

a. For the organizational structure chief financial officer Ford proposed, describe the
   1. advantages and disadvantages of that structure.
   2. impact of the resulting span of control.
   3. effect on employee behavior.

b. For the flat organizational structure Relco president Sanderson proposed, describe the
   1. advantages and disadvantages of that structure.
   2. impact of the resulting span of control.
   3. effect on employee behavior.

c. When determining the appropriate span of control for Arbeck, Inc., discuss the factors that Ford and Sanderson should consider.

13. CMA Adapted—Organizational Structure and Span of Control

Barnes Corporation recently purchased Parker Machine Company, a manufacturer of sophisticated parts for the aircraft industry. Donald Jenkins has been appointed vice president of production at Parker, and Beverly Kiner, president at Barnes, has asked Jenkins to prepare an organizational chart for his department at Parker. The chart that Jenkins prepared is presented in Chart A on the following page.

When Jenkins presented his chart to Kiner, she told him that she preferred a flat organizational structure and showed him how she envisioned his department at Parker by drawing the chart presented in Chart B. Kiner's chart reduced a layer of management personnel and increased the number of people reporting directly to the manager of planning and control and the manager of manufacturing.

Jenkins expressed concern about the broad span of control depicted in Kiner's chart, as he believed this might cause problems for the two managers. Kiner said that she believed that the benefits of a flat organizational structure outweighed the problems that could arise from too great a span of control.

Required:

a. For the organizational structure Jenkins proposed, describe the
   1. advantages and disadvantages of that structure.
   2. impact of the resulting span of control.
   3. effect of the organizational structure on employee behavior.

b. For the flat organizational structure Kiner proposed, describe the
   1. advantages and disadvantages of that organizational structure.

Problem 13:
Organizational Structure and Span of Control

Chart A

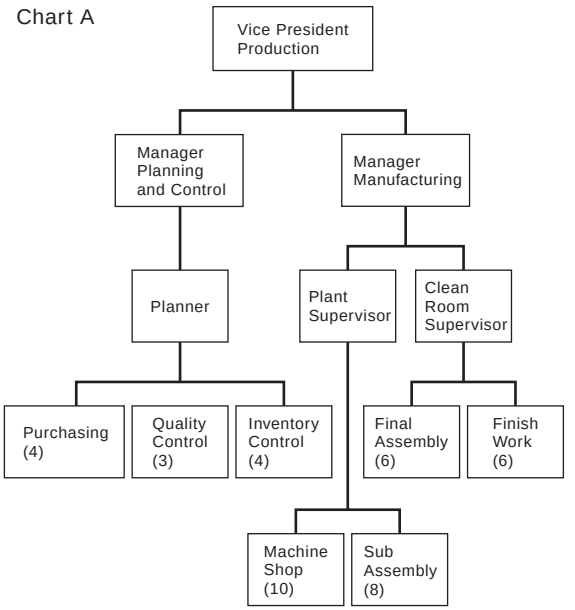
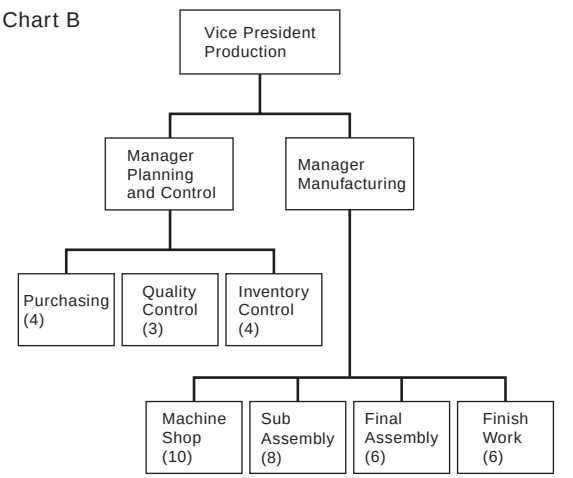


Chart B



2. impact of the resulting span of control.
3. effect of the organizational structure on employee behavior.

c. When determining the appropriate span of control for Parker Machine Company, discuss the factors that Jenkins and Kiner should consider.

14. CMA Adapted—Organizational Structure

While attending night school to earn a degree in computer engineering, Stan Wilson worked for Morlot Container Company (MCC) as an assembly line supervisor. MCC was located near Wilson's hometown and had been a prominent employer in the area for many years. MCC's main product was milk cartons that were distributed throughout the Midwest for milk processing plants. The technology at MCC was stable, and the assembly lines were monitored closely. MCC employed a standard cost system because cost control was considered important. The employees who manned the assembly lines were generally unskilled workers who had been with the company for many years; the majority of these workers belonged to the local union.

Wilson was glad he was nearly finished with school because he found the work at MCC to be repetitive and boring, even as a supervisor. The supervisors were monitored almost as closely as the line workers, and standard policies and procedures existed that applied to most situations. Most of MCC's management had been with the company for several years and believed in clear lines of authority and well-defined responsibilities. Whereas he knew he had performed well against the company's standards, Wilson also knew that there probably would be little opportunity for advancement or significant compensation increases.

After receiving his degree, Wilson went to work in the research and development department of Alden Computers, a five-year-old company specializing in educational computer systems for elementary schools. The company was customer-oriented and willing to tailor its computer systems to the needs of the end users. The customization of its systems, combined with continual changes in technology, resulted in a job-shop orientation in the company's production facility. The employees who assembled Alden's systems were skilled technicians who worked closely with the engineering staff.

Wilson was gratified by the respect and authority his newly acquired knowledge and

skills afforded him at Alden. If changes were required in his area of expertise, Wilson often made recommendations about how the work should proceed and was involved in decisions on new product development. The company's management team frequently "rolled up its sleeves" and worked alongside the technicians when production problems arose; the lines of authority were sometimes difficult to distinguish, and decisions were often made by the expert on the spot. Wilson believed that his skills were appreciated at Alden, and he would be fairly compensated for his professional expertise.

Required:

a. Morlot Container Company and Alden Computers represent two different types of organizational structures. In terms of each of the following points, explain how MCC differs from Alden Computers.
   1. General organizational structure and climate
   2. Bases of authority
   3. Evaluation criteria
   4. Bases of compensation

b. Both structures have potential benefits or can create problems. Discuss the features of the structure used by
   1. Alden Computers that might benefit MCC.
   2. Alden that might create problems for Alden.
   3. MCC that might benefit Alden Computers.

15. CMA Adapted—Performance Measures

The Star Paper Division of Royal Industries is located near Los Angeles. A major expansion of the division's only plant was completed in April 2007. The expansion consisted of an addition to the existing building, additions to the production-line machinery, and the replacement of obsolete and fully depreciated equipment that was no longer efficient or cost effective.

On May 1, 2007, George Harris became manager of Star. Harris had a meeting with Marie Fortner, vice president of operations for Royal, who explained to Harris that the company measured the performance of divisions and division managers on the basis of return on gross assets (ROA). When Harris asked if other measures were used in conjunction with ROA, Fortner replied, "Royal's top management prefers to use a single performance measure. Star should do well this year now that it has expanded and replaced all of that old equipment. You should have no problem exceeding the division's historical rate. I'll check with you at the end of each quarter to see how you are doing."

Fortner called Harris after the first quarter results were completed because Star's ROA was considerably below the historical rate for the division. Harris told Fortner that he did not believe that ROA was a valid performance measure for Star. Fortner indicated that she would discuss this with others at headquarters and get back to Harris. However, there was no further discussion of the use of ROA, only reports on divisional performance at the end of the second and third quarters. Now that the fiscal year has ended, Harris has received the memorandum shown on the next page.

Harris is looking forward to meeting with Fortner as he plans to pursue the discussion about the appropriateness of ROA as a performance measure for Star. While the ROA for Star is below historical levels, the division's profits for the year are higher than at any previous time. Harris is going to recommend that ROA be replaced with multiple criteria for evaluating performance—namely, dollar profit, receivable turnover, and inventory turnover.

Required:

a. Identify general criteria that should be used in selecting performance measures to evaluate operating managers.

b. Describe the probable cause of the decline in the Star Paper Division's return on gross assets during the fiscal year ended April 30, 2007.

Problem 15: Performance Measures

TO: George Harris, Star Paper Division
FROM: Marie Fortner, Royal Industries
SUBJECT: Divisional Performance

The operating results for the fourth quarter and for our fiscal year ended on April 30 are now complete. Your fourth quarter return on gross assets was only 9 percent, resulting in a return for the year of slightly under 11 percent. I recall discussing your low return after the first quarter and reminding you after the second and third quarters that this level of return is not considered adequate for the Star Paper Division.

The return on gross assets at Star has ranged from 15 to 18 percent for the past five years. An 11 percent return may be acceptable at some of Royal's other divisions, but not at a proven winner like Star, especially in light of your recently improved facility. Please arrange to meet with me in the near future to discuss ways to restore Star's return on gross assets to its former level.

c. On the basis of the relationship between Fortner and Harris, as well as the memorandum from Fortner, discuss apparent weaknesses in the performance evaluation process at Royal Industries.
d. Discuss whether the multiple performance evaluation criteria that Harris suggested would be appropriate for the evaluation of the Star Paper Division.

16. CMA Adapted—Responsibility Accounting

Family Resorts, Inc., is a holding company for several vacation hotels in the northeastern and mid-Atlantic states. The firm originally purchased several old inns, restored the buildings, and upgraded the recreational facilities. Vacationing families have been well pleased with the inns because many services are provided that accommodate children and afford parents time for themselves. Since the completion of the restoration 10 years ago, the company has been profitable.

Family Resorts has just concluded its annual meeting of regional and district managers. This meeting is held each November to review the results of the previous season and to help the managers prepare for the upcoming year. Before the meeting, the managers submitted proposed budgets for their districts or regions as appropriate. These budgets are reviewed and consolidated into an annual operating budget for the entire company. The 2008 budget has been presented at the meeting, and the managers accepted it.

To evaluate the performance of its managers, Family Resorts uses responsibility accounting. Therefore, the preparation of the budget is given close attention at headquarters. If major changes need to be made to the budgets that the managers submitted, all affected parties are consulted before the changes are incorporated. The following pages present two reports from the budget booklet that all managers received at the meeting.

Required:

a. Responsibility accounting has been used effectively by many companies, both large and small.
   1. Define responsibility accounting.
   2. Discuss the benefits that accrue to a company using responsibility accounting.
   3. Describe the advantages of responsibility accounting for the managers of a firm.
b. The regional and district managers accepted Family Resort's budget. Based on the facts presented, evaluate the budget process Family Resorts employs by addressing the following:
   1. What features of the budget presentation shown are likely to make the budget attractive to managers?
   2. What recommendations, if any, could be made to the budget preparers to improve the budget process? Explain your answer.

Problem 16:
Responsibility Accounting

FAMILY RESORTS, INC.
RESPONSIBILITY SUMMARY
($000 omitted)

Reporting Unit: Family Resorts		Reporting Unit: Maine District	
Responsible Person: President		Responsible Person: District Manager	
Mid-Atlantic Region	$ 605	Harbor Inn	$ 80
New England Region	365	Camden Country Inn	60
Unallocated costs	(160)	Unallocated costs	(35)
Income before taxes	$ 810	Total contribution	$ 105
Reporting Unit: New England Region		Reporting Unit: Harbor Inn	
Responsible Person: Regional Manager		Responsible Person: Innkeeper	
Vermont	$ 200	Revenue	$ 600
New Hampshire	140	Controllable costs	(455)
Maine	105	Allocated costs	(65)
Unallocated costs	(80)		
Total contribution	$ 365	Total contribution	$ 80

17. Management by Exception

A variety of quantitative measures are used to evaluate employee performance, including standard costs, financial ratios, human resource forecasts, and operating budgets.

Required:

a. Discuss the following aspects of a standard cost system.
   1. Discuss the characteristics that should be present to encourage positive employee motivation.
   2. Discuss how the system should be implemented to positively motivate employees.

b. The use of variance analysis often results in management by exception.
   1. Explain the meaning of management by exception.
   2. Discuss the behavioral implications of management by exception.

c. Explain how employee behavior could be adversely affected when actual-to-budget comparisons are used as the basis for performance evaluation.

18. CMA Adapted—Variance Analysis

Engineers Education Association (EEA) is a volunteer membership organization providing educational and professional services to its members. The professional staff is organized into four divisions with a total of 14 operating departments.

EEA adopted an annual budget program many years ago as a means for planning and controlling activities. Each department of EEA prepares an annual budget in consultation with its respective volunteer committee(s). After a series of reviews by both the professional staff and the volunteer structure, the budget is adopted. The professional staff is expected to comply with the budget in conducting its activities and operations.

The EEA's accounting department generates monthly income statements that present actual performance as compared to budget for each EEA department. The November 2007 statement for the publications department is reproduced on page 427. Accompanying the report this month was a memorandum from EEA's president, Daniel Riley, which is also presented on the page 427.

Problem 16: Responsibility Accounting

FAMILY RESORTS, INC.
CONDENSED OPERATING BUDGET—MAINE DISTRICT
FOR THE YEAR ENDING DECEMBER 31, 2008
($000 OMITTED)

	Region			New England District				Maine District Inns		
	Family Resorts	Mid-Atlantic	New England	Not Allocated[1]	Vermont	New Hampshire	Maine	Not Allocated[2]	Harbor	Camden Country
Net sales	$7,900	$4,200	$3,700		$1,400	$1,200	$1,100		$600	$500
Cost of sales	4,530	2,310	2,220		840	720	660		360	300
Gross margin	$3,370	$1,890	$1,480		$ 560	$ 480	$ 440		$240	$200
Controllable expenses:										
Supervisory	$ 240	$ 130	$ 110		$ 35	$ 30	$ 45	$ 10	$20	$ 15
Training	160	80	80		30	25	25		15	10
Advertising	500	280	220	$ 50	55	60	55	15	20	20
Repairs and maintenance	480	225	255	___	90	85	80	___	40	40
Total controllable expenses	$1,380	$ 715	$ 665	$ 50	$ 210	$ 200	$ 205	$ 25	$ 95	$ 85
Controllable contribution	$1,990	$1,175	$ 815	$(50)	$ 350	$ 280	$ 235	$(25)	$145	$115
Expenses controlled by others:										
Depreciation	$ 520	$ 300	$ 220	$ 30	70	$ 60	$ 60	$ 10	$ 30	$ 20
Property taxes	200	120	80		30	30	20		10	10
Insurance	300	150	150	___	50	50	50	___	25	25
Total expenses controlled by others	$1,020	$ 570	$ 450	$ 30	$ 150	$ 140	$ 130	$ 10	$ 65	$ 55
Total contribution	$ 970	$ 605	$ 365	$(80)	$ 200	$ 140	$ 105	$(35)	$ 80	$ 60
Unallocated costs[3]	160									
Income before taxes	$ 810									

[1]Unallocated expenses include a regional advertising campaign and equipment used by the regional manager.
[2]Unallocated expenses include a portion of the district manager's salary, district promotion costs, and a district manager's car.
[3]Unallocated costs include taxes on undeveloped real estate, headquarters' expense, legal fees, and audit fees.

Problem 18:
Variance Analysis

EEA—PUBLICATIONS DEPARTMENT
INCOME STATEMENT
FOR THE MONTH ENDED NOVEMBER 30, 2007
($000 OMITTED)

			Variance	
	Budget	Actual	Dollar	Percent
Revenues				
Subscriptions	$ 9.5	$ 8.4	$ (1.1)	(11.6)
Library subscriptions	3.4	3.3	(.1)	(2.9)
Research publications	13.6	15.2	1.6	11.8
Advertising	64.0	50.1	(13.9)	(21.7)
List rentals	15.2	13.9	(1.3)	(8.6)
Total revenue	$105.7	$90.9	$(14.8)	(14.0)
Operating expenses				
Salaries and wages	$ 24.0	$ 22.0	$ 2.0	8.3
Employee benefits	4.8	4.4	.4	8.3
Temporary help	0.0	1.5	(1.5)	(ERR)
Outside services	1.0	2.5	(1.5)	(150.0)
Education and training	0.5	0.0	.5	100.0
Promotion and advertising	7.5	4.0	3.5	46.6
Typesetting	8.0	12.0	(4.0)	(50.0)
Production printing	46.0	40.4	5.6	12.2
Postage, freight, and handling	12.0	11.0	1.0	8.3
Supplies	1.0	.8	.2	20.0
Total expenses	$104.8	$ 98.6	$ 6.2	5.9
Contribution	$ .9	$ (7.7)	$ (8.6)	(955.6)

Marie Paige, publications manager, was having lunch with Jon Franklin, continuing education manager, when the following conversation about Riley's memorandum took place.

Paige: The volunteers must be giving Riley some static—the memo doesn't sound like him.

Franklin: I think you're right. One of EEA's problems is that membership is down.

Problem 18:
Variance Analysis

December 12, 2007

TO: Department Managers
FROM: Daniel Riley, President
SUBJECT: Performance Analysis

The November 2007 operating results for your department are attached. The results for the entire organization and most departments are unfavorable as compared to budget. In fact, our results for the first three months of this fiscal year are substantially below budget.

I want to determine our problems as quickly as possible. Prepare an explanation of all unfavorable (negative) variances by line item that exceed budget by 5 percent or more, and present a plan to eliminate such variances in the future. Remember that you played a key role in the development of the budget, and you have a responsibility to achieve the budget figures. These negative variances must be eliminated if we are to get back on steam.

Please submit your analysis to your divisional director and accounting by noon, Monday, December 17. Divisional directors will meet at 10 a.m. on Tuesday, December 18, to review these analyses.

Paige: I heard that both growth and retention are bad. This is confirmed by my results. A set percentage of the membership dues of each member is assigned to us each month for the magazine subscription. This amount is down 12 percent. I have no control over this number because only members get the magazine.

Franklin: I wonder if the results are really as bad as they look. For instance, accounting has divided all of the annual budget figures by 12 to derive the monthly figures. This is okay for some things but not for most. What about you?

Paige: I agree. I don't know why they do that when we spend so much time up front developing the annual budget. I know what Riley

is attempting, but I don't think he is going to get the results he wants. I know he wants to eliminate the negative variances, but some positive variances are really not favorable! We should be analyzing all significant variances—positive and negative.

Franklin: What are you going to do—analyze just the negatives? Should we do anything before we prepare our reports?

Required:

a. The monthly income statements that EEA's accounting department prepares for each department of EEA are a form of communication.
   1. Explain why the departmental income statements are considered a form of communication.
   2. In terms of the format of the income statement presented for the publications department, evaluate EEA's departmental income statement as a communication device.

b. Paige stated that all significant variances should be analyzed because some positive variances are not favorable. Discuss why EEA's departments should be analyzing all significant variances, both positive (favorable) and negative (unfavorable). As support for your answer, identify a positive variance from the publications department's income statement that may not be favorable to EEA's operations and explain why.

c. Recommend a course of action that Paige or Franklin could take to encourage Riley to have all significant variances reviewed.