

# General Ledger and Reporting System

## LEARNING OBJECTIVES

After studying this chapter, you should be able to:

1. Describe the activities, information needs, and key decisions made in the general ledger and reporting system, explain the general threats in the cycle, and describe the controls that can be used to mitigate those threats.
2. Explain the process for **updating the general ledger**, the threats to that process, and the controls that can be used to mitigate those threats.
3. Explain the purpose and nature of **posting adjusting entries**, the threats to that process, and the controls that can be used to mitigate those threats.
4. Explain the process of **preparing financial statements**, the threats to that process, the controls that can be used to mitigate those threats, and how IT developments such as XBRL can improve the efficiency and effectiveness of preparing financial statements.
5. Describe the process for **producing various managerial reports**, the threats to that process, and how tools like responsibility accounting and the balanced scorecard can help mitigate those threats.

### INTEGRATIVE CASE

#### Alpha Omega Electronics

Linda Spurgeon, president and CEO of Alpha Omega Electronics (AOE), is not satisfied with the reporting capabilities of AOE's new enterprise resource planning (ERP) system. Although the monthly closing process now takes less than two days, the system only provides management with timely information about the firm's financial performance. Linda wants a report that integrates financial information with operational measures about how the firm is doing. She is also concerned about how to prepare AOE to transition from U.S. Generally Accepted Accounting Principles (GAAP) to International Financial Reporting Standards (IFRS).

Linda calls a meeting with Stephanie Cromwell, AOE's chief financial officer, Elizabeth Venko, AOE's controller, and Ann Brandt, AOE's vice president of information systems, to discuss these issues. Stephanie mentions that she has been reading about something called a balanced scorecard that might provide the kind of multidimensional report Linda desires.



Ann and Elizabeth agree to research the balanced scorecard and investigate how AOE's new ERP system could be configured to produce one. Stephanie asks them to also look at how AOE could make better use of the reporting and graphing capabilities of its new ERP system. In addition, they will report back on what needs to be done to prepare for IFRS and how to use XBRL to streamline its external reporting requirements. As you read this chapter, think about how both technological and regulatory changes affect the design and operation of an organization's general ledger and reporting systems.

## Introduction

This chapter discusses the information processing operations involved in updating the general ledger and preparing reports that summarize the results of an organization's activities. As shown in Figure 18-1, the general ledger and reporting system plays a central role in a company's accounting information system. Its primary function is to collect and organize data from the following sources:

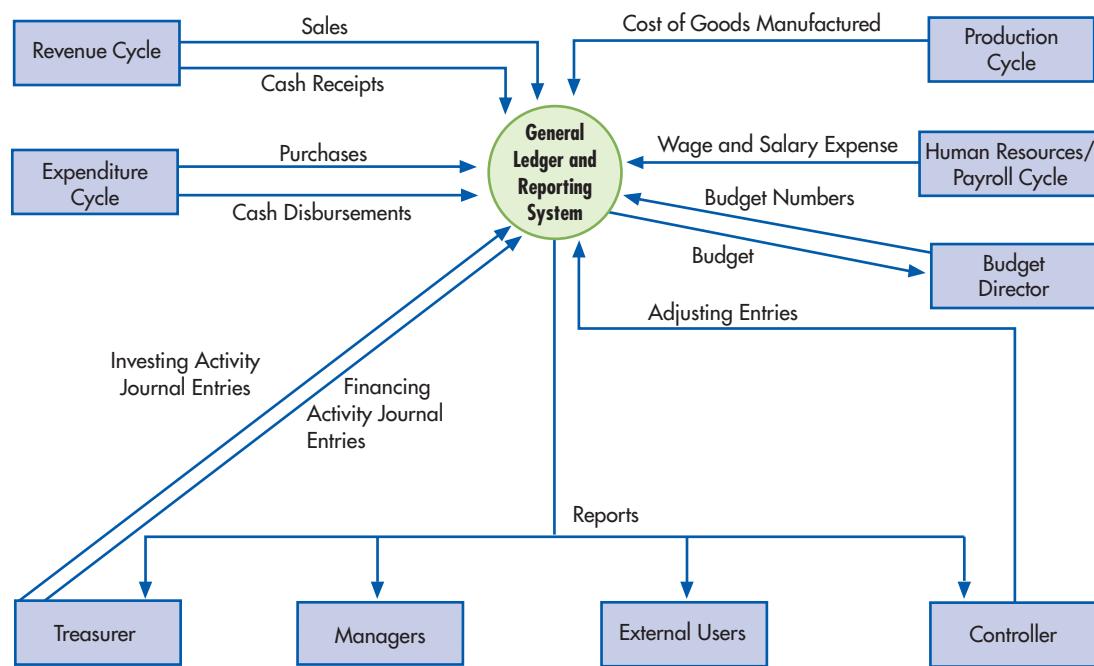
- Each of the accounting cycle subsystems described in Chapters 14 through 17 provides information about regular transactions. (Only the principal data flows from each subsystem are depicted, to keep the figure uncluttered.)
- The treasurer provides information about financing and investing activities, such as the issuance or retirement of debt and equity instruments and the purchase or sale of investment securities.
- The budget department provides budget numbers.
- The controller makes adjusting entries.

Figure 18-2 shows the basic activities performed in the general ledger and reporting cycle. The first three activities represent the basic steps in the accounting cycle, which culminate in the production of the traditional set of financial statements. The fourth activity indicates that, in addition to financial reports for external users, an organization's accounting system produces a variety of reports for internal management.

We begin by describing the design of a typical general ledger and reporting system and discuss the basic controls necessary to ensure that it provides management and various external stakeholders with reliable information. We then discuss in detail each of the basic general ledger and reporting cycle activities depicted in Figure 18-2. For each activity, we describe how the information needed to perform and manage the activity is collected, processed, and stored. We also explain the controls necessary to ensure not only the reliability of that information but also the safeguarding of the organization's resources. In addition, we discuss the impact of regulatory and technological changes, such as the proposed switch from GAAP to IFRS and the SEC's mandate to use XBRL for electronic filing, on the design and operation

**FIGURE 18-1**

Context Diagram of the General Ledger and Reporting System



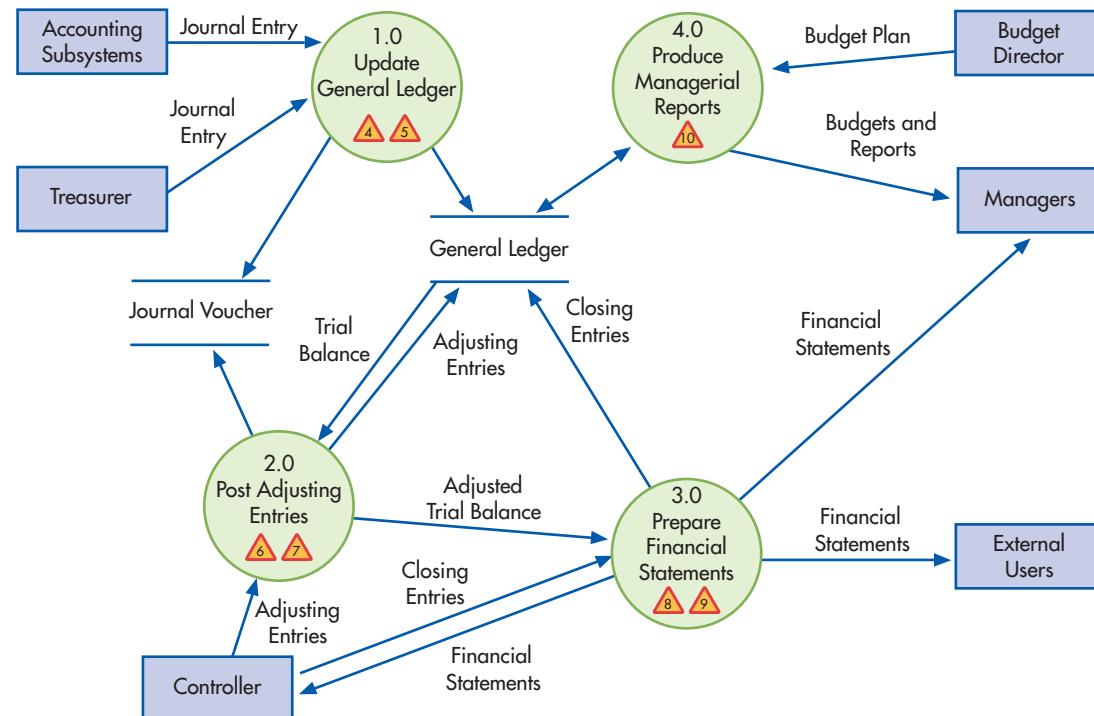
of the general ledger and reporting system. We also explore how tools such as responsibility accounting and balanced scorecards can improve the quality of information provided to managers.

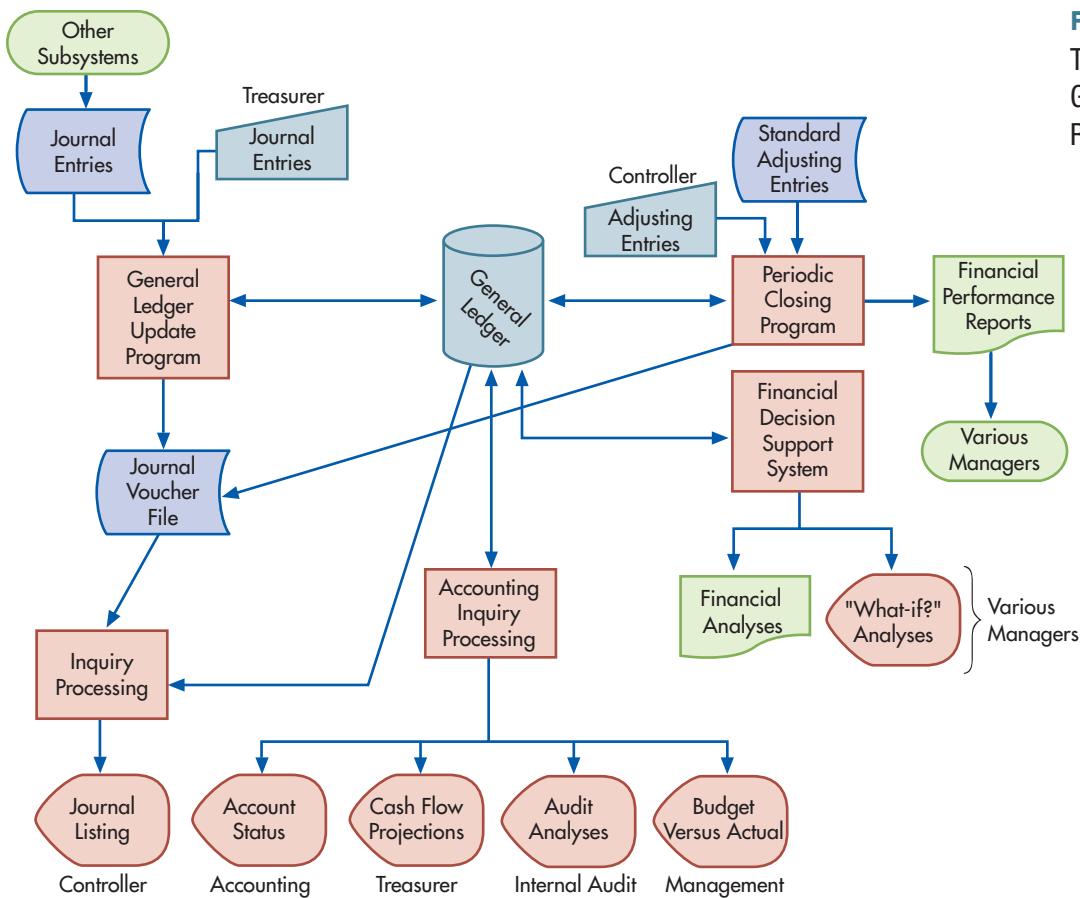
## General Ledger and Reporting System

Figure 18-3 shows the typical design of an online general ledger and reporting system.

**FIGURE 18-2**

Level 0 Data Flow Diagram of the General Ledger and Reporting Cycle (annotated to include threats)



**FIGURE 18-3**

Typical Design of Online General Ledger and Reporting System

## PROCESS

The centralized database must be organized in a manner that facilitates meeting the varied information needs of both internal and external users. Managers need timely detailed information about the results of operations in their particular area of responsibility. Investors and creditors want periodic financial statements and timely updates to help them assess the organization's performance. Various government agencies also mandate specific information requirements. To satisfy these multiple needs, the general ledger and reporting system not only produces periodic reports but also supports online inquiries.

## THREATS AND CONTROLS

Figure 18-3 shows that all general ledger and reporting cycle activities depend on the integrated database. Therefore, the first general threat listed in Table 18-1 is inaccurate or invalid general ledger data. Inaccurate general ledger data can result in misleading reports that cause managers to make erroneous decisions. Similarly, errors in financial statements provided to creditors, investors, and government agencies can cause those stakeholders to make wrong decisions. In addition, errors in financial statements and reports provided to external stakeholders can also result in fines and negative reactions from the capital markets.

One way to mitigate the threat of inaccurate or invalid general ledger data is to use the various processing integrity controls discussed in Chapter 13 to minimize the risk of data input errors when the treasurer and controller make direct journal entries (control 1.1). It is also important to restrict access to the general ledger and configure the system so that only authorized employees can make changes to master data (control 1.2). Thus, multifactor authentication should be used to restrict access to the general ledger. In addition, authorization controls (an access control matrix and compatibility tests) should also be used to limit the functions that each legitimate user may perform. For example, most managers should be given read-only access to the general ledger, as depicted at the bottom of Figure 18-3. Otherwise,

**TABLE 18-1** Threats and Controls in the General Ledger and Reporting System

Activity	Threat	Controls (First Number Refers to the Corresponding Threat)
General issues throughout entire general ledger and reporting cycle	1. Inaccurate or invalid general ledger data 2. Unauthorized disclosure of financial statement 3. Loss or destruction of data	1.1 Data processing integrity controls 1.2 Restriction of access to general ledger 1.3 Review of all changes to general ledger data 2.1 Access controls 2.2 Encryption 3.1 Backup and disaster recovery procedures
Update general ledger	4. Inaccurate updating of general ledger 5. Unauthorized journal entries	4.1 Data entry processing integrity controls 4.2 Reconciliations and control reports 4.3 Audit trail creation and review 5.1 Access controls 5.2 Reconciliations and control reports 5.3 Audit trail creation and review
Post adjusting entries	6. Inaccurate adjusting entries 7. Unauthorized adjusting entries	6.1 Data entry processing integrity controls 6.2 Spreadsheet error protection controls 6.3 Standard adjusting entries 6.4 Reconciliations and control reports 6.5 Audit trail creation and review 7.1 Access controls 7.2 Reconciliations and control reports 7.3 Audit trail creation and review
Prepare financial statements	8. Inaccurate financial statements 9. Fraudulent financial reporting	8.1 Processing integrity controls 8.2 Use of packaged software 8.3 Training and experience in applying IFRS and XBRL 8.4 Audits 9.1 Audits
Produce managerial reports	10. Poorly designed reports and graphs	10.1 Responsibility accounting 10.2 Balanced scorecard 10.3 Training on proper graph design

an unscrupulous manager can conceal theft of assets or poor performance by altering the information in the general ledger. Moreover, it is also important to carefully restrict read-only privileges to only those specific portions of the system relevant to that manager. In addition, the access control matrix should also be designed to limit the functions that can be performed at various terminals. Adjusting entries, for example, should be allowed only from terminals in the controller's office. However, because such preventive controls can never be 100% effective, Table 18-1 also indicates that an important detective control is to regularly produce a report of all changes to the general ledger and review them to verify that the database remains accurate (control 1.3).

A second general threat in the general ledger and reporting cycle is unauthorized disclosure of financial information. In particular, it is important not to prematurely release financial statements; doing so is likely to result in fines from various regulatory agencies and possible shareholder lawsuits. The best control procedure for reducing the risk of unauthorized disclosure of financial statements is to use multifactor authentication and physical security controls to restrict access to the general ledger (control 2.1) to only those employees who need such access to perform their jobs. Encrypting the database (control 2.2) provides additional protection by making the information unintelligible to anyone who succeeds in obtaining unauthorized access to the database. Encryption also prevents IT employees who do not have access to the ERP system from using operating system utilities to view sensitive information. In addition, general ledger data should be encrypted when it is transmitted over the Internet to other corporate offices, analysts, or government agencies.

A third general threat in the general ledger and reporting cycle concerns the loss or destruction of master data. The best way to mitigate the risk of this threat is to employ the backup and disaster recovery procedures (control 3.1) that were discussed in Chapter 13.

## Update General Ledger

As shown in Figure 18-2, the first activity in the general ledger system (circle 1.0) is updating the general ledger.

### PROCESS

Updating consists of posting journal entries that originate from two sources:

- 1. Accounting subsystems.** Each of the accounting subsystems described in Chapters 14 through 17 creates a journal entry to update the general ledger. In theory, the general ledger could be updated for each individual transaction. In practice, however, the various accounting subsystems usually update the general ledger by means of summary journal entries that represent the results of all transactions that occurred during a given period of time (day, week, or month). For example, the revenue cycle subsystem would generate a summary journal entry debiting accounts receivable and cash and crediting sales for all sales made during the update period. Similarly, the expenditure cycle would generate summary journal entries to record the purchase of supplies and inventories and to record cash disbursements in payment for those purchases.
- 2. Treasurer.** The treasurer's office provides information for journal entries to update the general ledger for nonroutine transactions such as the issuance or retirement of debt, the purchase or sale of investment securities, or the acquisition of treasury stock. Figure 18-4 shows an example of a typical journal entry screen for an ERP system.

Figure 18-3 shows that the individual journal entries used to update the general ledger are stored in the **journal voucher file**. The journal voucher file contains the information that would be found in the general journal in a manual accounting system: the date of the journal entry, the accounts debited and credited, and the amounts. Note, however, that the journal voucher file is a by-product of, not an input to, the posting process. As we will explain later,

**journal voucher file** - A file that stores all journal entries used to update the general ledger.

Account	Debit	Credit	Memo	Name	Department	Class	Location
Employee Advances	200.00			John J Jones			

**FIGURE 18-4**  
Example of Journal Entry Input Screen  
Source: 2010 © NetSuite Inc.

the journal voucher file forms an important part of the audit trail, providing evidence that all authorized transactions have been accurately and completely recorded.

## THREATS AND CONTROLS

Table 18-1 shows that two related threats at this stage are inaccurate and unauthorized journal entries to update the general ledger. Both can lead to poor decision making based on erroneous information in financial performance reports.

As Figure 18-3 shows, there are two sources of journal entries for updating the general ledger: summary journal entries from the other AIS cycles and direct entries made by the treasurer. The former are the output of a series of processing steps, each of which was subject to a variety of application control procedures designed to ensure accuracy and completeness, as described in the preceding four chapters. Consequently, the primary input edit control for summary journal entries from the other cycles is configuring the system to verify that the entries represent activity for the most recent time period.

Journal entries made by the treasurer, however, are original data entry. Consequently, the following types of input edit and processing controls discussed in Chapter 13 are needed to ensure they are accurate and complete (control 4.1):

1. A *validity check* to ensure that general ledger accounts exist for each account number referenced in a journal entry.
2. *Field (format) checks* to ensure that the amount field in the journal entry contains only numeric data.
3. A *zero-balance check* to verify that total debits equal total credits in a journal entry. (Figure 18-4 shows feedback from this control.)
4. A *completeness test* to ensure that all pertinent data are entered, especially the source of the journal entry.
5. *Closed-loop verification* matching account numbers with account descriptions, to ensure the correct general ledger account is accessed.
6. A *sign check* of the general ledger account balance, once updating is completed, to verify that the balance is of the appropriate nature (debit or credit).
7. Calculating *run-to-run totals* to verify the accuracy of journal voucher batch processing. (The computer calculates the new balance of the general ledger account, based on its beginning balance and the total debits and credits applied to that account, then compares that with the actual account balance in the updated general ledger. Any discrepancies indicate a processing error that must be investigated.)

Strong access controls, including multifactor authentication and compatibility tests based on access control matrices, reduce the risk of unauthorized journal entries (control 4.1). In addition to these preventive controls, Table 18-1 lists two types of detective controls that should be used to identify inaccurate and unauthorized journal entries: reconciliations and control reports (controls 4.2 and 5.2), and maintenance of an adequate audit trail (controls 4.3 and 5.3).

**RECONCILIATIONS AND CONTROL REPORTS** Reconciliations and control reports can detect whether any errors were made during the process of updating the general ledger. One form of reconciliation is the preparation of a trial balance. The **trial balance** is a report that lists the balances for all general ledger accounts (see Figure 18-5). Its name reflects the fact that if all activities have been properly recorded, the total of all debit balances in various accounts should equal the total of all credit balances; if not, a posting error has occurred.

Another important reconciliation is comparing the general ledger control account balances to the total balance in the corresponding subsidiary ledger. For example, the sum of the balances of individual customer accounts should equal the amount of the accounts receivable control account in the general ledger. If these two totals do not agree, the difference must be investigated and corrected. It is also important to examine all transactions occurring near the end of an accounting period to verify that they are recorded in the proper time period.

At the end of a fiscal period, it is also important to verify that any temporary “suspense” or “clearing” accounts have zero balances. Clearing and suspense accounts provide a means to ensure that the general ledger is always in balance. To illustrate how these types of special accounts are used, assume that one clerk is responsible for recording the release of inventory to

**trial balance** - A report listing the balances of all general ledger accounts.

Trial Balance - NetSuite (AOE)		
Trial Balance		
Account	Debit	Credit
Inventory Asset	\$1,873.75	
Long Term Notes Payable		
Uncle Ebenezer Long Term Note Payable	\$50,000.00	
Total - Long Term Notes Payable	<b>\$50,000.00</b>	
Checking	\$7,050.00	
Savings	\$30,000.00	
Petty Cash	\$200.00	
Employee Advances	\$200.00	
Machinery & Equipment		
Automobiles	\$12,000.00	
Total - Machinery & Equipment	<b>\$12,000.00</b>	
Accounts Payable	\$1,873.75	
Automobile Expense		
Gas & Oil	\$50.00	
Total - Automobile Expense	<b>\$50.00</b>	
Total	<b>\$52,073.75</b>	<b>\$52,073.75</b>

End Of This Period     As of Oct 2020     Column Debit/Credit     Find <Type then tab>     Next Prev

**FIGURE 18-5****Example Portion of Trial Balance**

Source: 2010 © NetSuite Inc.

customers and that another clerk is responsible for recording the billing of customers. (Neither clerk has custody of inventory.) The first clerk would make the following journal entry:

Unbilled shipments	xxx	
Inventory	xxx	

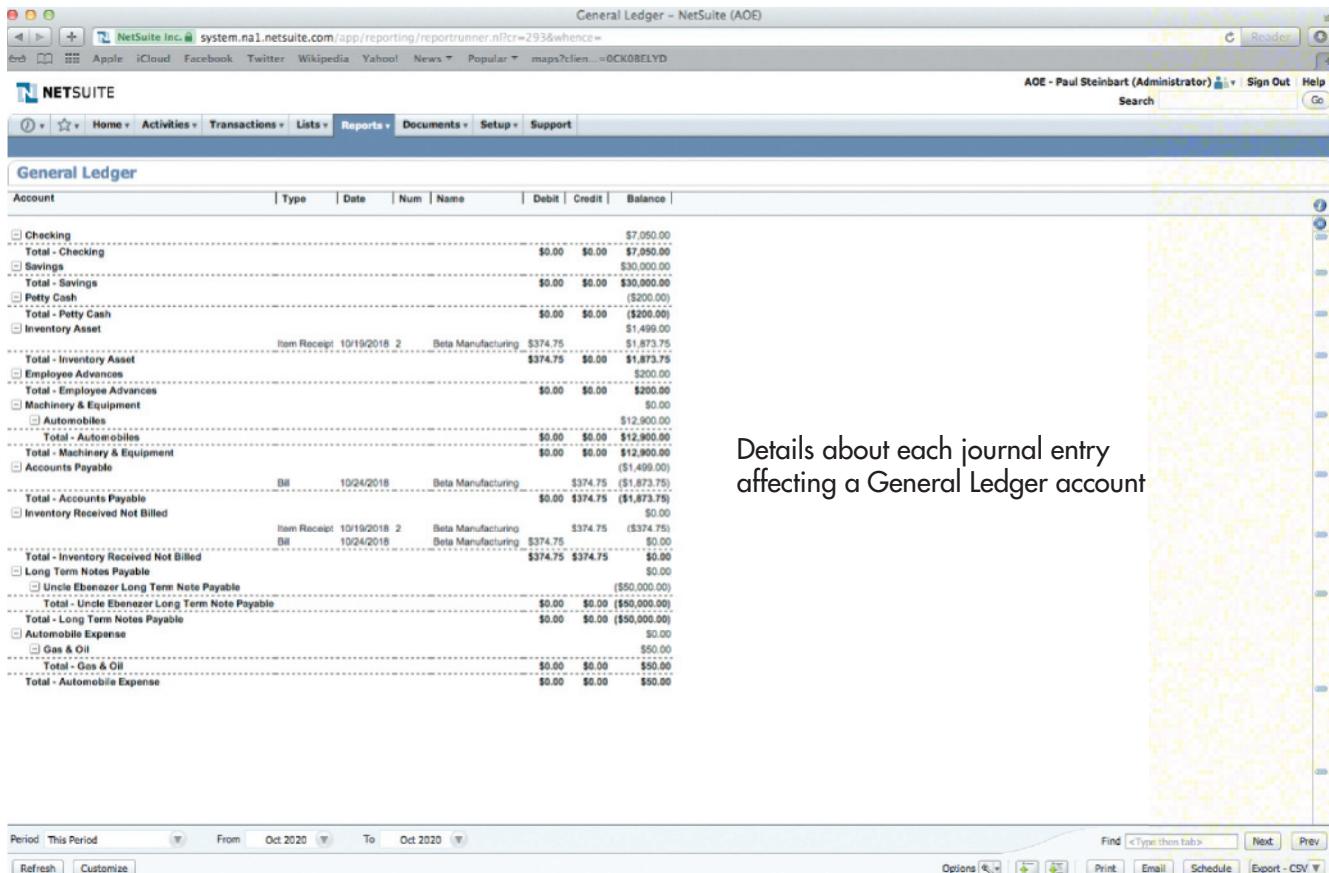
The second clerk would make this entry:

Cost of Goods Sold	xxx	
Accounts Receivable	yyy	
Unbilled Shipments	xxx	
Sales	yyy	

Once both entries have been completed, the special clearing account, unbilled shipments, should have a zero balance. If not, an error has been made and must be investigated and corrected.

Figure 18-6 is an example of one of the many kinds of control reports that ERP systems provide to help identify the source of any errors that occurred in the general ledger update process. Listing journal vouchers by general account number facilitates identifying the cause of errors affecting a specific general ledger account. Listing the journal vouchers by numerical sequence, date, and account number can indicate the absence of any journal entry postings. These reports often include totals to show whether total debits and credits posted to the general ledger were equal.

**THE AUDIT TRAIL** As explained in Chapter 2, the audit trail is a traceable path that shows how a transaction flows through the information system to affect general ledger account balances (see Figure 2-2). It is an important detective control that provides evidence about the causes of changes in general ledger account balances.

**FIGURE 18-6**

Example of Control Report Providing Details About Changes to a General Ledger Account Balance

Source: 2010 © NetSuite Inc.

A properly designed audit trail provides the ability to perform the following tasks:

1. Trace any transaction from its original source document (whether paper or electronic) to the journal entry that updated the general ledger and to any report or other document using that data. This provides a means to verify that all authorized transactions were recorded.
2. Trace any item appearing in a report back through the general ledger to its original source document (whether paper or electronic). This provides a means to verify that all recorded transactions were indeed authorized and that they were recorded correctly.

In legacy accounting systems, the journal voucher file is an important part of the audit trail, providing information about the source of all entries made to update the general ledger. The same capability is provided by the business workflow features in ERP systems, which make it easy to trace every step performed in processing a transaction. The usefulness of the audit trail depends on its integrity. Therefore, it is important to periodically make backups of all audit trail components and to control access to them to ensure that they cannot be altered. Thus, as Figure 18-7 shows, access to the audit trail is typically restricted. In addition, ERP systems provide built-in tools to ensure the integrity of the audit trail. SAP, for example, creates prenumbered records (called documents) for every action performed. These documents cannot be deleted; thus, enabling this built-in feature ensures that SAP creates and maintains a secure audit trail.

## Post Adjusting Entries

The second activity in the general ledger system is posting various adjusting entries (circle 2.0 in Figure 18-2).

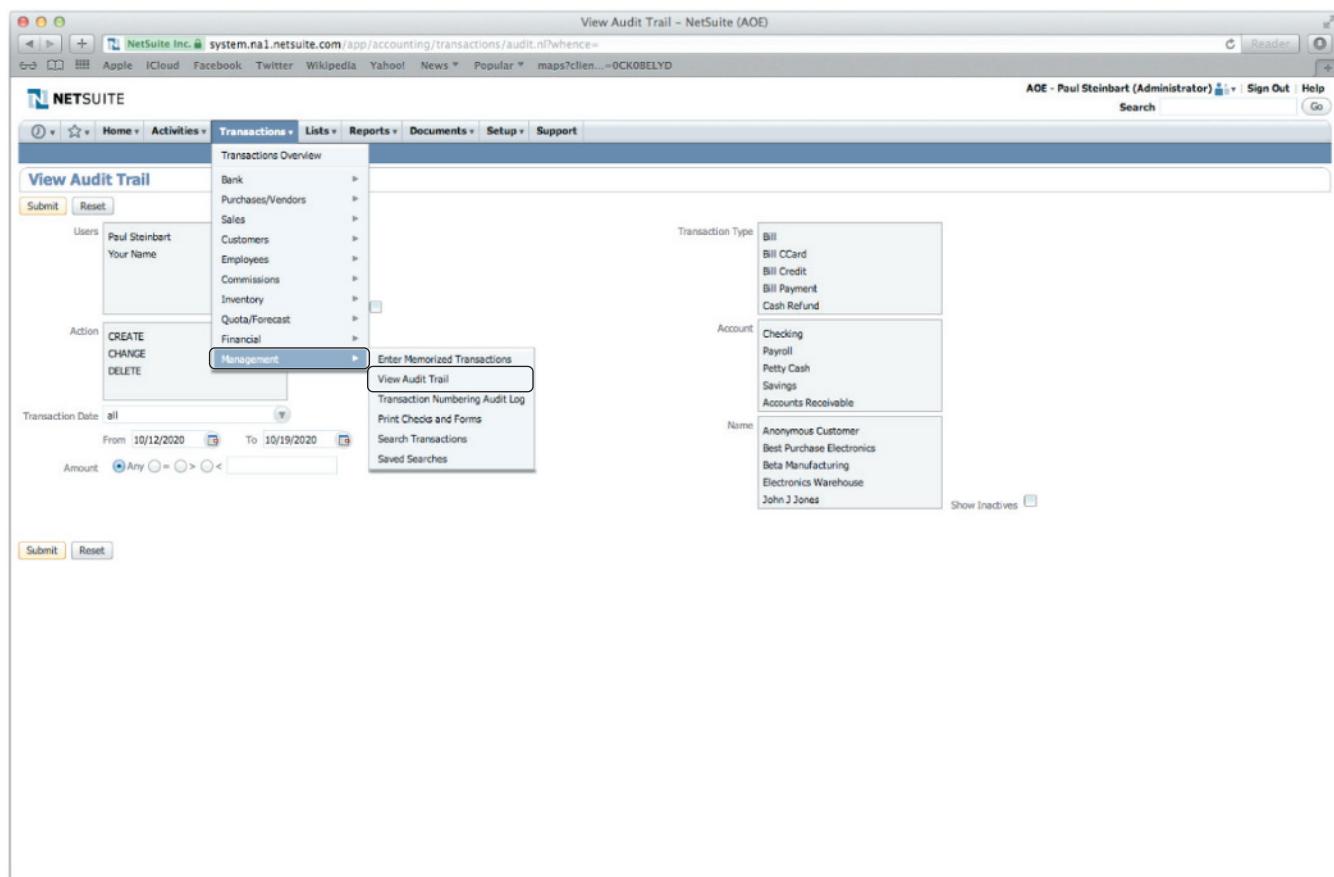
**FIGURE 18-7**

Illustration of How Access to Audit Trail Is Restricted to Managers

Source: 2010 © NetSuite Inc.

## PROCESS

Adjusting entries originate from the controller's office, after the initial trial balance has been prepared. Adjusting entries fall into five basic categories:

1. *Accruals* are entries made at the end of the accounting period to reflect events that have occurred but for which cash has not yet been received or disbursed. Examples include the recording of interest revenue earned and wages payable.
2. *Deferrals* are entries made at the end of the accounting period to reflect the exchange of cash prior to performance of the related event. Examples include recognizing advance payments from customers as a liability and recording certain payments (e.g., rent, interest, and insurance) as prepaid assets.
3. *Estimates* are entries that reflect a portion of expenses expected to occur over a number of accounting periods. Examples include depreciation and bad-debt expenses.
4. *Revaluations* are entries made to reflect either differences between the actual and recorded value of an asset or a change in accounting principle. Examples include a change in the method used to value inventory, reducing the value of inventory to reflect obsolescence, or adjusting inventory records to reflect the results noted during a physical count of inventory.
5. *Corrections* are entries made to counteract the effects of errors found in the general ledger.

As shown in Figure 18-3, information about these adjusting entries is also stored in the journal voucher file. After all adjusting entries have been posted, an adjusted trial balance is prepared. The adjusted trial balance serves as the input to the next step in the general ledger and financial reporting cycle, the preparation of financial statements.

## THREATS AND CONTROLS

As Table 18-1 shows, inaccurate and unauthorized adjusting journal entries are threats that need to be addressed because they can produce erroneous financial statements that lead to poor decisions. To reduce the risk of erroneous input, the same types of data entry processing integrity controls discussed earlier to prevent the threat of erroneous journal entries by the treasurer should also be applied to adjusting journal entries made by the controller (control 6.1). Often, however, adjusting journal entries are calculated in spreadsheets. Therefore, it is also important to employ the various spreadsheet error protection controls discussed in Chapter 13 to minimize the risk of mistakes (control 6.2). Additional control is provided by creating a standard adjusting entry file (control 6.3) for recurring adjusting entries made each period, such as depreciation expense. A standard adjusting entry file improves input accuracy by eliminating the need to repeatedly key in the same types of journal entries. It also reduces the risk of forgetting to make a recurring adjusting entry, thereby ensuring input completeness.

Strong access controls (control 7.1) reduce the risk of unauthorized adjusting entries. In addition to the preceding preventive controls, periodic reconciliations (controls 6.4 and 7.2) and audit trails (controls 6.5 and 7.3) provide a means to detect unauthorized or inaccurate adjusting entries.

## Prepare Financial Statements

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The third activity in the general ledger and reporting system is preparing financial statements (circle 3.0 in Figure 18-2).

### PROCESS

Most organizations “close the books” to produce financial statements monthly, quarterly, and annually. A closing journal entry zeroes out all revenue and expense accounts in the adjusted trial balance and transfers the net income (or loss) to retained earnings. We now discuss two important recent regulatory and technological developments that significantly affect the process of preparing financial statements: the proposed upcoming change from U.S. GAAP to IFRS and the mandatory use of XBRL to submit reports to the SEC.

**TRANSITION FROM GAAP TO IFRS** Although the effective date continues to be pushed back, the SEC maintains that it is committed to requiring American companies to switch from U.S.-based GAAP to IFRS as the basis for preparing financial statements. Therefore, companies need to begin planning for the transition now because it will likely require extensive changes to their general ledger and reporting systems.

IFRS differs from GAAP in several ways that affect the design of a company’s general ledger and reporting systems. One major difference concerns accounting for fixed assets. Under GAAP, most major fixed assets are recorded and depreciated on a composite basis. For example, the entire cost of a new corporate headquarters building would be recorded as one asset and depreciated over its estimated useful life, which, for buildings, is typically 40 years. In contrast, IFRS generally requires componentization of fixed assets, to recognize the fact that different elements (components) may have different economic lives. In terms of a corporate headquarters building, that would mean that the costs of the roof and of the heating and air conditioning systems would be recorded separately from the building itself because they are not likely to last 40 years. Componentization will require companies to dig through their databases to identify and disaggregate the costs of many fixed assets. For large companies that may have tens of thousands of fixed assets, componentization will be a major undertaking that carries the risk of classification and recording errors as they change the structure of their general ledgers.

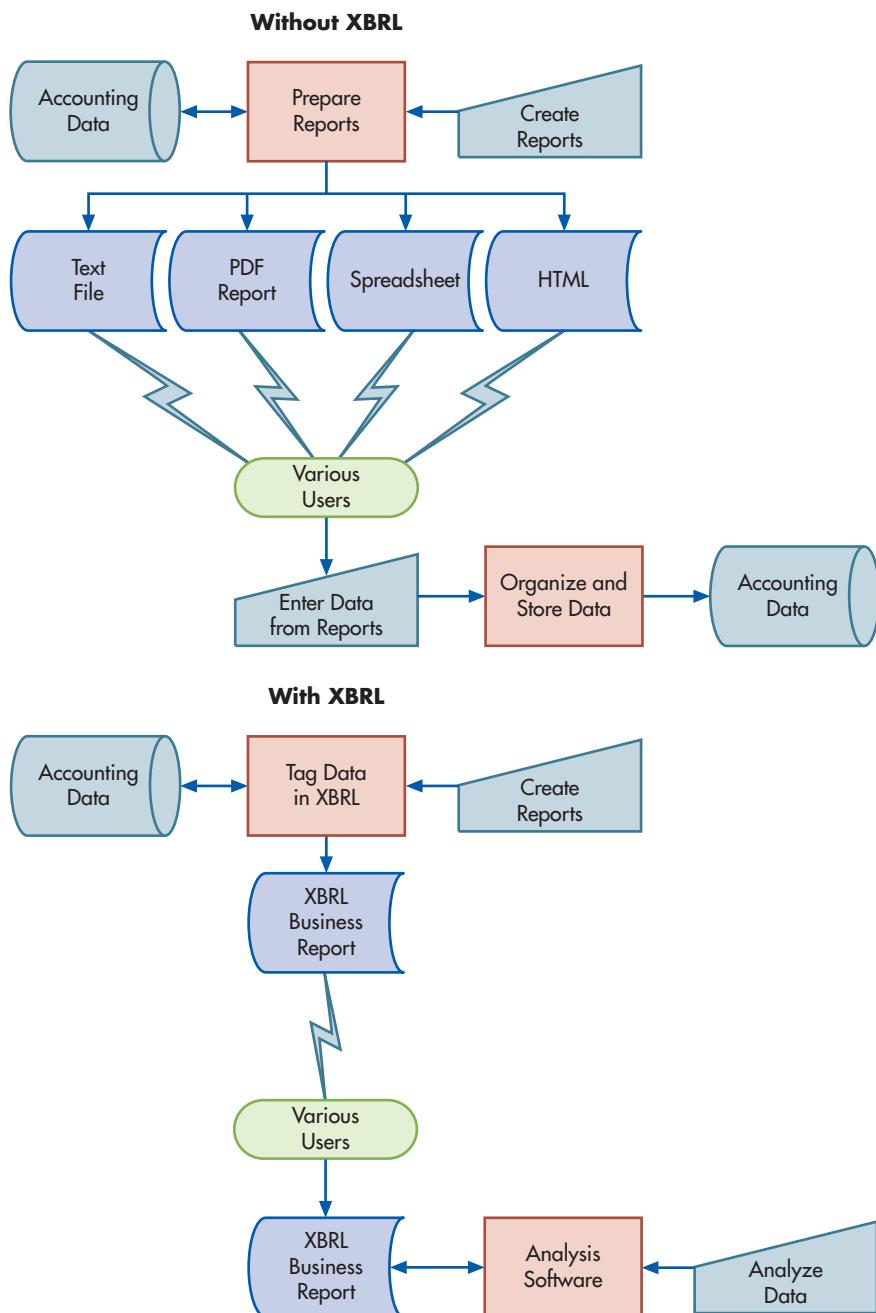
Another difference involves accounting for research and development (R&D) costs. IFRS permits capitalization of development costs at an earlier stage of the process than does GAAP. Consequently, American companies may need to improve the way that they collect and record R&D related costs so that they can properly decide which costs must be expensed and which can be capitalized. At a minimum, this process will require creating additional fields in data records to capture information about the stage of the R&D process when costs were incurred. In turn, this will necessitate careful modification and testing of existing programs to ensure that they correctly process the redesigned transaction records.

A third difference is that IFRS does not permit use of the last-in first-out (LIFO) method of accounting for inventory. Consequently, companies that use LIFO will have to modify their cost accounting systems and the calculations used to value inventory. Those changes will need to be carefully reviewed and tested to minimize the risk of errors.

**XBRL: REVOLUTIONIZING THE REPORTING PROCESS** XBRL stands for eXtensible Business Reporting Language; it is a programming language designed specifically to facilitate the communication of business information. To understand the revolutionary nature of XBRL, examine Figure 18-8. The top portion shows that prior to XBRL, preparers had to manually create reports in various formats for different users. Although those reports were then sent electronically to users, regardless of format (text, spreadsheet, HTML, PDF, etc.), the reports were humanly readable but the recipients then had to reenter the data into their own systems in order to manipulate it. The entire process was inefficient and prone to error.

The bottom portion of Figure 18-8 shows how XBRL improves the reporting process. Preparers use XBRL to encode the data with machine-readable tags that explain what each

**XBRL** - eXtensible Business Reporting Language is a variant of XML (eXtensible Markup Language) specifically designed for use in communicating the content of financial data.



**FIGURE 18-8**  
How XBRL Transforms  
the Reporting Process

**inline XBRL (iXBRL)** - An open standard that merges HTML and XBRL tags so that the same document is simultaneously human-readable in a browser yet also contains structured data that is machine-readable.

data item means and then transmit it electronically in various formats to users. Thus, XBRL saves time and reduces the chances for data entry errors.

To illustrate, Figure 18-9 shows how XBRL can annotate a number in a spreadsheet to indicate that it represents sales for a particular time period, following U.S. GAAP and measured in U.S. dollars. The top portion of Figure 18-9 shows the spreadsheet that most users would see; the XBRL code in the bottom portion is intended for use by software, although it can be viewed by programmers, auditors, or anyone who needs or wants to see it.

**Inline XBRL (iXBRL)** merges HTML and XBRL so that the same document is human-readable in a browser yet also contains structured machine-readable data that can be automatically processed by various analytics tools without requiring any manual input. Public companies must use iXBRL when submitting documents to the SEC. The top panel of

<b>Panel A: Portion of XBRL-Encoded Spreadsheet</b>			
Statement of Income Alternative (USD \$) (in Millions, except per share data)	<b>12 Months Ended</b>		
	<b>Dec. 31, 2021</b>	<b>Dec. 31, 2020</b>	<b>Dec. 31, 2019</b>
Sales (Q)	26,901	29,280	28,950
Cost of goods sold (exclusive of expenses below)	22,175	22,803	21,955
Selling, general administrative, and other expenses	1,167	1,444	1,372
Research and development expenses	246	238	201
Provision for depreciation, depletion, and amortization	1,234	1,244	1,252
Restructuring and other charges (D)	939	268	507
Interest expense (V)	407	401	384
Other income, net (O)	-59	-1,920	-236
Total costs and expenses	26,109	24,478	25,435
Income from continuing operations before taxes on income	792	4,802	3,515
Provision for taxes on income (T)	342	1,623	853
Income from continuing operations before minority interests' share	450	3,179	2,662
Minority interests	221	365	436
Income from continuing operations (Statement [Line Items])	229	2,814	2,226
(Loss) income from discontinued operations (B)	-303	-250	22
Net (Loss) Income (Statement [Line Items])	-74	2,564	2,248
Income from continuing operations (Basic)	0.28	3.27	2.56
(Loss) income from discontinued operations (Basic)	-0.37	-0.29	0.03
Net (loss) income (Basic)	-0.09	2.98	2.59
Income from continuing operations (Diluted)	0.28	3.23	2.54
(Loss) income from discontinued operations (Diluted)	-0.37	-0.28	0.03
Net (loss) income (Diluted)	-0.09	2.95	2.57

<b>Panel B: Portion of XBRL Code</b>
<us-gaap:ResearchAndDevelopmentExpense contextRef="eol_0001193125-09-029469_STD_p12m_20191231_0" decimals="-6" unitRef="USD">>201000000</us-gaap:ResearchAndDevelopmentExpense> <us-gaap:RestructuringCharges contextRef="eol_0001193125-09-029469_STD_p12m_20191231_0" decimals="-6" unitRef="USD">>507000000</us-gaap:RestructuringCharges> <us-gaap:SalesRevenueGoodsNet contextRef="eol_0001193125-09-029469_STD_p12m_20191231_0" decimals="-6" unitRef="USD">>88950000000</us-gaap:SalesRevenueGoodsNet> <us-gaap:SellingGeneralAndAdministrativeExpense contextRef="eol_0001193125-09-029469_STD_p12m_20191231_0" decimals="-6" unitRef="USD">>13720000000</us-gaap:SellingGeneralAndAdministrativeExpense>

**Explanation:**

The spreadsheet shows that the company had sales of \$28,950,000,000 for the year ended December 31, 2019. The XBRL code reveals that:

- The number 28,950 appearing on the spreadsheet is based on US-GAAP (the element begins with <usgaap: SalesRevenueGoodsNet and closes with </us-gaap:SalesRevenueGoodsNet>).
- The context is the SEC Edgar Online filing (eol) for a 12-month period (p12m) ending on December 31, 2019.
- The numbers on the spreadsheet are rounded to the nearest million (decimals = -6, raw value = 28950000000).
- The value is in U.S. dollars ("USD").

**FIGURE 18-9**

Example of an Instance Document Showing XBRL Tags

The top screenshot shows the "EDGAR Search Results" page for McDonald's Corporation (McDonald's Corp. (Fiscal) (00009100) (see all company filings)). It lists various documents such as 10-K, 10-Q, 8-K, and Form 10, along with their filing dates and file numbers. The bottom screenshot shows the "View Filing Data" page for the same company, specifically for its 10-K filing (Form 10-K for the year ended Dec 31, 2017). This page displays a detailed financial statement table, likely the Consolidated Statement of Income, in an interactive format where users can click on specific data points to view or print the document.

**FIGURE 18-10**

Example Screenshots  
Using the SEC's iXBRL  
Viewer

Figure 18-10 shows the various documents the SEC's EDGAR database has for McDonalds Corporation; clicking the button labeled *Interactive Data* in the row for its 10-K displays the iXBRL version of McDonalds Corporation's Consolidated Statement of Income shown in the bottom panel of Figure 18-10. Notice how the data in the lower panel is human-readable and looks like an extract from an Excel spreadsheet. Indeed, if the viewer clicks on the red words *View Excel Document*, the browser will download an XBRL-tagged spreadsheet with that data. If instead the viewer clicks on the black words *Print Document*, the browser will download a PDF version of that income statement.

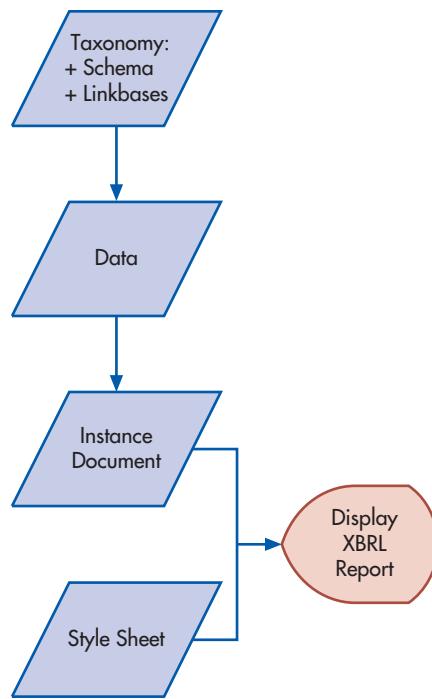
**XBRL PROCESS AND TERMINOLOGY** Figure 18-11 provides a high-level view of the basic steps in preparing and delivering iXBRL reports (hereafter our discussion refers to iXBRL because the SEC now requires public companies to use it; however, the same process that we now describe also applies to XBRL). The iXBRL file containing the tagged data delivered to users is called an **instance document**. The instance document contains facts about specific financial statement line items, including their values and contextual information such as the measurement unit (dollars, euros, yuans, etc.) and whether the value is for a specific point in time (e.g., a balance sheet item) or a period of time (e.g., an income statement item). Each specific data item in an iXBRL document is called an **element**. An element's specific value is displayed in an instance document between tags. Angle brackets are used to identify tags. Two tags are used for each element. The first tag presents the element name inside a pair of angle brackets; the second tag also uses a pair of angle brackets but precedes the element name with a slash. Additional information is needed to properly interpret that value, such as the monetary units used to measure net sales and the time period during which those sales occurred. That context information is also presented in the instance document between tags. Panel B of Figure 18-9 provides a detailed example for the element "Net Sales."

**instance document** - An iXBRL file that contains tagged data.

**element** - A specific data item in an iXBRL instance document, such as a financial statement line item.

**FIGURE 18-11**

Electronic Reporting  
with XBRL



**taxonomy** - A set of XBRL files that defines elements and the relationships among them.

**schema** - An XBRL file that defines every element that appears in a specific instance document.

**linkbases** - One or more XBRL files that define the relationships among elements found in a specific instance document.

An instance document is created by applying a taxonomy to a set of data. A **taxonomy** is a set of files that defines the various elements and the relationships between them. One part of the taxonomy is called the **schema**, which is a file that contains the definitions of every element that could appear in an instance document. The following are some of the basic attributes used to define each element:

- A unique identifying *name* used by the software.
- A *description* that can be used to correctly interpret the element.
- The element's *data type* (monetary unit, text, date, etc.).
- The element's normal *balance type* (debit or credit).
- The element's *period type* (one point in time, called an instant, or a period of time, called a duration).

Attribute information is enclosed within tags. Thus, to continue our example, the schema would contain the following portion of a definition of the *Net Sales* element:

```
<element name="NetSales" description="Sales net of returns and allowances"
type="monetaryItemType" balance="credit" periodType="duration"></element>
```

The taxonomy also includes a set of files called **linkbases**, which define the relationships among elements in a specific instance document. Important linkbases include the following:

- The *Reference* linkbase identifies relevant authoritative pronouncements (e.g., U.S.-GAAP, IFRS) for that element.
- The *Calculation* linkbase specifies how to combine elements (e.g., that "Current Assets" equals the sum of Cash, Accounts Receivable, and Inventory).
- The *Definition* linkbase indicates hierarchical relationships among elements (e.g., that "Current Assets" is a subset of "Assets").
- The *Presentation* linkbase describes how to group elements (e.g., Assets, Liabilities, and Equities).
- The *Label* linkbase associates human-readable labels with elements.

As Figure 18-11 shows, the information in an XBRL taxonomy is used to tag the data and create an instance document. The same taxonomy is usually used to create a set of separate instance documents, one for each reporting year. Instance documents, however, contain only



**THE ACCOUNTANT'S ROLE** The benefits of XBRL are not limited to its use for external reporting. Internal reporting will also benefit because data can be exported from the basic ERP system in a format that managers can import directly into a variety of applications, saving time and eliminating the errors arising from having to manually reenter data. Therefore, accountants can, and should, play a major role in all phases of producing XBRL reports, beginning with the selection of an appropriate taxonomy. To ensure comparability across XBRL reports produced by different organizations, standard taxonomies have been developed for many different countries and industries. Accountants use their knowledge of the organization's business practices plus general accounting principles to select the standard taxonomy that best fits the organization. They then map each data item in the organization's accounting system to its corresponding element in the taxonomy.

However, standard taxonomies cannot cover every possible situation. Sometimes, an organization needs to record financial information in a different manner or level of detail to reflect its unique way of doing business. In such cases, accountants can create new tags to more accurately present information about the organization's business activities. These new tags create what is called an **extension taxonomy**. This ability to modify XBRL is why it is referred to as an *extensible* language. Viewers can read about the taxonomies used by a company by clicking on a data element in an iXBRL instance document. For example, Figure 18-13 shows that McDonalds uses the standard U.S. GAAP taxonomy for the element labeled revenues (panel A) but that the element labeled Occupancy and Other Operating Expenses (panel B) is a customized extension.

Accountants should also use software to apply the taxonomy (and any extensions) to tag their organization's data, create instance documents, and then validate those instance documents before they are submitted. Accountants will also typically participate in creating style sheets to ensure that the information is displayed appropriately.

Not only do accountants use XBRL; as Focus 18-1 explains, the accounting profession played a major role in its creation. XBRL is a work in process. You should bookmark and regularly visit both the [xbrl.org](#) and [sec.gov](#) websites to stay abreast of continued developments in this important reporting tool.

**extension taxonomy** - A set of custom XBRL tags to define elements unique to the reporting organization that are not part of the standard generally accepted taxonomies for that industry.

## FOCUS 18-1 The Accounting Profession's Role in XBRL

The origins of XBRL can be traced back to the early 1990s. At that time, a software engineer named Jon Bosak recognized that a critical shortcoming of HTML is its inability to describe the content of the data presented. Bosak convinced the World Wide Web Consortium (W3C) to sponsor the development of a language with this capability. That project resulted in Bosak and two other software engineers creating a programming language called XML, which stands for extensible markup language. XML is a general-purpose tool that can tag any data with identifying markers.

XML was a step in the right direction. Charlie Hoffman, a CPA who worked for a local accounting firm in Tacoma, Washington, realized, however, that XML did not go far enough to be a general-purpose language for communicating financial information. What was needed was the ability not only to identify each piece of data but also how to process it and how to relate it to other data items. Hoffman started work on adding the desired capabilities to XML but realized that the project required additional support. He sought and obtained the AICPA's help to

pursue the development of a prototype set of XML-enhanced financial statements.

As the work progressed, the results were shared with major software companies, who recognized the value of such a common business language and joined the project. Eventually, many leading software companies, and important user groups, cooperated in the venture with the AICPA. The result: XBRL. The continued development and maintenance of XBRL is now overseen by a nonprofit international organization (XBRL International). Vendors are currently working on making a wide range of financial and decision support software capable of supporting XBRL. Industry-specific coding taxonomies have been developed in many countries. XBRL is on its way to becoming the global computer language for communicating financial data. And it all started with one CPA who was looking for a better way to disseminate financial data on the Internet!

Postscript: In December 2006, the AICPA formally recognized Charlie Hoffman's pioneering work in developing XBRL with a special achievement award.

<p><b>- Definition</b>            Amount of revenue recognized from goods sold, services rendered, insurance premiums, or other activities that constitute an earning process. Includes, but is not limited to, investment and interest income before deduction of interest expense when recognized as a component of revenue, and sales and trading gain (loss).</p> <p><b>- References</b>            Reference 1: <a href="http://www.xbrl.org/2003/role/presentationRef">http://www.xbrl.org/2003/role/presentationRef</a>            -Publisher FASB            -Name Accounting Standards Codification            -Topic 225            -SubTopic 10            -Section S99            -Paragraph 2            -Subparagraph (SX 210.5-03.1)            -URI <a href="http://asc.fasb.org/extlink&amp;oid=63488584&amp;loc=d3e20235-122688">http://asc.fasb.org/extlink&amp;oid=63488584&amp;loc=d3e20235-122688</a></p> <p><b>- Details</b>  <b>Name:</b> us-gaap_Revenues  <b>Namespace Prefix:</b> us-gaap_  <b>Data Type:</b> xbrli:monetaryItemType  <b>Balance Type:</b> credit  <b>Period Type:</b> duration</p>
<p><b>- Definition</b>            Cost of rent for ground and top leases to third party owners of land and/or buildings of which company-operated restaurants are operated, as well as the depreciation of tangible assets (equipment, signs, seating, decor and leasehold improvements), company-operated restaurant buildings/leaseholds and the amortization of reacquired franchise rights, and the cost of advertising, promotion, operating supplies, maintenance and repair, insurance, taxes and licenses, credit/debit card processing fees, etc.</p> <p><b>- References</b>            No definition available.</p> <p><b>- Details</b>  <b>Name:</b> mcd_OccupancyAndOtherOperatingExpenses  <b>Namespace Prefix:</b> mcd_  <b>Data Type:</b> xbrli:monetaryItemType  <b>Balance Type:</b> debit  <b>Period Type:</b> duration</p>

**FIGURE 18-13**

Taxonomy Information for Elements in an iXBRL Instance Document

## THREATS AND CONTROLS

Table 18-1 shows that one threat is the creation of inaccurate financial statements (threat 8). The data processing integrity controls for journal entries discussed earlier (control 8.1) combined with the use of packaged software (control 8.2) to produce the financial statements minimizes the risk of numerical errors in the data. However, because both IFRS and XBRL require numerous judgments about how to classify information, there is a risk that financial statements may not accurately represent the results of operations. For example, mistakes in componentizing fixed assets can result in inaccurate depreciation expenses for IFRS financial statements. XBRL standard taxonomies offer many fine-grained choices (e.g., more than 20 elements define the concept “Cash and Cash Equivalents”), which can result in selecting an inappropriate tag unless the person doing the mapping has extensive knowledge both about the organization’s business practices and the XBRL taxonomies. Unnecessarily creating taxonomy extensions instead of using a standard tag is another potential problem because it eliminates one of the major advantages of XBRL (standardization, which enables automatic comparisons across companies). Training (control 8.3) and experience will likely reduce

the risk of making such mistakes. In addition, an independent external audit (control 8.4) is necessary as a detective control.

Fraudulent financial reporting (threat 9) is another potential problem. Financial statement fraud often involves journal entries by upper-level management that cause the organization's financial statements to either overstate revenues or understate liabilities. It is difficult to prevent such journal entries because upper-level management inherently has the ability to override most internal controls. Therefore, the best control (control 9.1) to mitigate the threat of financial statement fraud is an independent review (audit) of all special journal entries to the general ledger (i.e., all entries other than the summary journal entries automatically generated by the various cycles discussed in Chapters 14 to 17). Although external auditors routinely "test the appropriateness of journal entries recorded in the general ledger and other adjustments," internal auditors should also regularly review all adjustments to the general ledger. To be effective, however, such testing requires proper configuration of the accounting system, so that every change to general ledger accounts is captured and recorded as part of the audit trail.

## Produce Managerial Reports

The final activity in the general ledger and reporting system (circle 4.0 in Figure 18-2) is to produce various managerial reports, including budgets.

### PROCESS

ERP systems like the one depicted in Figure 18-3 can produce a number of budgets to help managers plan and evaluate performance. An operating budget depicts planned revenues and expenditures for each organizational unit. A capital expenditures budget shows planned cash inflows and outflows for each capital project. Cash flow budgets compare estimated cash inflows from operations with planned expenditures and are used to determine borrowing needs.

In addition to budgets, the inquiry processing capabilities of ERP systems enable managers to easily create an almost unlimited number of performance reports. For example, sales can be broken down by products, by salesperson, and by customer. Displaying the data in graphs can help managers quickly identify important trends and relationships, as well as areas in need of more detailed analysis. Accountants should understand how to use the flexible reporting and graphing capabilities of ERP systems so that they can add value by suggesting alternative ways to organize and analyze data about business processes.

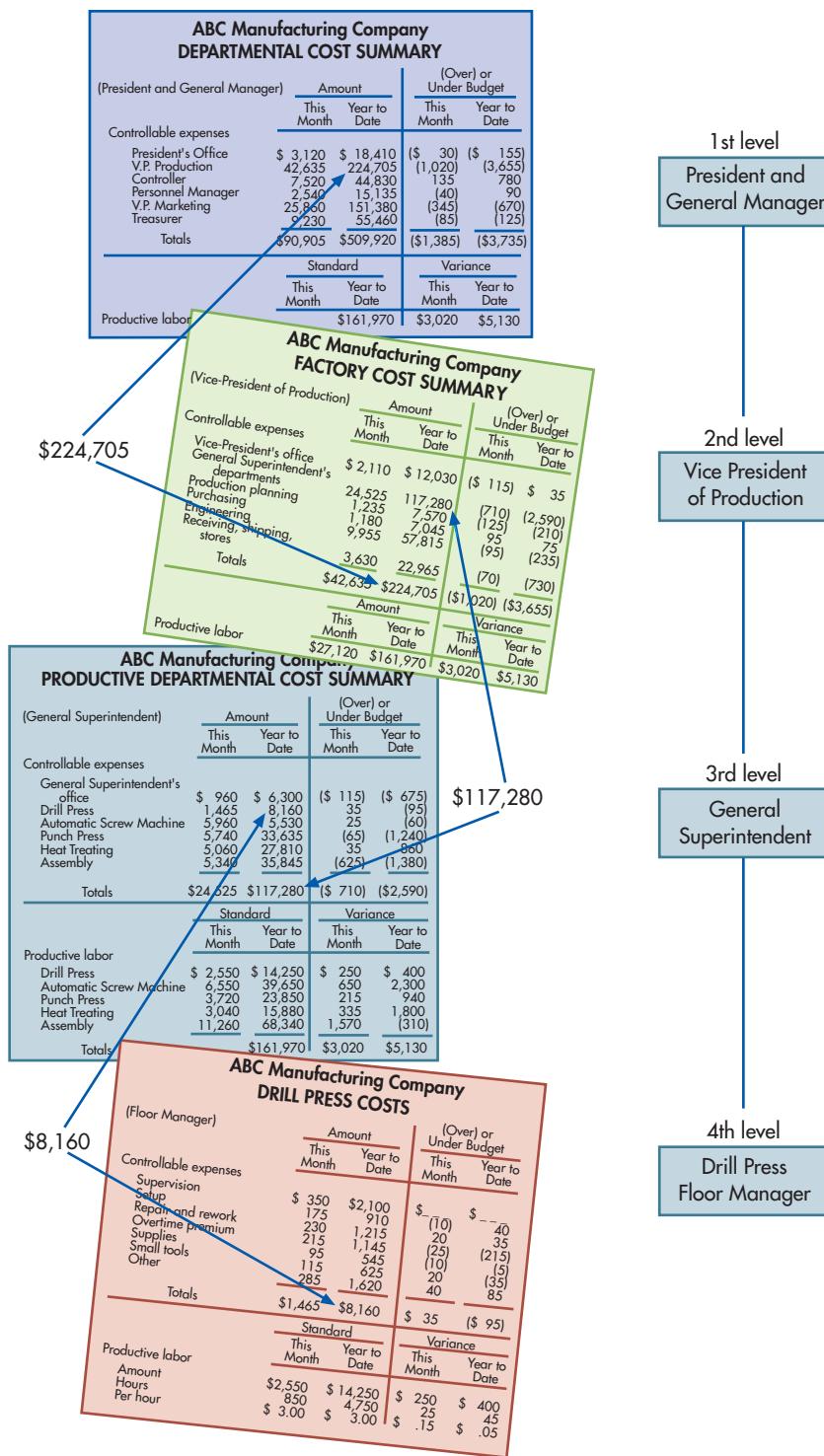
### THREATS AND CONTROLS

Poorly designed reports and graphs (threat 10 in Table 18-1) can cause managers to make biased or erroneous decisions. The following subsections discuss two important controls to mitigate that threat: the use of responsibility accounting and flexible budgets to design performance reports (control 10.1) and the balanced scorecard (control 10.2). The principles of proper graph design (control 10.3) were discussed in Chapter 7.

**RESPONSIBILITY ACCOUNTING AND FLEXIBLE BUDGETING** To properly evaluate performance, reports should highlight the results that can be directly controlled by the person or unit evaluated. **Responsibility accounting** does this by producing a set of correlated reports that break down the organization's overall performance by the specific subunits which can most directly control those activities, as shown in Figure 18-14. Note how each report shows actual costs and variances from budget for the current month and the year to date, but only for those items that the manager of that subunit controls. Note also the hierarchical nature of the reports: The total cost of each individual subunit is displayed as a single line item on the next-higher-level report.

It is also important to design the budget so that its content matches the nature of the unit evaluated. For example, the performance reports depicted in Figure 18-14 focus on costs because production departments are usually treated as cost centers. In contrast, sales departments are often evaluated as revenue centers. Consequently, their performance reports should compare actual to forecasted sales, broken down by appropriate product and geographic

**responsibility accounting** - A system of reporting financial results on the basis of managerial responsibilities within an organization.

**FIGURE 18-14**

Sample Set of Reports to Illustrate Responsibility Accounting

categories. Similarly, reports for departments treated as profit centers should include both revenues and expenses.

No matter which basis is used to prepare a unit's budgetary performance report, the method used to calculate the budget standard is crucial. The easiest approach is to establish fixed targets for each unit, store those figures in the database, and compare actual performance with those preset values. A major drawback to this approach is that the budget number is static and does not reflect unforeseen changes in the operating environment. Consequently, individual managers may be penalized or rewarded for factors beyond their control. For example, assume that the budgeted amounts in Figure 18-14 for the general superintendent are based on

**flexible budget** - A budget in which the amounts are stated in terms of formulas based on actual level of activity.

**balanced scorecard** - A management report that measures four dimensions of organizational performance: financial, internal operations, innovation and learning, and customer perspectives.

planned output of 2,000 units. If, however, actual production is 2,200 units because of greater-than-anticipated sales, then the negative variances for each expense category may indicate not inefficiency, but rather the increased level of output.

A **flexible budget**, in which the budgeted amounts vary in relation to some measure of organizational activity, mitigates such problems. In terms of our previous example, flexible budgeting would entail dividing the budget for each line item in the general superintendent's department into its fixed and variable cost components. In this way, budget standards would be automatically adjusted for any unplanned increases (or decreases) in production. Thus, any differences between these adjusted standards and actual costs can more appropriately be interpreted.

**THE BALANCED SCORECARD** As the chapter opening case illustrated, one problem with the reports produced by many accounting systems is that the reports too narrowly focus on just one dimension of performance: that reflected in the financial statements. The **balanced scorecard**, a report that provides a multidimensional perspective of organizational performance, addresses that problem. As shown in Table 18-2, a balanced scorecard<sup>1</sup> contains measures reflecting four perspectives on organizational performance: financial, customer, internal operations, and innovation and learning. The financial section contains lagging indicators of past performance, whereas the other three sections provide leading indicators about factors likely to affect future financial performance. For each dimension, the balanced scorecard shows the organization's goals and specific measures that reflect performance in attaining those goals. Together, the four dimensions of the balanced scorecard provide a much more comprehensive overview of organizational performance than that provided by financial measures alone. Let us now examine Table 18-2 to see how the four parts of the balanced scorecard reflect key aspects of an organization's strategy and important causal relationships between various measures.

AOE's top management, like many companies, agreed on three key financial goals: increased revenue streams through sales of new products, increased profitability as reflected in return on equity, and maintaining adequate cash flow to meet obligations. As shown in Table 18-2, specific measures and targets were developed to track the attainment of those goals. Both the choice of key metrics and the setting of target values are important management

**TABLE 18-2** Example of a Balanced Scorecard

Dimension Goals	Measure	Target	2021	2020	2019
<b>Financial</b>					
New revenue streams	Sales of new products (000s)	104	103	100	98
Improve profitability	Return on equity (%)	12.5%	12.6%	12.2%	12.1%
Positive cash flow	Cash from operations (000s)	156	185	143	164
<b>Customer</b>					
Improve satisfaction	Rating (0–100)	95	93	92	90
Be a preferred supplier	Percentage of key customers' electronics purchases made from us	20%	20%	18%	17%
<b>Internal Operations</b>					
Service quality	Orders filled without error (%)	98%	97%	95%	94%
Speed of delivery	Order cycle time (days)	10.4	10.5	11.2	11.5
Process efficiency	Defect rate	1.0%	1.1%	1.05%	1.02%
<b>Innovation and Learning</b>					
New products	Number of new products	4	4	3	3
Employee learning	Personnel attending advanced training courses (%)	10%	25%	9%	5%

<sup>1</sup>This section is based on two articles by Robert S. Kaplan and David P. Norton: "The Balanced Scorecard—Measures That Drive Performance," *Harvard Business Review* (January–February 1992): 71–79; and "Using the Balanced Scorecard as a Strategic Management System," *Harvard Business Review* (January–February 1996): 75–85. Additional information about the balanced scorecard can be found at [www.balancedscorecard.org](http://www.balancedscorecard.org).

decisions. Many organizations make the mistake of setting targets that reflect industry benchmark values. The problem with such an approach is that the organization's aspirations and, hence, its performance are limited by its competitors' performance. Although industry benchmarks may provide a useful reference point, management should set targets that take into consideration the organization's unique strengths and weaknesses.

For every organization, customers are the key to achieving financial goals. Accordingly, the customer perspective of AOE's balanced scorecard contains two key goals: Improve customer satisfaction and become the preferred supplier for key customers. In turn, meeting those customer-oriented goals requires efficiently and effectively performing internal business processes. Consequently, the internal operations perspective portion of AOE's balanced scorecard focuses on those activities most likely to directly affect customer perceptions: service quality, speed of delivery, and process efficiency. Finally, AOE's top management acknowledged the importance of developing new products and training its workforce to continuously improve service and results. Therefore, measures of those two items are included in the innovation and learning perspective of AOE's balanced scorecard.

Note that the preceding discussion implied a number of hypotheses about cause-and-effect relationships. For example, increased employee training is expected to improve service quality, as reflected in the percentage of customer orders filled correctly. In turn, improved service quality is expected to result in increased customer satisfaction and in more purchases from key customers. Finally, increased customer satisfaction is expected to result in improved profitability and cash flow. Thus, the measures in the innovation and learning, internal operations, and customer perspective portions of the balanced scorecard are hypothesized to be leading indicators of financial measures. Analyzing trends in the actual measures allows AOE's management to test the validity of those hypotheses. If improvements in one perspective do not generate expected improvements in other areas in subsequent time periods, top management must reevaluate and probably revise hypotheses about the determinants of organizational success. Indeed, this ability to test and refine strategy is one of the major benefits the balanced scorecard provides.

Accountants and systems professionals should participate in the development of a balanced scorecard. Top management's role is to specify the goals to be pursued in each dimension. Accountants and information systems professionals can then help management choose the most appropriate measures for tracking achievement of those goals. In addition, they can provide input concerning the feasibility of collecting the data that would be required to implement various proposed measures.

Although the balanced scorecard was initially developed as a strategic management tool, it can also be used as a vehicle to better manage enterprise risk by incorporating appropriate risk-based goals and measures in the various dimensions. For example, an organization might want to increase information security awareness among employees. One way to motivate attention to that objective is to explicitly list increased security awareness as one of the goals in the Innovation and Learning section of the scorecard and then measure employee knowledge about security best practices. Similarly, listing reduced inventory shrinkage as one of the Internal Operations Process goals and measuring it can help focus attention on reducing the risk of employee theft. External threats, such as loss of market share, can likewise be addressed by including appropriate measures (e.g., sales to repeat customers, number of new customers) in the Customer and Financial sections of the balanced scorecard. Thus, the balanced scorecard can be used as one tool to monitor and evaluate an organization's controls and risk management program.

The balanced scorecard, like all scorecards, is created periodically and provides management with a means to evaluate past performance. But, as the chapter-opening case explains, management also needs real-time reports that can be used to take corrective action in a timely manner. Such information is provided in **dashboards**, which are typically interactive displays of real-time measures of key indicators of operating performance.

Finally, although a number of different scorecards, dashboards, and other reports are necessary to support effective management, organizations should monitor the total number of reports and the costs associated with producing them. For example, one useful metric is to divide the total number of reports by the total number of employees. High scores may indicate that the company is producing a large number of reports used by very few individuals and

**dashboards** - Interactive real-time displays of key indicators of operating performance.

therefore could reduce costs by eliminating some of those reports. Another useful metric is the number of reports in which each general ledger account is used. Low scores may indicate unnecessary accounts which, if eliminated, could speed up the closing process and thereby provide more timely financial statements.

## Summary and Case Conclusion

The general ledger and financial reporting system integrates and summarizes the results of the various accounting subsystems for the revenue, expenditure, production, and human resources cycles. The general ledger is the central master file in the accounting system. Consequently, it is important to implement control procedures to ensure its accuracy and security. Important controls include data processing integrity checks of the journal voucher records posted to the general ledger, access controls, an adequate audit trail, and appropriate backup and disaster recovery procedures.

The outputs produced by the general ledger system fall into two primary categories: financial statements and managerial reports. The former are prepared periodically in accordance with regulatory frameworks (GAAP or IFRS) and are distributed to both internal and external users. The latter are prepared for internal use only and therefore often include comparisons between actual and budgeted performance. The usefulness of these reports, whether presented in the form of tables or graphs, is affected by how well they are designed.

Organizations must provide information to a wide variety of users, including government agencies, industry analysts, financial institutions, and individual decision makers. XBRL provides a mechanism for improving the efficiency of generating such information, as well as for using information obtained from external sources.

Elizabeth Venko and Ann Brandt explained that AOE's new integrated transaction processing database provides much of the data needed to create a balanced scorecard. They told Linda Spurgeon that they could help her design a balanced scorecard that included metrics that would reflect AOE's strategic goals. Linda and Stephanie agreed with those suggestions. Linda also approved Elizabeth and Ann's request for two accountants and two IS staff to be assigned to begin work on reconfiguring AOE's new ERP system to generate financial statements in accordance with IFRS.

This chapter concludes our examination of the various cycles in an integrated accounting system. This chapter and the previous four explained how an accounting system should be designed: (1) to process transactions for accountability purposes, (2) to maintain adequate controls to ensure the integrity of the organization's data and the safeguarding of its assets, and (3) to provide information to support decision making. One other theme that appears throughout this book is the need for accountants to move beyond the traditional role of scorekeeper and actively seek to add value to their organization. Accountants should participate in decisions about adopting new technology and implementing new information systems because they have the training to properly evaluate the relative costs and benefits, as well as the economic risks, underlying such investments. Effectively participating in decisions concerning technology, however, requires accountants not only to keep abreast of current accounting developments but also to stay informed about advances in IT. Thus, as an accountant, you must make a commitment to lifelong learning. We wish you well in this endeavor.

### KEY TERMS

journal voucher file 597	taxonomy 606	responsibility accounting 610
trial balance 598	schema 606	flexible budget 612
XBRL 603	linkbases 606	balanced scorecard 612
inline XBRL (iXBRL) 604	style sheet 607	dashboards 613
instance document 605	extension taxonomy 608	
element 605		

## AIS in Action

### CHAPTER QUIZ

1. From where do adjusting entries usually come?
  - a. treasurer
  - b. controller
  - c. various accounting cycle subsystems, such as sales order entry
  - d. unit managers
2. Errors in financial statements provided to creditors, investors, and government agencies can cause these stakeholders to make wrong decisions. This threat is referred to as
  - a. inaccurate or invalid general ledger data.
  - b. unauthorized disclosure of financial information.
  - c. loss or destruction of master data.
3. The audit trail is a traceable path that shows how a transaction flows through the information system to affect general ledger account balances. Access to the audit trail is typically restricted to
  - a. managers.
  - b. auditors.
  - c. secretaries.
  - d. company workers.
4. The journal voucher file contains information that would be found in the general journal in a manual accounting system. Which individual journal entries are not used to update its general ledger?
  - a. date of journal entry
  - b. accounts debited and credited
  - c. addresses of creditors
  - d. amounts
5. Which of the following checks is not an input edit and processing control needed to ensure that journal entries made by the treasurer are accurate and complete?
  - a. validity check
  - b. field (format) checks
  - c. closed-loop verification
  - d. back validation
6. In what dimension of a balance scorecard would one record upskilling of existing staff members?
  - a. financial
  - b. customer
  - c. internal operations
  - d. innovation and learning
7. Which feature in an ERP system provides the same capability as the journal voucher file for use in audit trails?
  - a. prenumbered records
  - b. trial balance
  - c. business workflow
  - d. instance documents
8. Which of the following contains the definition of each element that appears in an instance document?
  - a. schema
  - b. linkbase
  - c. taxonomy
  - d. style sheet
9. Which of the following is designed primarily to improve the efficiency of financial reporting?
  - a. XML
  - b. XBRL
  - c. IFRS
  - d. the balanced scorecard
10. Which of the following provides real-time data about key measures of operating performance ?
  - a. XBRL
  - b. the balanced scorecard
  - c. dashboards
  - d. a flexible budget

**DISCUSSION QUESTIONS**

- 18.1** XBRL stands for eXtensible Business Reporting Language. It is a programming language designed specifically to facilitate the communication of business information. The SEC requires U.S. public companies to use XBRL when submitting their filings. Explain how accountants can, and should, play a major role in all phases of producing XBRL reports.
- 18.2** Describe some of the basic attributes used to define each element in an XBRL schema.
- 18.3** Why is the audit trail an important control?
- 18.4** No matter what basis is used to prepare a unit's budgetary performance report, the method used to calculate the budget is crucial. The easiest approach is to establish fixed targets for each unit, store these figures in the database, and compare actual performance with these preset values. What are the major drawbacks of this approach?
- 18.5** The trial balance lists the balances for all general ledger accounts. If all activities have been properly recorded, the total of all debit balances in various accounts should equal the total of all credit balances. If they don't, a posting error has occurred. How can one detect such an error?

**PROBLEMS**

- 18.1** Match the terms with their definitions:
- |                                    |  |
|------------------------------------|--|
| ____ 1. journal voucher file       | a. Individual financial statement item   |
| ____ 2. instance document          | b. Evaluating performance based on controllable costs  |
| ____ 3. XBRL element               | c. Evaluating performance by computing standards in light of actual activity levels                                |
| ____ 4. balanced scorecard         | d. Set of journal entries that updated the general ledger  |
| ____ 5. XBRL extension taxonomy    | e. Set of files that defines XBRL elements and specifies the relationships among them                              |
| ____ 6. dashboards                 | f. Multidimensional performance report   |
| ____ 7. XBRL taxonomy              | g. File that defines relationships among XBRL elements   |
| ____ 8. XBRL linkbase              | h. File that defines the attributes of XBRL elements   |
| ____ 9. XBRL schema                | i. Detective control that can be used to trace changes in general ledger account balances back to source documents |
| ____ 10. XBRL style sheet          | j. File that explains how to display an XBRL instance document   |
| ____ 11. responsibility accounting | k. File that contains specific data values for a set of XBRL elements for a specific time period or point in time  |
| ____ 12. flexible budget           | l. File containing a set of customized tags to define new XBRL elements that are unique to a specific organization |
|                                    | m. A real-time report containing key operating performance metrics   |

- 18.2 Which controls would be most appropriate to address the following problems?
- Users other than the treasurer can create journal entries.
  - A manager used his computer to post adjusting entries to conceal unauthorized expenses.
  - An IT staff member used the ERP system to view financial records and subsequently informed a friend of his working at a competitor organization about the financial troubles of his employer.
  - The treasurer accidentally posted a debit to the wrong account number.
  - Depreciation expenses for the current period were never recorded.
  - An upper-level manager understated liabilities in an effort to improve the financial outlook of the organization.
  - A newly appointed manager decided that management needs to develop a new balanced scorecard to measure the financial goals within the organization.
  - When a transaction was processed, the treasurer did not enter the account number.
- 18.3 The general ledger and reporting system has a major role in the accounting information system of a company. Briefly explain what information the general ledger and reporting system receives from the different accounting cycle subsystems.
- 18.4 You are working at a Trident Steel, a steel solution provider that manufactures steel for several industries, including construction, mining, and automotive industries. One of your immediate tasks is to develop a balance scorecard to monitor the overall performance of Trident Steel.

**REQUIRED**

- Draw up a balance scorecard for Trident Steel and propose at least two goals per dimension. At least one goal per dimension should focus on performance and at least one goal should be related to risk.
  - Propose measures that could be used to evaluate each goal identified in the previous question.
  - Identify how the data needed for each dimension in the previous question would be gathered.
- 18.5 Use Table 18-1 to create a questionnaire checklist that can be used to evaluate controls in the general ledger and reporting cycle.
- For each control issue, write a Yes/No question such that a “No” answer represents a control weakness. For example, one question might be, “Is access to the general ledger restricted?”
  - For each Yes/No question, write a brief explanation of why a “No” answer represents a control weakness.

**18.6 Excel Problem.\***

Objective: Enhancing Tabular Displays in Excel.

**REQUIRED**

- Improve tabular displays of information by shading alternate rows. Download the spreadsheet for this problem from the textbook website and use conditional formatting to shade alternating rows so that even numbered rows are in standard white, but odd numbered rows are in a light shade of blue, beginning with row 3.
- Improve tabular displays by adding colored arrows (red, yellow, and green) in column A (next to the name of the row) to indicate status in terms of “red” = definitely a negative trend, “yellow” = warning, and “green” = definitely a positive trend. Use the following rules:
  - For sales: Green means that this year’s sales are larger than last year’s; yellow means this year’s sales are less than last year’s but more than two years ago; red otherwise.
  - For net sales: Green means net sales are more than 97% of sales; yellow means between 95% and 97% of sales; red means net sales are less than 95% of sales.

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\* Life-long learning opportunity: see pp. xxiii–xxiv in preface.

3. For gross profit, green means more than last year; yellow means less than last year but more than two years ago; red otherwise.
- c. Insert a row between Operating Expenses and Income tax, with the label “Income before tax.” Your solution at this point should look like Figure 18-15 below.

### HINTS

- The formula mod(row(),2) returns the remainder of dividing the row number by two.
- Choose classic style for row shading; choose icon sets and then search for the colored arrows for “labeling” the trends of sales, net sales, and gross profits.
- You may want to check the “reverse icon” box for some of the rows where you are placing your icon.

**18.7** In Italy, it is mandatory for unlisted companies to utilize XBRL extensions to financial statement notes. Use reputable sources to determine the advantages and the disadvantages of this requirement, from a chartered accountant’s perspective. Cite your sources.

**18.8** Excel Problem.\*

Objective: Learn how to use the camera feature to create a dashboard.

### REQUIRED

- a. Download the spreadsheet for this problem.
- b. Format the data to display sales and income before tax as currency, with no decimals.
- c. Format the rest of the data to display commas for the thousands, with no decimals.
- d. Create a column chart (or bar chart, whichever you prefer) that shows the trend in sales and net sales.
- e. Create four pie charts, one for each year, to show the relative size of sales returns, cost of goods sold, operating expenses, interest expense, and income before tax expressed as percentages of total sales (see Figure 18-16 on previous page for an example).
- f. Create a line chart that shows the trend in sales and income before tax.
- g. Label this entire worksheet, with the 3 charts, as “Source Data.”
- h. Open a new blank worksheet and label it “Dashboard.”
- i. Use the camera tool to insert the charts from the “Source Data” worksheet on the “Dashboard” worksheet.
- j. Resize and rearrange the charts on the Dashboard page in any manner you think is most interesting.

### HINTS

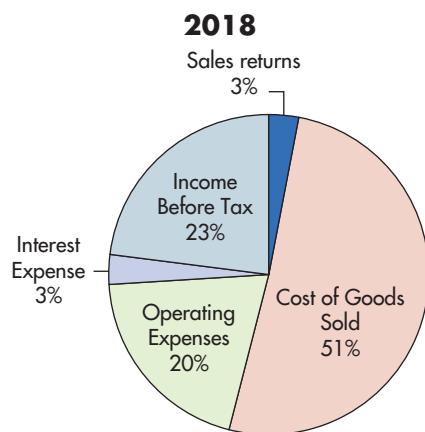
- You may need to load the camera tool onto your toolbar. Search the Internet for tips on how to do this.
- You may need to move your charts around so they do not share any cells in the spreadsheet because you may have to select the cells in which the chart is located, not the chart itself, to be able to use the camera tool.

**FIGURE 18-15**

Example of Solution to Problem 18.6

		2021	2020	2019	2018	2017
Sales	●	935,000	944,000	925,000	930,000	910,000
Sales returns	●	25,000	31,000	33,000	36,000	39,000
Net Sales		910,000	913,000	892,000	894,000	871,000
Cost of Goods Sold		742,000	727,000	713,000	715,000	700,000
Gross Profit		168,000	186,000	179,000	179,000	171,000
Operating Expenses	●	143,000	142,000	141,000	138,000	135,000
Income Taxes		6,250	11,000	9,500	10,250	9,000
Net Income		18,750	33,000	28,500	30,750	27,000

\* Life-long learning opportunity: see pp. xxiii–xxiv in preface.



**FIGURE 18-16**  
Sample Pie Chart for  
Problem 18.8

### 18.9 XBRL Problem\*

Objective: Practice examining iXBRL financial statements to identify use of extension taxonomies.

#### REQUIRED

- Access the iXBRL reports from the SEC for two companies in the same industry (your instructor may specifically assign companies and industries or leave the choice to you—the key is that both companies must be in the same industry). Use the SEC's iXBRL viewer (or another iXBRL viewer of your choice) to explore the iXBRL Consolidated Statement of Income for each company, and submit a document that completes the following table:

	Name of Company 1	Name of Company 2
Number of iXBRL elements in the Consolidated Statement of Income based on a standard taxonomy (US GAPP, IFRS, etc.)		
Number of iXBRL elements in the Consolidated Statement of Income based on an extension taxonomy		

- Attach screenshots of all iXBRL elements that use an extension taxonomy.
- How do you explain any differences you find between the two companies? For example, given that they are in the same industry, why do you think one company created a special extension taxonomy for one or more elements but the other company did not and instead used the standard U.S. GAPP taxonomy?

### 18.10 Excel Problem\*

Objective: How to do what-if analysis with graphs.

#### REQUIRED

- Read the article “Tweaking the Numbers,” by Theo Callahan in the June 2001 issue of the *Journal of Accountancy* (available at [www.aicpa.org](http://www.aicpa.org)). Follow the instructions in the article to create a spreadsheet with graphs that do what-if analysis.
- Now create a spreadsheet to do graphical what-if analysis for the “cash gap.” Cash gap represents the number of days between when a company has to pay its suppliers and when it gets paid by its customers. Thus,

\* Life-long learning opportunity: see pp. xxiii–xxiv in preface.

$$\text{Cash gap} = \text{Inventory days on hand} + \text{Receivables collection period} - \text{Accounts payable period}$$

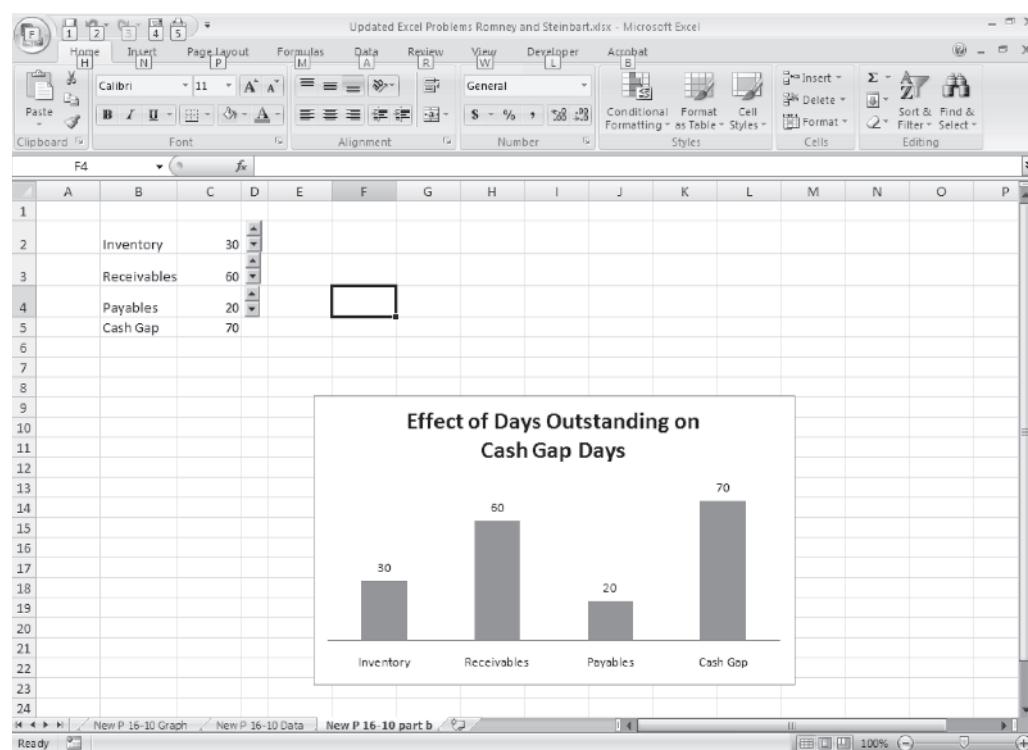
The purpose of your spreadsheet is to display visually what happens to cash gap when you “tweak” policies concerning inventory, receivables, and payables. Thus, you will create a spreadsheet that looks like Figure 18-17.

- c. Set the three spin buttons to have the following values:

	Spin Button for Inventory	Spin Button for Receivables	Spin Button for Payables
Linked cell	C2	C3	C4
Maximum	120	120	90
Minimum	0	30	20
Value	30	60	20
Small change	10	10	10

- d. The article “Analyzing Liquidity: Using the Cash Conversion Cycle” by C. S. Cagle, S. N. Campbell, and K. T. Jones in the *Journal of Accountancy* (May 2013), pp. 44–48, calls the “Cash Gap” the “Currency Conversion Cycle” and explains that bigger values are bad because they indicate less liquidity (because cash needed to pay suppliers is tied up in receivables and inventory). Indeed, the “cash gap” can even be negative for companies, like Dell, that collect payment from customers in advance and stretch out payments to suppliers as long as possible. Given that background, collect the information from annual reports needed to calculate the “cash gap” for at least 3 years for Dell, Walmart, Home Depot, and McDonalds. Enter that data in a spreadsheet and create a graph that best highlights the trend in cash gap across the different companies.

**FIGURE 18-17**  
Spreadsheet for  
Problem 18.10, part b



### CASE 18-1 Exploring iXBRL Viewers\*

The SEC provides a free iXBRL viewer. Another free viewer is available at edgardashboard.xbrlcloud.com. Use those two iXBRL viewers (and any others your professor assigns) to examine the iXBRL filings by a

specific company, and write a report that compares them in terms of ease of use and features. Attach screen shots to support your analyses.

### CASE 18-2 Evaluating a General Ledger Package\*

Magazines such as *Journal of Accountancy* and *Strategic Finance* periodically publish reviews of accounting software. Obtain a copy of a recent software review article, and read its comments about a general ledger package to which you have access. Using the software, write a report that indicates whether, and why, you agree or disagree with the review's opinions about the following features:

- a. Ease of installation
- b. Flexibility of the initial setup of the chart of accounts

- c. Ease of modifying the chart of account
- d. Control procedures available to restrict access
- e. Control procedures available to ensure accuracy of input and processing
- f. Report flexibility (how easy it is to design reports, etc.)
- g. Adequacy and control of the audit trail (e.g., what reference data are automatically provided versus how much of the audit trail has to be manually constructed)

## AIS in Action Solutions

### QUIZ KEY

1. From where do adjusting entries usually come?
  - a. treasurer [Incorrect. Adjusting entries are entered by the controller after the trial balance has been prepared. The treasurer makes regular journal entries to record financing activities, such as issuing or retiring debt.]
  - b. controller [Correct. Adjusting entries are entered by the controller after the trial balance has been prepared.]
  - c. various accounting cycle subsystems, such as sales order entry [Incorrect. Subsystems send summary regular journal entries, not adjusting entries, to the general ledger.]
  - d. unit managers [Incorrect. Unit managers should not make any journal entries.]
2. Errors in financial statements provided to creditors, investors, and government agencies can cause these stakeholders to make wrong decisions. This threat is referred to as
  - a. inaccurate or invalid general ledger data. [Correct. Inaccurate general ledger data can result in misleading reports that cause managers to make erroneous decisions.]
  - b. unauthorized disclosure of financial information. [Incorrect. It is important not to prematurely release financial statements. Doing so is likely to result in fines from various regulatory agencies and possible shareholder lawsuits.]
  - c. loss or destruction of master data. [Incorrect. The best way to mitigate the risk of this threat is to employ the backup and disaster recovery procedures.]

\* Life-long learning opportunity: see pp. xxiii–xxiv in preface.

3. The audit trail is a traceable path that shows how a transaction flows through the information system to affect general ledger account balances. Access to the audit trail is typically restricted to
  - a. managers. [Correct.]
  - b. auditors. [Incorrect.]
  - c. secretaries. [Incorrect.]
  - d. company workers. [Incorrect.]
4. The journal voucher file contains information that would be found in the general journal in a manual accounting system. Which individual journal entries are not used to update its general ledger?
  - a. date of journal entry [Incorrect. Included in journal entries.]
  - b. accounts debited and credited [Incorrect. Included in journal entries.]
  - c. addresses of creditors [Correct. Not included in journal entries.]
  - d. amounts [Incorrect. Included in journal entries.]
5. Which of the following checks is not an input edit and processing control needed to ensure that journal entries made by the treasurer are accurate and complete?
  - a. validity check [Incorrect. Ensures that general ledger accounts exist for each account number referenced in a journal entry.]
  - b. field (format) checks [Incorrect. Ensures that the amount field in the journal entry contains only numeric data.]
  - c. closed-loop verification [Incorrect. Involves matching account numbers with account descriptions, to ensure that the correct general ledger account is being accessed.]
  - d. back validation [Correct.]
6. In what dimension of a balance scorecard would one record upskilling of existing staff members?
  - a. financial [Incorrect. The proposed metric focuses on employee training and not the financial aspects.]
  - b. customer [Incorrect. The proposed metric focuses on employee training and not on the customer section.]
  - c. internal operations [Incorrect. The proposed metric focuses on employee training and not on the internal operations of the organization.]
  - d. innovation and learning [Correct. The proposed metric focuses on employee training that belongs to the learning aspect of innovation and learning.]
7. Which feature in an ERP system provides the same capability as the journal voucher file for use in audit trails?
  - a. prenumbered records [Incorrect. These are used to ensure integrity of the audit trail and cannot be deleted.]
  - b. trial balance [Incorrect. A trial balance is a report that lists the balances of all general ledger accounts.]
  - c. business workflow [Correct]
  - d. instance documents [Incorrect. These are XBRL files that contain tagged data, such as facts about specific financial line items.]
8. Which of the following contains the definition of each element that appears in an instance document?
  - a. schema [Correct]
  - b. linkbase [Incorrect. These are sets of files defining relationships among elements in a specified instance document.]
  - c. taxonomy [Incorrect. A set of files that define elements and the relationship between the elements.]
  - d. style sheet [Incorrect. File that provides instructions on how to correctly display the content of an instance document.]

9. Which of the following is designed primarily to improve the efficiency of financial reporting?
- XML [Incorrect. XML is a general-purpose language but is not designed for financial reporting.]
  - b.** XBRL [Correct. The eXtensible Business Reporting Language was developed, in part, by accountants to facilitate business reporting.]
  - IFRS [Incorrect. IFRS is an alternative to GAAP.]
  - The balanced scorecard [Incorrect. The balanced scorecard is a multidimensional performance report.]
10. Which of the following provides real-time data about key measures of operating performance?
- XBRL [Incorrect. XBRL is a tool used to produce financial statements.]
  - the balanced scorecard [Incorrect. The balanced scorecard is a periodic report that summarizes performance for a period of time.]
  - c.** dashboards [Correct. Dashboards present real-time measures of key operating performance data.]
  - a flexible budget [Incorrect. Flexible budgets are designed to help managers more accurately interpret variances from plans. However, like the balanced scorecard, they do not present real-time data but are only prepared periodically and summarize performance for a period of time.]