Fundamentals of Information Systems, Fifth Edition

Chapter 5

Electronic and Mobile Commerce and Enterprise Systems

Principles and Learning Objectives

- Electronic commerce and mobile commerce are evolving, providing new ways of conducting business that present both opportunities for improvement and potential problems

  – Describe the current status of various forms of e-commerce, including B2B, B2C, C2C, and m-commerce

  – Identify several e-commerce and m-commerce applications

  – Identify several advantages associated with the use of e-commerce and m-commerce

Principles and Learning Objectives (continued)

- E-commerce and m-commerce require the careful planning and integration of a number of technology infrastructure components

  – Identify the key components of technology infrastructure that must be in place for e-commerce and m-commerce to work

  – Discuss the key features of the electronic payment systems needed to support e-commerce and m-commerce.

Principles and Learning Objectives (continued)

- An organization must have information systems that support the routine, day-today activities that occur in the normal course of business and help a company add value to its products and services

  - Identify the basic activities and business objectives common to all transaction processing systems

  - Identify key control and management issues associated with transaction processing systems

Principles and Learning Objectives (continued)

- A company that implements an enterprise resource planning system is creating a highly integrated set of systems, which can lead to many business benefits

    – Discuss the advantages and disadvantages associated with the implementation of an enterprise resource planning system

    – Identify the challenges multinational corporations must face in planning, building, and operating their TPSs

An Introduction to Electronic Commerce

- Electronic commerce
  - Conducting business activities electronically over computer networks such as the Internet, extranets, and corporate networks

- Business activities that are strong candidates for conversion to e-commerce:
  - Paper-based
  - Time-consuming
  - Inconvenient for customers

Business-to-Business (B2B) E-Commerce

- A subset of e-commerce where all the participants are organizations

- Useful tool for connecting business partners in a virtual supply chain to cut resupply times and reduce costs

Business-to-Consumer (B2C) E-Commerce

- Business-to-consumer (B2C) e-commerce
  - Businesses sell their products directly to consumers
- Elimination of intermediaries
  - Squeezes costs and inefficiencies out of supply chain
  - Can lead to higher profits for companies and lower prices for consumers

Consumer-to-Consumer (C2C) E-Commerce

- Consumer-to-consumer (C2C) e-commerce
  - Consumers sell directly to other consumers
  - Example: eBay

eGovernment

- Use of information and communications technology to:
  - Simplify the sharing of information
  - Speed formerly paper-based processes
  - Improve the relationship between citizen and government
- Forms of eGovernment
  - Government-to-consumer (G2C)
  - Government-to-business (G2B)
  - Government-to-government (G2G)

Mobile Commerce

- Relies on the use of wireless devices, such as personal digital assistants, cell phones, and smart phones, to place orders and conduct business

Mobile Commerce in Perspective

- Market for m-commerce in North America is maturing much later than in Western Europe and Japan

- Japanese consumers
  - Generally enthusiastic about new technology
 - Much more likely to use mobile technologies for making purchases

Electronic and Mobile Commerce Applications

- Retail and wholesale
  - Electronic retailing (e-tailing)
    - Direct sale from business to consumer through electronic storefronts
  - Cybermall
    - Single Web site that offers many products and services at one Internet location

Manufacturing

- **Electronic exchange**
  - Electronic forum where manufacturers, suppliers, and competitors buy and sell goods, trade market information, and run back-office operations

- **Private exchanges**
  - Owned and operated by a single company

- **Public exchanges**
  - Owned and operated by industry groups

Manufacturing (continued)
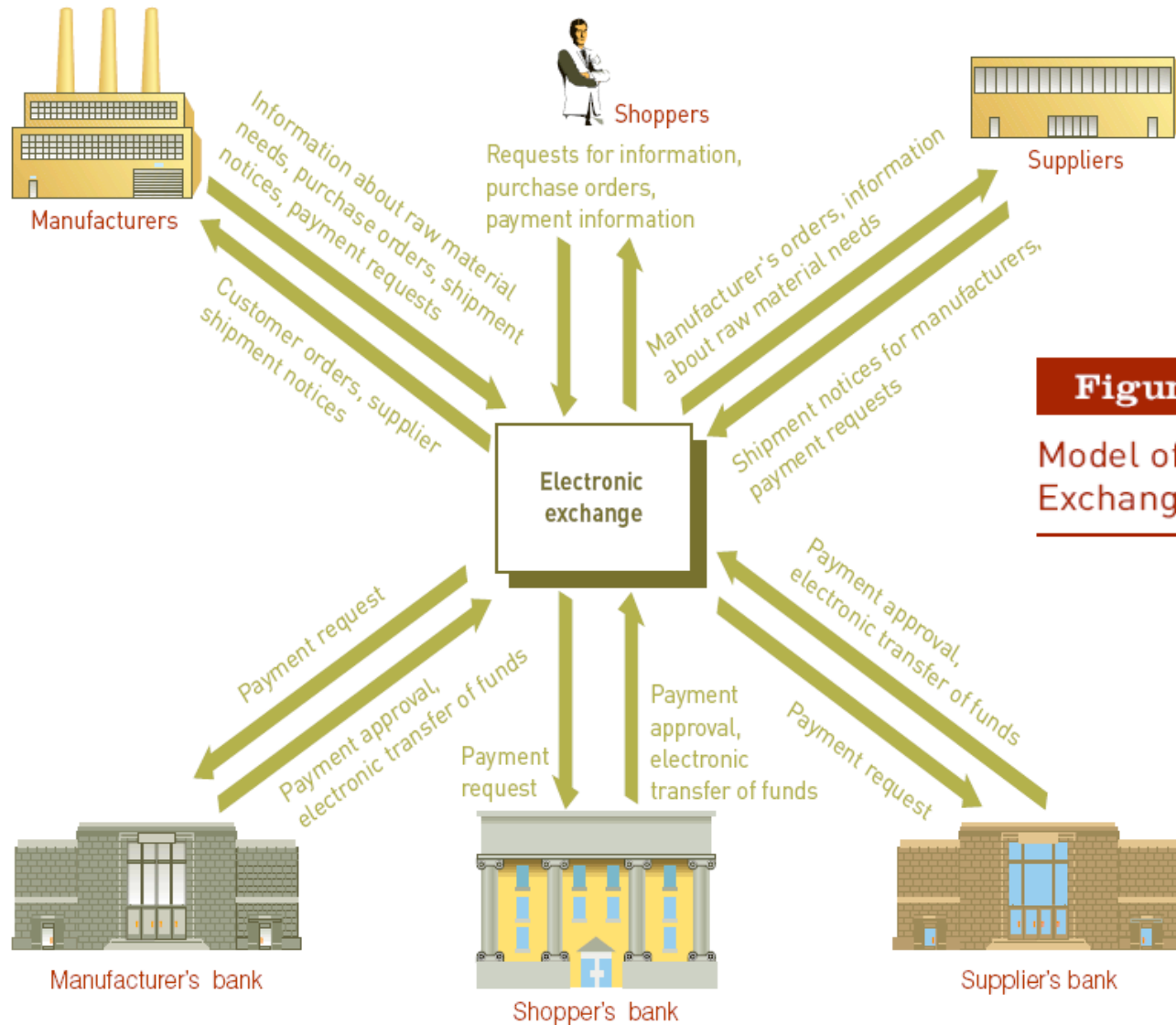
Figure 5.1

Model of an Electronic Exchange

Marketing

- ## Market segmentation
  - The identification of specific markets to target them with advertising messages

- ## Technology-enabled relationship management
  - Use of detailed information about a customer's behavior, preferences, needs, and buying patterns to set prices, negotiate terms, tailor promotions, and add product features

Investment and Finance

- The brokerage business

  – Adapted to the Internet faster than any other arm of finance

- Electronic bill presentment

  – Vendor posts an image of your statement on the Internet and alerts you by e-mail that your bill has arrived

Online Real Estate Services

- Redfin
  - Online real estate company that provides both online real estate search capabilities and access to live agents
  - Pays bonuses to agents when they receive high customer satisfaction ratings

Auctions

- Popular online auction Web sites

  - eBay, Craigslist, uBid, Auctions, Onsale

- English auction

  - Initial price starts low and is bid up by successive bidders

- Reverse auction

  - Sellers compete to obtain business by submitting successively lower prices for their goods or services

Anywhere, Anytime Applications of Mobile Commerce

- Mobile banking
  - Consumers can manage their finances from anywhere

- Mobile price comparison
  - Encourages shoppers to do Web-based price comparisons while they are in stores

Anywhere, Anytime Applications of Mobile Commerce (continued)

- Mobile advertising
  - 58 million U.S. wireless subscribers viewed an ad on their cell phones in February 2008

- Mobile coupons
  - About two percent of advertisers surveyed by Jupiter Research are using mobile coupons

Advantages of Electronic and Mobile Commerce

- Conversion to an e-commerce or m-commerce system enables organizations to:
  - Reduce the cost of doing business
  - Speed the flow of goods and information
  - Increase the accuracy of order processing and order fulfillment
  - Improve the level of customer service

Advantages of Electronic and Mobile Commerce (continued)

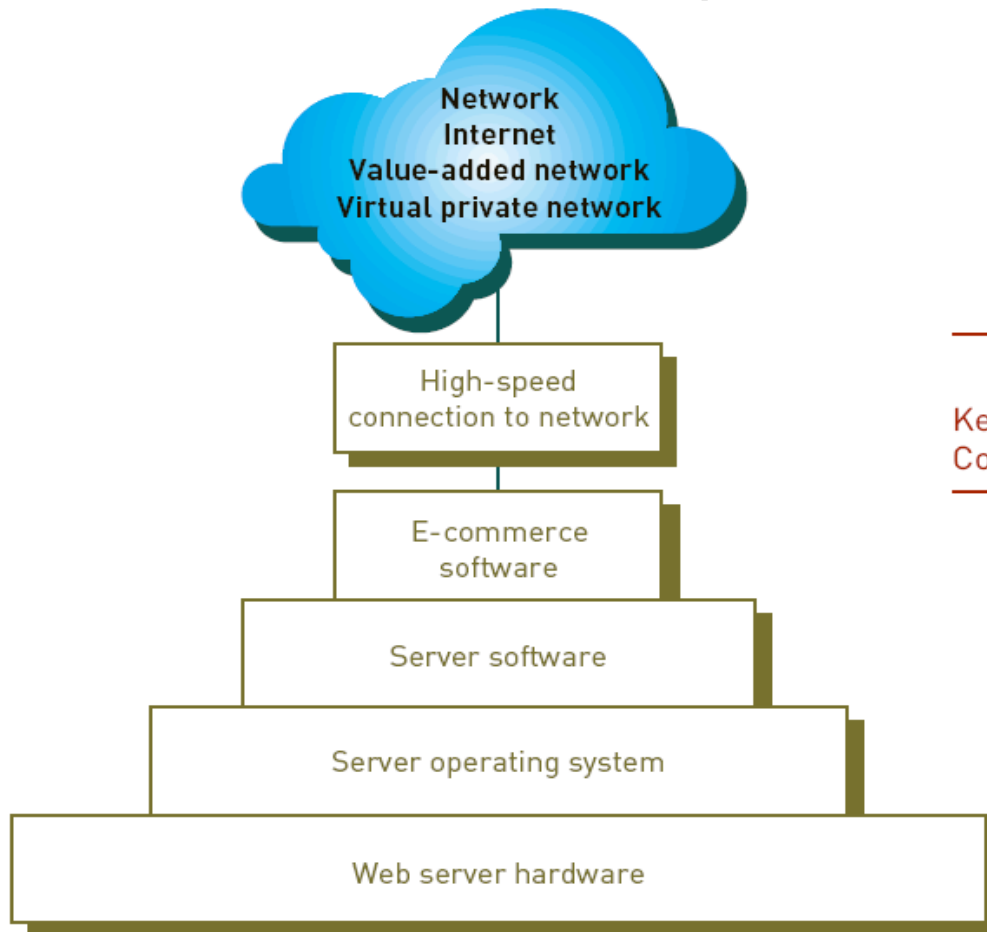| Advantages	Explanation
Provides global reach	Allows manufacturers to buy at a low cost worldwide and offers enterprises the chance to sell to a global market right from the very start-up of their business.
Reduces costs	Eliminates time-consuming and labor-intensive steps throughout the order and delivery process so that more sales can be completed in the same period and with increased accuracy.
Speeds flow of goods and information	The flow of information is accelerated because of the established electronic connections and communications processes.
Increased accuracy	Enables buyers to enter their own product specifications and order information directly so that human data-entry error is eliminated.
Improves customer service	Increased and more detailed information about delivery dates and current status increases customer loyalty.

Table 5.1

Advantages of Electronic and Mobile Commerce

Technology Infrastructure Required to Support E-Commerce and M-Commerce

- Successful implementation of e-business requires:
  - Significant changes to existing business processes
  - Substantial investment in IS technology
- Poor Web site performance
  - Drives consumers to abandon some e-commerce sites

Technology Infrastructure Required to Support E-Commerce and M-Commerce (continued)

Network
Internet
Value-added network
Virtual private network

High-speed connection to network

E-commerce software

Server software

Server operating system

Web server hardware

Figure 5.2

Key Technology Infrastructure Components

Hardware

- Storage capacity and computing power required of the Web server depends on:
  - Software that will run on the server
  - Volume of e-commerce transactions

Web Server Software

- Security and identification
  - Essential for intranet Web servers to identify and verify employees accessing the system
- Web site development
  - Include features such as an HTML/visual Web page editor
- Web page construction
  - Static and dynamic Web pages

E-Commerce Software

- Catalog Management

- Product Configuration

- Shopping Cart

- Web Services

Technology Needed for Mobile Commerce

- Security is a major concern in two areas
  - The security of the transmission itself
  - The trust that the transaction is being made with the intended party

- Encryption
  - Can provide secure transmission

- Digital certificates
  - Can ensure that transactions are made between the intended parties

Electronic Payment Systems

- Certificate authority (CA)
  - Trusted third-party organization or company that issues digital certificates

- Secure Sockets Layer (SSL)
  - Used to secure sensitive data

- Electronic cash
  - Money that is computerized, stored, and used as cash for e-commerce transactions

Electronic Payment Systems (continued)

- Credit, charge, debit, and smart cards
  - Used for most of Internet purchases

- Payments using cell phones
  - Retail and banking industries are keenly interested in using a cell phone like a credit card

Electronic Payment Systems (continued)

| Payment System	Description	Advantages	Disadvantages
Credit card	Carries preset spending limit based on the user's credit history.	Each month the user can pay part or all of the amount owed.	Unpaid balance accumulates interest charges—often at a high rate of interest.
Charge card	Looks like a credit card but carries no preset spending limit.	Charge cards do not involve lines of credit and do not accumulate interest charges.	The entire amount charged to the card is due at the end of the billing period.
Debit card	Look like a credit cards or automated teller machine (ATM) cards.	Operates like cash or a personal check	Money is immediately deducted from user's account balance.
Smart card	Credit card device with embedded microchip capable of storing facts about card holder	Better protected from misuse than conventional credit, charge, and debit cards because the smart-card information is encrypted	Not widely used in the U.S.

Table 5.2

Comparison of Payment Systems

An Overview of Enterprise Systems: Transaction Processing Systems and Enterprise Resource Planning

- Enterprise system
  - Ensures information can be shared across all business functions and all levels of management
- Transaction processing systems
  - Capture and process the detailed data necessary to update records about the fundamental business operations of the organization

An Overview of Enterprise Systems: Transaction Processing Systems and Enterprise Resource Planning (continued)
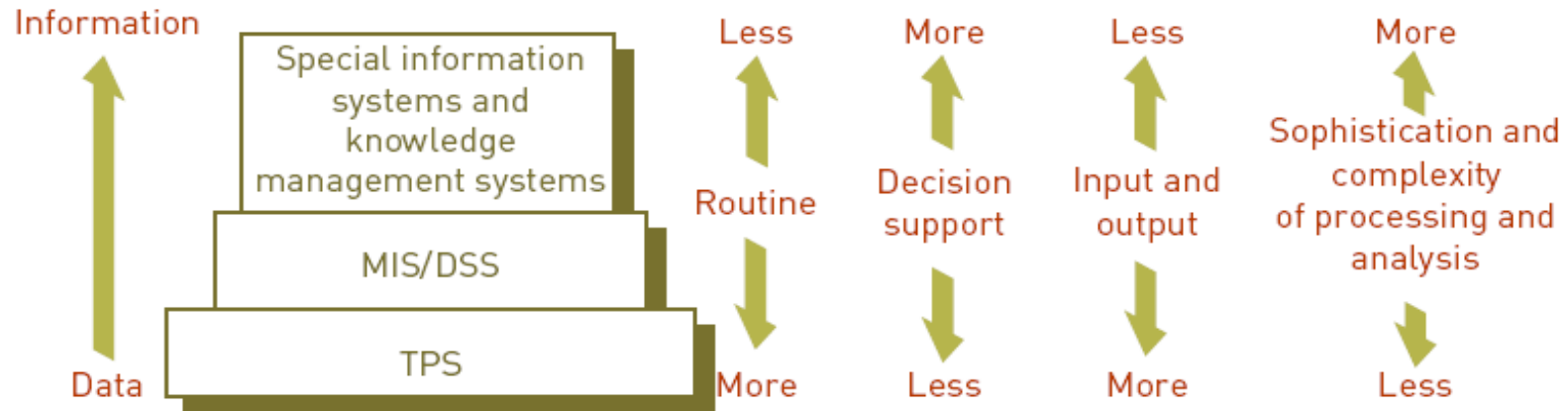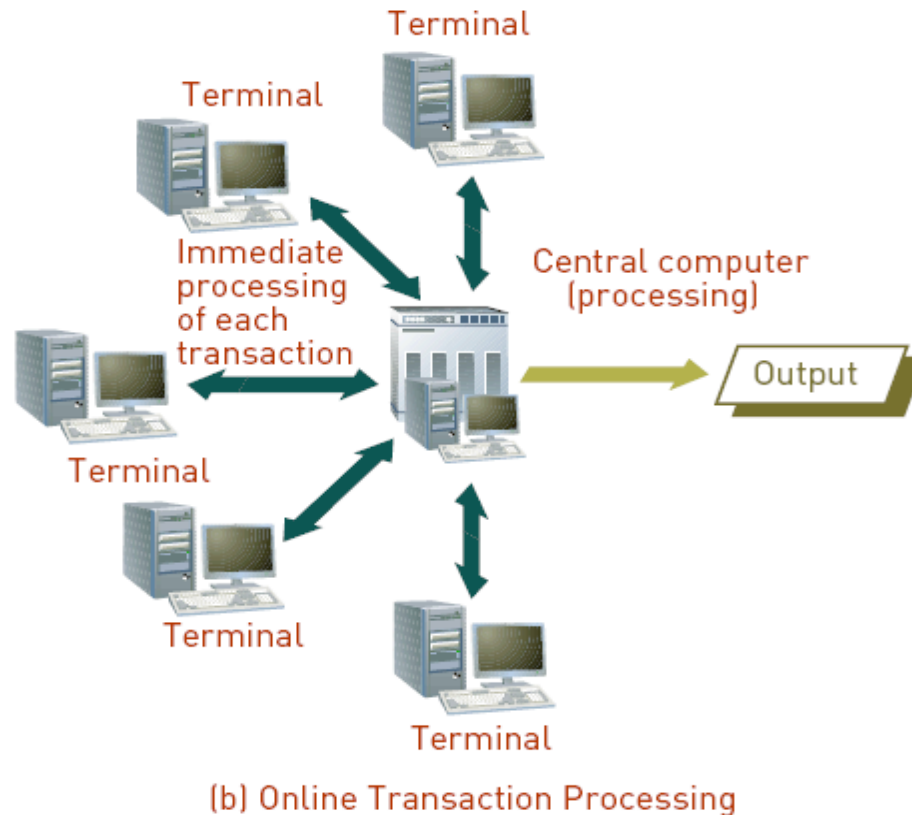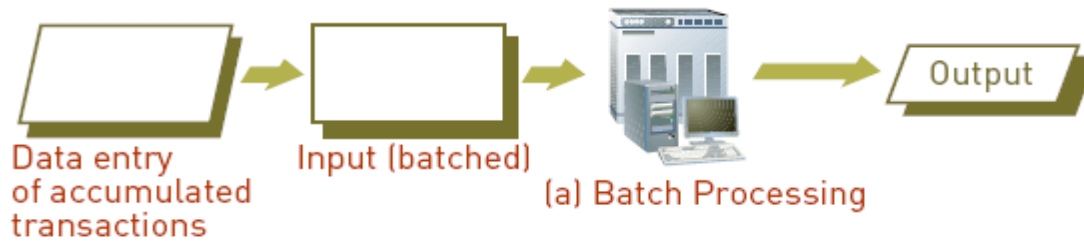

Figure 5.4

TPS, MIS/DSS, and Special Information Systems in Perspective

Traditional Transaction Processing Methods and Objectives

- Batch processing system
  - Business transactions are accumulated over a period of time and prepared for processing as a single unit or batch

- Online transaction processing (OLTP)
  - Each transaction is processed immediately, without the delay of accumulating transactions into a batch

Traditional Transaction Processing Methods and Objectives (continued)

Data entry of accumulated transactions → Input (batched) → (a) Batch Processing → Output

Terminal

Terminal

Immediate processing of each transaction

Central computer (processing)

Terminal

Terminal

Terminal

(b) Online Transaction Processing

Figure 5.5

Batch Versus Online Transaction Processing

(a) Batch processing inputs and processes data in groups. (b) In online processing, transactions are completed as they occur.

# Traditional Transaction Processing Methods and Objectives (continued)

Figure 5.6

Integration of a Firm's TPSs

Transaction Processing Activities

- TPSs
  - Capture and process data that describes fundamental business transactions

- Transaction processing cycle
  - Process of data collection, data editing, data correction, data manipulation, data storage, and document production

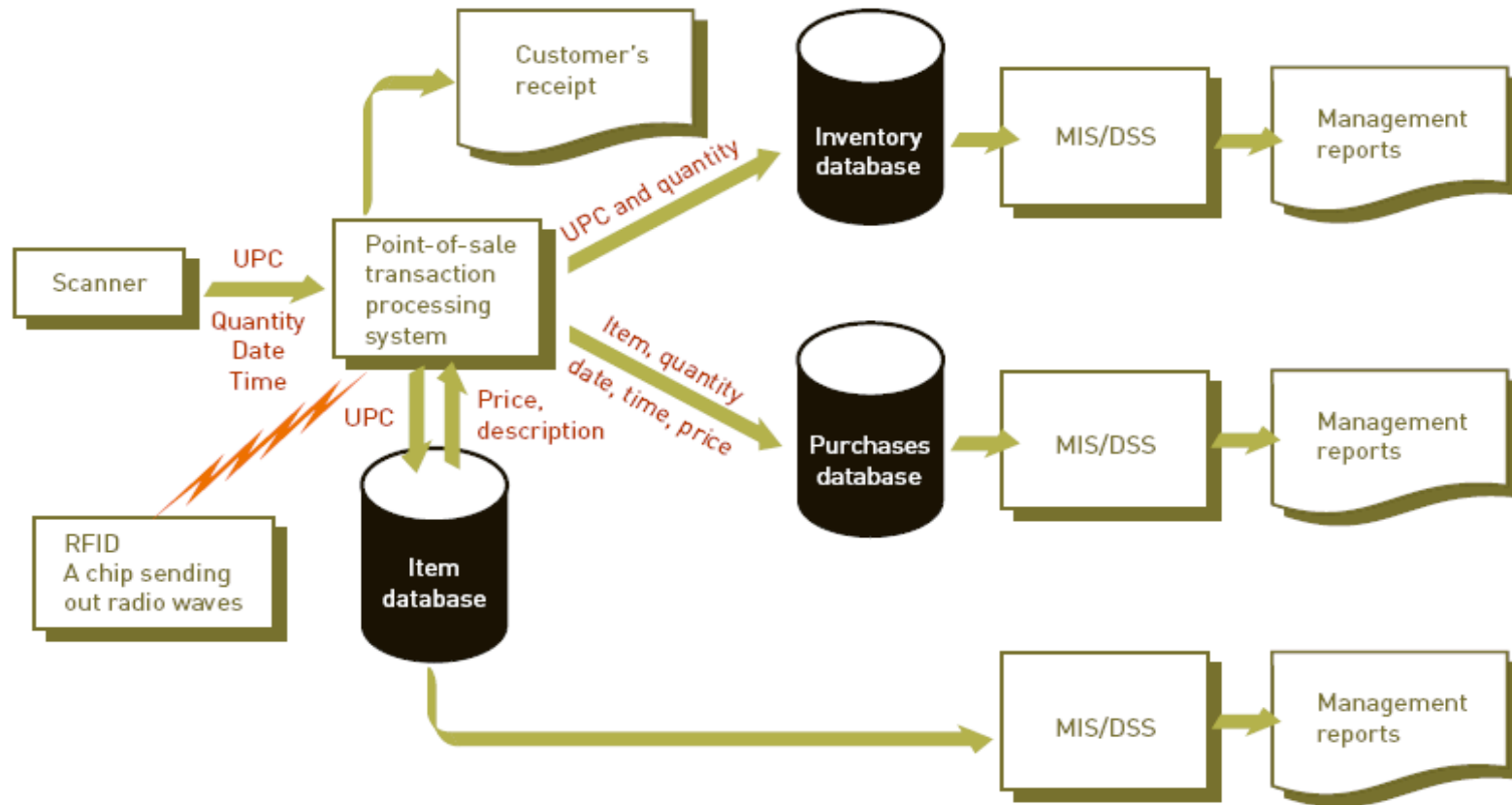# Transaction Processing Activities (continued)
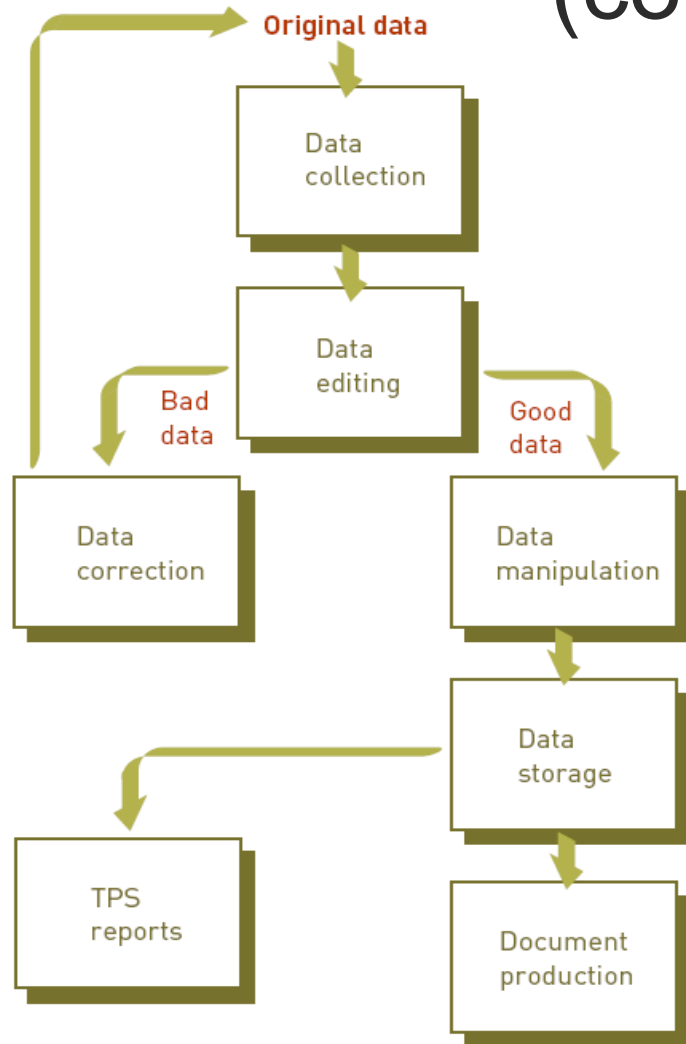
Figure 5.7

Data-Processing Activities Common to Transaction Processing Systems

Data Collection

- Capturing and gathering data necessary to complete the processing of transactions

- Data should be:
  - Collected at source
  - Recorded accurately and in a timely fashion

Data Collection (continued)

Figure 5.8

Point-of-Sale Transaction Processing System

Data Editing

- The process of checking data for validity and completeness

- Example:
  - Quantity and cost data must be numeric and names must be alphabetic; otherwise, the data is not valid

Data Correction

- The process of reentering data that was not typed or scanned properly

- Example:

  – A scanned UPC code must match a code in a master table of valid UPCs

Data Manipulation

- The process of performing calculations and other data transformations related to business transactions

- Can include:

  – Classifying data

  – Sorting data into categories

  – Performing calculations

Data Storage

- The process of updating one or more databases with new transactions

- After being updated data can be further processed and manipulated by other systems

Document Production and Reports

- Document production
  - Generating output records and reports

- Printed paychecks
  - Hard-copy documents produced by a payroll TPS

Control and Management Issues

- Disaster recovery plan (DRP)
  - Formal plan describing the actions that must be taken to restore computer operations and services in the event of a disaster
- Critical business information systems
  - TPSs that directly affect the cash flow of the firm

Transaction Processing System Audit

- Attempts to answer four basic questions
  - Does the system meet the business need for which it was implemented?
  - What procedures and controls have been established?
  - Are these procedures and controls being used properly?
  - Are the information systems and procedures producing accurate and honest reports?

Traditional Transaction Processing Application

- A TPS typically includes the following types of systems
    - Order processing systems
    - Accounting systems
    - Purchasing systems

Transaction Processing Systems for Small and Medium Size Enterprises (SMES)

- Many software packages
  - Provide integrated transaction processing system solutions for small and medium size enterprises (SMEs)

Transaction Processing Systems for Small and Medium Size Enterprises (SMES) (continued)

| Vendor	Software	Type of TPS Offered	Target Customers
AccuFund	AccuFund	Financial reporting and accounting	Non-profit, municipal and government organizations
OpenPro	OpenPro	Complete ERP solution including financials, supply chain management, e-commerce, customer relationship management, and retail POS system	Manufacturers, distributors, and retailers
Intuit	QuickBooks	Financial reporting and accounting	Manufacturers, professional services, contractors, nonprofits, and retailers
Sage	Timberline	Financial reporting, accounting, and operations	Contractors, real estate developers, and residential builders
Redwing	TurningPoint	Financial reporting and accounting	Professional services, banks, and retailers

Table 5.3

Sample of Integrated TPS Solutions for SMEs

Enterprise Resource Planning, Supply Chain Management, and Customer Relationship Management

- Business process
  - Set of coordinated and related activities that takes one or more kinds of input and creates an output of value to the customer of that process
- At the core of the ERP system
  - A database shared by all users

Enterprise Resource Planning, Supply Chain Management, and Customer Relationship Management (continued)
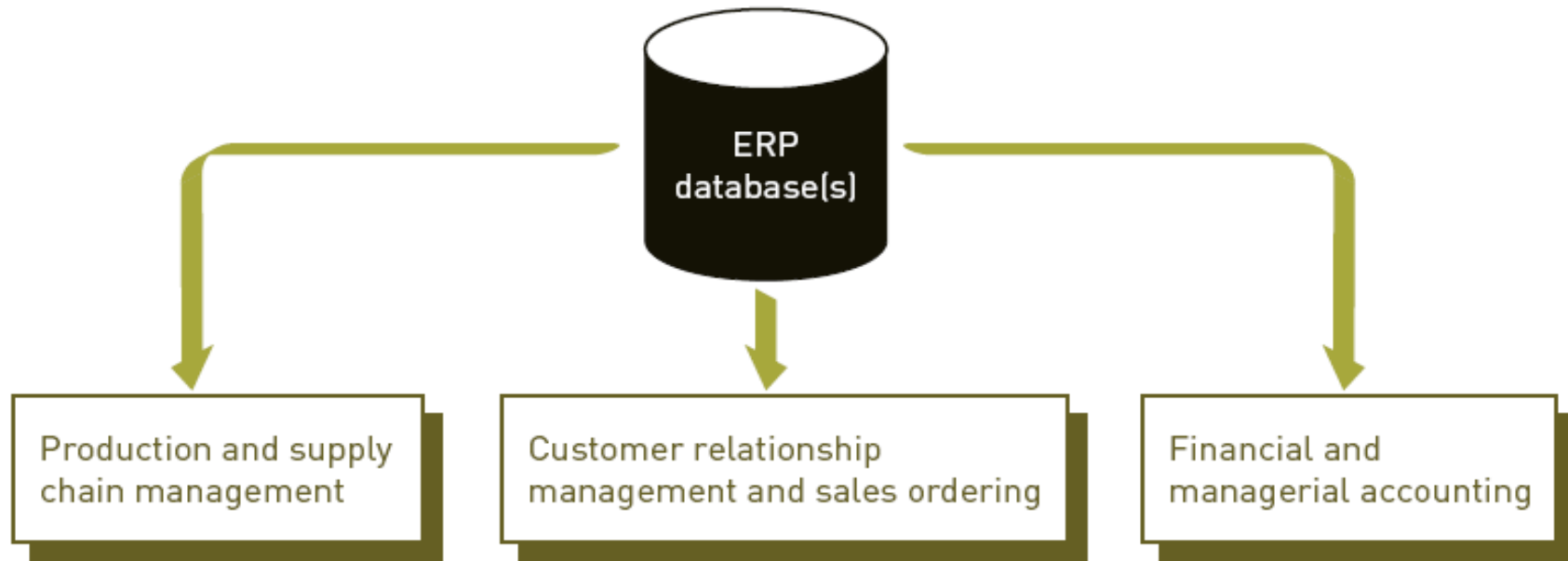
Figure 5.9

Enterprise Resource Planning System

An ERP integrates business processes and the ERP database.

An Overview of Enterprise Resource Planning

- ERP systems
  - Evolved from materials requirement planning systems (MRP)

- First to take on the challenge of implementing ERP
  - Large organizations; members of the Fortune 1000

Advantages of ERP

- Improved access to data for operational decision making

- Elimination of costly, inflexible legacy systems

- Improvement of work processes

- Upgrade of technology infrastructure

Disadvantages of ERP Systems

- Expense and time in implementation
- Difficulty implementing change
- Difficulty integrating with other systems
- Risks in using one vendor
- Risk of implementation failure

ERP for Small and Medium Size Enterprises (SMEs)

- SMEs
  - Can achieve real business benefits from their ERP efforts

- With open-source software anyone can see and modify the source code to customize it to meet their needs

ERP for Small and Medium Size Enterprises (SMEs) (continued)

| Vendor	ERP Solutions
Apache	Open For Business ERP
Compiere	Compiere Open Source ERP
Openbravo	Openbravo Open Source ERP
WebERP	WebERP

Table 5.4

Open Source ERP Systems

Production and Supply Chain Management

- ERP systems follow a systematic process for developing a production plan
  - Sales forecasting
  - Sales and operations plan
  - Demand management
  - Detailed scheduling
  - Materials requirement planning
  - Purchasing
  - Production

Customer Relationship Management and Sales Ordering

- Goals of CRM:
  - Understand and anticipate the needs of current and potential customers to increase customer retention and loyalty
  - Optimize the way products and services are sold

- Sales ordering
  - Set of activities that must be performed to capture a customer sales order

Customer Relationship Management and Sales Ordering (continued)
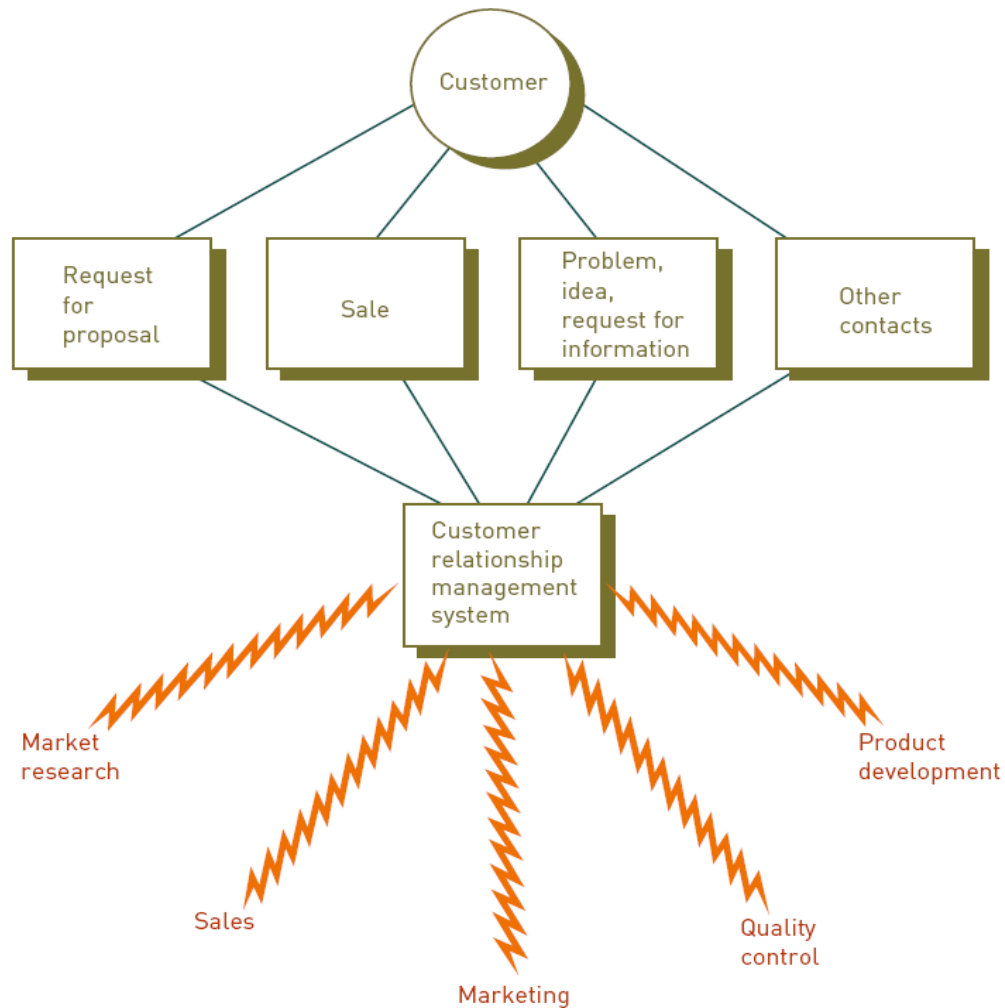
Figure 5.10

Customer Relationship Management System

Financial and Managerial Accounting

- Financial accounting
  - Capturing and recording all transactions that affect a company's financial state

- Managerial accounting
  - Provides data to enable the firm's managers to:
    - Assess the profitability of a given product
    - Identify underperforming sales regions
    - Establish budgets
    - Make profit forecasts

Hosted Software Model for Enterprise Software

- Goal:
  - To help customers acquire, use, and benefit from the new technology while avoiding much of the associated complexity and high start-up costs
- Potential problems can occur if the hosted software vendor cannot provide a reliable operation environment

Hosted Software Model for Enterprise Software (continued)

Advantages	Disadvantages
Decreased total cost of ownership	Potential availability and reliability issues
Faster system startup	Potential data security issues
Lower implementation risk	Potential problems integrating the hosted products of different vendors
Management of systems outsourced to experts	Savings anticipated from outsourcing may be offset by increased effort to manage vendor

Table 5.5

Advantages and Disadvantages of Hosted Software Model

International Issues Associated with Enterprise Systems

- Challenges that must be met by an enterprise system of a multinational company
  - Different languages and cultures
  - Disparities in IS infrastructure
  - Varying laws and customs rules
  - Multiple currencies

Summary

- E-commerce
  - Business-to-business (B2B)
  - Business-to-consumer (B2C)
  - Consumer-to consumer (C2C)
  - Mobile commerce

- Wireless Application Protocol (WAP)
  - Standard set of specifications to enable development of m-commerce software for wireless devices

Summary (continued)

- Electronic payment systems
  - Key component of the e-commerce infrastructure
- Transaction processing systems (TPSs)
  - The heart of most information systems in businesses today
- Basic activities of TPSs
  - Data collection, data editing
  - Data correction, data manipulation
  - Sorting, categorizing, summarizing
  - Data storage and document production

Summary (continued)

- Enterprise resource planning (ERP)
  - Software that integrates activities throughout a business
- Many SMEs have found open source ERP systems to be effective solutions to their transaction processing and management reporting needs
- Production and supply chain management process
  - Starts with sales forecasting