

A Custom Edition

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THE CROSSROADS OF ACCOUNTING AND BUSINESS INFORMATION SYSTEMS

Managing Risk and Applying Controls



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Sample pages

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Accounting System Insights

How Can the Data in Your Accounting System Create Value?

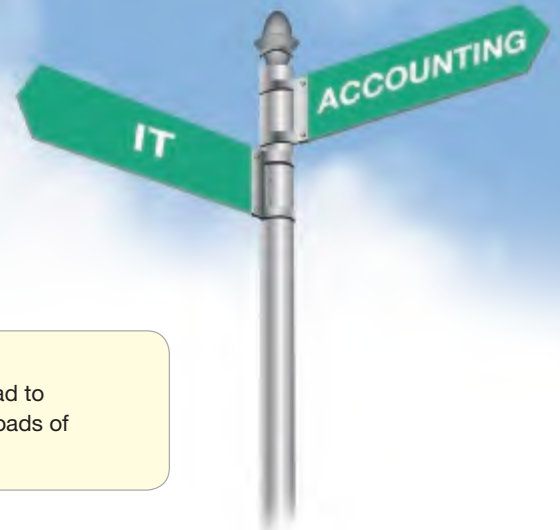
Meet Business Intelligence.

Can you imagine how the data stored in your accounting system can make millions of dollars for your business?

Meet business intelligence. Business intelligence (BI) uses data in smarter ways. BI involves analyzing data to glean insights for improved decisions and performance. The accounting system stores data, such as sales data, that can be used in BI analytics.

- Southwest Airlines used BI to increase profitability.
- Travelocity, a leader in the online travel industry, used BI to personalize customer service, increasing its gross bookings and earnings by 100% in the first year.
- Coca-Cola Bottling Company used BI about sales from vending machines to better forecast demand, increasing sales by 10%.
- The state of Texas used BI to recover over \$600 million in taxes from noncompliant taxpayers by crosschecking returns with other sources of data.
- Wells Fargo & Co., a leader in online financial services, used BI to provide its customers with a 360-degree view of their spending, credit and debit card transactions, checking accounts, and online bill payments.





At the Crossroads of Accounting and IT...

When you open this book and begin reading the first page, you are on the road to becoming a successful accounting professional who can navigate the crossroads of accounting and IT.

My Questions

- Q 1.1** How do I navigate the crossroads of accounting and IT?
- Q 1.2** How is the accounting system related to the enterprise system?
- Q 1.3** What are the secrets of my success at the crossroads of accounting and IT?
- Q 1.4** What are three keys to opportunity at the crossroads of accounting and IT?

Crossroads

This feature will appear throughout your book to clue you in to important terms and topics at the crossroads of accounting and IT.

How Do I Navigate the Crossroads of Accounting and IT?

Imagine that you just landed a new job! You have been hired as the IT auditor for EspressoCoffee Company, an online retailer of Italian espresso beans and espresso machines. You are responsible for auditing the accounting system and the related information technology (IT).

Can you conduct a successful audit if you don't understand the IT used by the system? How do you evaluate IT security for the accounting system if you don't understand the underlying IT? Did you know IT auditors often receive higher salaries because of their specialized knowledge of accounting and IT?

To audit accounting systems, IT auditors must be able to communicate with both accounting and IT professionals. Often accountants and IT professionals appear to be speaking different languages. The specialties of their unique fields often have terms and definitions that differ. For example, what an IT professional might call a *computer application*, the accountant might refer to as *software*. Some enterprises have addressed this need by hiring professionals with experience in both accounting and IT who serve as liaisons between the organization's accounting and IT professionals.

In today's business environment, the accounting professional stands at the crossroads of accounting and information technology. The goal of this text is to assist you in navigating the crossroads. We will equip you with IT terminology to facilitate communication with IT professionals, give you tools that IT professionals use, and provide you with insights to understand better the role of the accounting professional at the crossroads of accounting and IT. Having IT knowledge gives you a competitive advantage as an accounting professional.

To guide you through the crossroads of accounting and IT, this book is organized around three major functions of the accounting system:

1. **Store.** People, processes, and technology to store accounting data are covered in Part 1.
2. **Analyze.** Financial analytics and business intelligence for decision making are covered in Part 2.
3. **Safeguard.** Safeguarding information assets stored in the accounting system using security, controls, and risk management is covered in Part 3.

Numbers...2 Digits or 10?

Both accounting and IT professionals deal with numbers. Computers are digital and can process only 0s and 1s, so computer scientists distill everything down to two digits: 0s and 1s.

Accountants distill business transactions into numbers. The difference is that accountants use all 10 digits instead of just 2. So at the crossroads of accounting and IT, it all comes down to numbers.

4 PART ONE • ENTERPRISE ACCOUNTING SYSTEMS: PEOPLE, PROCESSES, AND TECHNOLOGY

When the Numbers Change

One enterprise found that its accounting staff and IT professionals were in a heated disagreement about a relatively minor update to an accounting program needed by the accounting staff. The IT staff wanted to charge thousands of dollars to the accounting department for the minor change. When a liaison was called in, she facilitated communication and discovered that all the numbers in the accounting program had been “hard keyed” into the program. Thus, actual numbers, such as 127 or 580, had been used in the program instead of using spreadsheet cell addresses for the source data. The only way to update the program was to manually replace the numbers that had been hard-keyed into the program with updated numbers. This time-consuming, labor-intensive approach was costly.

Imagine if an accounting professional with IT knowledge had been present at the meeting when the initial program was designed. If cell addresses had been used, results would have updated automatically when the numbers changed. Imagine the resources and time that the enterprise might have saved had this oversight never occurred. This example of accounting and IT professionals who need to work together and communicate well underscores the need for accountants who understand accounting and IT. It also underscores your value as an accounting professional if you understand the crossroads of accounting and IT.

My Connection . . .

How do I study less and learn more? Make connections. Try the following:

- Active Review 1.9
- It's Your Call 1.26

What Is Your Competitive Advantage?

To understand how to be a valued accountant, you need to understand how the accounting system (and you) fit into the larger enterprise system. What value do you add to the enterprise?

Throughout your book the terms *enterprise* and *organization* are used interchangeably.



Crossroads

As an accounting professional, you will encounter symbols and terminology used by IT professionals. A cloud is used by IT professionals to represent the enterprise network. This is known as a network cloud (Figure 1.1).

How Is the Accounting System Related to the Enterprise System?

Imagine that you just received your first paycheck on your new job! How was the data collected to create your paycheck? Who collected the data? Who created the paycheck?

When you were hired, the human resources department collected personal data about you, such as your name, address, and Social Security number. Human resources also collected data about your salary, pay grade, and benefits. That information was shared with the accounting department to generate your paycheck.

Within an enterprise there are numerous activities performed by various departments. These activities are often interconnected, such as human resources and accounting working together to create your paycheck.

An **enterprise system** supports people conducting business activities throughout the enterprise. Three basic functions of an enterprise system involve the following:

- Input: Capturing information to store in the system (such as your salary data)
- Processing: Sorting and storing information (such as calculating the amount of your paycheck)
- Output: Summarizing information to generate documents and reports used by executives, managers, and employees (such as your paycheck)

Because people performing different activities (such as human resources and accounting) have different needs, unique software may be required to meet their specific needs. For example, accountants use an accounting system to meet their needs. This accounting system is a subsystem of the larger enterprise system (Figure 1.1).

An accounting system captures accounting information about transactions, processes the accounting information captured, and generates financial reports, such as income statements and sales reports.

In addition to the accounting system (see Figure 1.1) additional modules or subsystems of an enterprise system might include the following:

- Supply chain management (SCM)
- Operations/production system (OPS)
- Human resource management (HRM)
- Customer relationship management (CRM)

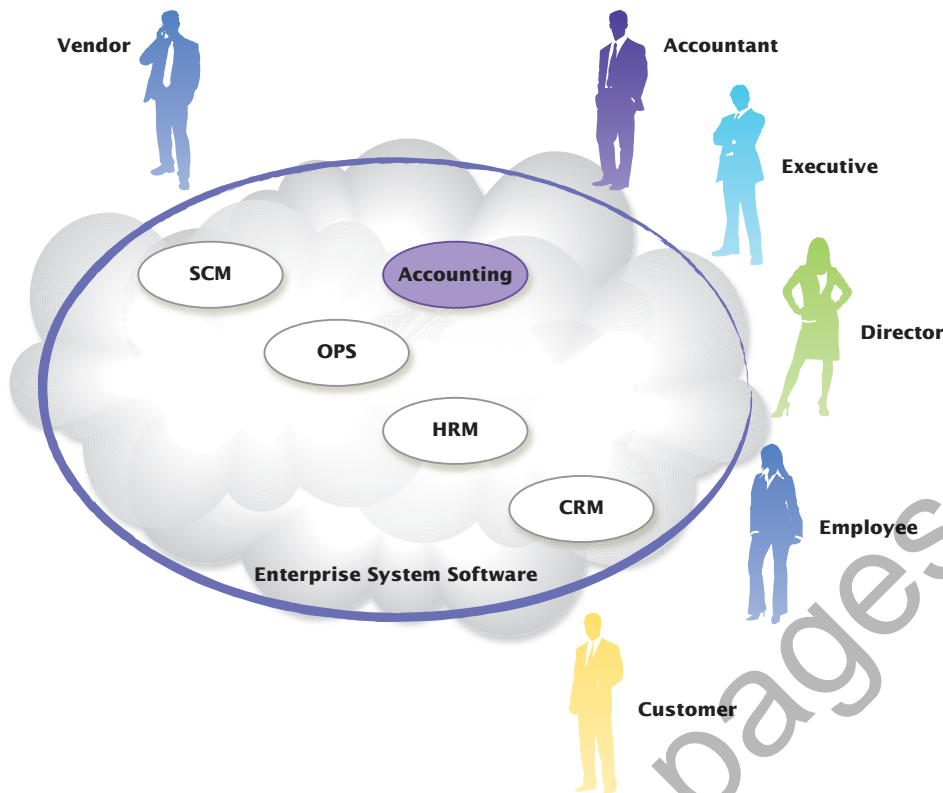


FIGURE 1.1
Enterprise System

How do you see the accounting system interacting with HRM to create your paycheck? When you make an online purchase, how do you interact with an enterprise system?

An **integrated enterprise system** shares data across functional areas within the enterprise. The same information is often used by different departments, as in the case of your paycheck. In an integrated enterprise system, when human resources enters your personal salary data into

Integrated Enterprise Systems...

...share data across the enterprise. For example, when data is entered into the supply chain management system to record the receipt of an inventory order, the same data can be shared with the accounting system to record the related accounting transactions. This is a good news/bad news situation. The good news is that other people are entering accounting data for you. The bad news is that they may not enter it correctly.

The Road to Integrated Enterprise Systems... How Did We Get Here?

Enterprise resource planning or ERP software of the 1990s was developed as an enterprise-wide system to help managers plan and control organizational resources. ERPs focused on resource planning for the enterprise, integrating information flows across an entire enterprise including accounting, human resources, supply chain, production, and marketing.

In the 2000s ERPs evolved further into the next generation of integrated business processing software called **enterprise software**. Enterprise software goes beyond resource planning. It encompasses all the information processing needs of the entire enterprise, including, but not limited to, resource planning. Enterprise software integrates the various business functions and transaction processing in the enterprise system. One widely used enterprise software is SAP (Systems, Applications, and Products in Data Processing) AG headquartered in Germany. A SAP enterprise system offers modules to assist in managing business processes including the following:

- Financials
- Human resources
- Operations
- Customer relationship management (CRM)
- Supply chain management (SCM)
- Enterprise resource planning (ERP)

If the modules are integrated with the capability to pass electronic documents and information from one module to another, the system is called an integrated enterprise system (IES).

How many times today have you re-entered the same information?

6 PART ONE • ENTERPRISE ACCOUNTING SYSTEMS: PEOPLE, PROCESSES, AND TECHNOLOGY

the system, the accounting department could access that data to create your paycheck. Thus, the integrated enterprise system can save time and reduce errors by eliminating the need to rekey the same data into multiple systems.

Enterprise system users can be internal or external users. Internal users can include employees, accountants, directors, and executives. External users include vendors and customers given access to the enterprise system to streamline and coordinate business activities. Amazon.com, for example, permits vendors to access its supply chain system to coordinate inventory deliveries.

Asking the following key questions about an enterprise can provide a deeper understanding of the underlying business the enterprise system serves:

- How does the enterprise create value?
- What are its business operations?
- What are the enterprise's business processes for conducting operations?
- Can the business processes be streamlined or improved?

Business Processes

To understand an enterprise system, first you must understand the underlying business and business processes. **Business processes** are related activities performed by an enterprise to create value by transforming input into output (a product or service sold to customers). Apple Inc., for example, buys input (components such as Intel processors, memory chips, copper wire, transformers, etc.) to transform into output (MacBook Air laptops).

The enterprise value chain is an organizing framework for business processes. The **value chain** is useful in coordinating activities with suppliers and customers.

There are many variations of the value chain. In general, the value chain begins with purchasing items from vendors and ends with selling items to customers. As shown in Figure 1.2, one variation of the value chain includes the impact of innovation on an enterprise's ability to create value. Innovation in the current business environment includes not only designing new services and products but also designing new experiences for customers. For example, Twitter.com is a social networking tool that created a new type of social networking experience for online users. Starbucks Coffee sold not only coffee, but provided the coffee house experience to customers.

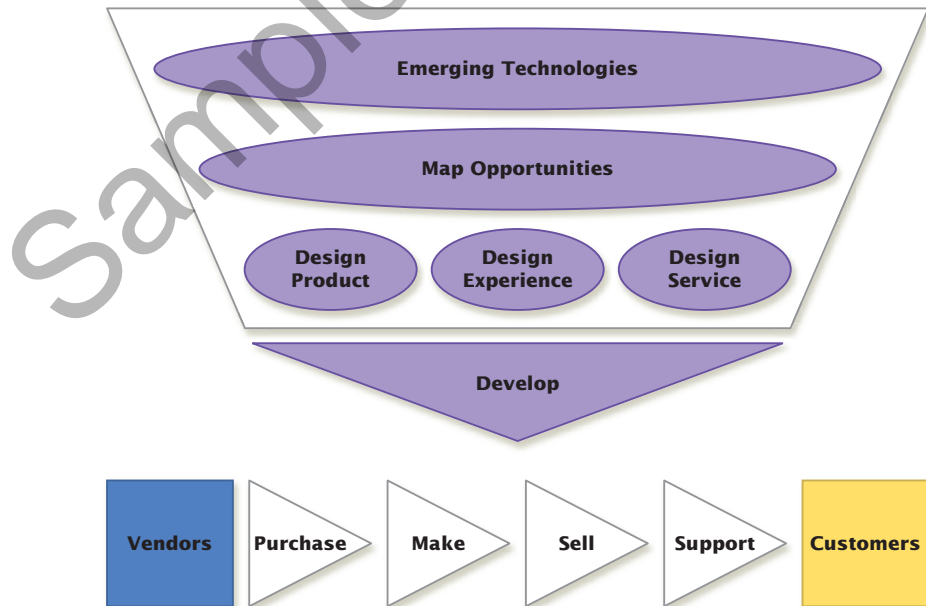


FIGURE 1.2
Value Chain and Innovation

Pair and Share: Share with a classmate your response to the following question: How do you think emerging technologies will create opportunities for accounting?

Based upon The New Value Chain from *The Imagination Challenge: The Strategic Foresight and Innovation in the Global Economy* by Alexander Manu. peachpit.com/articles/ (accessed July 2009).

By Any Other Name...

The system that supports financial and accounting activities in an organization can be called many different names. In academia, such a system is often called an *accounting information system* or *AIS*. However, if you use that term on the job, be prepared for responses such as “What are you talking about?” Typically, AIS is not a term that is used in practice. Instead, terms used may be *accounting system*, *enterprise accounting system*, *financial system*, or *general ledger system*. Boeing, for example, uses the term *enterprise accounting system*.

For simplicity, this book uses the term *accounting system* to refer to systems that support financial and accounting activities within an enterprise. Keep in mind as you are reading that the term *accounting system* may be used interchangeably with *accounting information system* or *enterprise accounting system*.

As shown in Figure 1.2, in addition to research and development for new services, products, and experiences, the value chain is comprised of a series of business processes. These processes include the following:

- Purchase items from vendors.
- Make the service, product, or experience.
- Market and sell the service, product, or experience to customers.
- Support and maintain the service, product, or experience.

The enterprise system supports these business processes. As shown in Figure 1.3, the supply chain management (SCM) system supports the business process of purchasing items from vendors. The operations/production system (OPS) provides the resources to support tracking

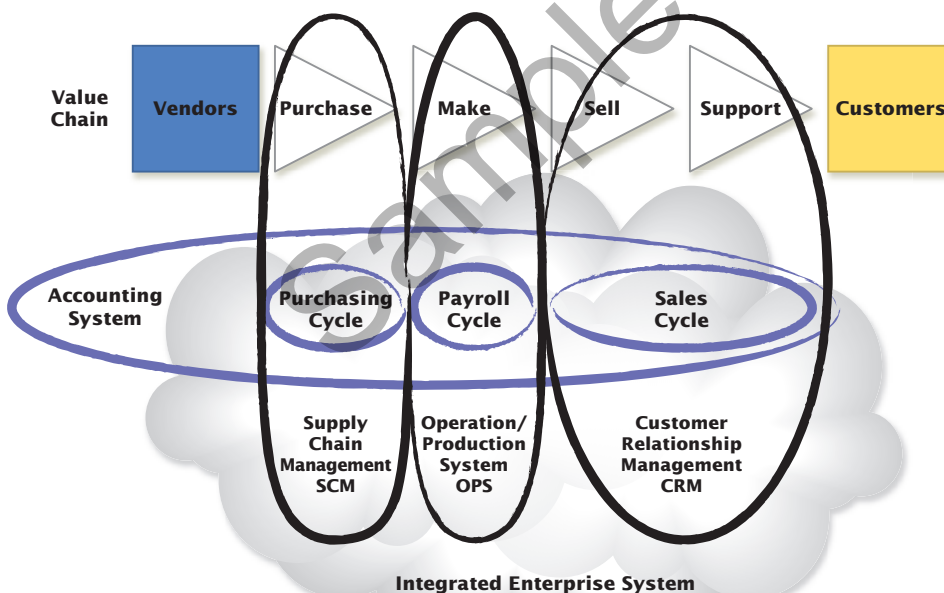


FIGURE 1.3
Business Processes, Transaction Cycles, and the Integrated Enterprise System

Pair and Share: Share with a classmate your response to the following question: Of all the systems, why is the accounting system the most indispensable in the integrated enterprise system?

and coordinating operations of the business to make the service, product, or experience. The customer relationship management (CRM) system supports marketing and sales activities. The accounting system is unique in that it spans the value chain, tracking transaction information from the purchase of items from vendors through the sale to customers (Figure 1.3).



Crossroads

What IT professionals may refer to as *business processes*, accounting professionals may call *transaction cycles*.



Crossroads

Some IT professionals may mistakenly use the term *accounting cycle* to refer to the purchasing, payroll, and sales cycle.

Accounting professionals typically use the term *accounting cycle* to refer to the accounting activities that span the accounting period, such as preparing a trial balance, making adjusting entries, and creating financial statements.

My Connection...

How do I study less and learn more? Make connections. Try the following:

- Active Review 1.8
- Short Exercise 1.29

Transaction Cycles

An enterprise's business processes and accounting system are interrelated. The accounting transactions related to specific business processes are frequently called **transaction cycles**. Figure 1.3 shows the relationship between the business processes in the value chain and the accounting transaction cycles. As the figure illustrates, the **purchasing cycle** consists of transactions related to purchasing items from vendors. Sometimes the purchasing cycle is referred to as the *vendors transaction cycle* or *purchasing transaction cycle*. The purchasing cycle relates to transactions between an enterprise and its vendors, including suppliers and consultants.

The **payroll cycle** consists of employee and payroll transactions. These expenditures make it possible to conduct operations to create a service, product, or experience for the enterprise's customers. Together, the purchasing cycle and payroll cycle are referred to as the *expenditure transaction cycle*.

The **sales cycle** in the accounting system corresponds to the selling component of the value chain. The sales cycle may also be called the *revenue cycle* or *revenue transaction cycle*. The sales cycle involves exchanges or transactions between an enterprise and its customers.

To understand the accounting system for an enterprise, it is essential to understand the underlying business processes and transaction cycles. Next, we share with you some accounting system insights. These insights will aid you in navigating the crossroads of accounting and IT.

Have You Ever Purchased a Used Car?

CARFAX.com is an online service for used car buyers. For a fee, you can obtain information about the car you would like to purchase, such as previous owner(s), prior accidents, repairs, and the resale value. What is the value of this information to a used car buyer?

What do you think?

1. How does CARFAX.com create value? What is the enterprise's value chain? What are the business processes that make up the value chain for the enterprise?
2. What are the accounting events or transactions that correspond to the enterprise's business processes?
3. What transactions make up the purchasing cycle for the business?
4. What are the transactions in the payroll cycle?
5. What is the sales cycle for the enterprise?

Would You Like to Know a Secret?

We will share with you some secrets about accounting that you may not have heard about in your previous accounting classes. These secrets will provide you insights to effectively prepare you for your transition into the world of accounting/IT professionals.

Accounting System Insights: What Are the Secrets of My Success at the Crossroads of Accounting and IT?

Imagine that you take your first paycheck to the bank and deposit it using the ATM. Accountants are well known for focusing on details, such as recording your single bank deposit accurately.

Now imagine the accounting system required to track all deposits made at Wells Fargo's 12,000 ATMs. In addition to getting the details right, the accounting/IT professional must also be able to understand the overall accounting system, such as Wells Fargo's system's ability to track deposits made at over 12,000 ATMs.

Can't See the Forest for the Trees?

Studying accounting systems is very different from studying other areas of accounting, such as financial, tax, or managerial accounting. Financial accounting focuses on external reporting for creditors and investors. Tax accounting focuses on tax reports for the Internal Revenue Service (IRS), state departments of revenue, and local tax agencies. Managerial accounting focuses on providing accounting information to internal users, primarily management. Successful accountants are well known for focusing on details, which is imperative for a successful accounting professional. However, understanding accounting systems involves seeing the overall system as well as focusing on details.



FIGURE 1.4
Satellite Mapping
 (learn.arc.nasa.gov)

Your prior accounting courses, such as financial, managerial, and tax accounting, focused more on details. You may find that this course requires you to think differently about accounting. To aid you in this transition, we share with you some accounting system insights.

Accounting Insight No. 1: Think Satellite Mapping

Viewing an accounting system can be compared to satellite mapping. With satellite mapping, you can use an aerial satellite view to see the entire globe or zoom in to see cities or even streets (Figure 1.4). Obtain the level of detail needed by zooming in or out until the satellite map is in focus.

The aerial view of accounting is the enterprise-wide view of the accounting system. To see the detailed view of accounting, zoom in (drill down) to focus on specific, detailed information, events, and transactions recorded in the accounting system.



ACCOUNTING INSIGHT NO. 1
 Use Satellite Mapping to View Accounting Systems...
 Zoom out for Aerial View...
 Zoom in for Detail View...

BASELINE ACCOUNTING SYSTEM MODEL To assist you in envisioning a global view of an accounting system, Figure 1.5 shows an accounting system model that is representative of most enterprises. This will be referred to as a baseline accounting system model.

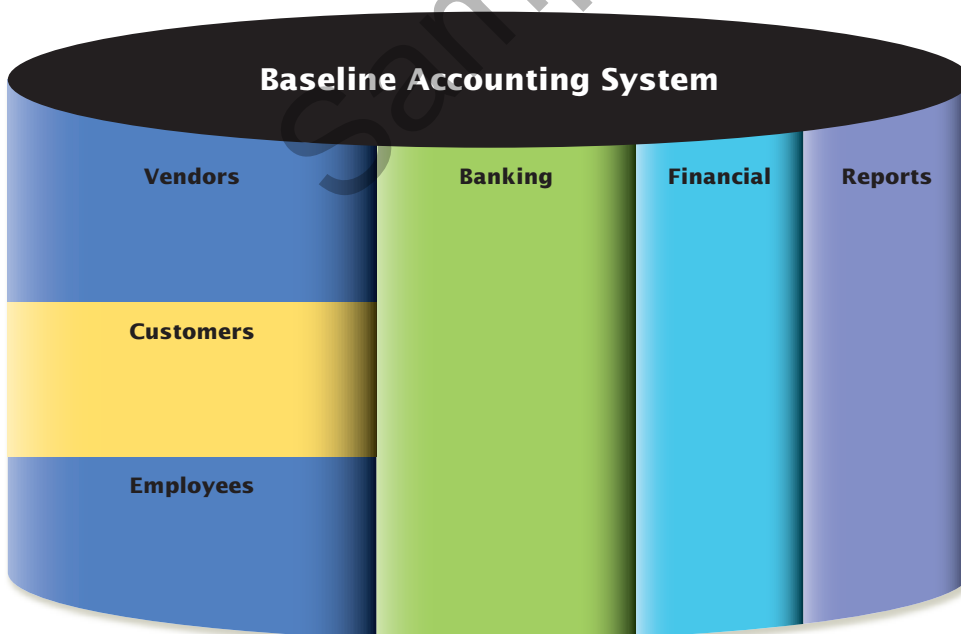


FIGURE 1.5
Baseline Accounting System Model

The **baseline accounting system** model provides an enterprise-wide view of the firm’s accounting similar to the aerial, global view for satellite mapping.

The baseline accounting system typically consists of the following modules that most enterprises use:

- Vendors module
- Customers module
- Employees module
- Banking module
- Financial module
- Reports module

A Model...

... is a symbolic representation of a real system or product. For example, a car manufacturer designs a car, then builds a working model (prototype) of the car to test the design before actually building the entire car. Similarly, we will use a baseline model of the accounting system to represent how accounting information flows through most enterprises.

Each module contains business processes with related accounting transactions. The baseline accounting system with transactions common to most business operations is shown in Figure 1.6. The baseline accounting system with corresponding transaction cycles is shown in Figure 1.7. Next, we explore further each module in the baseline accounting system.

VENDORS MODULE: PURCHASING CYCLE The **vendors module** is composed of transactions with vendors, such as purchasing goods or services. An example of a vendor transaction would be when Apple Inc. purchases components to use for building iPads.

The vendors module relates to the purchasing cycle. Vendor transactions that are common to the purchasing cycle for many enterprises include the following:

- Create purchase orders.
- Receive items.
- Enter bills.

CUSTOMERS MODULE: SALES CYCLE The **customers module** consists of transactions with customers, such as selling the customer a product or service. An example of a customer transaction would be when an Apple retail store sells you, the customer, an iPad.

The customers module relates to the sales cycle. Customer transactions that are commonly performed as part of the sales cycle include the following:

- Create invoices.
- Receive customer payments.

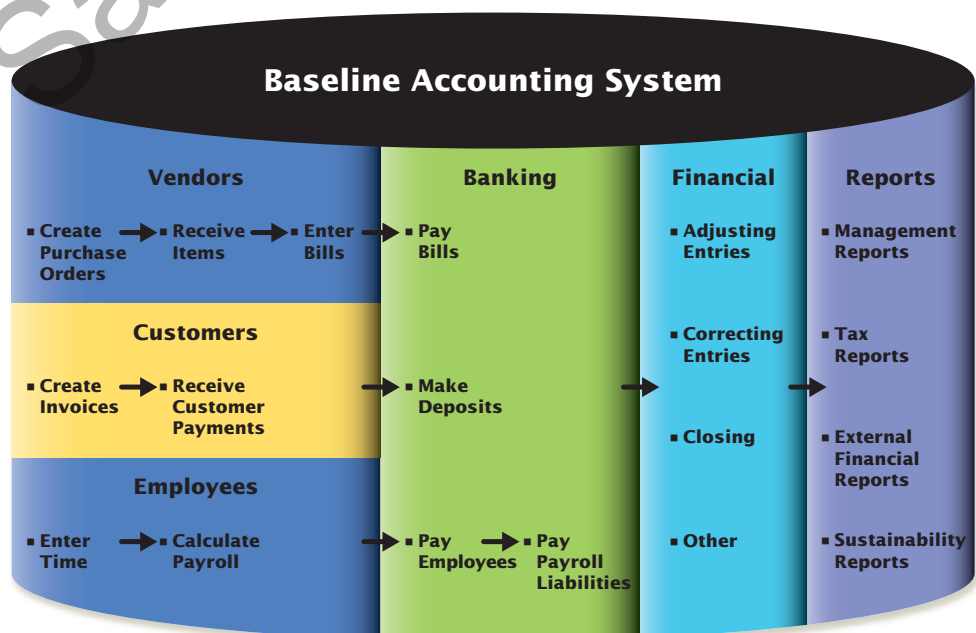


FIGURE 1.6
 Baseline Accounting System with Transactions

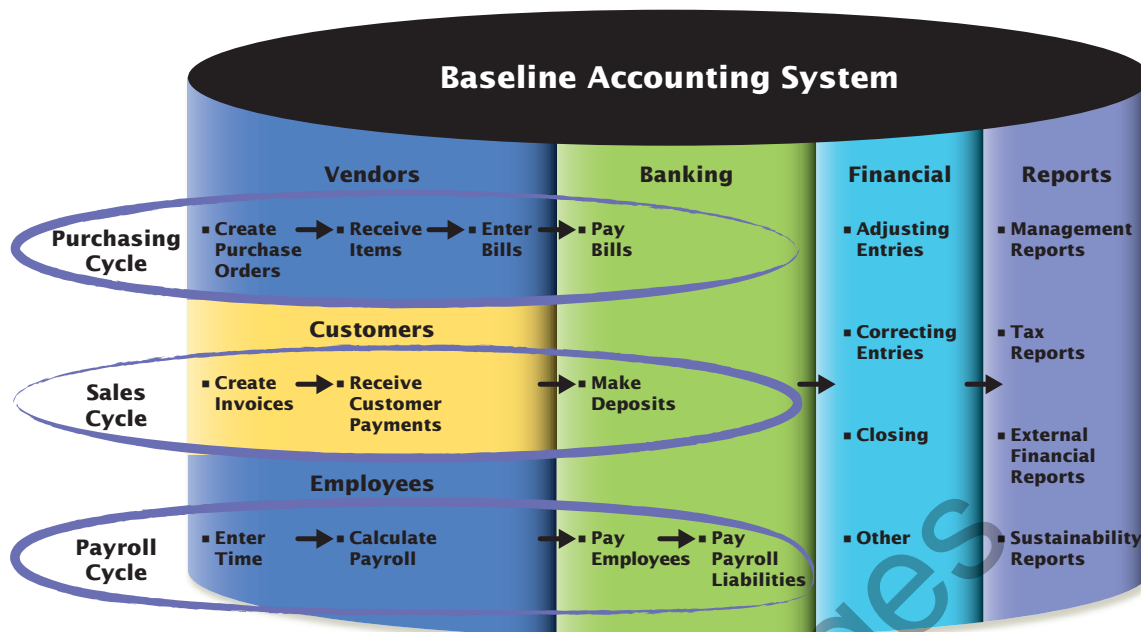


FIGURE 1.7
Baseline Accounting System with Transaction Cycles

Pair and Share: Share with a classmate your response to the following:
 Explain how Figures 1.5, 1.6, and 1.7 use satellite mapping for accounting.

EMPLOYEES MODULE: PAYROLL CYCLE The **employees module** consists of transactions with employees for payroll. If you work at an Apple store as an employee, an example of an employee (payroll) transaction is when Apple pays you a salary.

The employees module relates to the payroll cycle. Employee transactions often completed as part of the payroll cycle include the following:

- Enter time.
- Calculate payroll.

BANKING MODULE The **banking module** involves cash received (deposits) or cash paid (checks/withdrawals) by the enterprise. An example of a banking transaction would be if you, the customer, paid cash to Apple Inc. for your new iPad. Apple would deposit this cash in a bank.

You will notice in Figure 1.6 that the banking module is typically a continuation of other modules:

- Pay bills is a continuation of the vendors module components.
- Make deposits is a continuation of the customers module components.
- Pay employees and pay payroll liabilities are continuations of the employees module components.

FINANCIAL MODULE: FINANCIAL CYCLE The **financial module** consists of other events and transactions that do not fall into the prior modules. Sometimes it is referred to as the *financial cycle*.

The financial module includes the following items:

- **Adjusting entries** at year end to bring accounts up to date, such as recording depreciation for the period
- **Correcting entries** to correct errors
- **Closing entries** to close out Income and Expense accounts at year end so the enterprise can begin the new year with \$-0- balances in all Income and Expense accounts.

REPORTS MODULE The **reports module** relates to output from the accounting system. Reports can be in electronic form or in hardcopy printouts. In general, there are four types of reports produced by the accounting system:

- **Financial reports**, such as the financial statements included in a company’s annual report given to investors. For example, Apple Inc. includes an income statement, balance sheet, and statement of cash flows in its annual report to investors.
- **Tax reports** used when filing federal, state, and local taxes.
- **Management reports** provided to management of the enterprise. These reports are prepared as needed to assist management in decision making.
- **Sustainability reports** used for decision making and performance evaluation related to an enterprise’s sustainability practices.

Reports generated by the reports module of the accounting system are often summaries of the output from the other baseline modules, (i.e., vendors, customers, employees, banking, and financial modules). Next, we will look at how the modules in the baseline accounting system are incorporated into accounting software.

ACCOUNTING SOFTWARE Accounting software often includes a navigation screen that represents the major modules within the accounting system. QuickBooks accounting software uses a Home page as shown in Figure 1.8. The QuickBooks Home page aids you in seeing the entire accounting system at a glance. It is your satellite map for the accounting software. If you zoom in closer, you see the modules and related transaction cycles:

- Vendor transactions in the purchasing cycle
- Customer transactions in the sales cycle
- Employee transactions in the payroll cycle

To zoom in or drill down to see details, you simply click on the icons. For example, if you click on the Write Checks icon (Figure 1.9), you can drill down to view the detail of an onscreen check (Figure 1.10).

Your Competitive Advantage...

In your book you see the approach frequently used in practice:

1. Start with a baseline system.
2. Customize the baseline for enterprise-specific needs.

With this approach, you can handle virtually any accounting system you encounter in practice, giving you a competitive advantage.

ABCs of Accounting Systems

Today, developing an accounting system is as easy as ABC. Divide the accounting system into two stages: baseline and customized. The dilemma facing enterprises has been:

- Do we change our business processes to fit a generic baseline accounting system?
- Do we custom build an accounting system that fits our unique business needs?

This dilemma is addressed by using the accounting system ABCs. The baseline accounting system is a generic accounting system that includes the workflow and business processes frequently used by most enterprises. Modules in a baseline accounting system include the vendors, customers, employees, banking, financial, and reports modules as shown in the baseline accounting system model in Figures 1.5, 1.6, and 1.7.

To create a customized accounting system, we configure or customize the baseline accounting system to accommodate the unique requirements and needs of the specific enterprise. This involves customizing each of the modules shown in the baseline model to fit the specific needs of the enterprise.

$$\text{Accounting System} = \text{Baseline System} + \text{Customized System}$$

Debits and Credits...

A transaction is an exchange between an enterprise and another entity. Double-entry accounting using debits and credits is based upon receiving and giving. When Apple sells an iPhone, Apple receives cash and gives an iPhone. Thus, an exchange of cash and merchandise inventory occurs. An event may not involve an exchange, but may still need to be recorded in the accounting system. Accrued interest expense needs to be recorded at the end of the accounting period to bring accounts up to date but does not involve an exchange.

Debits and Credits...

Debits and credits play an important role when learning double-entry accounting.

Accounting Insight No. 2: Debits and Credits?

Today, most accounting information is *not* entered using debits and credits. Debits and credits may be used to make adjusting entries at year end to bring accounts up to date. However, debits and credits typically are not used to enter transactions and events into the accounting system.



ACCOUNTING INSIGHT NO. 2
 Most Accounting Information Is NOT Entered...
 Using Debits and Credits

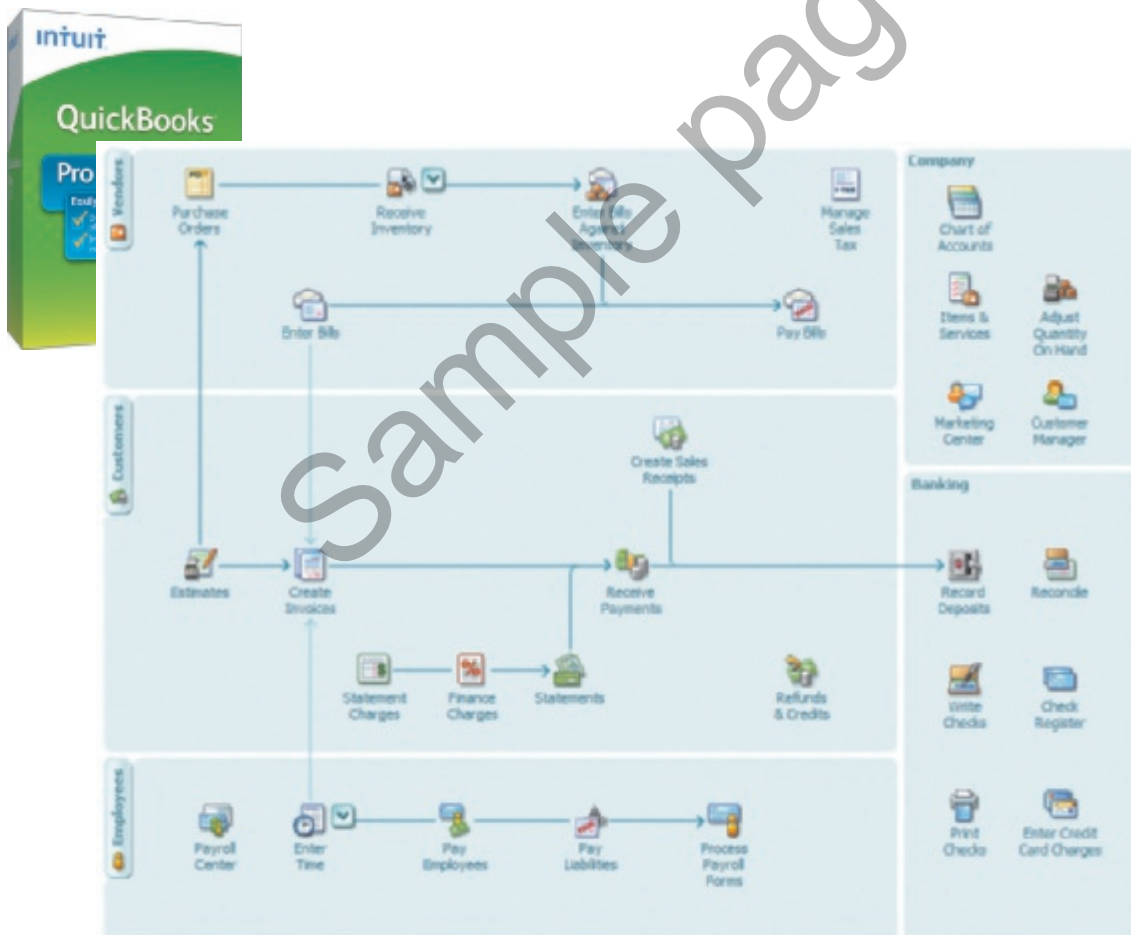


FIGURE 1.8
QuickBooks Home Page

On the QuickBooks Home page, can you find the vendors module? The employees module? The customers module? Does the QuickBooks Home page have a financial module?

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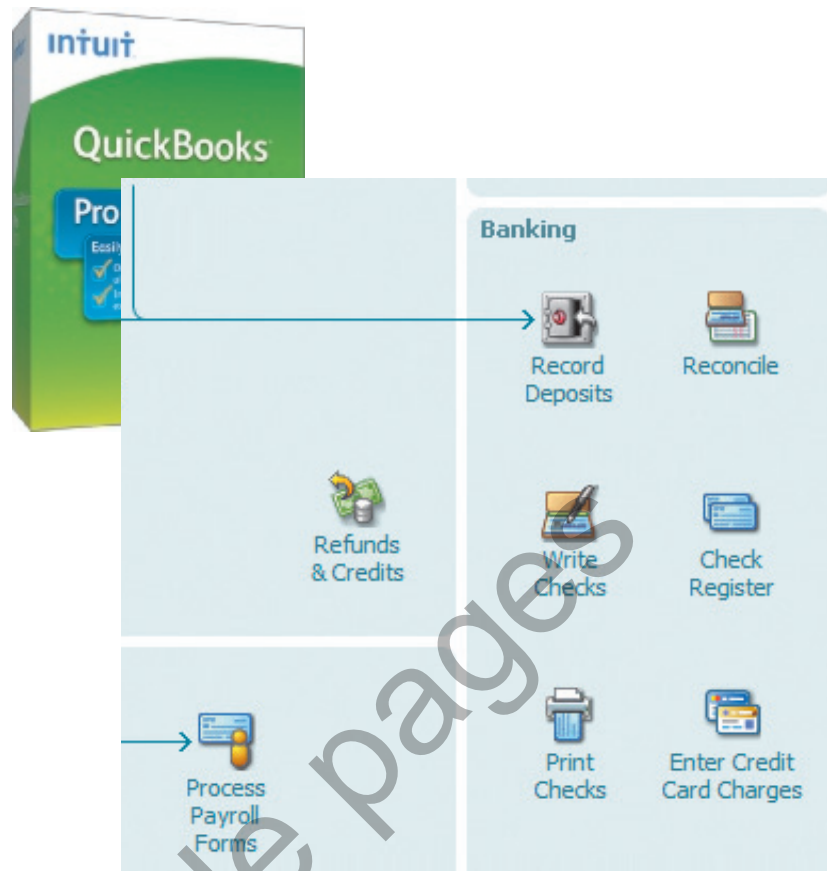


FIGURE 1.9
QuickBooks Drill Down

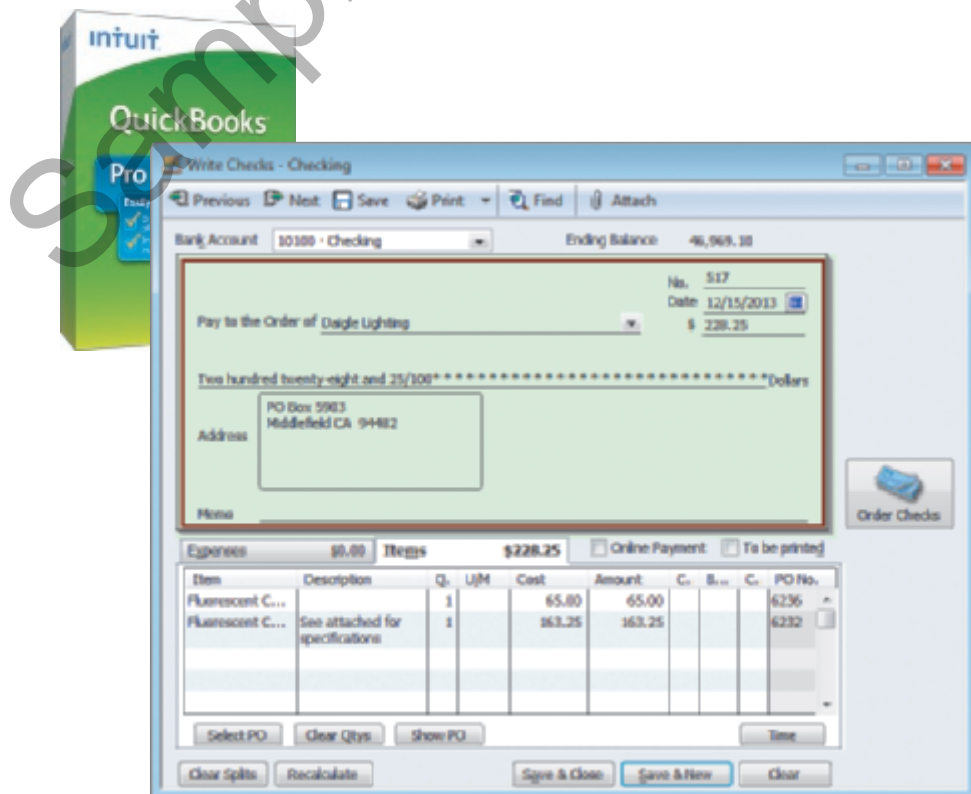


FIGURE 1.10
Onscreen Check Detail

Accounting Insight No. 3: Onscreen Forms

Accounting information is frequently entered using onscreen forms, such as the onscreen check shown in Figure 1.10.

These onscreen forms are actually database forms designed to look like frequently used paper forms, such as checks, invoices, and purchase orders. The onscreen forms often mirror the paper forms to speed data entry.



ACCOUNTING INSIGHT NO. 3
Accounting Information Is Often Entered...

Using Onscreen Forms:

- Checks
- Invoices
- Purchase Orders
- and More....

Accounting Insight No. 4: Databases

This brings us to Accounting Insight No. 4: Today, virtually without exception, accounting systems use databases to store accounting information. From QuickBooks for small business to SAP for large-scale enterprises, accounting systems use databases to store accounting data. Thus, the database is a key component of the accounting system.



ACCOUNTING INSIGHT NO. 4
Accounting Systems Use DATABASES to Store Accounting Information

Accounting software is often classified into three categories:

- Small business
- Midsize
- Large scale

Small business software includes QuickBooks, Peachtree, and SAP Business One. Accounting software for midsize enterprises includes QuickBooks Enterprise and SAP Business All-in-One. Large-scale accounting systems would use enterprise software such as SAP Business Suite and Oracle E-Business Suite (Figure 1.11).

With small business accounting software, such as QuickBooks or Peachtree, the database is integrated. When you install the software, the database is installed also. This is similar to an integrated sound system, such as a BOSE speaker with sound components integrated into one unit.

For large-scale enterprises using enterprise software, such as SAP, there is a front-end software application (client) that is the user interface. The user interface consists of the input and output forms seen on the computer screen. A database software application, such as an Oracle database, is installed as a separate component. Large-scale enterprise software with a front-end software application on screen and a behind-the-screen database can be compared to a high-end Bang & Olufsen sound system with separate components of woofers, subwoofers, and so on.

Although the size and number of databases may differ, accounting systems use databases to collect and store accounting information.

Accounting Databases...

In your book, to clearly identify databases used to store accounting data, the term *accounting database* is used.

In Your Book...

We use illustrations from different accounting software to give you stronger transitional skills.

We begin your book using QuickBooks software examples because it is easy to learn. Then you can transition your skills to use accounting software designed for larger enterprises.

Your Competitive Advantage...

Transitional skills permit you to learn one type of accounting software and transition your knowledge to other accounting software packages. For example, if you learn the fundamentals of accounting software for small business, you can transition that knowledge to learning mid- and large-scale accounting software.

Accounting Insight No. 5: Behind the Screen

This leads us to Accounting Insight No. 5: To understand accounting systems, the accountant must understand databases. Understanding databases can be tricky because databases are *behind the screen*. The accounting software appears on the accountant's computer screen. The accounting database that stores the accounting data runs behind the screen of the accounting software.



ACCOUNTING INSIGHT NO. 5
To Understand Accounting Systems the Accountant Today Must Understand DATABASES... Behind the Screen

FIGURE 1.11

Accounting Software

Did you know that QuickBooks Enterprise software has a larger market share than all other midsize accounting software combined? Did you know that QuickBooks accounting software has almost 95% of the small business accounting software market?



ACCOUNTING INSIGHT NO. 6
 When Designing a Database
 Begin with the Outcome in Mind

Accounting Insight No. 6: Outcome in Mind

Accounting Insight No. 6 states that when designing an accounting database, begin with the outcome in mind. What reports or outcomes do you need from the accounting system? The outcomes are called user requirements. Collecting and anticipating user requirements is a crucial part of designing an effective accounting system. For example, let's say you are designing a database for EspressoCoffee. EspressoCoffee would like to send a mailing to all customers in the 63141 ZIP code. Thus, it is necessary to design and store the address information in the database in such a way that EspressoCoffee can search by ZIP code.

Begin with the Outcome in Mind...

For example, if you needed to mail your customers in the 63141 ZIP code, you must be able to sort by ZIP.

User Requirements...

Outcomes required by the user are called user requirements.

EspressoCoffee Company

EspressoCoffee is a company that will be used throughout your book to illustrate accounting system concepts.

2-D Databases...

A spreadsheet can be viewed as a two-dimensional or flat database (see Figure 1.13).

What are the database essentials that you need to know as an accounting professional? Database essentials include the following:

- Fields
- Records
- Tables

To illustrate these database essentials, we will assist EspressoCoffee in setting up a system for tracking customer information. EspressoCoffee would like to set up a system for tracking information about its customers who buy espresso beans and machines. For ease of use, EspressoCoffee would like to organize the information in a spreadsheet.

Database Essentials

- Field: A piece of information about events, people, or objects
- Record: A collection of related fields
- Table: A collection of related records with a unique table name
- Database: A collection of related tables

DATABASE FIELDS: PIECES OF INFORMATION Each piece of information that EspressoCoffee collects about a customer is called a **field**. For example, customer name, street, city, state, and ZIP would be considered fields.

DATABASE RECORDS: COLLECTION OF RELATED FIELDS Each row in EspressoCoffee's spreadsheet contains information about a specific customer. This is called a **record**. A database record is a collection of related database fields populated with data about a specific customer (Figure 1.12).

The **primary key** is a unique identifier for each record. For example, for EspressoCoffee to retrieve a specific customer, it needs a unique identifier for each customer. If EspressoCoffee had two customers named John Smith, when John Smith placed an order for espresso beans, the company would have no way to know which John Smith placed the order—unless EspressoCoffee had a unique identifier for each customer. Customer No. is the primary key that uniquely identifies each customer for EspressoCoffee. Each customer has a unique customer number so that no two customers have the same number (Figure 1.12).

	A	B	C	D	E	F	G	H
1	CUSTOMER No	LAST NAME	FIRST NAME	COMPANY NAME	STREET ADDRESS	CITY	STATE	ZIP
2	127127	Ashuer	Angela		13 Joseph Ave	Appleton	WI	54911
3	913691	Pico	Vincent	EspressoBar	58 Dante	Pisa	Tuscany	56100
4								
5								

FIGURE 1.12

Fields and Records

How many fields do you see in Figure 1.12?

How many records are in Figure 1.12?

DATABASE TABLES: COLLECTION OF RELATED RECORDS A database table is a collection of related records. You can think of a spreadsheet as a two-dimensional or flat database because it is only one table (Figure 1.13).

Note that the address is broken into separate fields so that you can search by ZIP, for example.

Each database table has a unique name. For example, we will name the database table in Figure 1.13 the CUSTOMER table because it stores data about EspressoCoffee’s customers.

ACCOUNTING DATABASES: COLLECTION OF RELATED TABLES A database is a collection of related tables. A relational database is three dimensional with many interrelated tables (Figure 1.14). In a **relational database**, the tables are related or connected through fields that are common to two or more tables.

	A	B	C	D	E	F	G	H
1	CUSTOMER No	LAST NAME	FIRST NAME	COMPANY NAME	STREET ADDRESS	CITY	STATE	ZIP
2	127127	Ashuer	Angela		13 Joseph Ave	Appleton	WI	54911
3	913691	Pico	Vincent	EspressoBar	58 Dante	Pisa	Tuscany	56100
4								
5								

FIGURE 1.13
Excel Spreadsheet as a 2-Dimensional Database Table

Customers Table:

CUSTOMER NO	COMPANY NAME	LAST NAME	FIRST NAME	STREET ADDRESS	CITY	STATE	ZIP	COUNTRY	ACCOUNT BALANCE
127127		Ashuer	Angela	13 Joseph Ave	Appleton	WI	54911	USA	\$1,080.00
913691	EspressoBar	Pico	Vincent	58 Dante	Pisa	Tuscany	43001	Italy	\$530.00

Sales Order Table:

SALES ORDER NO	ORDER DATE	SALES ORDER SUBTOTAL	SALES	SALES	SALES	CUSTOMER NO
5820	8/12/2010	\$80.00				127127
5820	8/12/2010	\$45.00				913691
5890	7/20/2010	\$1,000.00				127127
6077						
7011						

Items Table:

ITEM NO	ITEM NAME	ITEM DESCRIPTION
500B	Espresso Machine Lux	Espresso Machine Lux Model 2009 all electronic
AR01	Pure Arabica	Pure Arabica from Colombia and Africa
AR0C	Arabica Colombian Mix	Arabica Colombian Mix - 60% Arabica 40% Colombian
BB6-1	Espresso Machine Base	Espresso Machine Base Model 2001 with foam feature
WC1	Small Cups	Small Cups - White small espresso cups
WC2	Small Cup Lux	Small Cups Lux - White small espresso cups quality

FIGURE 1.14

Database Tables in Three Dimensions

Can you identify the three dimensions to a database?

FIGURE 1.15
CUSTOMER Table

Customer No	Last Name	First Name	Street Address	City	State	Zip
127127	Ashuer	Angela	13 Joseph Ave	Appleton	WI	54911
913691	Pico	Vincent	58 Dante	Pisa	Tuscany	56100

FIGURE 1.16
ORDER Table

Why don't we need to repeat the customer information in the ORDER table?

Invoice No	Date	Customer No
5819	12.21.2010	127127
5820	12.23.2010	913691

EspressoCoffee
 Company



For example, after EspressoCoffee builds a CUSTOMER database table, it will need to track information about customer orders in a separate table called the ORDER table. The ORDER table also needs a unique identifier or primary key, such as Order No.

The customer information is stored in the CUSTOMER table and the order information is stored in a separate table, the ORDER table. Note that we do not need to reenter all of the customer information again in the ORDER table. We can simply enter the customer number and then connect the related tables (CUSTOMER table and ORDER table). This is why it is called a relational database: The table relationships are used to connect the tables in the database (Figure 1.15 and 1.16). In a relational database, the tables are related or connected using fields that are common to two or more tables.

In an accounting database, there will be many tables including a table for customers, vendors, employees, sales orders, purchase orders, and many more. Each table in the database will consist of records comprised of fields.

Three more database essential terms that an accountant needs to understand are:

- Database forms
- Database queries
- Database reports

DATABASE FORMS: INPUT Database forms are forms used to input data into the database. Onscreen checks and onscreen invoices in accounting software are actually database forms designed to resemble paper source documents, making data entry easier and faster (Figure 1.10).

DATABASE QUERIES: SEARCHES Database queries are questions. Database queries search the database to answer a specific question and extract a specific piece of information from one or more tables. For example, you might ask the question “How many customers does EspressoCoffee have in the 54911 ZIP code?” You could query the database to search on the ZIP field using the criteria of ZIP = 54911.

DATABASE REPORTS: OUTPUT After you search or query the database, you will need a way to view or output the information. Database reports provide a format for viewing the results of your query. You can usually view a report onscreen or print out a copy of a report.

For example, if you wanted to create a 2012 income statement for EspressoCoffee using accounting information stored in a database, first the system would run a query to retrieve revenue and expense account balances for 2012. Then the results of the query would display in a database report using an income statement format.

Accounting Insights No. 3 through 6 relate to how accounting data is stored in a database. Storing accounting data is one of three vital functions that the accounting system serves. Basically, three functions of the accounting system include:

1. Storage of accounting transactions and financial data. The accounting transactions that result from the operations of the business are typically stored in a relational database. Sometimes the relational database that stores operational transactions is referred to as an **operational database**. Accounting Insights No. 3 through 6 relate to this first function of storing accounting data in a database.
2. Business intelligence and financial analytics for decision making. Business intelligence employs data analytics and predictive modeling to gain insights from data to improve the

Database Queries...

Note that the customer address must be broken into separate fields so that you can search on the ZIP Code field.

Database Queries...

SQL (Structured Query Language) is a query language used to query a relational database.

More Database Essentials

Database form: Database screen to input data
 Database query: Database searches
 Database report: Database screen for output data

quality of business decisions. Accounting Insight No. 7 relates to this second function of how accounting data is used for decision making.

3. Safeguarding information assets. One of the functions of the accounting system is to have appropriate security and controls to safeguard the information assets that it contains. Accounting Insight No. 8 relates to this third function of accounting systems, safeguarding information assets.

My Connection...

How do I study less and learn more? Make connections. Try the following:

- Active Review 1.3
- Tech in Practice 1.27
- Short Exercise 1.30
- Tech in Practice 1.40

Accounting Insight No. 7: Business Intelligence

Businesses may invest millions of dollars to create financial systems to collect and store data. The total cost of ownership (TCO) for a large enterprise system has been estimated to be as high as \$300 million. To increase the return on this sizable investment, enterprises seek to derive value from the data to make more intelligent decisions to improve business performance. A growing trend in organizations today is the use of **business intelligence (BI)**. Data analysis and predictive modeling are used to gain insights from data to improve the quality of business decisions. The value of information often derives from its ability to improve decision making. Business intelligence provides organizations with a competitive advantage.



ACCOUNTING INSIGHT NO. 7
Business Intelligence
Provides Organizations with
Competitive Advantage

Accounting and financial systems play an important role, not only in collecting and storing financial data, but also in providing information for decision making and BI. If the accounting system does not collect the information needed, makes errors in storing the information, or is unable to retrieve the information once stored, then the information needed for decisions is flawed or unavailable. If the information is flawed, the decision may be misguided, sometimes costing enterprises millions of dollars—simply because the accounting system did not provide useful information to decision makers.

Increasingly, systems today are expected to have the capability to convert data into information and, through further analysis, into BI for improved decisions. The transformation of data to intelligence can be illustrated with the following example for Apple Inc.

- **Data:** The amount of a single sale of an Apple computer would be accounting data.
- **Information:** Apple's income statement for the year showing sales by type of customer would be information. Which customers purchased what products last year?
- **Intelligence:** Financial analytics and predictive modeling that allows Apple to predict the number of customers who will purchase a new product. Which customers will purchase what products next year?

Decisions. Decisions. Decisions...

An important role of the accounting system is to provide information to decision makers.

Enterprise decisions: Should Apple Inc. open new stores? Should Apple raise prices of the iPad? Would making a greener Apple computer be more competitive?

Investor decisions: Should an investor buy stock in Apple Inc? Should an investor buy or sell Google stock?

Creditor decisions: Should Duetsch Bank make a loan to a new start-up enterprise? Will the borrower be able to repay loan interest and principal?

How many decisions do you make in one day? What information do you use when you make those decisions?



Kroger supermarket chain used BI to increase its coupon redemption rate to 50% as compared to a typical redemption rate of 1% to 3%.

Two approaches to BI and financial analytics are:

- Shadow data
- BI technologies

ODBC...

Think of ODBC as a pipeline connecting your Excel spreadsheet to the database.

SHADOW DATA Many organizations use shadow data consisting of internally developed spreadsheets. Shadow data is data that shadows the formal accounting system. For example, shadow data is often data extracted from the relational database to perform financial analyses.

Queries of the operational database are combined with financial analytics to derive BI. BI using daily accounting sales transactions stored in the operational database can answer such questions as “Which customers purchased what products *last year*?”

MS Excel has the capability to extract data from databases using Open DataBase Connectivity (ODBC). After the data is imported into Excel, the spreadsheet software can be used to perform analysis that is cumbersome, if not impossible, to perform within the relational database. Significant amounts of an accountant’s time may be spent extracting information from the relational database into spreadsheets and then analyzing the data using spreadsheet software. Some accountants estimate that 90% of their time is spent using spreadsheets.

There are several reasons for the popularity of shadow data. One of the main reasons is that it is easier to perform analysis using spreadsheet features than performing the analysis using a relational database. Another reason is that using a relational database to perform analysis often requires the assistance of IT staff to program the necessary queries, which creates dependency on IT availability and knowledge.

A disadvantage of shadow data is that often there is little or no documentation. When the employee who created the spreadsheet leaves, no one else may know how to use the application. The same application must be redeveloped by someone else or abandoned. Another disadvantage is that while security and control may be adequate to prevent unauthorized access to the relational database, security and control for shadow data is often inadequate or nonexistent.

BUSINESS INTELLIGENCE TECHNOLOGIES An increasing trend in business is the use of BI technologies. BI technologies are basically software applications that perform data mining and advanced mathematical analysis. Organizations use BI technologies to find patterns and insights, such as Kroger using BI to target consumers with specific coupons. The insights gained can be used as BI to improve decision making.

The advent of integrated enterprise systems led to the development of data warehouses storing massive amounts of enterprise data. Data warehouses permit extensive data analytics to provide BI for improved decision quality.

By analyzing historical and current data, past and present performance, and vast data stores contained in data warehouses, decision makers can gain valuable insights. BI using data warehouses employ financial analytics and predictive modeling to forecast future business trends. For example, BI using predictive modeling might answer the following question: Which customers will purchase what products *next year*?

BI using a data warehouse employs an extract, transform, and load (ETL) approach. Data is extracted from the operational database, transformed by analytical processing, and then loaded into an online application. These online applications are called online analytical processing or **OLAP cubes**. Data cubes permit users to view the data in a multidimensional manner. For example, sales can be viewed in terms of geographic region, market segment, and type of customer.

The disadvantage to this type of BI is that often there is a lag between when the data, such as sales transactions for example, is entered into the relational database and when it is available for viewing in an OLAP cube. Sometimes the lag can be 24 hours or longer.

Data Mining...

Data mining is a BI tool that scans the database for patterns, such as characteristics of customers who have purchased a certain type of product.

OLAP Cubes

Think of an OLAP cube as a Rubik’s Cube. It permits you to see the same data from many different perspectives.



ACCOUNTING INSIGHT NO. 8
Because Information Assets Have Value the Accounting System Must SAFEGUARD the Information Stored

Accounting Insight No. 8: Safeguarding Information

Organizations seek to collect and store valuable information to improve business performance; yet by doing so, the information asset becomes a prime target. Fighting cybercrime has become an ongoing battle for some enterprises as they try to prevent and detect cyberattacks on information assets. Because information assets have value, the accounting system must safeguard the information stored.

In today's business environment with financial frauds, lapses in ethics, and cybercrime, a crucial aspect of accounting systems is security and controls to safeguard information assets stored in the system.

To protect information assets, organizations implement security and controls to prevent fraud, unauthorized access, modification, destruction, or disclosure. Internal control is the set of policies and procedures enterprises use to safeguard assets, including information assets, and to prevent and detect errors. Limiting access to your enterprise's accounting system by requiring a valid user ID and password is an example of an internal control.

In the aftermath of the Enron financial scandal, which involved massive fraud, there is increased emphasis upon preventing and detecting fraud. There is also an increased focus upon ethics within the accounting profession. The Sarbanes-Oxley Act of 2002 (SOX), the U.S. legislation passed after the Enron scandal, requires that publicly traded companies assess the effectiveness of their system of internal controls and that an independent CPA firm audit this assessment. IT audit plays a critical role in assessing security and controls for an enterprise's IT and accounting applications.

When designing an accounting system, it is crucial that security for information assets is considered to prevent fraud and unauthorized access. Security and controls are needed for accounting systems, accounting databases, shadow data systems, and BI applications.

Fraud, ethics, SOX, and other security and control standards and frameworks are discussed in detail in later chapters.

Information Assets...

Information assets consist of information contained within the information system including electronic records, files, and databases.

\$11,000,000 Spreadsheet Error...

Kodak, the world's largest film maker, announced it was adjusting earnings due to an \$11,000,000 spreadsheet error. Kodak's chief financial officer (CFO) explained how the \$11 million error occurred: "There were too many zeros added to the employee's accrued severance." (marketwatch.com, 2005)

You're The Boss...

If you were the CFO of Kodak, how would you explain to the public that one of your employees had mistakenly entered too many zeros in a spreadsheet and overstated your earnings by \$11,000,000? How would you explain that the error went undetected before you announced earnings and issued your financial results to your investors and the public?

My Connection...

How do I study less and learn more? Make connections. Try the following:

- Active Review 1.10
- Short Exercise 1.31
- It's Your Call 1.34

What Are Three Keys to Opportunity at the Crossroads of Accounting and IT?

Successful accounting systems consider the impact of three key factors: people, processes, and technology. These three keys are a triage that you can use as an accounting/IT professional to assess and address virtually any systems issues or opportunities (Figure 1.17).

People, Processes, and Technology

If you are evaluating a new accounting system, you can use these three keys to address its impact:

1. What is the impact of the new system on **people**? *Who* will be affected? *How* will they be impacted? Will we downsize? Upsize? Will training be required? How will our employees manage the changes required by the new system?
2. What is the impact of the new system on **processes**? How will our business processes change? Will the new system require us to change the way we enter information into our accounting system?
3. What is the impact on **technology**? Will our existing technology be adequate? What new technology will we need to purchase? How much will the new technology cost?

Triage means "to sort." Medical professionals triage or sort patients based on need. Triage your accounting IT issues by sorting into people, processes, or technology.

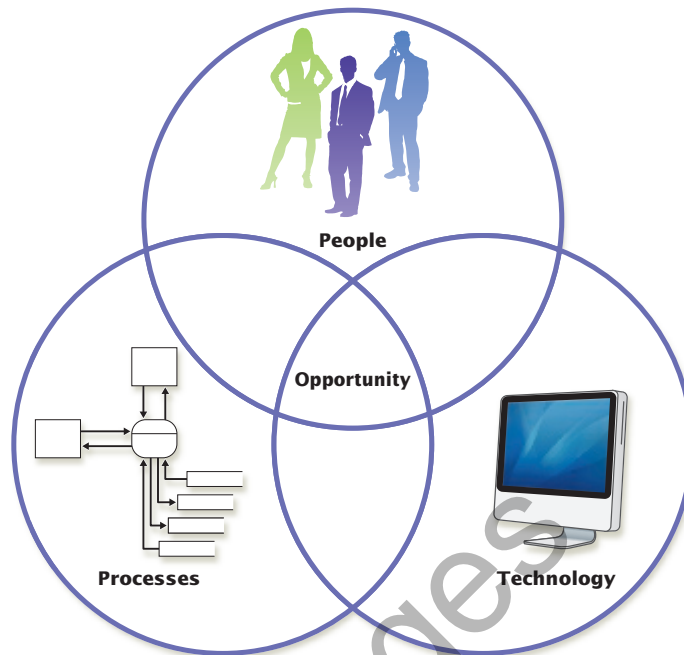


FIGURE 1.17

Three Keys

Pair and Share: Share with a classmate your response to the following:

How can you use the three keys to triage an issue or opportunity that you are currently facing?

International Financial Reporting Standards (IFRS)...

When addressing the impending changes required by the anticipated adoption of IFRS in the United States, sort the impacts into people, processes, and technology:

1. What is the impact of IFRS on people?
2. What is the impact of IFRS on processes?
3. What is the impact of IFRS on technology?

Transactions are exchanges. If Apple Inc. sells a laptop to a customer, Apple gives the customer the laptop and receives cash from the customer. Thus, there is an exchange of a laptop for cash.

PEOPLE People involved in the accounting system are sometimes referred to as agents. People can be internal agents, such as employees. Agents can also be external to the enterprise, such as vendors. People to consider when evaluating the impact of a proposed action can include the following:

- Vendors: People from whom your enterprise purchases goods and services. This includes consultants hired by the enterprise.
- Customers: People who buy your goods and/or services.
- Employees: People employed by the enterprise.

PROCESSES Processes are related activities or events that create value. These activities and events can be grouped into related areas, such as vendor transactions, customer transactions, and employee transactions:

- Vendor transactions: Purchase transactions resulting from when an enterprise purchases goods and services from vendors
- Customer transactions: Sales transactions related to an enterprise selling goods and services to customers
- Employee transactions: Payroll transactions related to processing payments to enterprise employees and governmental agencies

As we study processes, we want to view how the information flows through your enterprise and accounting system. When and how is information captured? For example, Figure 1.7 shows how information flows through a baseline accounting system. We will explore business processes further in Chapters 4 and 5.



Crossroads

What the accountant refers to as *software*, the IT professional may refer to as *applications*.