Unit 6: e-Business Systems

Introduction
- e-Business is the use of the Internet and other networks and information technologies to support e-commerce, enterprise communications and collaboration, and Web-enabled business processes, both within a networked enterprise and with its customers and business partners.
- E-business includes e-commerce, which involves the buying and selling and marketing and servicing of products, services, and information over the Internet and other networks.
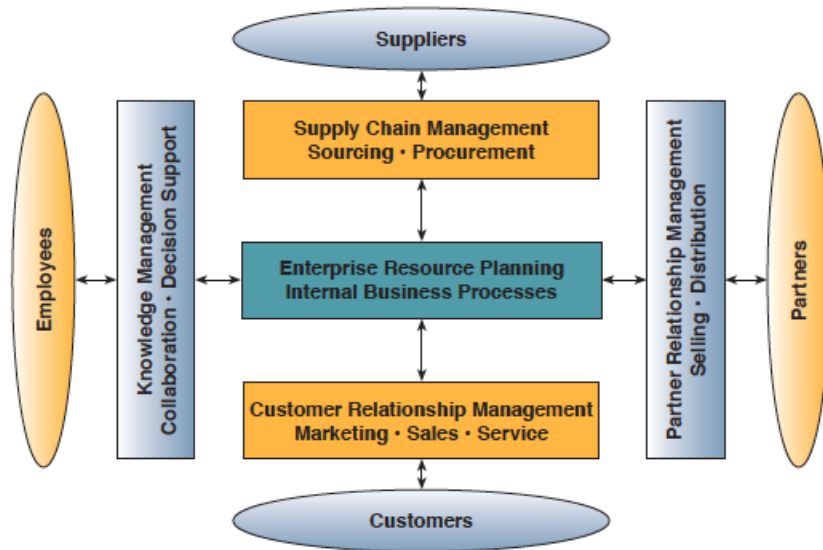
Cross-Functional Enterprise Applications
- Many companies today are using information technology to develop integrated **cross-functional enterprise systems** that cross the boundaries of traditional business functions in order to reengineer and improve vital business processes all across the enterprise.
- These organizations view cross-functional enterprise systems as a strategic way to use IT to share information resources and improve the efficiency and effectiveness of business processes, and develop strategic relationships with customers, suppliers, and business partners.
- Companies first moved from functional mainframe-based *legacy systems* to integrated cross-functional client/server applications. This typically involved installing *enterprise resource planning, supply chain management,* or *customer relationship management software* from SAP America, PeopleSoft, Oracle, and others.
- Instead of focusing on the information processing requirements of business functions, such enterprise software focuses on supporting integrated clusters of business processes involved in the operations of a business.
- Nowadays business firms are using Internet technologies to help them reengineer and integrate the flow of information among their internal business processes and their customers and suppliers.
- Companies are using the World Wide Web and their intranets and extranets as a technology platform for their cross-functional and inter enterprise information systems.

Enterprise Application Architecture

FIGURE 7.3

This enterprise application architecture presents an overview of the major cross-functional enterprise applications and their interrelationships.


- Figure above presents an **enterprise application architecture**, which illustrates the interrelationships of the major cross-functional enterprise applications that many companies have or are installing today.
- It provides a conceptual framework to help us visualize the basic components, processes, and interfaces of these major e-business applications, and their interrelationships to each other.
- This application architecture also spotlights the roles these business systems play in supporting the customers, suppliers, partners, and employees of a business.
- Instead of concentrating on traditional business functions or supporting only the internal business processes of a company, enterprise applications focus on accomplishing fundamental business processes in concert with a company's customer, supplier, partner, and employee stakeholders.
    - Thus, enterprise resource planning (ERP) concentrates on the efficiency of a firm's internal production, distribution, and financial processes.
    - Customer relationship management (CRM) focuses on acquiring and retaining profitable customers via marketing, sales, and service processes.
    - Partner relationship management (PRM) aims to acquire and retain partners who can enhance the sale and distribution of a firm's products and services.
    - Supply chain management (SCM) focuses on developing the most efficient and effective sourcing and procurement processes with suppliers for the products and services that a business needs.
    - Knowledge management (KM) applications provide a firm's employees with tools that support group collaboration and decision support.

Enterprise Application Integration

- **Enterprise application integration (EAI)** software is being used by many companies to connect their major e-business applications.

FIGURE 7.4
Enterprise application integration software interconnects front-office and back-office applications.
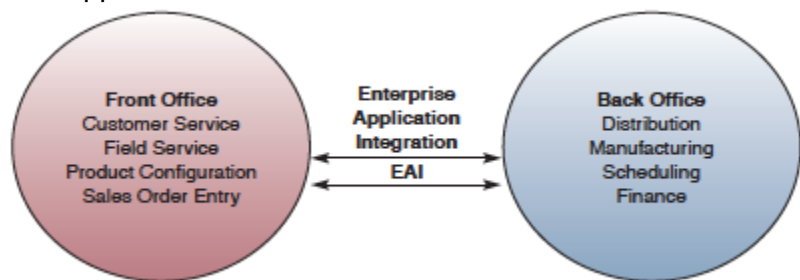
- EAI software enables users to model the business processes involved in the interactions that should occur between business applications.
- EAI also provides **middleware** that performs data conversion and coordination, application communication and messaging services, and access to the application interfaces involved.
- Thus, EAI software can integrate a variety of enterprise application clusters by letting them exchange data according to rules derived from the business process models developed by users.
- For example, a typical rule might be:
  > *When an order is complete, have the order application tell the accounting system to send a bill and alert shipping to send out the product.*
- EAI software can integrate the front-office and back-office applications of a business so they work together in a seamless, integrated way.
- This is a vital capability that provides real business value to a business enterprise that must respond quickly and effectively to business events and customer demands.
- For example, the integration of enterprise application clusters has been shown to dramatically improve customer call center responsiveness and effectiveness.
- That's because EAI integrates access to all of the customer and product data that customer representatives need to quickly serve customers.
- EAI also streamlines sales order processing so products and services can be delivered faster.
- Thus, EAI improves customer and supplier experience with the business because of its responsiveness.
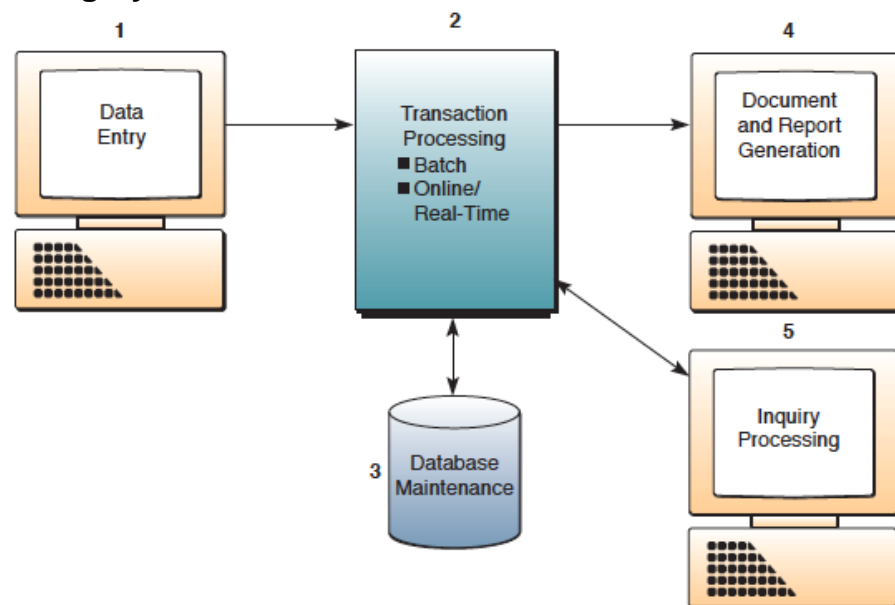
Transaction Processing Systems

- Transaction processing systems (TPS) are cross-functional information systems that process data resulting from the occurrence of business transactions.
- Transactions are events that occur as part of doing business, such as sales, purchases, deposits, withdrawals, refunds, and payments.
- For example, the data generated whenever a business sells something to a customer on credit, whether in a retail store or at an e-commerce site on the Web.
- Data about the customer, product, salesperson, store, and so on, must be captured and processed

- This need prompts additional transactions, such as credit checks, customer billing, inventory changes, and increases in accounts receivable balances, which generate even more data.
- Thus, transaction processing activities are needed to capture and process such data, or the operations of a business would grind to a halt.
- Therefore, transaction processing systems play a vital role in supporting the operations of most companies today.
- Online transaction processing systems play a strategic role in Web-enabled businesses.
- Many firms are using the Internet and other networks that tie them electronically to their customers or suppliers for online transaction processing (OLTP).
- Such real-time systems, which capture and process transactions immediately, can help firms provide superior service to customers and other trading partners.
- This capability adds value to their products and services, and thus gives them an important way to differentiate themselves from their competitors.

The Transaction Processing Cycle

FIGURE 7.7
The transaction processing cycle. Note that transaction processing systems use a five-stage cycle of data entry, transaction processing, database maintenance, document and report generation, and inquiry processing activities

1. **Data Entry**
- The first step of the transaction processing cycle is the capture of business data.
- For example, transaction data may be collected by point-of-sale terminals using optical scanning of bar codes and credit card readers at a retail store or other business.
- Transaction data can also be captured at an e-commerce Web site on the Internet.
- The proper recording and editing of data so they are quickly and correctly captured for processing is one of the major design challenges of information systems.
2. **Transaction Processing**
- Transaction processing systems process data in two basic ways:

    a. **batch processing**, where transaction data are accumulated over a period of time and processed periodically, and

    b. **real-time processing** (also called online processing), where data are processed immediately after a transaction occurs.

- All online transaction processing systems incorporate real-time processing capabilities.
- Many online systems also depend on the capabilities of *fault tolerant* computer systems that can continue to operate even if parts of the system fail.

3. Database Maintenance

- An organization's databases must be updated by its transaction processing systems so that they are always correct and up-to-date.
- Therefore, transaction processing systems serve to assist in maintaining the corporate databases of an organization to reflect changes resulting from day-to-day business transactions.
- For example, credit sales made to customers will cause customer account balances to be increased and the amount of inventory on hand to be decreased.
- Database maintenance ensures that these and other changes are reflected in the data records stored in the company's databases.

4. Document and Report Generation

- Transaction processing systems produce a variety of documents and reports.
- Examples of transaction documents include purchase orders, paychecks, sales receipts, invoices, and customer statements.
- Transaction reports might take the form of a transaction listing such as a payroll register, or edit reports that describe errors detected during processing.

5. Inquiry Processing

- Many transaction processing systems allow us to use the Internet, intranets, extranets, and Web browsers or database management query languages to make inquiries and receive responses concerning the results of transaction processing activity.
- Typically, responses are displayed in a variety of prespecified formats or screens.
- For example, one might check on the status of a sales order, the balance in an account, or the amount of stock in inventory and receive immediate responses at your PC.

Enterprise Collaboration Systems

- Enterprise collaboration systems (ECS) are cross-functional information systems that enhance communication, coordination, and collaboration among the members of business teams and workgroups.
- The goal of enterprise collaboration systems is to enable us to work together more easily and effectively by helping us to:
  - **Communicate**: Share information with each other.
  - **Coordinate**: Organize our individual work efforts and use of resources.
  - **Collaborate**: Work together cooperatively on joint projects and assignments.

- For example, engineers, business specialists, and external consultants may form a virtual team for a project. The team may rely on intranets and extranets to collaborate via e-mail, videoconferencing, discussion forums, and a multimedia database of work-in-progress information at a project Web site.
- The ECS may use PC workstations networked to a variety of servers on which project, corporate, and other databases are stored.
- In addition, network servers may provide a variety of software resources, such as Web browsers, groupware, and application packages, to assist the team's collaboration until the project is completed.

Tools for Enterprise Collaboration
- The capabilities and potential of the Internet, as well as intranets and extranets, are driving the demand for better enterprise collaboration tools in business.
- However, Internet technologies like Web browsers and servers, hypermedia documents and databases, and intranets and extranets provide the hardware, software, data, and network platforms for many of the groupware tools for enterprise collaboration that business users want.

FIGURE 7.8
Electronic communications, conferencing, and collaborative work software tools enhance enterprise collaboration.
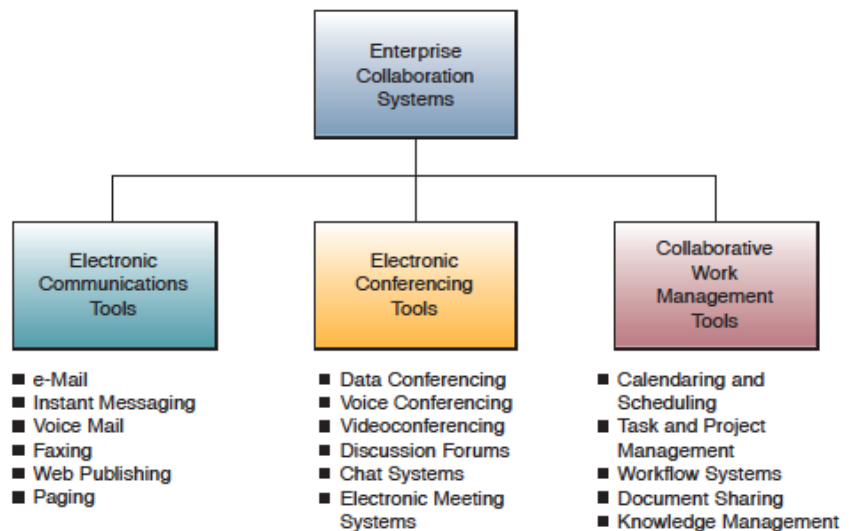
a. Electronic communication tools
- include e-mail, voice mail, faxing, Web publishing, bulletin board systems, paging, and Internet phone systems.
- These tools enable us to send electronically messages, documents, and files in data, text, voice, or multimedia over computer networks.
- This helps us share everything from voice and text messages to copies of project documents and data files with our team members, wherever they may be.
- The ease and efficiency of such communications are major contributors to the collaboration process.

b. Electronic conferencing tools

- Help people communicate and collaborate as they work together.
- A variety of conferencing methods enable the members of teams and workgroups at different locations to exchange ideas interactively at the same time, or at different times at their convenience.
- These include data and voice conferencing, videoconferencing, chat systems, and discussion forums.
- Electronic conferencing options also include **electronic meeting systems** and other **group support systems** where team members can meet at the same time and place in a **decision room** setting, or use the Internet to work collaboratively anywhere in the world.

c. Collaborative work management tools
- Help people accomplish or manage group work activities.
- This category of software includes calendaring and scheduling tools, task and project management, workflow systems, and knowledge management tools.
- Other tools for joint work, such as joint document creation, editing, and revision, are found in the software suites.
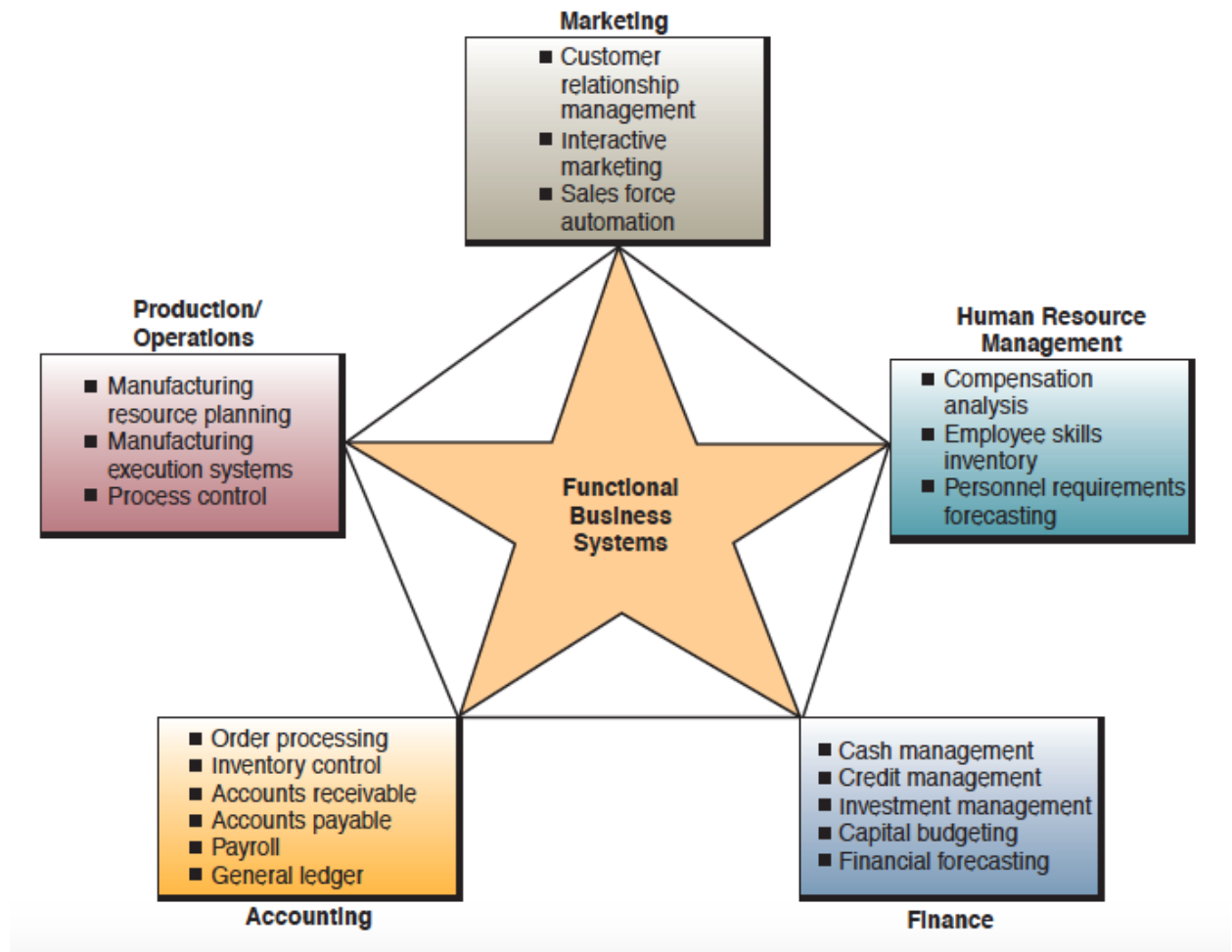
Functional Business Systems

Introduction
- There are as many ways to use information technology in business as there are business activities to be performed, business problems to be solved, and business opportunities to be pursued.

IT in Business
- As a business professional, it is important that one has a specific understanding of how information systems affect a particular business function (e.g., marketing) or a particular industry (e.g., banking) that is directly related to his career objectives.
- For example, someone whose career objective is a marketing position in banking should have a basic understanding of how information systems are used in banking and how they support the marketing activities of banks and other firms.

FIGURE 7.11 Examples of functional business information systems. Note how they support the major functional areas of business.

Marketing
- Customer relationship management
- Interactive marketing
- Sales force automation

Production/ Operations
- Manufacturing resource planning
- Manufacturing execution systems
- Process control

Human Resource Management
- Compensation analysis
- Employee skills inventory
- Personnel requirements forecasting

Functional Business Systems

Accounting
- Order processing
- Inventory control
- Accounts receivable
- Accounts payable
- Payroll
- General ledger

Finance
- Cash management
- Credit management
- Investment management
- Capital budgeting
- Financial forecasting

Marketing Systems

- The business function of marketing is concerned with the planning, promotion, and sale of existing products in existing markets, and the development of new products and new markets to better attract and serve present and potential customers.
- Thus, marketing performs an essential function in the operation of a business enterprise.
- Business firms have increasingly turned to information technology to help them perform vital marketing functions in the face of the rapid changes of today's environment.

FIGURE 7.12
Marketing information systems provide information technologies to support major components of the marketing function.
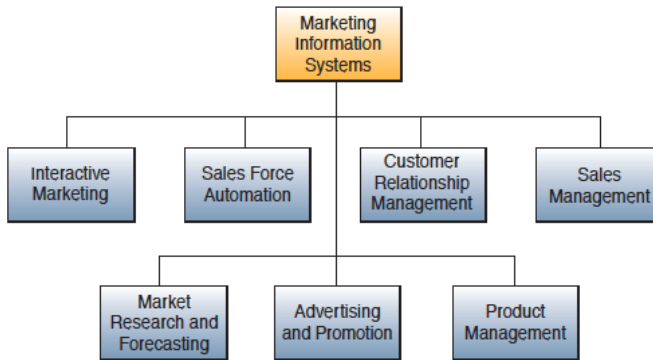
- Three of the marketing applications:

1. Interactive Marketing
- Interactive marketing is a customer-focused marketing process that is based on using the Internet, intranets, and extranets to establish two-way transactions between a business and its customers or potential customers.
- The goal of interactive marketing is to enable a company to use those networks profitably to attract and keep customers who will become partners with the business in creating, purchasing, and improving products and services.
- In interactive marketing, customers are not just passive participants who receive media advertising prior to purchase; they are actively engaged in network-enabled proactive and interactive processes.
- Interactive marketing encourages customers to become involved in product development, delivery, and service issues.
- This is enabled by various Internet technologies, including chat and discussion groups, Web forms and questionnaires, instant messaging, and e-mail correspondence.
- Finally, the expected outcomes of interactive marketing are a rich mixture of vital marketing data, new product ideas, volume sales, and strong customer relationships.

2. Targeted Marketing
- Targeted marketing has become an important tool in developing advertising and promotion strategies to strengthen a company's e-commerce initiatives, as well as its traditional business venues.
- Target marketing is in the digital arena, with a new way of doing something old.
- Targeted marketing is an advertising and promotion management concept that includes five targeting components:
    a. Community
    - Companies can customize their Web advertising messages and promotion methods to appeal to people in specific communities.
    - They can be communities of interest, such as virtual communities of online sporting enthusiasts, or arts and crafts hobbyists, or geographic communities formed by the Web sites of a city or other local organization.

b. Content
- Advertising, such as electronic billboards or banners, can be placed on a variety of selected Web sites, in addition to a company's Web site.
- The content of these messages is aimed at the targeted audience.
- An ad for a product campaign on the opening page of an Internet search engine is a typical example.

c. Context
- Advertising appears only in Web pages that are relevant to the content of a product or service.
- So, advertising is targeted only at people who are already looking for information about a subject matter (e.g., vacation travel) that is related to a company's products (e.g., car rental services).

d. Demographic/Psychographic
- Web marketing efforts can be aimed only at specific types or classes of people: for example, unmarried, twenty-something, middle income, male college graduates.

e. Online Behavior
- Advertising and promotion efforts can be tailored to each visit to a site by an individual.
- This strategy is based on a variety of tracking techniques, such as Web "cookie" files recorded on the visitor's disk drive from previous visits.
- This enables a company to track a person's online behavior at its Web site so marketing efforts (such as coupons redeemable at retail stores or e-commerce Web sites) can be targeted to that individual at each visit to its Web site.

3. Sales Force Automation
- Increasingly, computers and the Internet are providing the basis for sales force automation.
- In many companies, the sales force is being outfitted with notebook computers, Web browsers, and sales contact management software that connect them to marketing Web sites on the Internet, extranets, and their company intranets.
- This not only increases the personal productivity of salespeople, but it dramatically speeds up the capture and analysis of sales data from the field to marketing managers at company headquarters.
- In return, it allows marketing and sales management to improve the delivery of information and the support they provide to their salespeople.
- Therefore, many companies are viewing sales force automation as a way to gain a strategic advantage in sales productivity and marketing responsiveness.
- For example, salespeople use their PCs to record sales data as they make their calls on customers and prospects during the day. Then each night, sales reps in the field can connect their computers by modem and telephone links to the Internet and extranets,

which can access intranet or other network servers at their company. Then, they can upload information on sales orders, sales calls, and other sales statistics, as well as send e-mail messages and access Web site sales support information. In return, the network servers may download product availability data, prospect lists of information on good sales prospects, and e-mail messages.

Manufacturing Systems
- Manufacturing information systems support the production/operations function that includes all activities concerned with the planning and control of the processes producing goods or services.
- Thus, the production/operations function is concerned with the management of the operational processes and systems of all business firms.
- Information systems used for operations management and transaction processing support all firms that must plan, monitor, and control inventories, purchases, and the flow of goods and services.
- Therefore, firms such as transportation companies, wholesalers, retailers, financial institutions, and service companies must use production/operations information systems to plan and control their operations.

Computer Integrated Manufacturing
- A variety of manufacturing information systems, many of them Web-enabled, are used to support **computer-integrated manufacturing (CIM)**.
- CIM is an overall concept that emphasizes that the objectives of computer-based systems in manufacturing must be to:
  - **Simplify** (reengineer) production processes, product designs, and factory organization as a vital foundation to automation and integration.
  - **Automate** production processes and the business functions that support them with computers, machines, and robots.
  - **Integrate** all production and support processes using computer networks, cross functional business software, and other information technologies.
- The overall goal of CIM and such manufacturing information systems is to create flexible, agile, manufacturing processes that efficiently produce products of the highest quality.
- Thus, CIM supports the concepts of *flexible manufacturing systems, agile manufacturing,* and *total quality management.*
- Implementing such manufacturing concepts enables a company to respond to and fulfill customer requirements quickly with high-quality products and services.
- Manufacturing information systems help companies simplify, automate, and integrate many of the activities needed to produce products of all kinds.
- For example, computers are used to help engineers design better products using both *computer-aided engineering (CAE)* and *computer-aided design (CAD)* systems, and better production processes with *computer-aided process planning.*
- They are also used to help plan the types of material needed in the production process, which is called *material requirements planning (MRP)*, and to integrate MRP with

production scheduling and shop floor operations, which is known as *manufacturing resource planning.*

- **Computer-aided manufacturing (CAM)**
    - These systems are those that automate the production process.
    - For example, this could be accomplished by monitoring and controlling the production process in a factory (manufacturing execution systems) or by directly controlling a physical process (process control), a machine tool (machine control), or machines with some humanlike work capabilities (robots).

- **Manufacturing execution systems (MES)**
    - These are performance-monitoring information systems for factory floor operations.
    - They monitor, track, and control the five essential components involved in a production process: materials, equipment, personnel, instructions and specifications, and production facilities.
    - MES includes shop floor scheduling and control, machine control, robotics control, and process control systems.
    - These manufacturing systems monitor, report, and adjust the status and performance of production components to help a company achieve a flexible, high-quality manufacturing process.

- **Process control**
    - This is the use of computers to control an ongoing physical process.
    - Process control computers control physical processes in petroleum refineries, cement plants, steel mills, chemical plants, food product manufacturing plants, pulp and paper mills, electric power plants, and so on.
    - A process control computer system requires the use of special sensing devices that measure physical phenomena such as temperature or pressure changes.
    - These continuous physical measurements are converted to digital form by analog-to-digital converters and relayed to computers for processing.

- **Machine control**
    - This is the use of computers to control the actions of machines.
    - This is also popularly called numerical control.
    - The computer-based control of machine tools to manufacture products of all kinds is a typical numerical control application used by many factories throughout the world.

Human Resource Systems

- The human resource management (HRM) function involves the recruitment, placement, evaluation, compensation, and development of the employees of an organization.
- The goal of human resource management is the effective and efficient use of the human resources of a company.
- Thus, *human resource information systems (HRIS)* are designed to support:

a. planning to meet the personnel needs of the business,
  b. development of employees to their full potential, and
  c. control of all personnel policies and programs.
- Originally, businesses used computer-based information systems to:
  a. produce paychecks and payroll reports,
  b. maintain personnel records, and
  c. analyze the use of personnel in business operations
- Many firms have gone beyond these traditional **personnel management** functions and have developed human resource information systems that also support:
  a. recruitment, selection, and hiring;
  b. job placement;
  c. performance appraisals;
  d. employee benefits analysis;
  e. training and development; and
  f. health, safety, and security

HRM and the Internet
- The Internet has become a major force for change in human resource management.
- For example, online HRM systems may involve recruiting for employees through recruitment sections of corporate Web sites.
- Companies are also using commercial recruiting services and databases on the World Wide Web, posting messages in selected Internet newsgroups, and communicating with job applicants via email.
- The Internet has a wealth of information and contacts for both employers and job hunters. Top Websites for job hunters and employers on the World Wide Web include Monster.com, HotJobs.com, and CareerBuilder.com.
- These Websites are full of reports, statistics, and other useful HRM information, such as job reports by industry, or listings of the top recruiting markets by industry and profession.

HRM and Corporate Intranets
- Intranet technologies allow companies to process most common HRM applications over their corporate intranets.
- Intranets allow the HRM department to provide around-the-clock services to their customers: the employees.
- They can also disseminate valuable information faster than through previous company channels.
- Intranets can collect information online from employees for input to their HRM files, and they can enable managers and other employees to perform HRM tasks with little intervention by the HRM department.
- For example, employee self-service (ESS) intranet applications allow employees to view benefits, enter travel and expense reports, verify employment and salary information, access and update their personal information, and enter time-sensitive data.

- Through this completely electronic process, employees can use their Web browsers to look up individual payroll and benefits information online, right from their desktop PCs, mobile computers, or intranet kiosks located around a work site.
- Another benefit of the intranet is that it can serve as a superior training tool.
- Employees can easily download instructions and processes to get the information or education they need.
- In addition, employees using new technology can view training videos over the intranet on demand.
- Thus, the intranet eliminates the need to loan out and track training videos.
- Employees can also use their corporate intranets to produce automated paysheets, the online alternative to time cards.
- These electronic forms have made viewing, entering, and adjusting payroll information easy for both employees and HRM professionals.

Accounting Systems
- Accounting information systems are the oldest and most widely used information systems in business.
- They record and report business transactions and other economic events.
- Computer-based accounting systems record and report the flow of funds through an organization on a historical basis and produce important financial statements such as balance sheets and income statements.
- Such systems also produce forecasts of future conditions such as projected financial statements and financial budgets.
- A firm's financial performance is measured against such forecasts by other analytical accounting reports.
- Operational accounting systems emphasize legal and historical record-keeping and the production of accurate financial statements.
- Typically, these systems include transaction processing systems such as **order processing, inventory control, accounts receivable, accounts payable, payroll,** and **general ledger systems.**
- Management accounting systems focus on the planning and control of business operations.
- They emphasize cost accounting reports, the development of financial budgets and projected financial statements, and analytical reports comparing actual to forecasted performance.

FIGURE 7.19   A summary of six essential accounting information systems used in business.

| Common Business Accounting Systems |
|---|
| ● **Order Processing**
Captures and processes customer orders and produces data for inventory control and accounts receivable. |
| ● **Inventory Control**
Processes data reflecting changes in inventory and provides shipping and reorder information. |
| ● **Accounts Receivable**
Records amounts owed by customers and produces customer invoices, monthly customer statements, and credit management reports. |
| ● **Accounts Payable**
Records purchases from, amounts owed to, and payments to suppliers, and produces cash management reports. |
| ● **Payroll**
Records employee work and compensation data and produces paychecks and other payroll documents and reports. |
| ● **General Ledger**
Consolidates data from other accounting systems and produces the periodic financial statements and reports of the business. |

Online Accounting Systems

- The accounting information systems nowadays are being transformed by Internet technologies.
- The interactive nature of online accounting systems calls for new forms of transaction documents, procedures, and controls.
- This particularly applies to systems like order processing, inventory control, accounts receivable, and accounts payable.
- These systems are directly involved in the processing of transactions between a business and its customers and suppliers.
- So naturally, many companies are using Internet and other network links to these trading partners for such online transaction processing systems.

Financial Management Systems

- Computer-based financial management systems support business managers and professionals in decisions concerning:
    1. the financing of a business and
    2. the allocation and control of financial resources within a business.
- Major financial management system categories include cash and investment management, capital budgeting, financial forecasting, and financial planning.

FIGURE 7.21
Examples of important financial management systems.
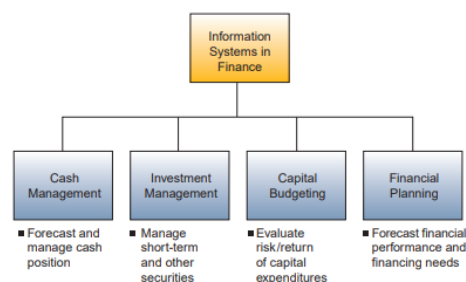
- For example, the **capital budgeting** process involves evaluating the profitability and financial impact of proposed capital expenditures. Long-term expenditure proposals for facilities and equipment can be analyzed using a variety of return on investment (ROI) evaluation techniques. This application makes heavy use of spreadsheet models that incorporate present value analysis of expected cash flows and probability analysis of risk to determine the optimum mix of capital projects for a business.
- Financial analysts also typically use electronic spreadsheets and other **financial planning** software to evaluate the present and projected financial performance of a business.
- They also help determine the financing needs of a business and analyze alternative methods of financing.
- Financial analysts use financial forecasts concerning the economic situation, business operations, types of financing available, interest rates, and stock and bond prices to develop an optimal financing plan for the business.
- Electronic spreadsheet packages, DSS software, and Web-based groupware can be used to build and manipulate financial models.
- Answers to what-if and goal seeking questions can be explored as financial analysts and managers evaluate their financing and investment alternatives.