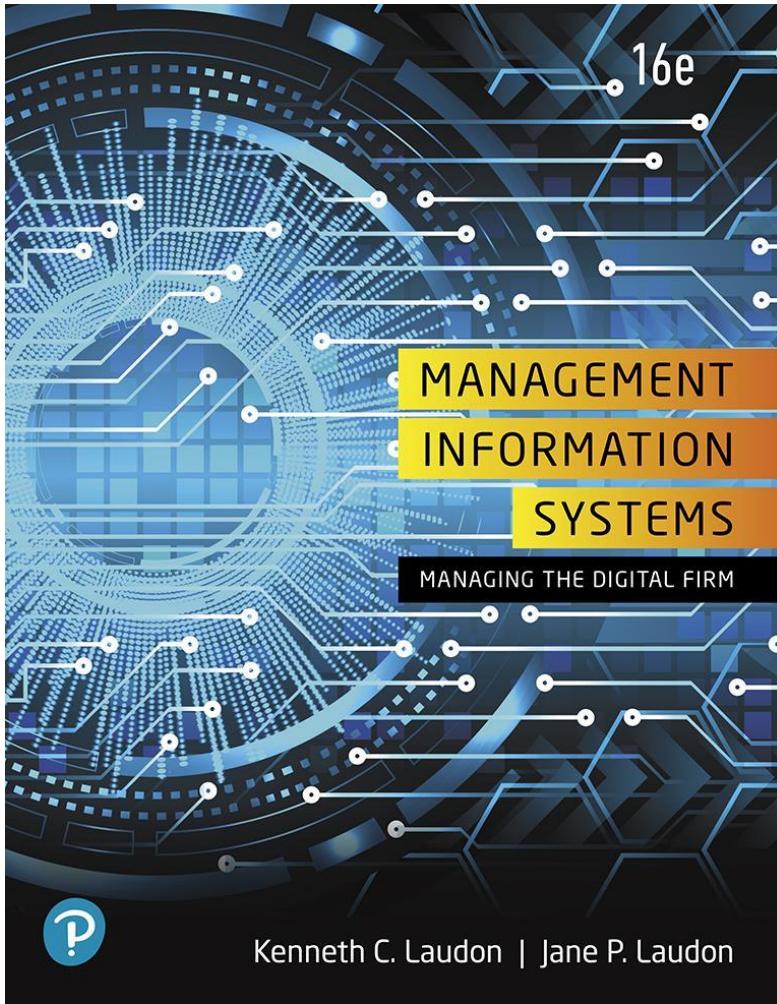


Management Information Systems: Managing the Digital Firm

Sixteenth Edition



Chapter 8

Securing Information Systems

Learning Objectives

- 8.1** Why are information systems vulnerable to destruction, error, and abuse?
- 8.2** What is the business value of security and control?
- 8.3** What are the components of an organizational framework for security and control?
- 8.4** What are the most important tools and technologies for safeguarding information resources?
- 8.5** How will MIS help my career?

Video Cases

- Case 1: Stuxnet and Cyberwarfare
- Case 2: Cyberespionage: The Chinese Threat
- Instructional Video 1: Sony PlayStation Hacked; Data Stolen from 77 Million Users
- Instructional Video 2: Meet the Hackers: Anonymous Statement on Hacking Sony

Hackers Target the U.S. Presidential Election: What Happened? (1 of 2)

- Problem
 - Weak network security
 - Limited financial resources
- Solutions
 - Malware detection technology
 - Isolate systems and networks
 - Prevent unauthorized access

Hackers Target the U.S. Presidential Election: What Happened? (2 of 2)

- Hackers took advantage of uneven security and controls and loose management structure to attack the Clinton campaign
- Demonstrates vulnerabilities in information technology systems
- Illustrates some of the reasons organizations need to pay special attention to information system security

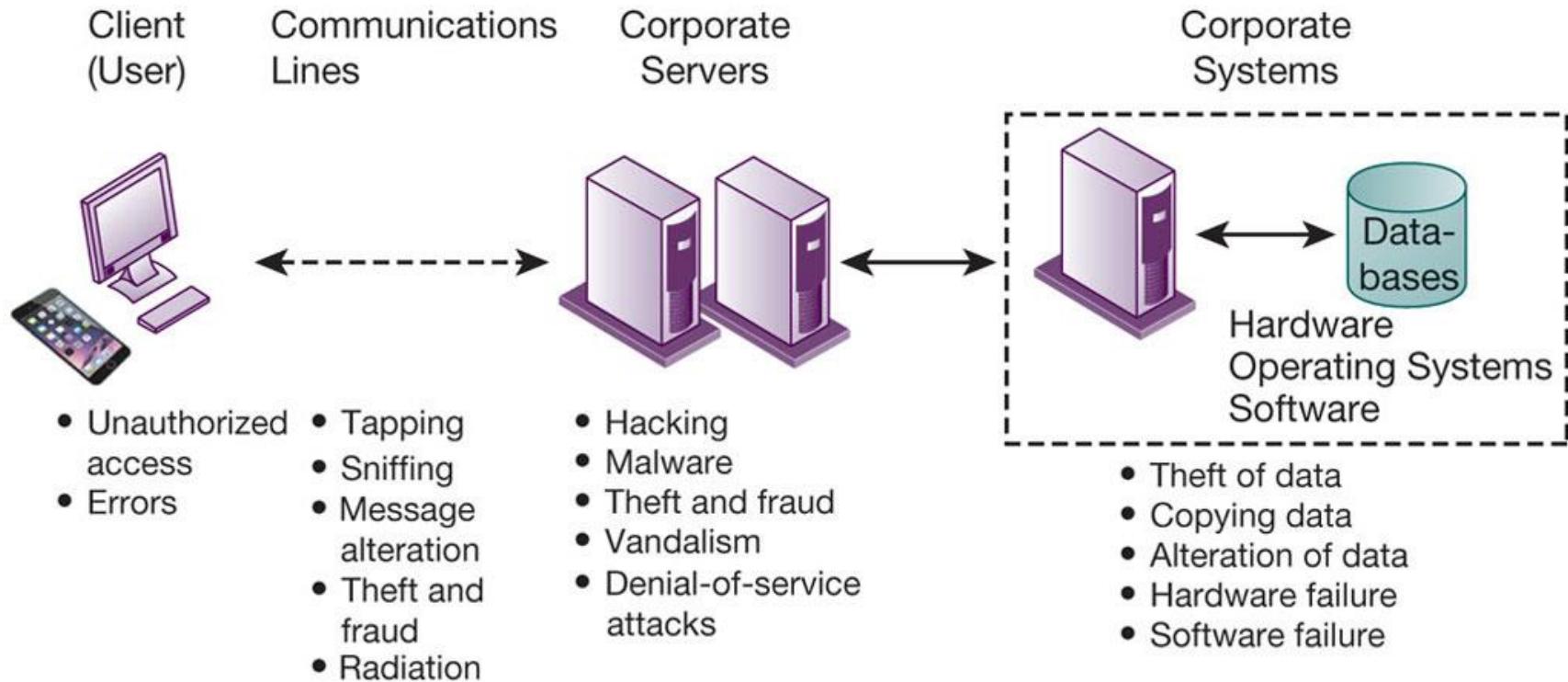
Why Systems are Vulnerable (1 of 2)

- Security
 - Policies, procedures, and technical measures used to prevent unauthorized access, alteration, theft, or physical damage to information systems
- Controls
 - Methods, policies, and organizational procedures that ensure safety of organization's assets; accuracy and reliability of its accounting records; and operational adherence to management standards

Why Systems are Vulnerable (2 of 2)

- Accessibility of networks
- Hardware problems (breakdowns, configuration errors, damage from improper use or crime)
- Software problems (programming errors, installation errors, unauthorized changes)
- Disasters
- Use of networks/computers outside of firm's control
- Loss and theft of portable devices

Figure 8.1 Contemporary Security Challenges and Vulnerabilities



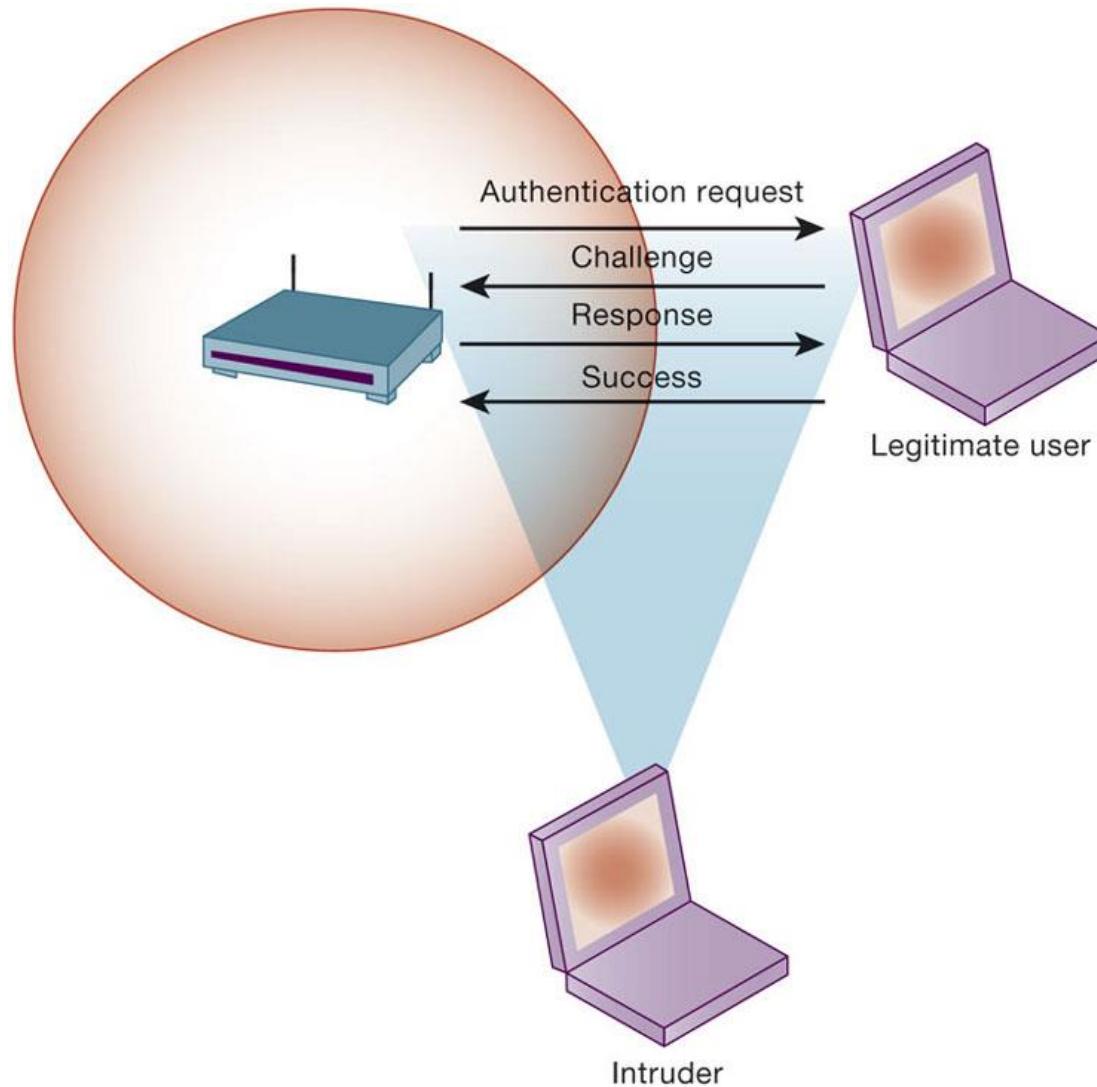
Internet Vulnerabilities

- Network open to anyone
- Size of Internet means abuses can have wide impact
- Use of fixed Internet addresses with cable / DSL modems creates fixed targets for hackers
- Unencrypted VOIP
- E-mail, P2P, IM
 - Interception
 - Attachments with malicious software
 - Transmitting trade secrets

Wireless Security Challenges

- Radio frequency bands easy to scan
- SSIDs (service set identifiers)
 - Identify access points, broadcast multiple times, can be identified by sniffer programs
- War driving
 - Eavesdroppers drive by buildings and try to detect SSID and gain access to network and resources
 - Once access point is breached, intruder can gain access to networked drives and files
- Rogue access points

Figure 8.2 Wi-Fi Security Challenges



Malicious Software: Viruses, Worms, Trojan Horses, and Spyware (1 of 2)

- Malware (malicious software)
- Viruses
- Worms
- Worms and viruses spread by
 - Downloads and drive-by downloads
 - E-mail, IM attachments
- Mobile device malware
- Social network malware

Malicious Software: Viruses, Worms, Trojan Horses, and Spyware (2 of 2)

- Trojan horse
- SQL injection attacks
- Ransomware
- Spyware
 - Key loggers
 - Other types
 - Reset browser home page
 - Redirect search requests
 - Slow computer performance by taking up memory

Hackers and Computer Crime (1 of 3)

- Hackers vs. crackers
- Activities include:
 - System intrusion
 - System damage
 - Cybervandalism
 - Intentional disruption, defacement, destruction of website or corporate information system
- Spoofing and sniffing

Hackers and Computer Crime (2 of 3)

- Denial-of-service attacks (DoS)
- Distributed denial-of-service attacks (DDoS)
- Botnets
- Spam
- Computer crime
 - Computer may be target of crime
 - Computer may be instrument of crime

Hackers and Computer Crime (3 of 3)

- Identity theft
 - Phishing
 - Evil twins
 - Pharming
- Click fraud
- Cyberterrorism
- Cyberwarfare

Internal Threats: Employees

- Security threats often originate inside an organization
- Inside knowledge
- Sloppy security procedures
 - User lack of knowledge
- Social engineering
- Both end users and information systems specialists are sources of risk

Software Vulnerability

- Commercial software contains flaws that create security vulnerabilities
 - Bugs (program code defects)
 - Zero defects cannot be achieved
 - Flaws can open networks to intruders
- Zero-day vulnerabilities
- Patches
 - Small pieces of software to repair flaws
 - Patch management

What is the Business Value of Security and Control?

- Failed computer systems can lead to significant or total loss of business function
- Firms now are more vulnerable than ever
 - Confidential personal and financial data
 - Trade secrets, new products, strategies
- A security breach may cut into a firm's market value almost immediately
- Inadequate security and controls also bring forth issues of liability

Interactive Session: Technology: Meltdown and Spectre Haunt the World's Computers

- Class discussion
 - How dangerous are Spectre and Meltdown? Explain your answer.
 - Compare the threats of Spectre and Meltdown to cloud computing centers, corporate data centers, and individual computer and smartphone users.
 - How would you protect against Spectre and Meltdown if you were running a public cloud computing center, if you ran a corporate data center, and if you were an individual computer user?

Legal and Regulatory Requirements for Electronic Records Management

- HIPAA
 - Medical security and privacy rules and procedures
- Gramm-Leach-Bliley Act
 - Requires financial institutions to ensure the security and confidentiality of customer data
- Sarbanes-Oxley Act
 - Imposes responsibility on companies and their management to safeguard the accuracy and integrity of financial information that is used internally and released externally

Electronic Evidence and Computer Forensics

- Electronic evidence
 - Evidence for white collar crimes often in digital form
 - Proper control of data can save time and money when responding to legal discovery request
- Computer forensics
 - Scientific collection, examination, authentication, preservation, and analysis of data from computer storage media for use as evidence in court of law
 - Recovery of ambient data

Information Systems Controls

- May be automated or manual
- General controls
 - Govern design, security, and use of computer programs and security of data files in general throughout organization
 - Software controls, hardware controls, computer operations controls, data security controls, system development controls, administrative controls,
- Application controls
 - Controls unique to each computerized application
 - Input controls, processing controls, output controls

Risk Assessment

- Determines level of risk to firm if specific activity or process is not properly controlled
 - Types of threat
 - Probability of occurrence during year
 - Potential losses, value of threat
 - Expected annual loss

Table 8.5 Online Order Processing Risk Assessment

Exposure	Probability of Occurrence	Loss Range (Average) (\$)	Expected Annual Loss (\$)
Power failure	30%	\$5,000 – \$200,000 (\$102,500)	\$30,750
Embezzlement	5%	\$1,000 – \$50,000 (\$25,500)	\$1,275
User error	98%	\$200 – \$40,000 (\$20,100)	\$19,698

Security Policy

- Ranks information risks, identifies security goals and mechanisms for achieving these goals
- Drives other policies
- Acceptable use policy (AUP)
 - Defines acceptable uses of firm's information resources and computing equipment
- Identity management
 - Identifying valid users
 - Controlling access

Figure 8.3 Access Rules for a Personnel System

SECURITY PROFILE 1	
User: Personnel Dept. Clerk	
Location: Division 1	
Employee Identification Codes with This Profile:	00753, 27834, 37665, 44116
Data Field Restrictions	Type of Access
All employee data for Division 1 only	Read and Update
• Medical history data	None
• Salary	None
• Pensionable earnings	None
SECURITY PROFILE 2	
User: Divisional Personnel Manager	
Location: Division 1	
Employee Identification Codes with This Profile:	27321
Data Field Restrictions	Type of Access
All employee data for Division 1 only	Read Only

Disaster Recovery Planning and Business Continuity Planning

- Disaster recovery planning
 - Devises plans for restoration of disrupted services
- Business continuity planning
 - Focuses on restoring business operations after disaster
- Both types of plans needed to identify firm's most critical systems
 - Business impact analysis to determine impact of an outage
 - Management must determine which systems restored first

The Role of Auditing

- Information systems audit
 - Examines firm's overall security environment as well as controls governing individual information systems
- Security audits
 - Review technologies, procedures, documentation, training, and personnel
 - May even simulate disaster to test responses
- List and rank control weaknesses and the probability of occurrence
- Assess financial and organizational impact of each threat

Figure 8.4 Sample Auditor's List of Control Weaknesses

Function: Loans Location: Peoria, IL		Prepared by: J. Ericson Date: June 16, 2018		Received by: T. Benson Review date: June 28, 2018	
Nature of Weakness and Impact	Chance for Error/Abuse		Notification to Management		
	Yes/No	Justification	Report date	Management response	
User accounts with missing passwords Network configured to allow some sharing of system files Software patches can update production programs without final approval from Standards and Controls group	Yes	Leaves system open to unauthorized outsiders or attackers Exposes critical system files to hostile parties connected to the network	5/10/18 5/10/18	Eliminate accounts without passwords Ensure only required directories are shared and that they are protected with strong passwords	
	Yes				
	No	All production programs require management approval; Standards and Controls group assigns such cases to a temporary production status			

Tools and Technologies for Safeguarding Information Systems

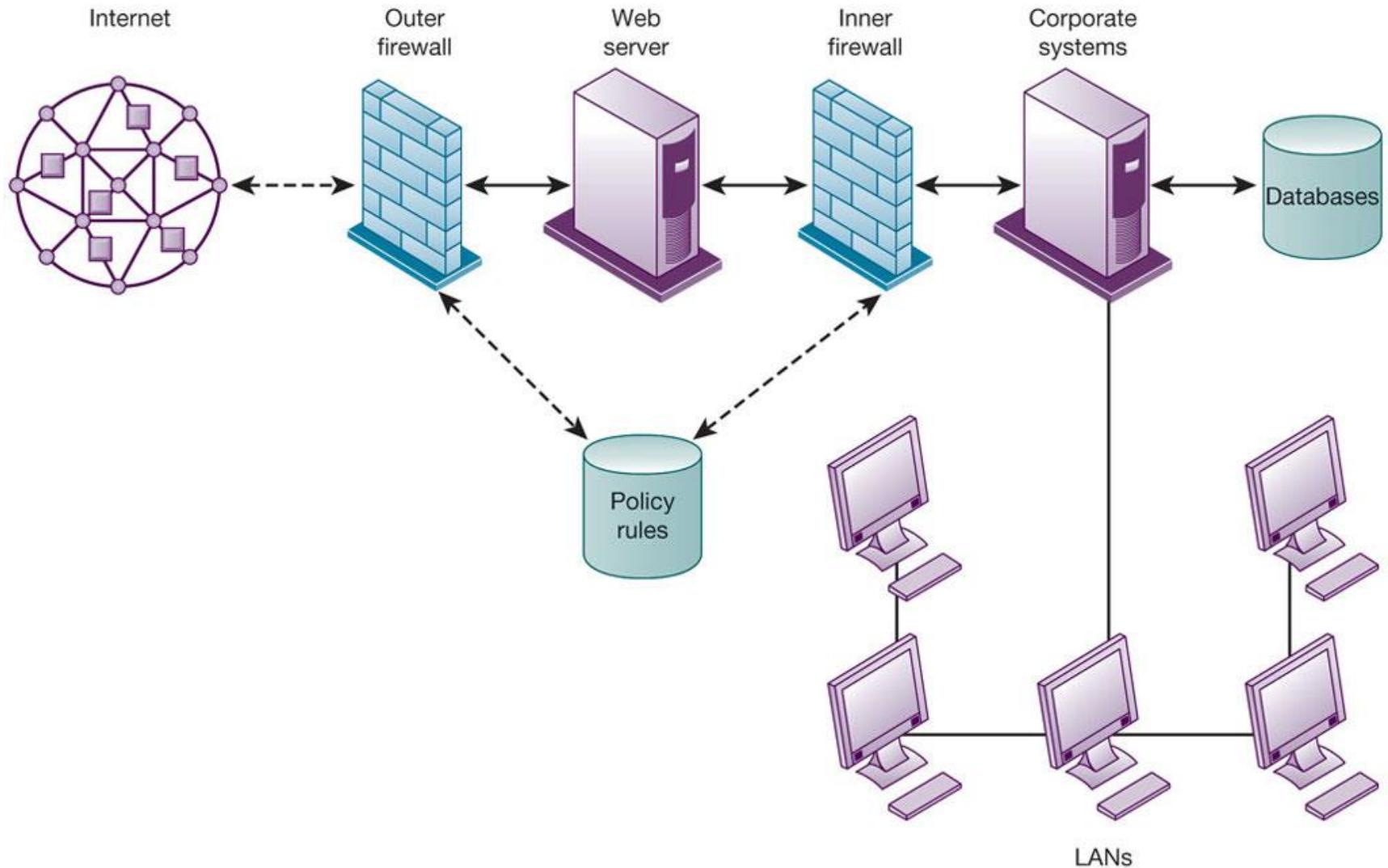
(1 of 3)

- Identity management software
 - Automates keeping track of all users and privileges
 - Authenticates users, protecting identities, controlling access
- Authentication
 - Password systems
 - Tokens
 - Smart cards
 - Biometric authentication
 - Two-factor authentication

Tools and Technologies for Safeguarding Information Systems (2 of 3)

- Firewall
 - Combination of hardware and software that prevents unauthorized users from accessing private networks
 - Packet filtering
 - Stateful inspection
 - Network address translation (NAT)
 - Application proxy filtering

Figure 8.5 A Corporate Firewall



Tools and Technologies for Safeguarding Information Systems

(3 of 3)

- Intrusion detection system
 - Monitors hot spots on corporate networks to detect and deter intruders
- Antivirus and antispyware software
 - Checks computers for presence of malware and can often eliminate it as well
 - Requires continual updating
- Unified threat management (UTM) systems

Securing Wireless Networks

- WEP security
 - Static encryption keys are relatively easy to crack
 - Improved if used in conjunction with VPN
- WPA2 specification
 - Replaces WEP with stronger standards
 - Continually changing, longer encryption keys

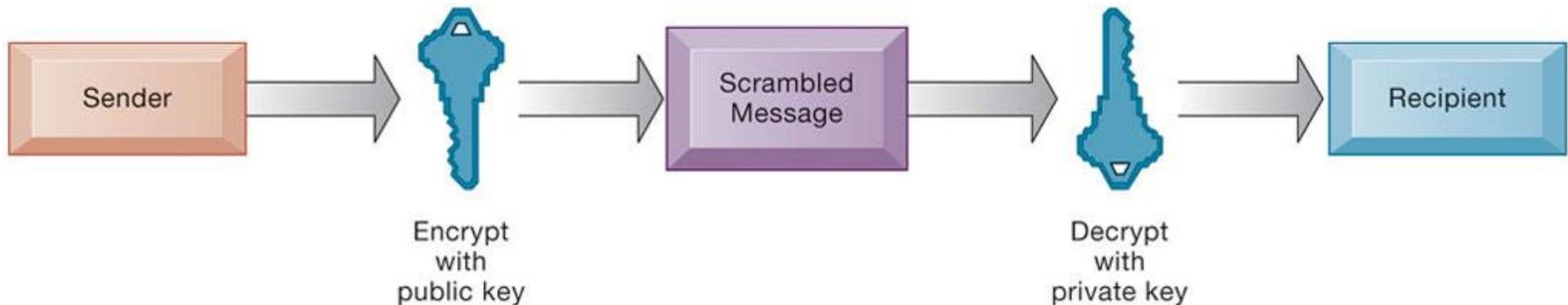
Encryption and Public Key Infrastructure (1 of 3)

- Encryption
 - Transforming text or data into cipher text that cannot be read by unintended recipients
 - Two methods for encryption on networks
 - Secure Sockets Layer (SSL) and successor Transport Layer Security (TLS)
 - Secure Hypertext Transfer Protocol (S-HTTP)

Encryption and Public Key Infrastructure (2 of 3)

- Two methods of encryption of messages
 - Symmetric key encryption
 - Sender and receiver use single, shared key
 - Public key encryption
 - Uses two, mathematically related keys: public key and private key
 - Sender encrypts message with recipient's public key
 - Recipient decrypts with private key

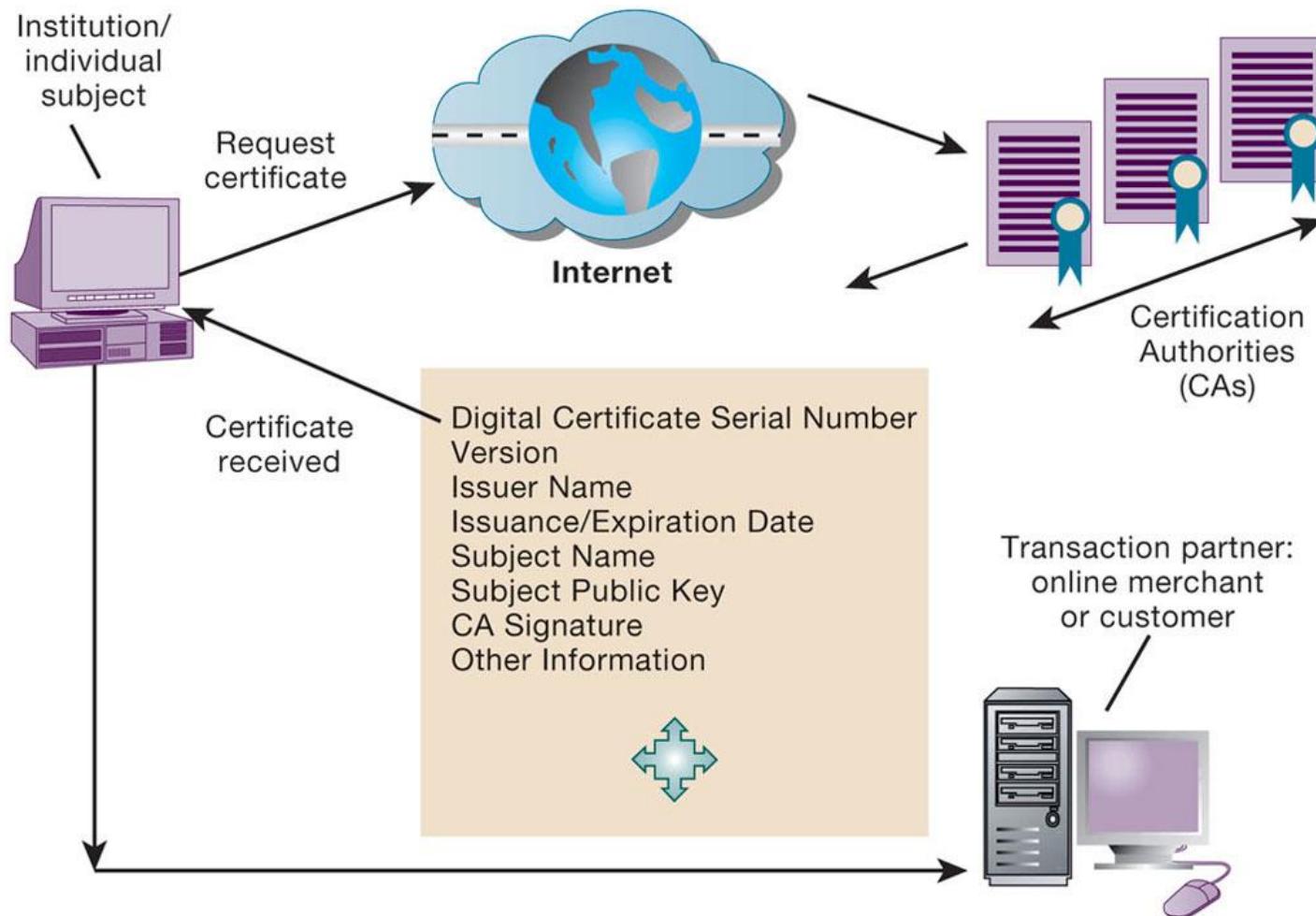
Figure 8.6 Public Key Encryption



Encryption and Public Key Infrastructure (3 of 3)

- Digital certificate
 - Data file used to establish the identity of users and electronic assets for protection of online transactions
 - Uses a trusted third party, certification authority (CA), to validate a user's identity
 - CA verifies user's identity, stores information in CA server, which generates encrypted digital certificate containing owner ID information and copy of owner's public key
- Public key infrastructure (PKI)
 - Use of public key cryptography working with certificate authority
 - Widely used in e-commerce

Figure 8.7 Digital Certificates



Ensuring System Availability

- Online transaction processing requires 100% availability
- Fault-tolerant computer systems
 - Contain redundant hardware, software, and power supply components that create an environment that provides continuous, uninterrupted service
- Deep packet inspection
- Security outsourcing
 - Managed security service providers (MSSPs)

Security Issues for Cloud Computing and the Mobile Digital Platform (1 of 2)

- Security in the cloud
 - Responsibility for security resides with company owning the data
 - Firms must ensure providers provide adequate protection:
 - Where data are stored
 - Meeting corporate requirements, legal privacy laws
 - Segregation of data from other clients
 - Audits and security certifications
 - Service level agreements (SLAs)

Security Issues for Cloud Computing and the Mobile Digital Platform (2 of 2)

- Securing mobile platforms
 - Security policies should include and cover any special requirements for mobile devices
 - Guidelines for use of platforms and applications
 - Mobile device management tools
 - Authorization
 - Inventory records
 - Control updates
 - Lock down/erase lost devices
 - Encryption
 - Software for segregating corporate data on devices

Ensuring Software Quality

- Software metrics: Objective assessments of system in form of quantified measurements
 - Number of transactions
 - Online response time
 - Payroll checks printed per hour
 - Known bugs per hundred lines of code
- Early and regular testing
- Walkthrough: Review of specification or design document by small group of qualified people
- Debugging: Process by which errors are eliminated

Interactive Session: Organizations: How Secure Is the Cloud?

- Class discussion
 - What kinds of security problems does cloud computing pose? How serious are they? Explain your answer.
 - What management, organization, and technology factors are responsible for cloud security problems? To what extent is cloud security a management issue?
 - What steps can organizations take to make their cloud-based systems more secure?
 - Should companies use the public cloud to run their mission-critical systems? Why or why not?

How Will MIS Help My Career?

- The Company: No. 1 Value Supermarkets
- Position Description: Identity access and management support specialist, entry-level
- Job Requirements
- Interview Questions
- Author Tips

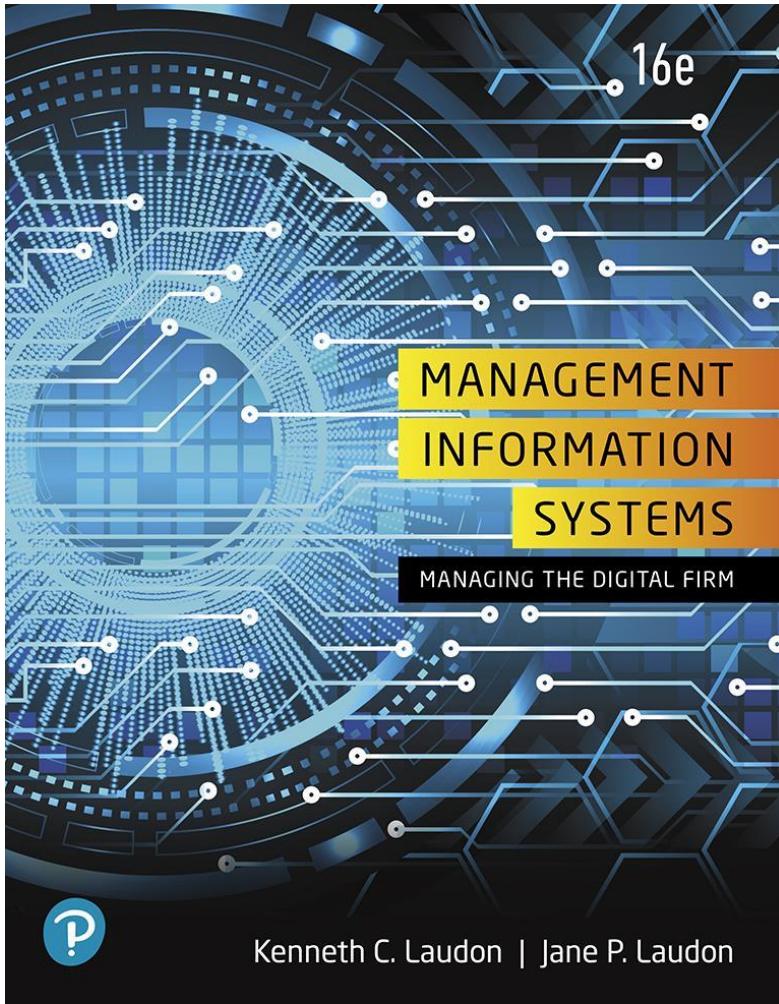
Copyright



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

Management Information Systems: Managing the Digital Firm

Sixteenth Edition



Chapter 9

Achieving Operational Excellence
and Customer Intimacy: Enterprise
Applications

Learning Objectives

- 9.1** How do enterprise systems help businesses achieve operational excellence?
- 9.2** How do supply chain management systems coordinate planning, production, and logistics with suppliers?
- 9.3** How do customer relationship management systems help firms achieve customer intimacy?
- 9.4** What are the challenges that enterprise applications pose, and how are enterprise applications taking advantage of new technologies?
- 9.5** How will MIS help my career?

Video Cases

- Case 1: Life Time Fitness Gets in Shape with Salesforce CRM
- Instructional Video: GSMS Protects Patients by Serializing Every Bottle of Drugs

Avon Beautifies Its Supply Chain (1 of 2)

- Problem
 - Volatile demand
 - Global operations
 - Complex supply chain
 - Manual processes
- Solutions
 - Revise supply chain processes
 - Deploy JDA Manufacturing
 - Intelligent Fulfillment

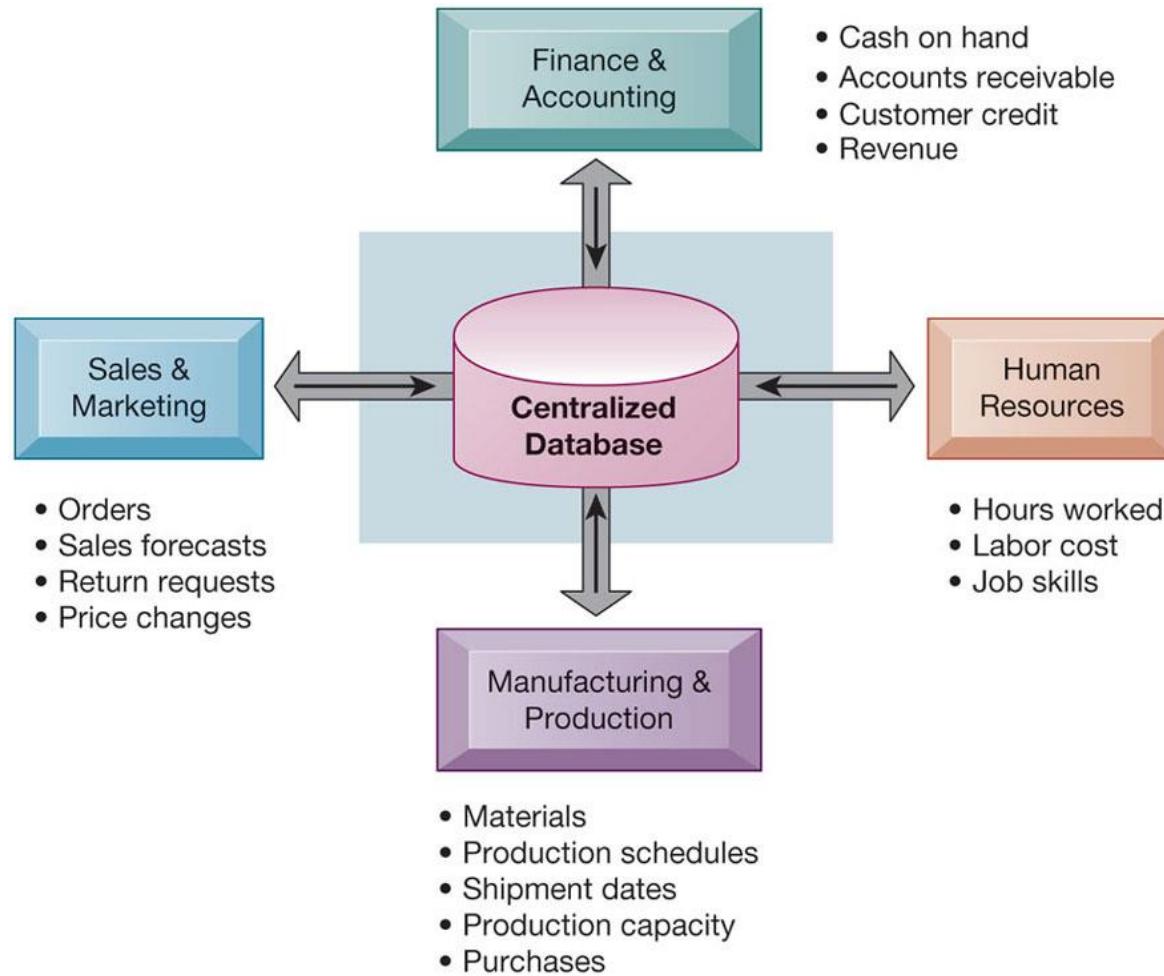
Avon Beautifies Its Supply Chain (2 of 2)

- Avon uses JDA's Manufacturing and Intelligent Fulfillment system to gain control over its supply chain and inventory, and estimate future needs to integrate business processes and decision making
- Demonstrates why companies need enterprise applications
- Illustrates the ability of ERP systems to dramatically improve operational effectiveness and decision making on a global scale

Enterprise Systems

- Enterprise resource planning (ERP) systems
- Suite of integrated software modules and a common central database
- Collects data from many divisions of firm for use in nearly all of firm's internal business activities
- Information entered in one process is immediately available for other processes

Figure 9.1 How Enterprise Systems Work



Enterprise Software

- Built around thousands of predefined business processes that reflect best practices
 - Finance and accounting
 - Human resources
 - Manufacturing and production
 - Sales and marketing
- To implement, firms:
 - Select functions of system they wish to use
 - Map business processes to software processes
 - Use software's configuration tables for customizing

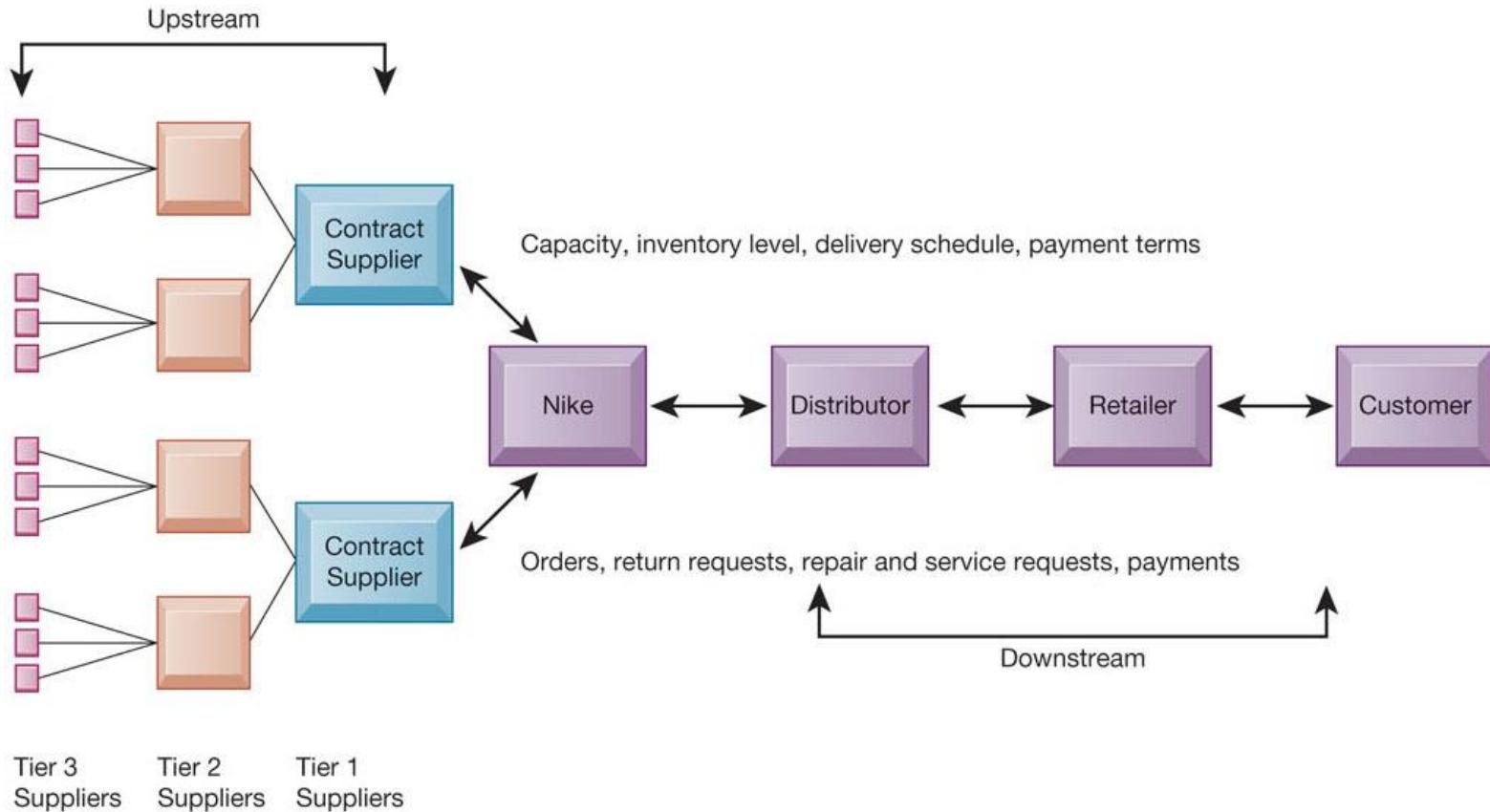
Business Value of Enterprise Systems

- Increase operational efficiency
- Provide firm-wide information to support decision making
- Enable rapid responses to customer requests for information or products
- Include analytical tools to evaluate overall organizational performance and improve decision-making

The Supply Chain

- Network of organizations and processes for:
 - Procuring materials
 - Transforming materials into products
 - Distributing the products
- Upstream supply chain
- Downstream supply chain
- Internal supply chain

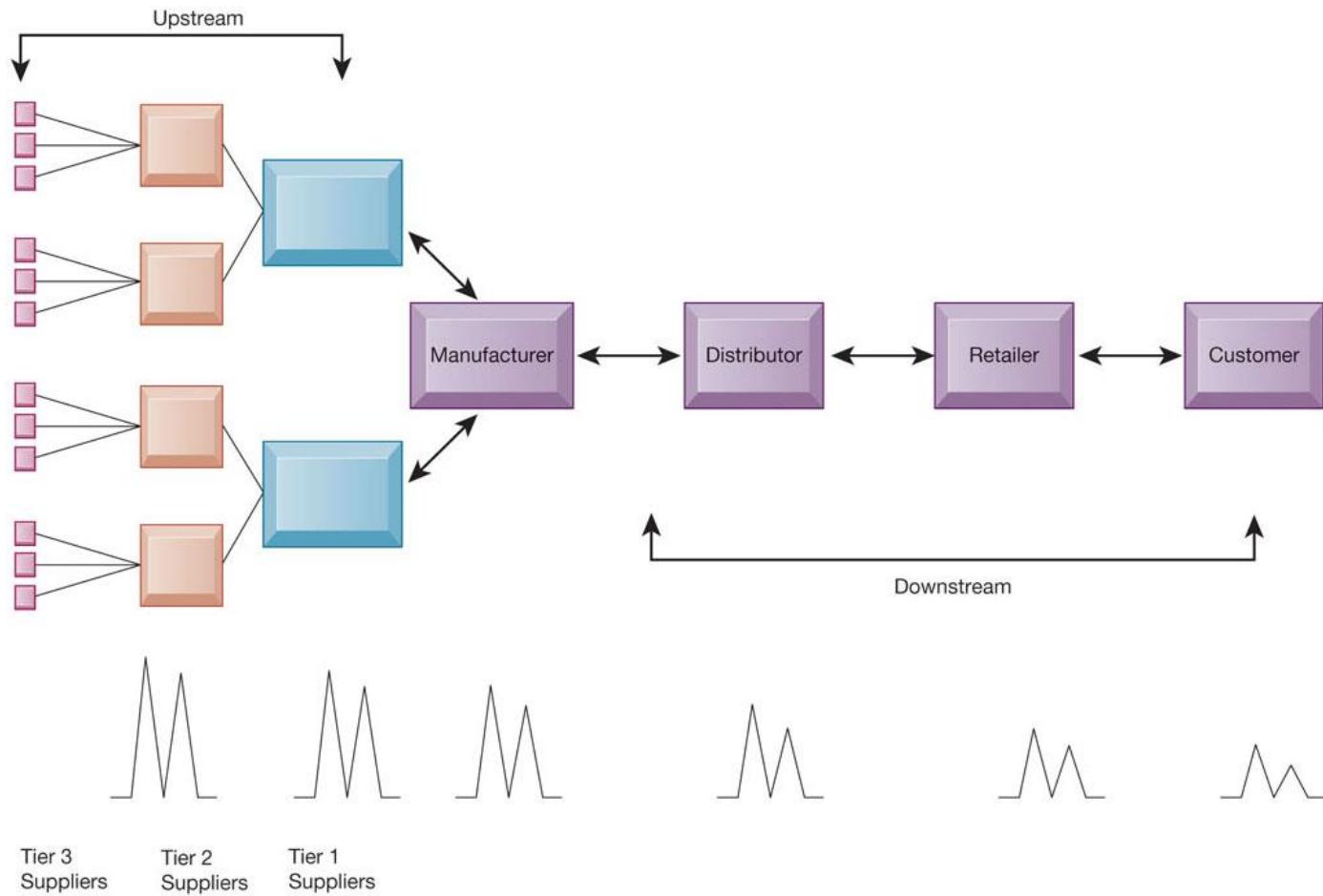
Figure 9.2 Nike's Supply Chain



Supply Chain Management

- Inefficiencies cut into a company's operating costs
 - Can waste up to 25 percent of operating expenses
- Just-in-time strategy
 - Components arrive as they are needed
 - Finished goods shipped after leaving assembly line
- Safety stock: buffer for lack of flexibility in supply chain
- Bullwhip effect
 - Information about product demand gets distorted as it passes from one entity to next across supply chain

Figure 9.3 The Bullwhip Effect



Supply Chain Management Software

- Supply chain planning systems
 - Model existing supply chain
 - Enable demand planning
 - Optimize sourcing, manufacturing plans
 - Establish inventory levels
 - Identify transportation modes
- Supply chain execution systems
 - Manage flow of products through distribution centers and warehouses

Global Supply Chains and the Internet

- Global supply chain issues
 - Greater geographical distances, time differences
 - Participants from different countries
 - Different performance standards
 - Different legal requirements
- Internet helps manage global complexities
 - Warehouse management
 - Transportation management
 - Logistics
 - Outsourcing

Demand-Driven Supply Chains: From Push to Pull Manufacturing and Efficient Customer Response

- Push-based model (build-to-stock)
 - Earlier SCM systems
 - Schedules based on best guesses of demand
- Pull-based model (demand-driven)
 - Web-based
 - Customer orders trigger events in supply chain
- Internet enables move from sequential supply chains to concurrent supply chains
 - Complex networks of suppliers can adjust immediately

Figure 9.4 Push- Versus Pull-Based Supply Chain Models

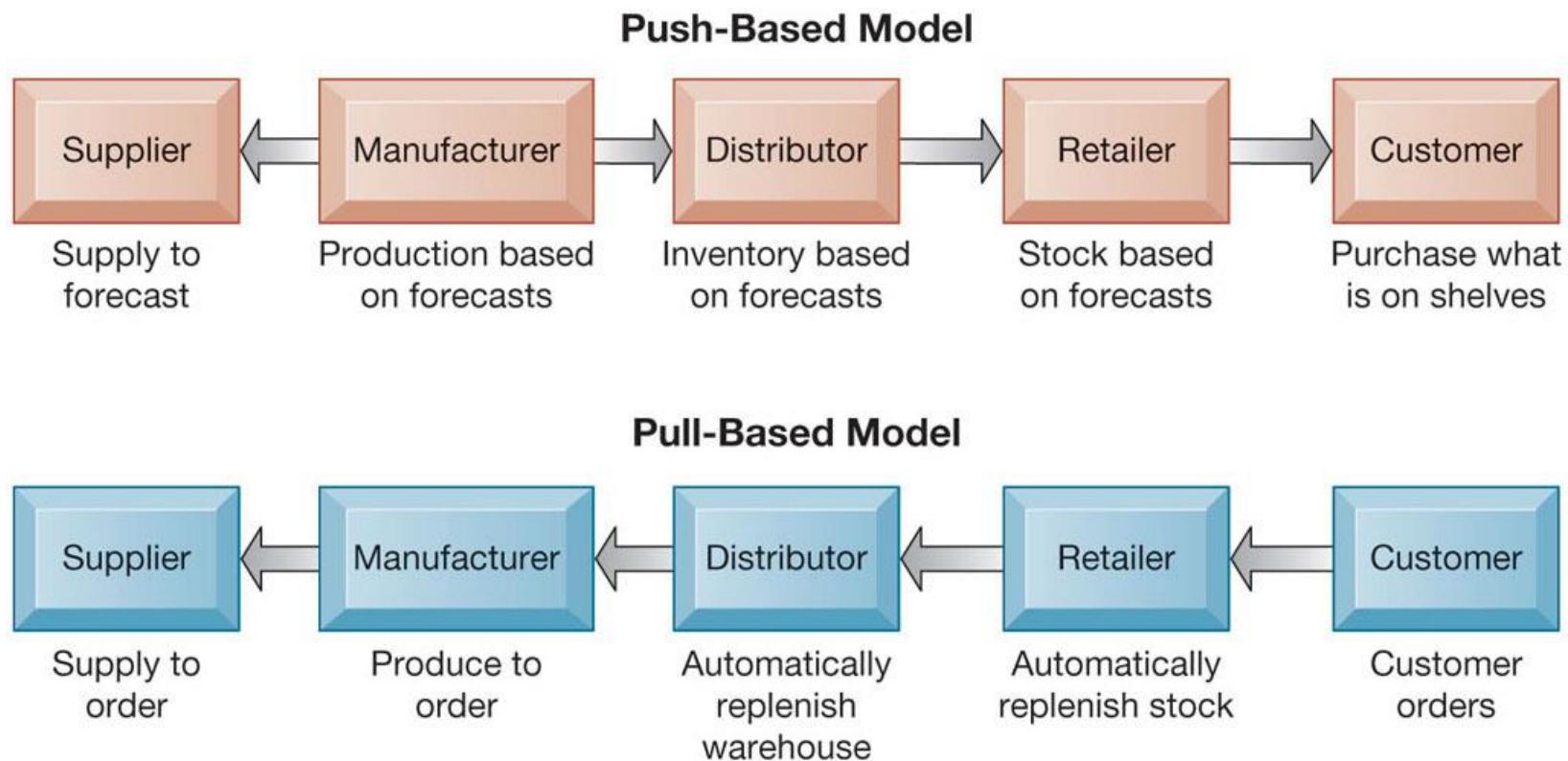
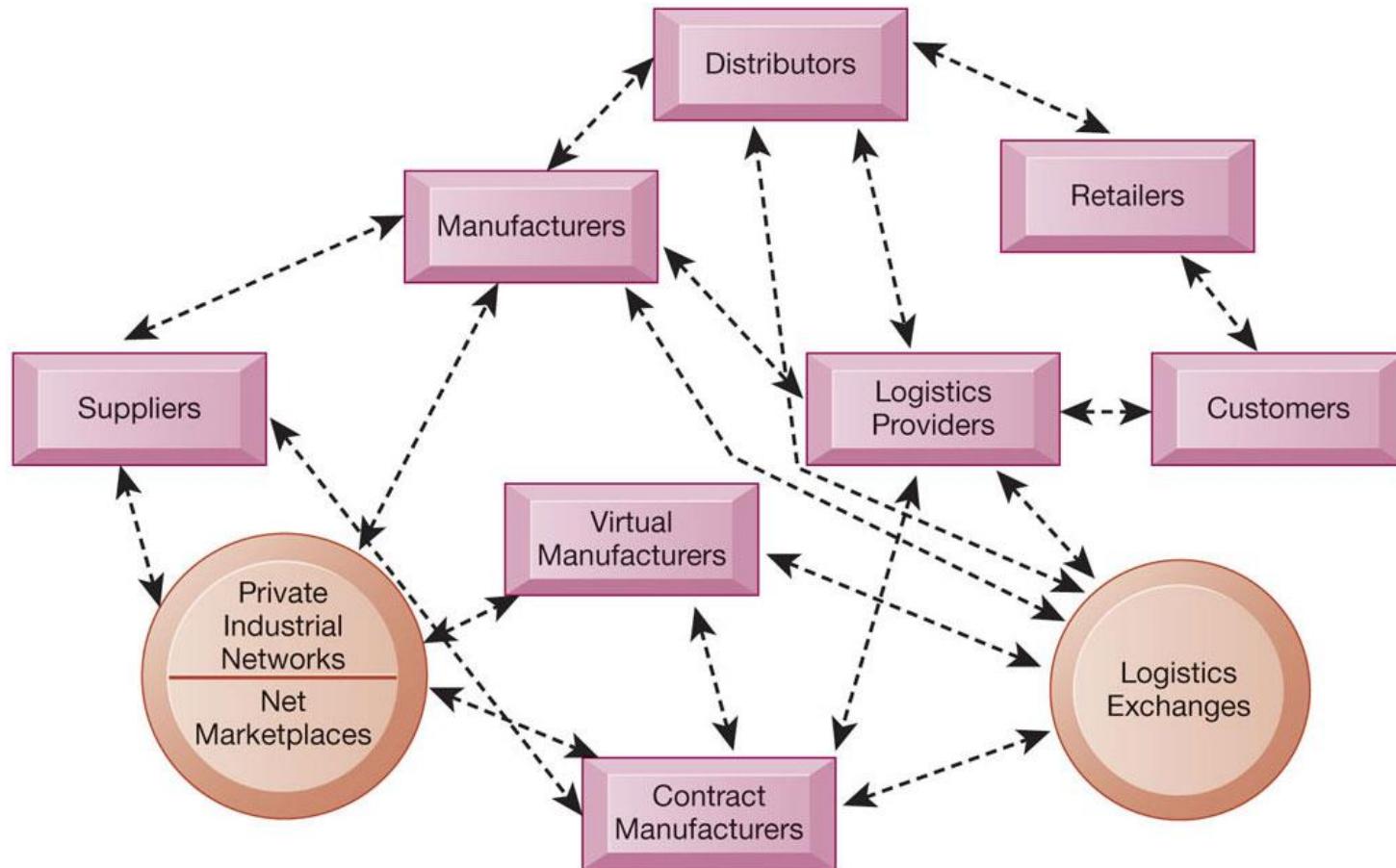


Figure 9.5 The Emerging Internet-Driven Supply Chain



Business Value of Supply Chain Management Systems

- Match supply to demand
- Reduce inventory levels
- Improve delivery service
- Speed product time to market
- Use assets more effectively
 - Total supply chain costs can be 75 percent of operating budget
- Increase sales

Interactive Session: Management: Soma Bay Prospers with ERP in the Cloud

- Class discussion
 - Identify and describe the problem discussed in this case. What management, organization, and technology factors contributed to the problem?
 - Why was an ERP system required for a solution? How did having a cloud-based ERP system contribute to the solution?
 - What were the business benefits of Soma Bay's new enterprise system? How did it change decision making and the way the company operated?

Customer Relationship Management

- Knowing the customer
- In large businesses, too many customers and too many ways customers interact with firm
- CRM systems
 - Capture and integrate customer data from all over the organization
 - Consolidate and analyze customer data
 - Distribute customer information to various systems and customer touch points across enterprise
 - Provide single enterprise view of customers

Figure 9.6 Customer Relationship Management (CRM)



Customer Relationship Management Software (1 of 2)

- Packages range from niche tools to large-scale enterprise applications
- More comprehensive packages have modules for:
 - Partner relationship management (PRM)
 - Integrating lead generation, pricing, promotions, order configurations, and availability
 - Tools to assess partners' performances
 - Employee relationship management (ERM)
 - Setting objectives, employee performance management, performance-based compensation, employee training

Customer Relationship Management Software (2 of 2)

- CRM packages typically include tools for:
 - Sales force automation (SFA)
 - Sales prospect and contact information
 - Sales quote generation capabilities
 - Customer service
 - Assigning and managing customer service requests
 - Web-based self-service capabilities
 - Marketing
 - Capturing prospect and customer data, scheduling and tracking direct-marketing mailings or e-mail
 - Cross-selling

Figure 9.7 How CRM Systems Support Marketing

Responses by Channel for January 2019 Promotional Campaign

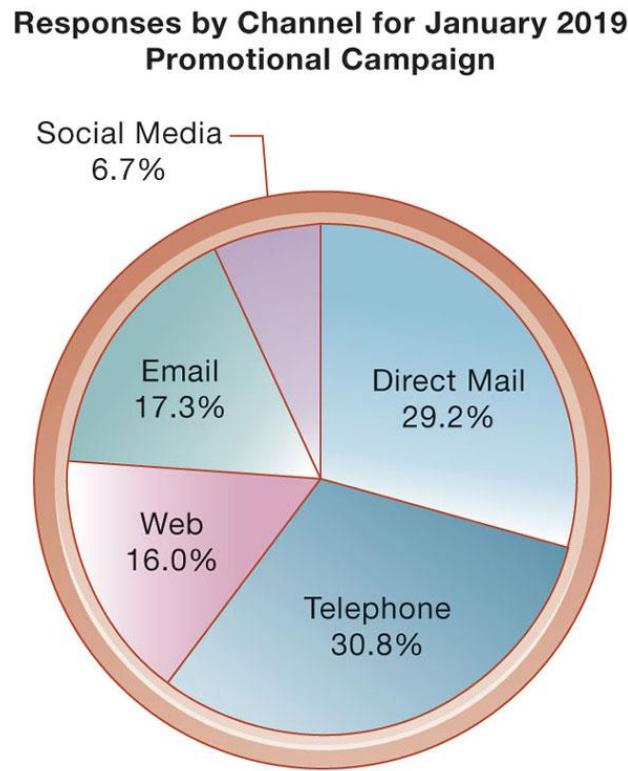


Figure 9.8 CRM Software Capabilities

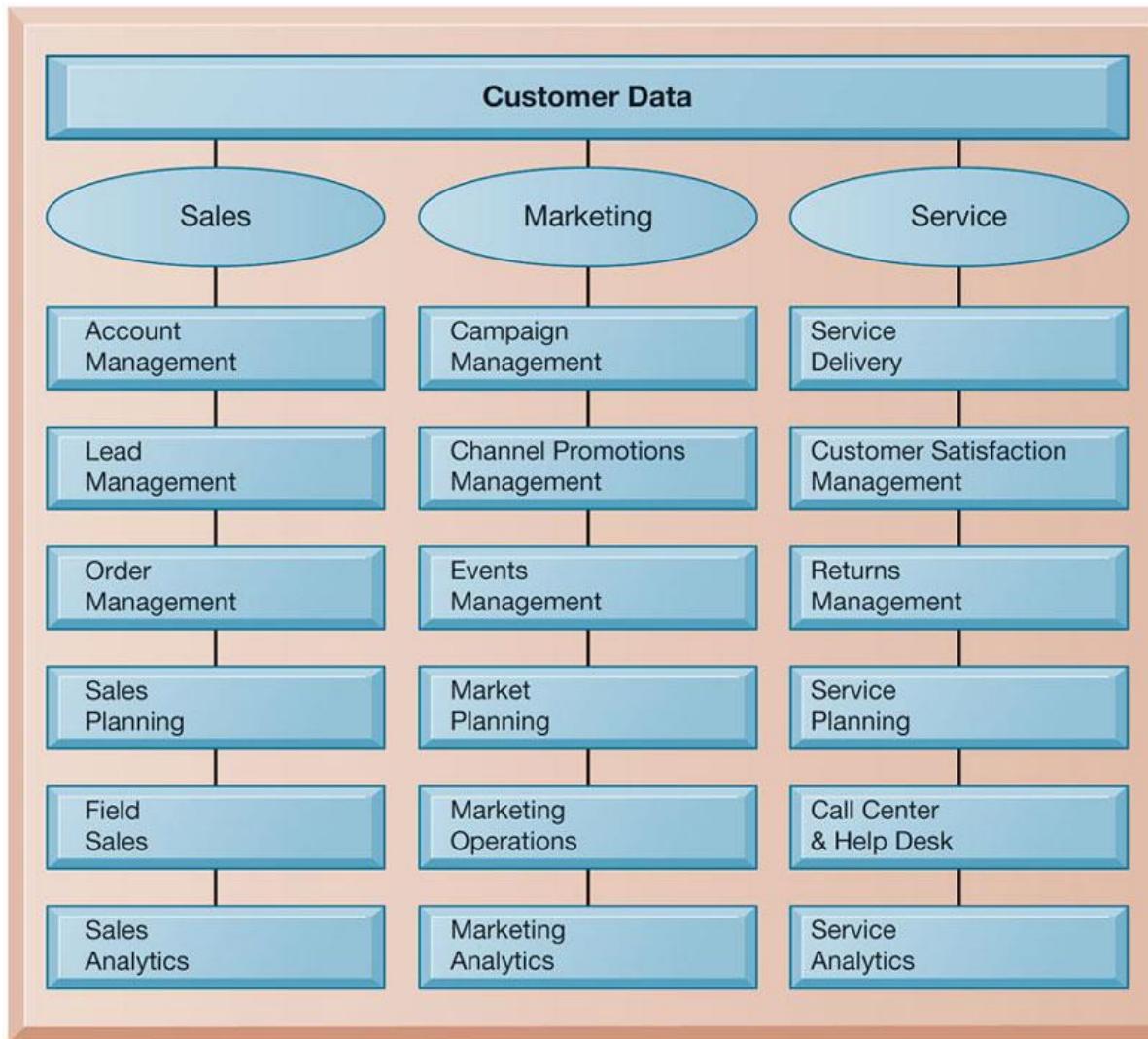
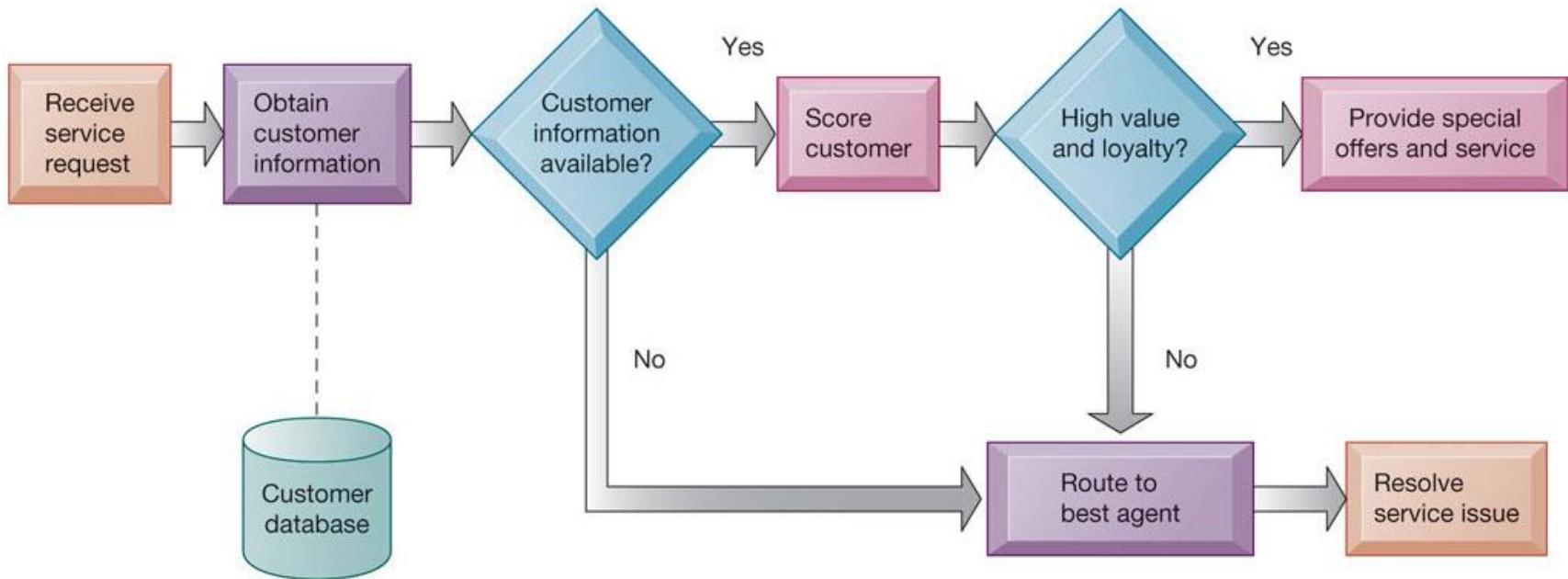


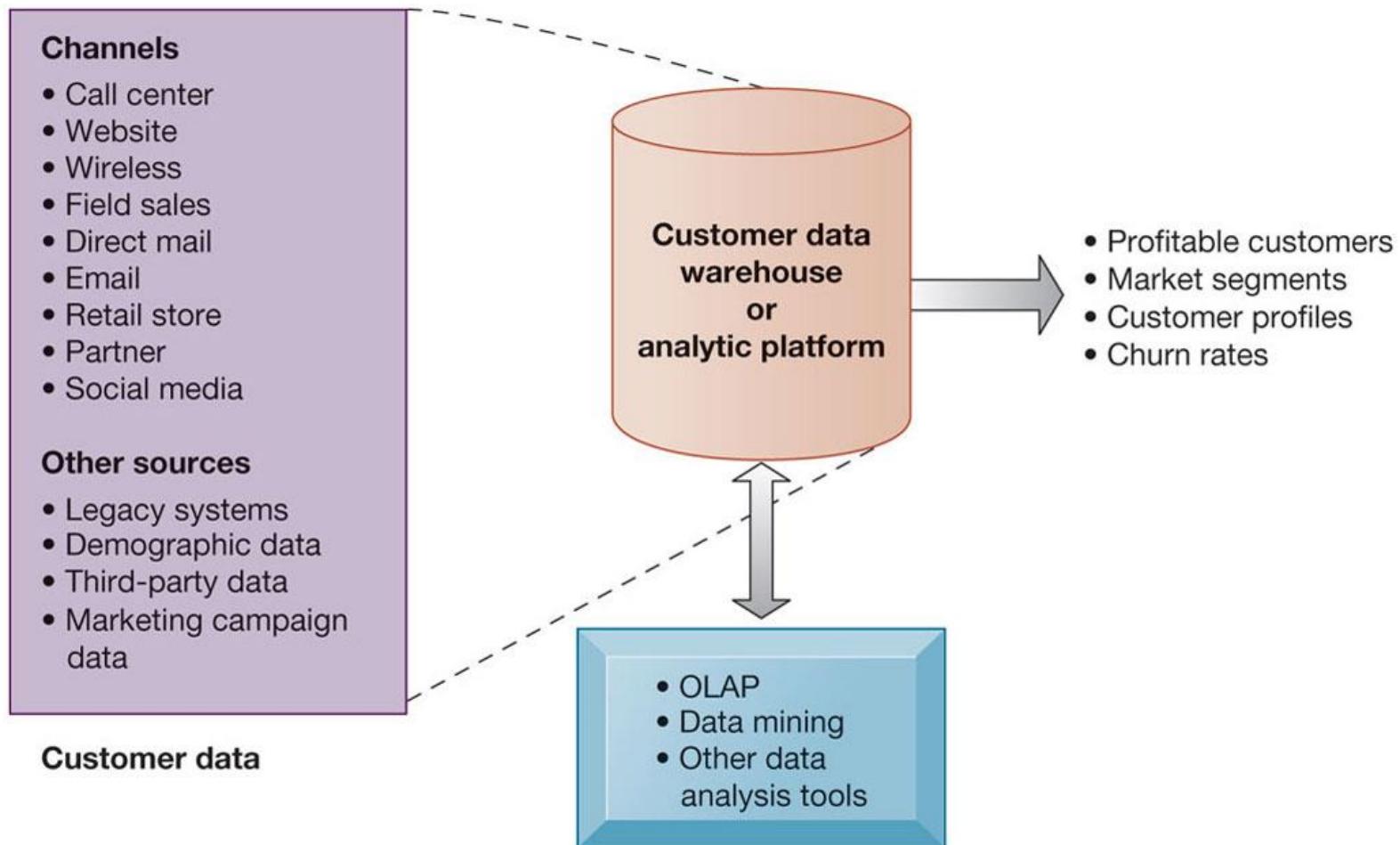
Figure 9.9 Customer Loyalty Management Process Map



Operational and Analytical CRM

- Operational CRM
 - Customer-facing applications
 - Sales force automation call center and customer service support
 - Marketing automation
- Analytical CRM
 - Based on data warehouses populated by operational CRM systems and customer touch points
 - Analyzes customer data (OLAP, data mining, etc.)
 - Customer lifetime value (CLTV)

Figure 9.10 Analytical CRM Data Warehouse



Interactive Session – Organizations: Kenya Airways Flies High with Customer Relationship Management

- Class discussion
 - What was the problem at Kenya Airways described in this case? What people, organization, and technology factors contributed to this problem?
 - What was the relationship of customer relationship management to Kenya Airway's business performance and business strategy?
 - Describe Kenya Airway's solution to its problem. What people, organization, and technology issues had to be addressed by the solution?
 - How effective was this solution? How did it affect the way Kenya Airways ran its business and its business performance?

Business Value of Customer Relationship Management Systems

- Business value of CRM systems
 - Increased customer satisfaction
 - Reduced direct-marketing costs
 - More effective marketing
 - Lower costs for customer acquisition/retention
 - Increased sales revenue
- Churn rate
 - Number of customers who stop using or purchasing products or services from a company
 - Indicator of growth or decline of firm's customer base

Enterprise Application Challenges

- Expensive to purchase and implement enterprise applications
 - Multi-million dollar projects in 2018
 - Long development times
- Technology changes
- Business process changes
- Organizational learning, changes
- Switching costs, dependence on software vendors
- Data standardization, management, cleansing

Next-Generation Enterprise Applications (1 of 2)

- Enterprise solutions/suites
 - Make applications more flexible, web-enabled, integrated with other systems
- SOA standards
- Open-source applications
- On-demand solutions
- Cloud-based versions
- Functionality for mobile platform

Next-Generation Enterprise Applications (2 of 2)

- Social CRM
 - Incorporating social networking technologies
 - Company social networks
 - Monitor social media activity; social media analytics
 - Manage social and web-based campaigns
- Business intelligence
 - Inclusion of BI with enterprise applications
 - Flexible reporting, ad hoc analysis, “what-if” scenarios, digital dashboards, data visualization

How Will MIS Help My Career?

- The Company: XYZ Global Industrial Components
- Position Description: Manufacturing management trainee
- Job Requirements
- Interview Questions
- Author Tips

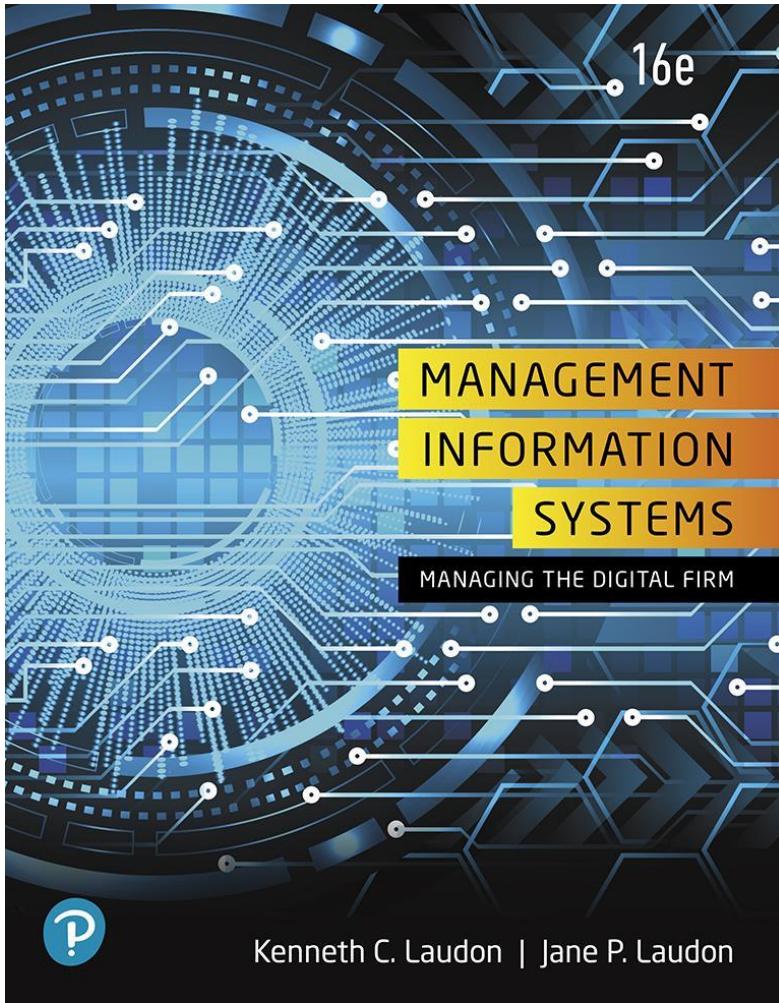
Copyright



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

Management Information Systems: Managing the Digital Firm

Sixteenth Edition



Chapter 10

E-commerce: Digital Markets, Digital Goods

Learning Objectives

- 10.1** What are the unique features of e-commerce, digital markets, and digital goods?
- 10.2** What are the principal e-commerce business and revenue models?
- 10.3** How has e-commerce transformed marketing?
- 10.4** How has e-commerce affected business-to-business transactions?
- 10.5** What is the role of m-commerce in business, and what are the most important m-commerce applications?
- 10.6** What issues must be addressed when building an e-commerce presence?
- 10.7** How will MIS help my career?

Video Cases

- Case 1: Walmart Takes on Amazon: A Battle of IT and Management Systems
- Case 2: Groupon: Deals Galore
- Case 3: Etsy: A Marketplace and Community
- Instructional Video 1: Walmart's E-commerce Fulfillment Center Network
- Instructional Video 2: Behind the Scenes of an Amazon Warehouse

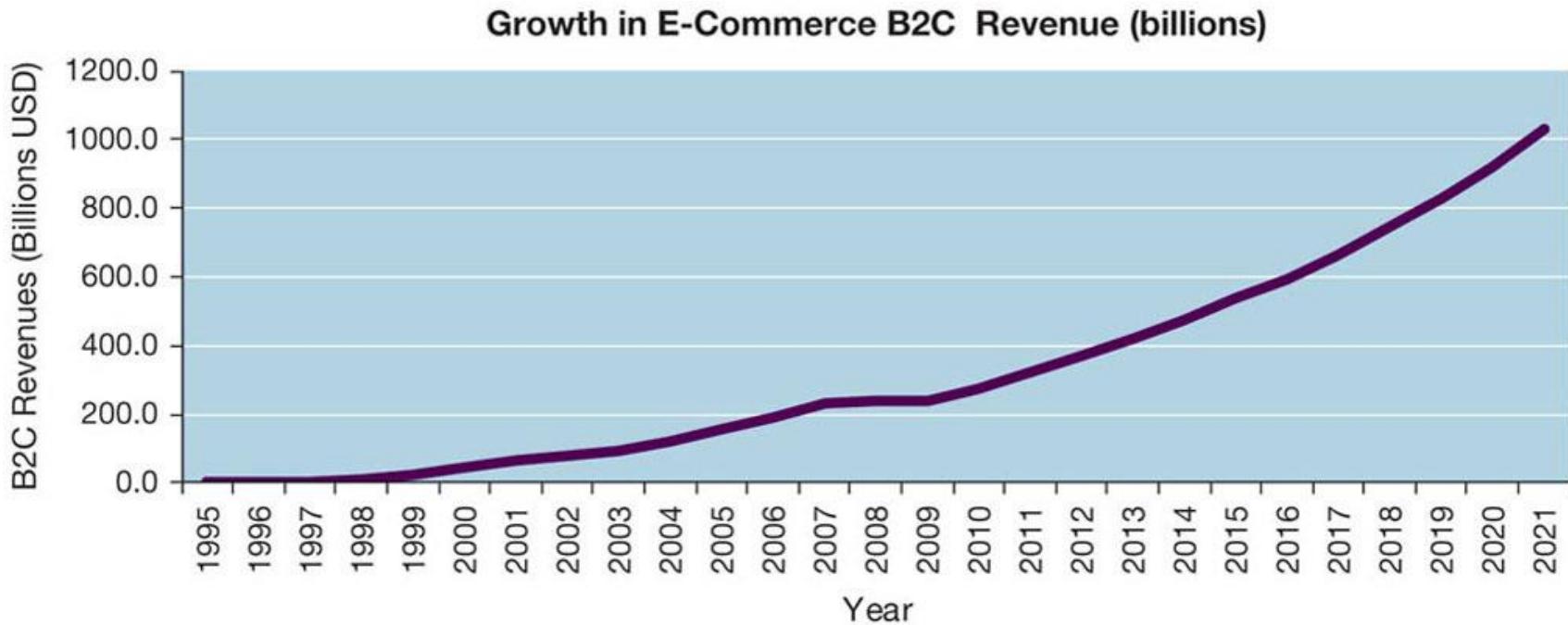
YouTube Transforms the Media Landscape

- Problem
 - Opportunities presented by new technology
- Solutions
 - Streaming video
 - Piggyback advertising
 - Content subscription services
- Illustrates some major trends in e-commerce
 - Sales of services
 - Advanced data mining and search technology
 - Mobile platforms

E-Commerce Today

- E-commerce: Use of the Internet and Web to transact business
- Began in 1995 and grew exponentially; still stable even in a recession
- Companies that survived the dot-com bubble now thrive
- The new e-commerce: social, mobile, local
- Move from desktop to smartphone

Figure 10.1 The Growth of E-Commerce



Why E-Commerce is Different (1 of 2)

- Ubiquity
 - Marketspace is virtual
 - Transaction costs reduced
- Global reach
 - Transactions cross cultural and national boundaries
- Universal standards
 - One set of technology standards: Internet standards
- Richness
 - Supports video, audio, and text messages

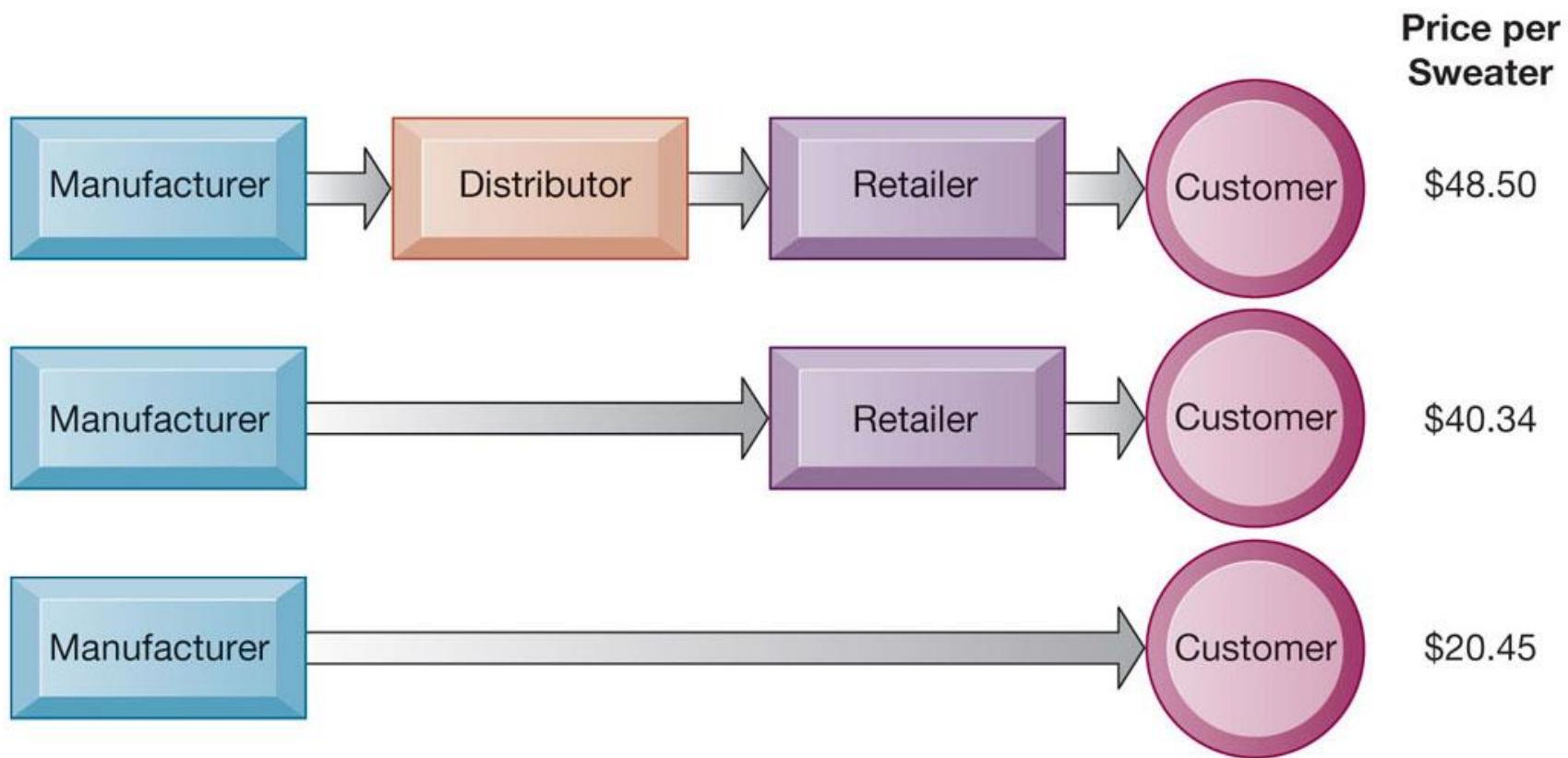
Why E-Commerce is Different (2 of 2)

- Interactivity
- Information density
 - Greater price and cost transparency
 - Enables price discrimination
- Personalization/customization
 - Technology permits modification of messages, goods
- Social technology
 - Promotes user content generation and social networking

Key Concepts in E-Commerce – Digital Markets and Digital Goods in a Global Marketplace

- Internet and digital markets have changed the way companies conduct business
- Information asymmetry reduced
- Menu costs, search and transaction costs reduced
- Dynamic pricing enabled
- Switching costs
- Delayed gratification
- Disintermediation

Figure 10.2 The Benefits of Disintermediation to the Consumer



Digital Goods

- Goods that can be delivered over a digital network
- Cost of producing first unit is almost entire cost of product
- Costs of delivery over the Internet very low
- Marketing costs remain the same; pricing highly variable
- Industries with digital goods are undergoing revolutionary changes (publishers, record labels, etc.)

Types of E-Commerce

- Three major types
 - Business-to-consumer (B2C)
 - Example: Barnes and Noble.com
 - Business-to-business (B2B)
 - Example: ChemConnect
 - Consumer-to-consumer (C2C)
 - Example: e Bay
- E-commerce can be categorized by platform
 - Mobile commerce (m-commerce)

E-Commerce Business Models

- Portal
- E-tailer
- Content provider
- Transaction broker
- Market creator
- Service provider
- Community provider

Interactive Session – Organizations: Uber: Digital Disruptor

- Class discussion
 - Analyze Uber using the competitive forces and value chain models. What is its competitive advantage?
 - What is the relationship between information technology and Uber's business model? Explain your answer.
 - How disruptive is Uber?
 - Is Uber a viable business? Explain your answer.

E-Commerce Revenue Models

- Advertising
- Sales
- Subscription
- Free/Freemium
- Transaction fee
- Affiliate

How Has E-commerce Transformed Marketing?

- Internet provides new ways to identify and communicate with customers
- Long tail marketing
- Internet advertising formats
- Behavioral targeting
 - Tracking online behavior of individuals
- Programmatic ad buying
- Native advertising

Figure 10.3 Website Visitor Tracking



The shopper clicks on the home page. The store can tell that the shopper arrived from the Yahoo portal at 2:30 PM (which might help determine staffing for customer service centers) and how long she lingered on the home page (which might indicate trouble navigating the site). Tracking beacons load cookies on the shopper's browser to follow her across the Web.



The shopper clicks on blouses, then clicks to view a woman's pink blouse. The shopper clicks to select this item in a size 10 in pink and clicks to place it in her shopping cart. This information can help the store determine which sizes and colors are most popular. If the visitor moves to a different site, ads for pink blouses will appear from the same or a different vendor.



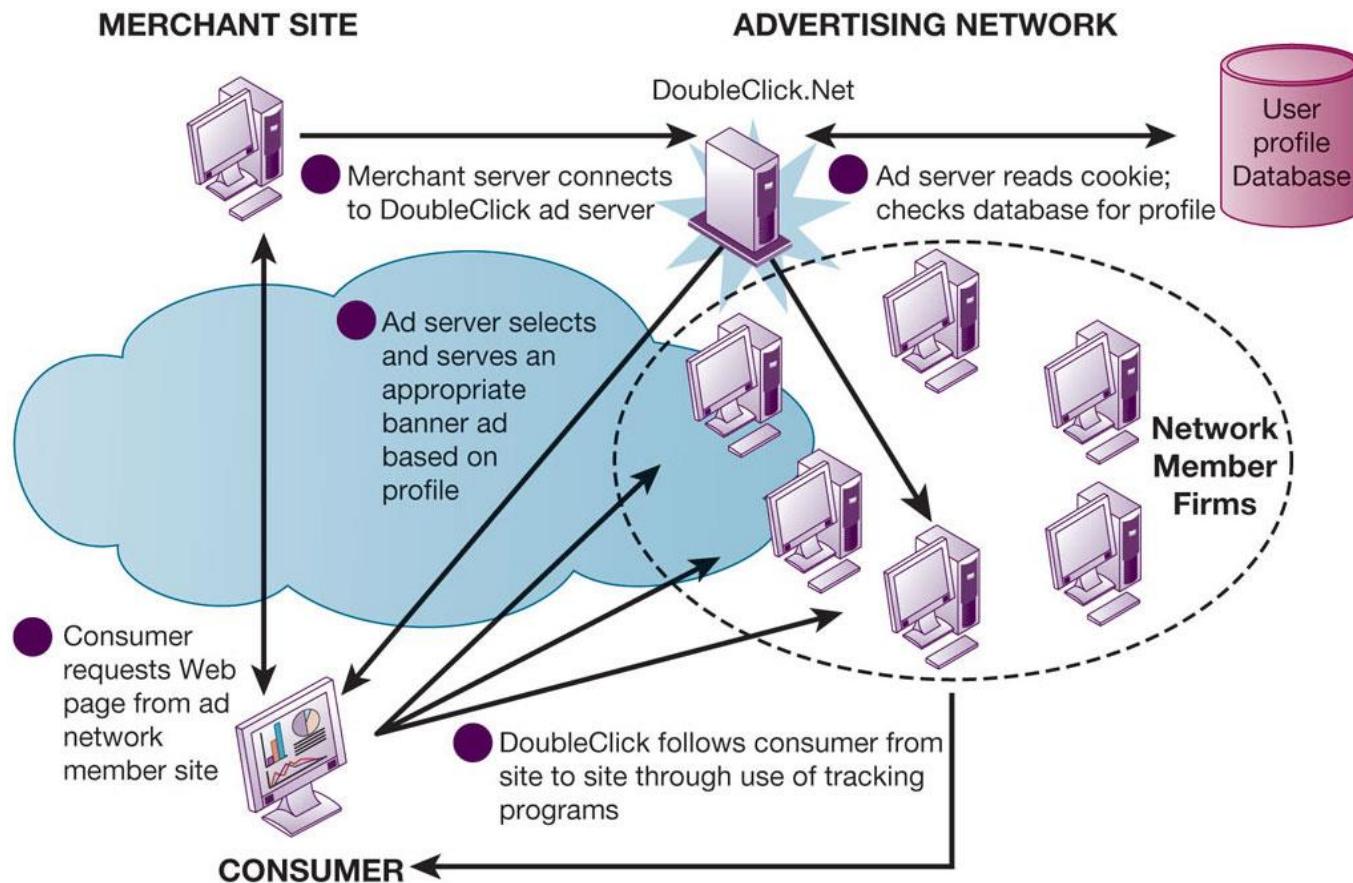
From the shopping cart page, the shopper clicks to close the browser to leave the website without purchasing the blouse. This action could indicate the shopper changed her mind or that she had a problem with the website's checkout and payment process. Such behavior might signal that the website was not well designed.



Figure 10.4 Website Personalization



Figure 10.5 How an Advertising Network Such as DoubleClick Works



Social E-Commerce and Social Network Marketing (1 of 2)

- Social e-commerce based on digital social graph
- Features of social e-commerce driving its growth
 - Newsfeed
 - Timelines
 - Social sign-on
 - Collaborative shopping
 - Network notification
 - Social search (recommendations)
- Social media
 - Fastest growing media for branding and marketing

Social E-Commerce and Social Network Marketing (2 of 2)

- Social network marketing
 - Seeks to leverage individuals' influence over others
 - Targeting a social network of people sharing interests and advice
 - Facebook's "Like" button
 - Social networks have huge audiences
- Social shopping sites
- Wisdom of crowds
- Crowdsourcing

Interactive Session – Management: “Socializing” with Customers

- Class discussion
 - Assess the people, organization, and technology issues for using social media technology to engage with customers.
 - What are the advantages and disadvantages of using social media for advertising, brand building, market research, and customer service?
 - Give an example of a business decision in this case study that was facilitated by using social media to interact with customers.
 - Should all companies use social media technology for customer service and marketing? Why or why not? What kinds of companies are best suited to use these platforms?

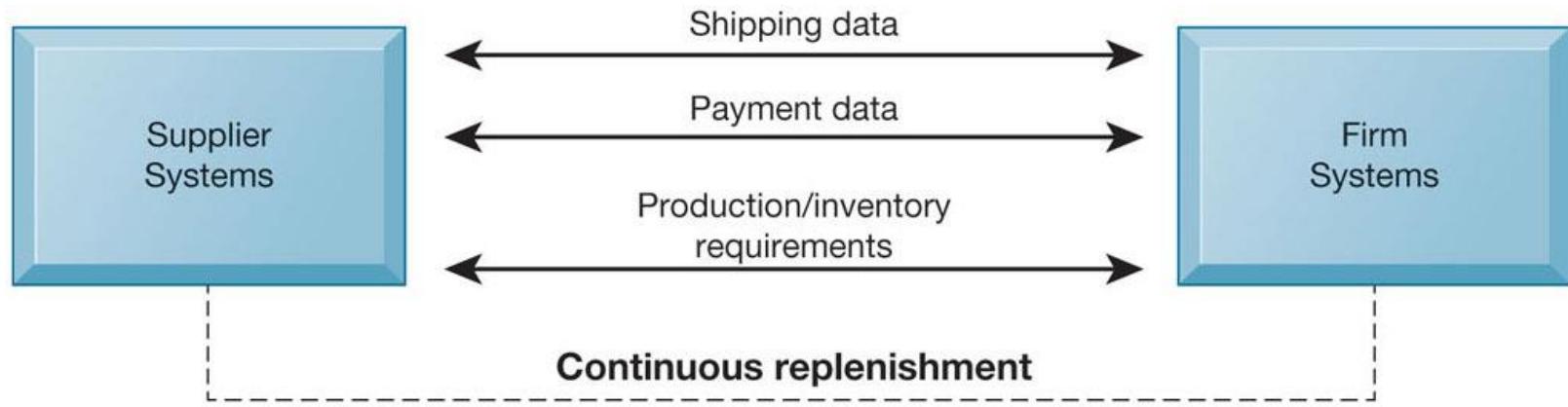
How Has E-Commerce Affected Business-To Business Transactions?

- U.S. B2B trade in 2019 is \$13.5 trillion
 - U.S. B2B e-commerce in 2018 is \$6.2 trillion
- Internet and networking helps automate procurement
- Variety of Internet-enabled technologies used in B2B
 - Electronic data interchange (EDI)
 - Private industrial networks (private exchanges)
 - Net marketplaces
 - Exchanges

Electronic Data Interchange (EDI)

- Computer-to-computer exchange of standard transactions such as invoices, purchase orders
- Major industries have EDI standards
 - Define structure and information fields of electronic documents
- More companies are moving toward web-enabled private networks
 - Allow them to link to a wider variety of firms than EDI allows
 - Enable sharing a wider range of information

Figure 10.6: Electronic Data Interchange (EDI)



New Ways of B2B Buying and Selling

- Private industrial networks
 - Private exchanges
 - Large firm using a secure website to link to suppliers and partners
- Net marketplaces (e-hubs)
 - Single digital marketplace for many buyers and sellers
 - May focus on direct or indirect goods
 - May be vertical or horizontal marketplaces
- Exchanges
 - Independently owned third-party Net marketplaces for spot purchasing

Figure 10.7 A Private Industrial Network

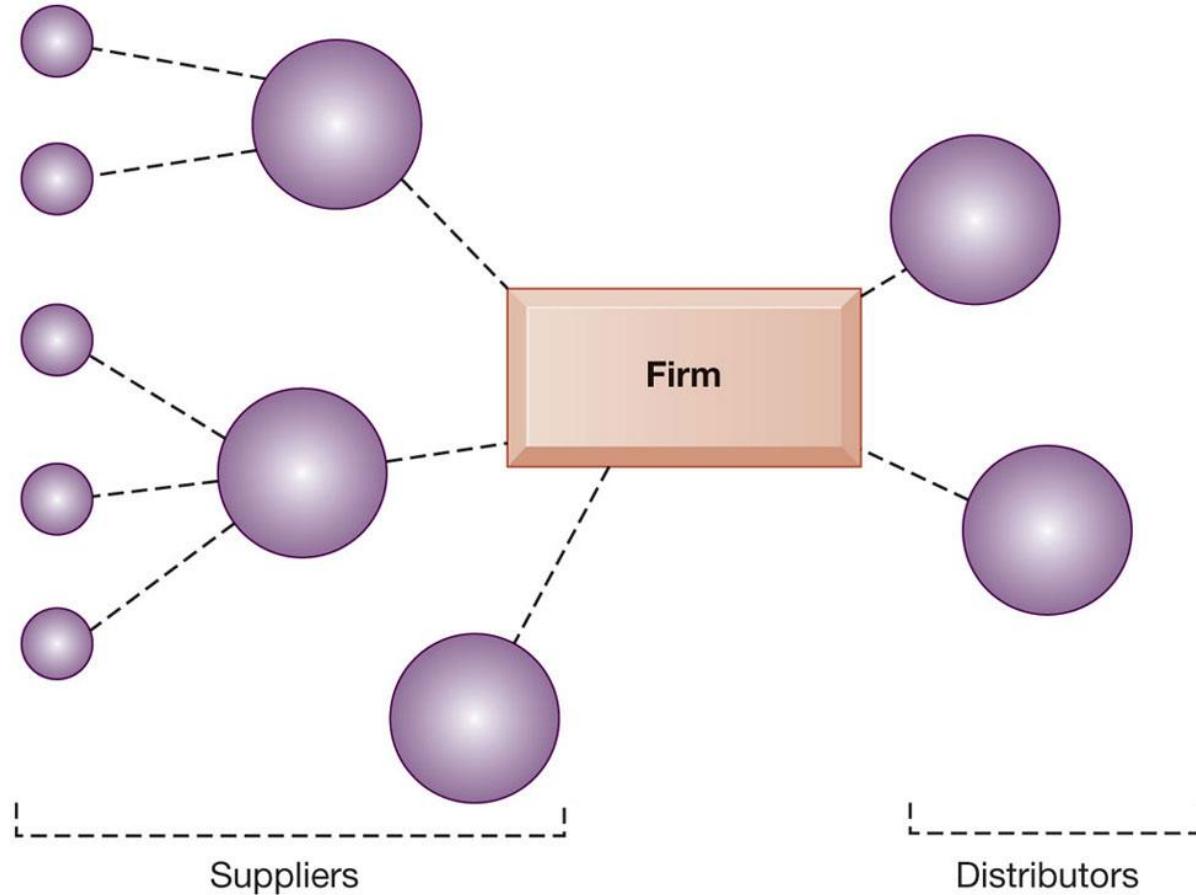
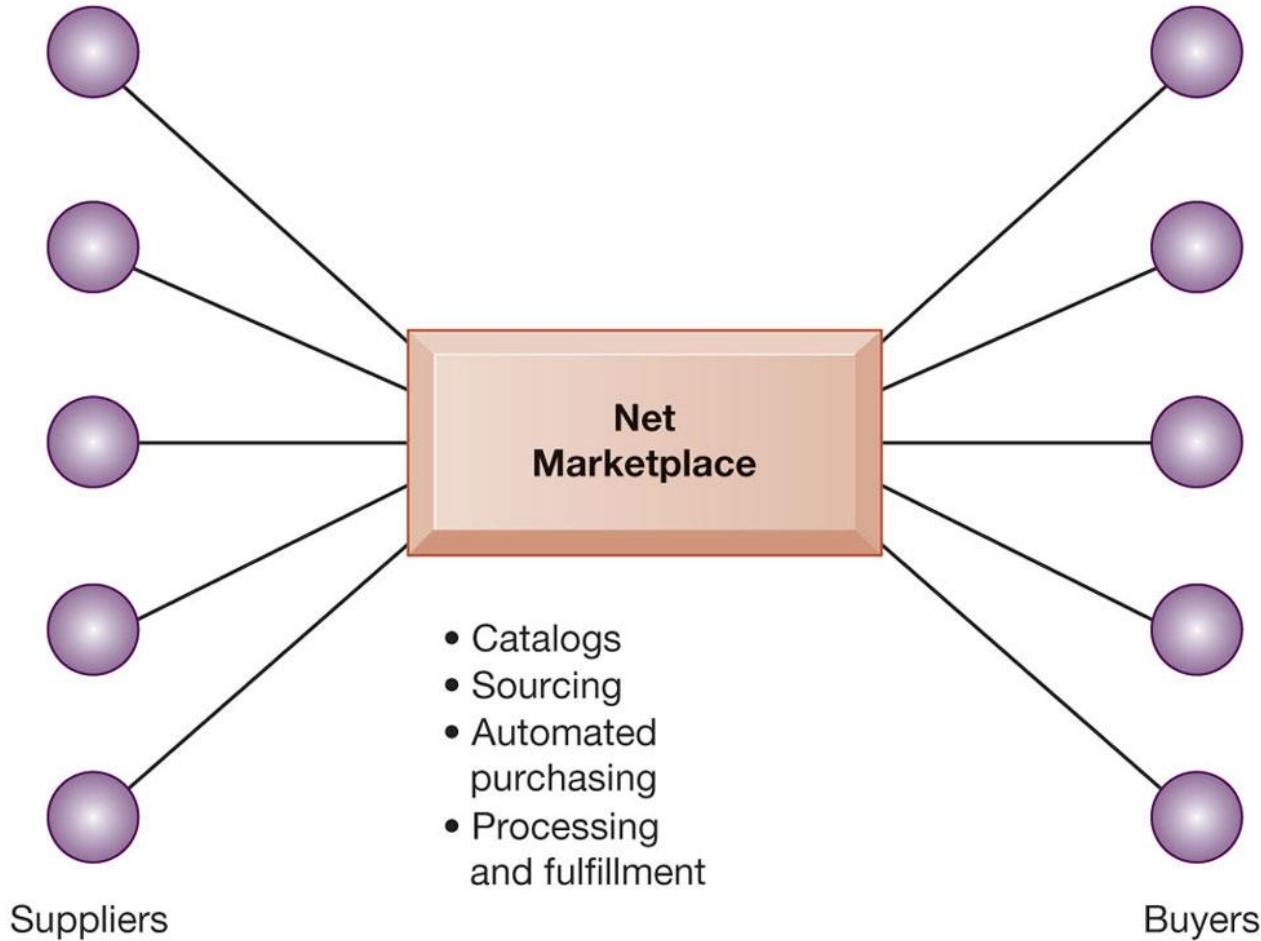


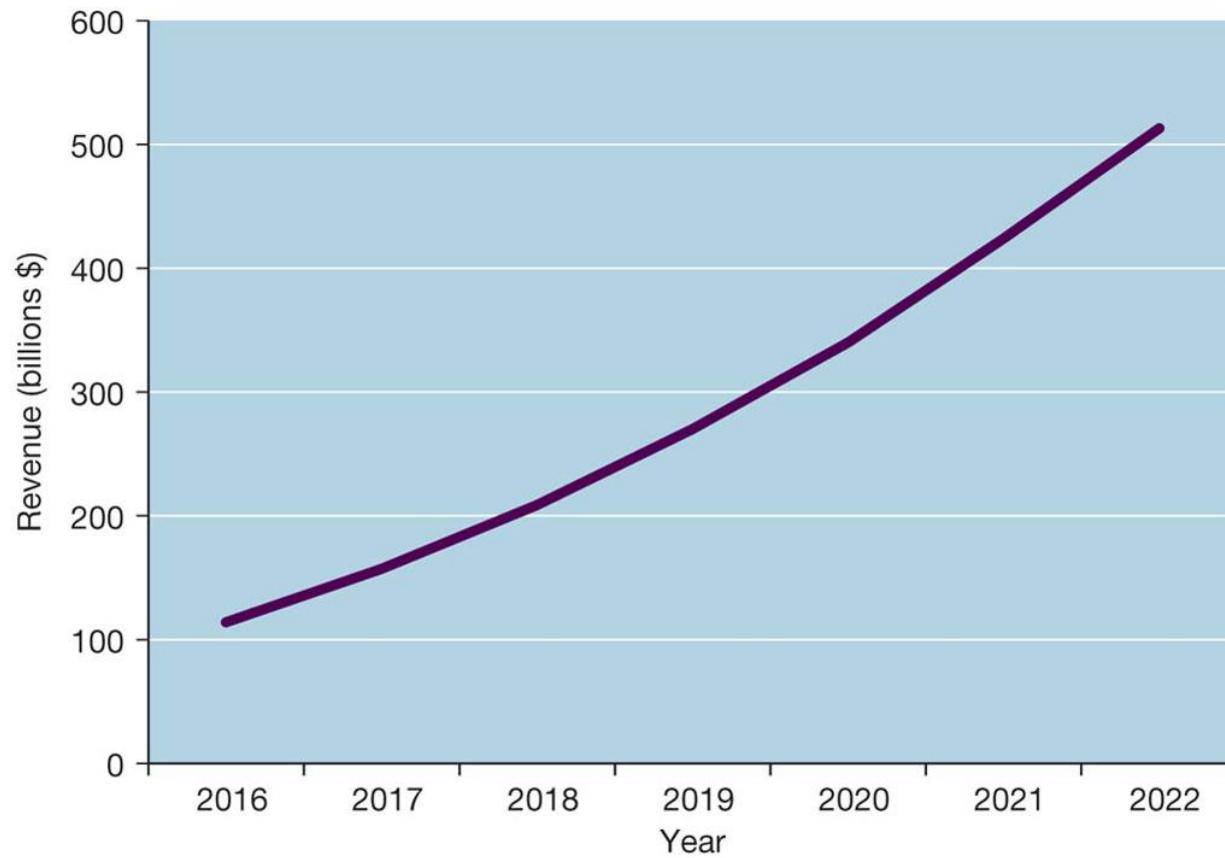
Figure 10.8 A Net Marketplace



What is the Role of M-Commerce in Business, and What are the Most Important M-Commerce Applications?

- M-commerce in 2017 is 35 percent of all e-commerce
- Fastest growing form of e-commerce
 - Growing at 20 percent or more per year
- Main areas of growth
 - Mass market retailing (Amazon, eBay, etc.)
 - Sales of digital content (music, T V, etc.)
 - In-app sales to mobile devices

Figure 10.9 Mobile Retail Commerce Revenues



Location-Based Services and Applications

- Used by 74 percent of smartphone owners
- Based on GPS map services
- Geosocial services
 - Where friends are
- Geo advertising
 - What shops are nearby
- Geo information services
 - Price of house you are passing

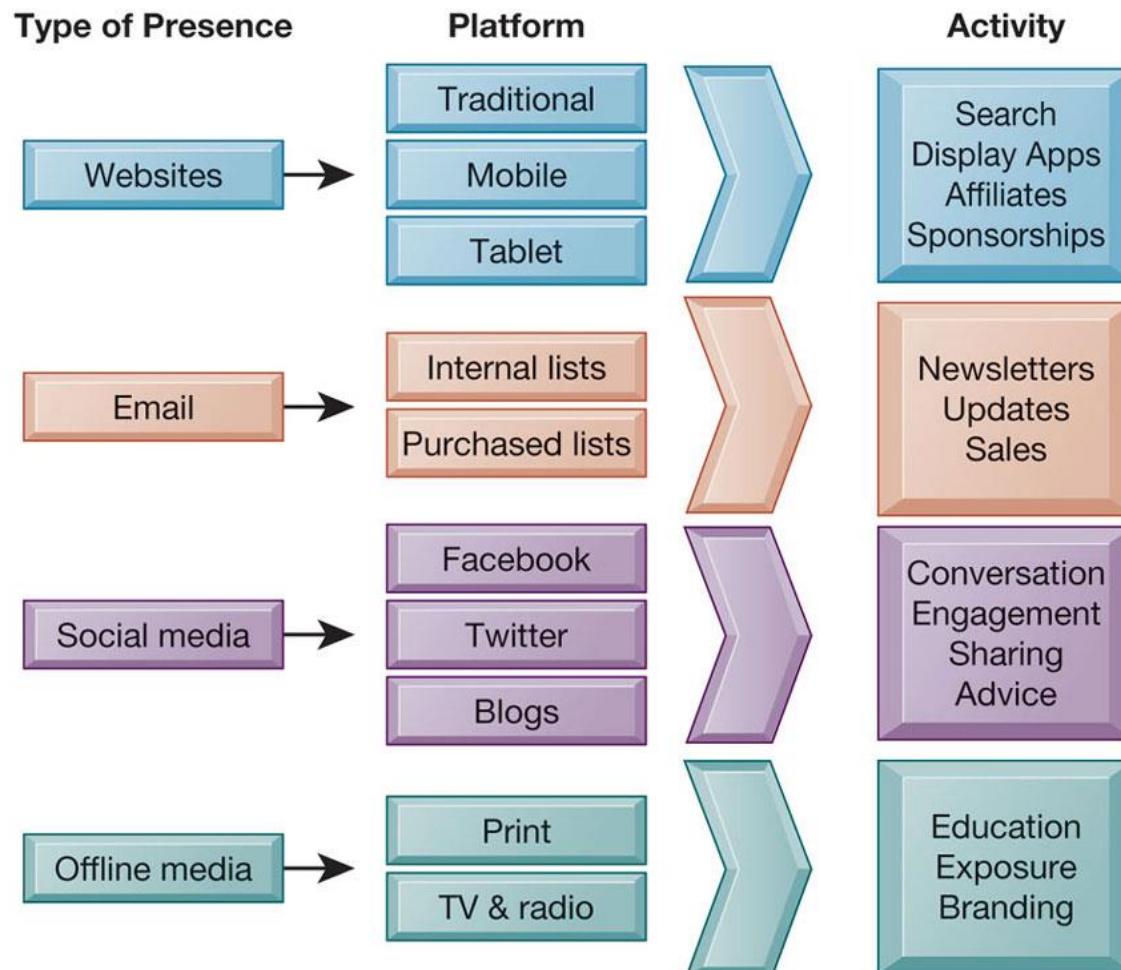
Other Mobile Commerce Services

- Financial account management apps
 - Banks, credit card companies
- Mobile advertising market
 - Google and Facebook are largest markets
 - Ads embedded in games, videos, and mobile apps
- 55 percent of online retailers have m-commerce websites

What Issues Must Be Addressed When Building an E-Commerce Presence?

- Most important management challenges
 - Developing clear understanding of business objectives
 - Knowing how to choose the right technology to achieve those objectives
- Develop an e-commerce presence map
 - Four areas: websites, e-mail, social media, offline media
- Develop a timeline: milestones
 - Breaking a project into discrete phases

Figure 10.10 E-Commerce Presence Map



How Will MIS Help My Career?

- The Company: SportsFantasy Empire
- Position Description: Junior e-commerce data analyst
- Job Requirements
- Interview Questions
- Author Tips

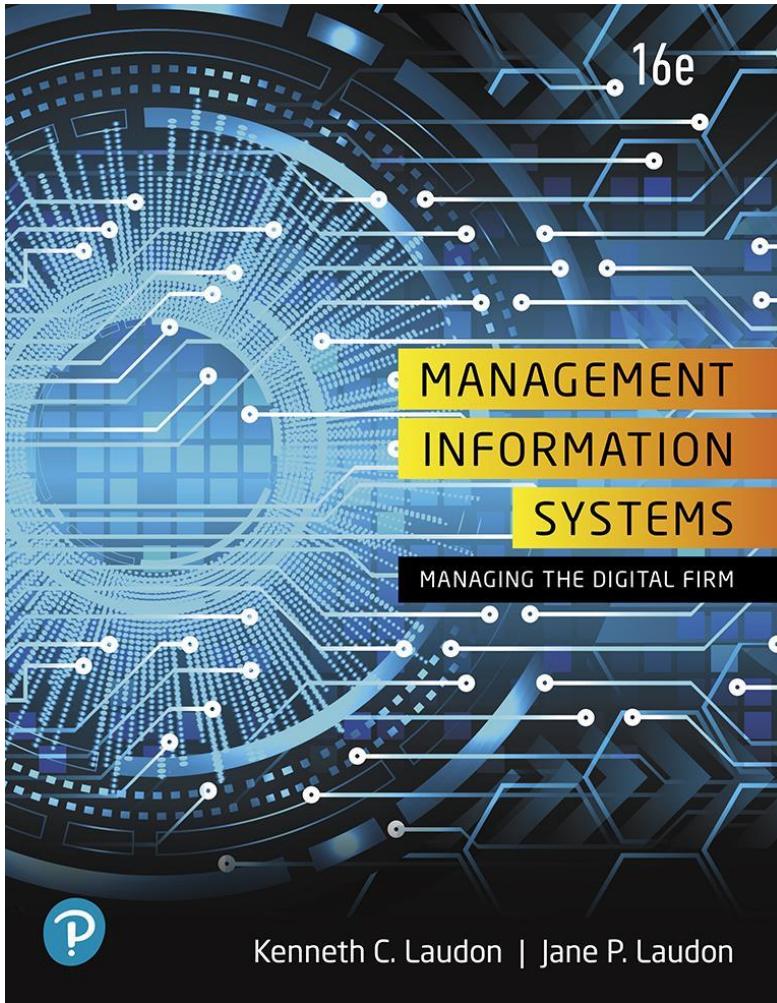
Copyright



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

Management Information Systems: Managing the Digital Firm

Sixteenth Edition



Chapter 11

Managing Knowledge and Artificial
Intelligence

Learning Objectives

- 11.1** What is the role of knowledge management systems in business?
- 11.2** What types of systems are used for enterprise-wide knowledge management, and how do they provide value for businesses?
- 11.3** What are the major types of knowledge work systems, and how do they provide value for firms?
- 11.4** What are the business benefits of using intelligent techniques for knowledge management?
- 11.5** How will MIS help my career?

Video Cases

- Case 1: How IBM's Watson Became a Jeopardy Champion
- Case 2: Alfresco: Open Source Document Management and Collaboration

Machine Learning Helps Akershus University Hospital Make Better Treatment Decisions (1 of 2)

- Problem
 - Unstructured data
 - Very large volume of data
 - Opportunities from new technology
- Solutions
 - Manage safety, costs, and health outcomes of patients
 - Collect procedures, and test data
 - Train Watson Explorer
 - CT Scan Analysis System

Machine Learning Helps Akershus University Hospital Make Better Treatment Decisions (2 of 2)

- Organize treatments and improve safety
- Demonstrates role of artificial intelligence in helping organizations improve performance and remain competitive
- Illustrates the ability of machine learning systems to analyze vast quantities of data and find patterns

What is the Role of Knowledge Management Systems in Business?

- Knowledge management systems among fastest growing areas of software investment
- Information economy
 - 37 percent U.S. labor force: knowledge and information workers
 - 55 percent U.S. GDP from knowledge and information sectors
- Substantial part of a firm's stock market value is related to intangible assets: knowledge, brands, reputations, and unique business processes
- Well-executed knowledge-based projects can produce extraordinary ROI

Important Dimensions of Knowledge (1 of 2)

- Data, knowledge, and wisdom
- Tacit knowledge and explicit knowledge
- Important dimensions of knowledge
 - Knowledge is a firm asset.
 - Knowledge has different forms.
 - Knowledge has a location.
 - Knowledge is situational.

Important Dimensions of Knowledge (2 of 2)

- Knowledge-based core competencies
 - Key organizational assets
- Knowing how to do things effectively and efficiently in ways others cannot duplicate is a prime source of profit and competitive advantage
 - Example: Having a unique build-to-order production system
- Organizational learning
 - Process in which organizations gain experience through collection of data, measurement, trial and error, and feedback

The Knowledge Management Value Chain (1 of 3)

- Knowledge management
 - Set of business processes developed in an organization to create, store, transfer, and apply knowledge
- Knowledge management value chain
 - Each stage adds value to raw data and information as they are transformed into usable knowledge
 - Knowledge acquisition
 - Knowledge storage
 - Knowledge dissemination
 - Knowledge application

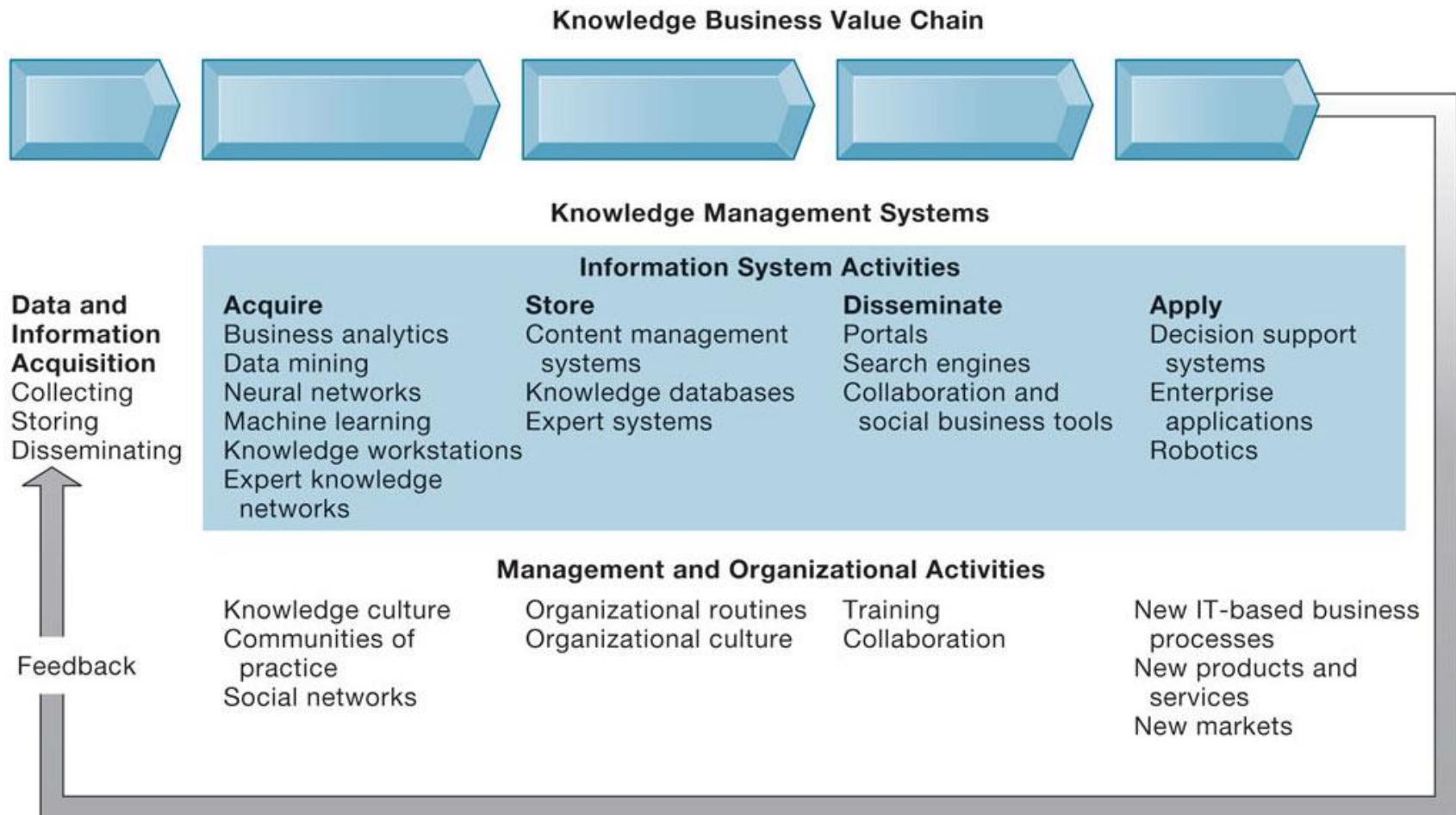
The Knowledge Management Value Chain (2 of 3)

- Knowledge acquisition
 - Documenting tacit and explicit knowledge
 - Storing documents, reports, presentations, best practices
 - Unstructured documents (e.g., e-mails)
 - Developing online expert networks
 - Creating knowledge
 - Tracking data from TPS and external sources
- Knowledge storage
 - Databases
 - Document management systems
 - Role of management

The Knowledge Management Value Chain (3 of 3)

- Knowledge dissemination
 - Portals, wikis
 - E-mail, instant messaging
 - Search engines, collaboration tools
 - A deluge of information?
 - Training programs, informal networks, and shared management experience help managers focus attention on important information.
- Knowledge application
 - New business practices
 - New products and services
 - New markets

Figure 11.1 The Knowledge Management Value Chain



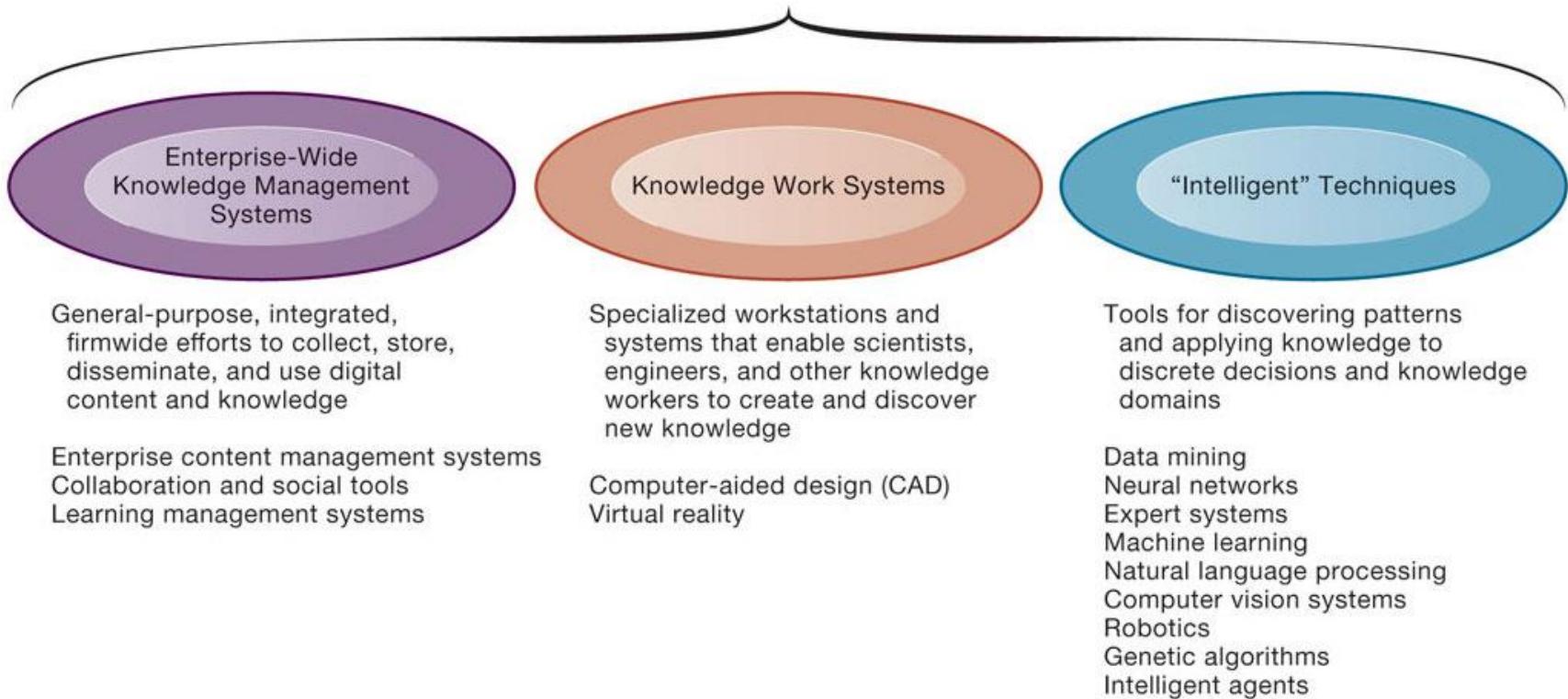
Building Organizational and Management Capital: Collaboration, Communities of Practice, and Office Environments

- Developing new organizational roles and responsibilities for the acquisition of knowledge
- Chief knowledge officer executives
- Dedicated staff / knowledge managers
- Communities of practice (COPs)
 - Informal social networks of professionals and employees
 - Activities include education, online newsletters, sharing knowledge
 - Reduce learning curves of new employees

Types of Knowledge Management Systems

- Enterprise-wide knowledge management systems
 - General-purpose firm-wide efforts to collect, store, distribute, and apply digital content and knowledge
- Knowledge work systems (KWS)
 - Specialized systems built for engineers, scientists, other knowledge workers charged with discovering and creating new knowledge
- Intelligent techniques
 - Diverse group of techniques such as data mining used for various goals: discovering knowledge, distilling knowledge, discovering optimal solutions

Figure 11.2 Major Types of Knowledge Management Systems



What Types of Systems Are Used for Enterprise-Wide Knowledge Management?

- Three major types of knowledge in an enterprise
 - Structured documents
 - Reports, presentations
 - Formal rules
 - Semistructured documents
 - E-mails, videos
 - Unstructured, tacit knowledge
- 80% of an organization's business content is semistructured or unstructured

What Is Artificial Intelligence? (1 of 3)

- Grand vision
 - Computer hardware and software systems that are as “smart” as humans
 - So far, this vision has eluded computer programmers and scientists
- Realistic vision
 - Systems that take data inputs, process them, and produce outputs (like all software programs) and that can perform many complex tasks that would be difficult or impossible for humans to perform.

What Is Artificial Intelligence? (2 of 3)

- Examples:
 - Recognize millions of faces in seconds
 - Interpret millions of CT scans in minutes
 - Analyze millions of financial records
 - Detect patterns in very large Big Data databases
 - Improve their performance over time (“learn”)
 - Navigate a car in certain limited conditions
 - Respond to questions from humans (natural language); speech activated assistants like Siri, Alexa, and Cortana

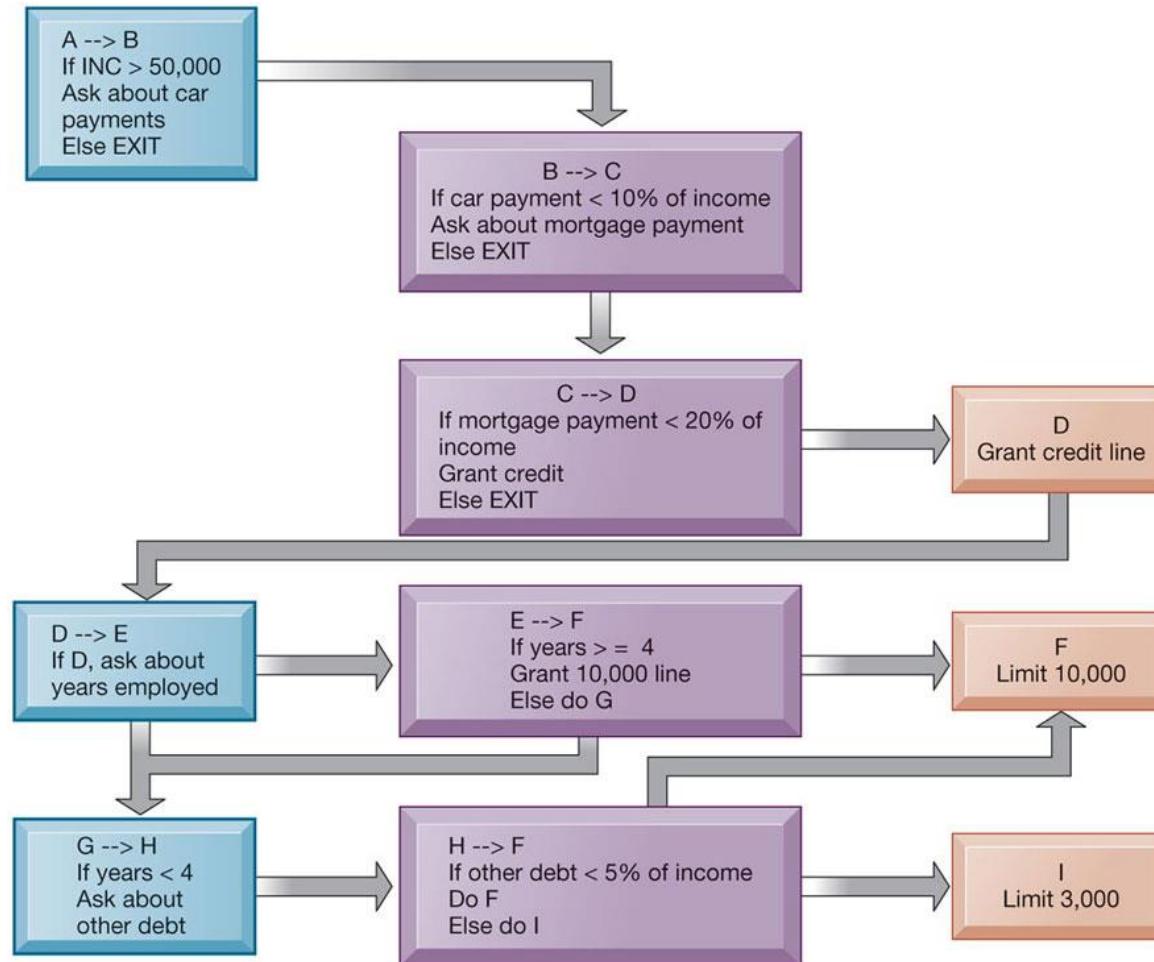
What Is Artificial Intelligence? (3 of 3)

- Major Types of AI
 - Expert systems
 - Machine learning
 - Neural networks and deep learning networks
 - Genetic algorithms
 - Natural language Processing
 - Computer vision
 - Robotics

Capturing Knowledge: Expert Systems

- Capture tacit knowledge in very specific and limited domain of human expertise
- Capture knowledge as set of rules
- Typically perform limited tasks
 - Diagnosing malfunctioning machine
 - Determining whether to grant credit for loan
- Used for discrete, highly structured decision making
- Knowledge base: Set of hundreds or thousands of rules
- Inference engine: Strategy used to search knowledge base
 - Forward chaining
 - Backward chaining

Figure 11.3 Rules in an Expert System



Machine Learning

- How computer programs improve performance without explicit programming
 - Recognizing patterns
 - Experience
 - Prior learnings (database)
 - Supervised vs. unsupervised learning
- Contemporary examples
 - Google searches
 - Recommender systems on Amazon, Netflix

Neural Networks

- Find patterns and relationships in massive amounts of data too complicated for humans to analyze
- “Learn” patterns by searching for relationships, building models, and correcting over and over again
- Humans “train” network by feeding it data inputs for which outputs are known, to help neural network learn solution by example from human experts.
- Used in medicine, science, and business for problems in pattern classification, prediction, financial analysis, and control and optimization

Figure 11.4 How a Neural Network Works

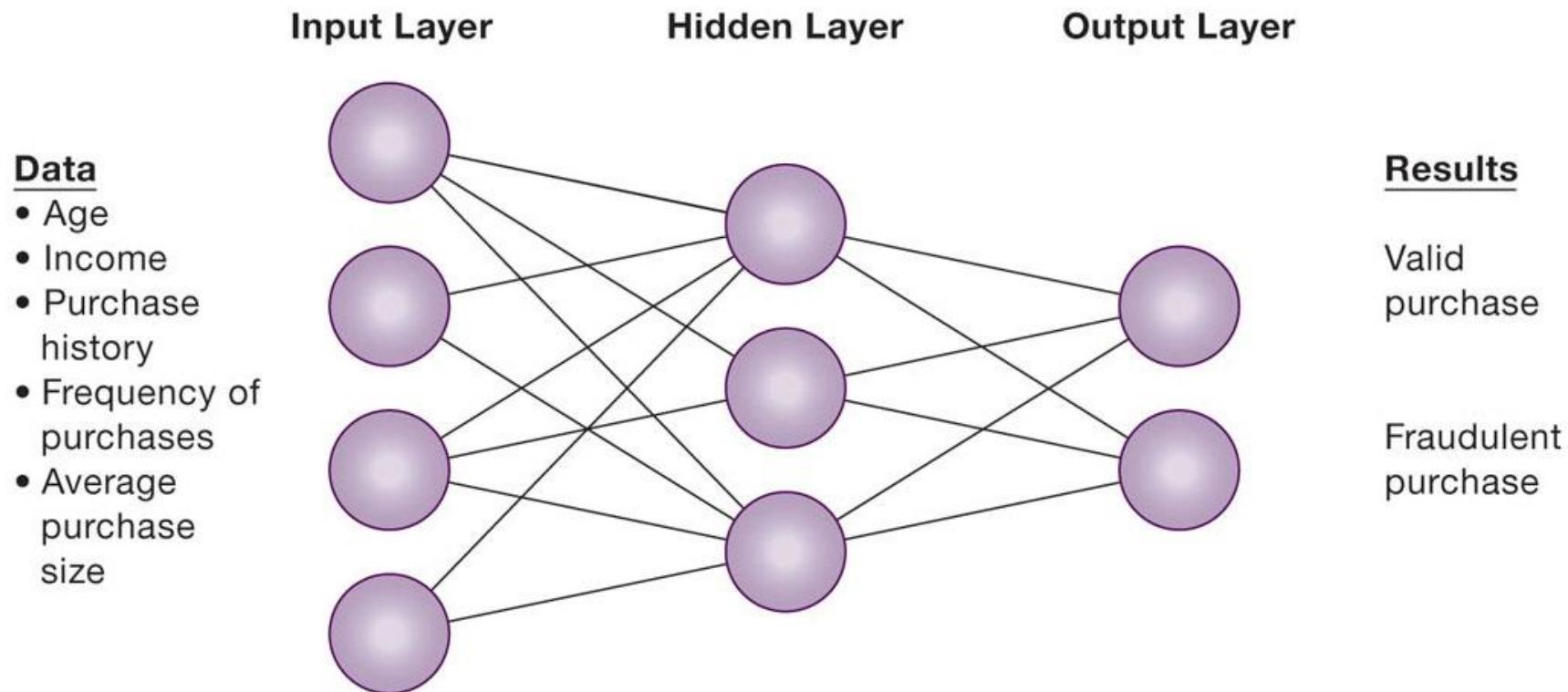
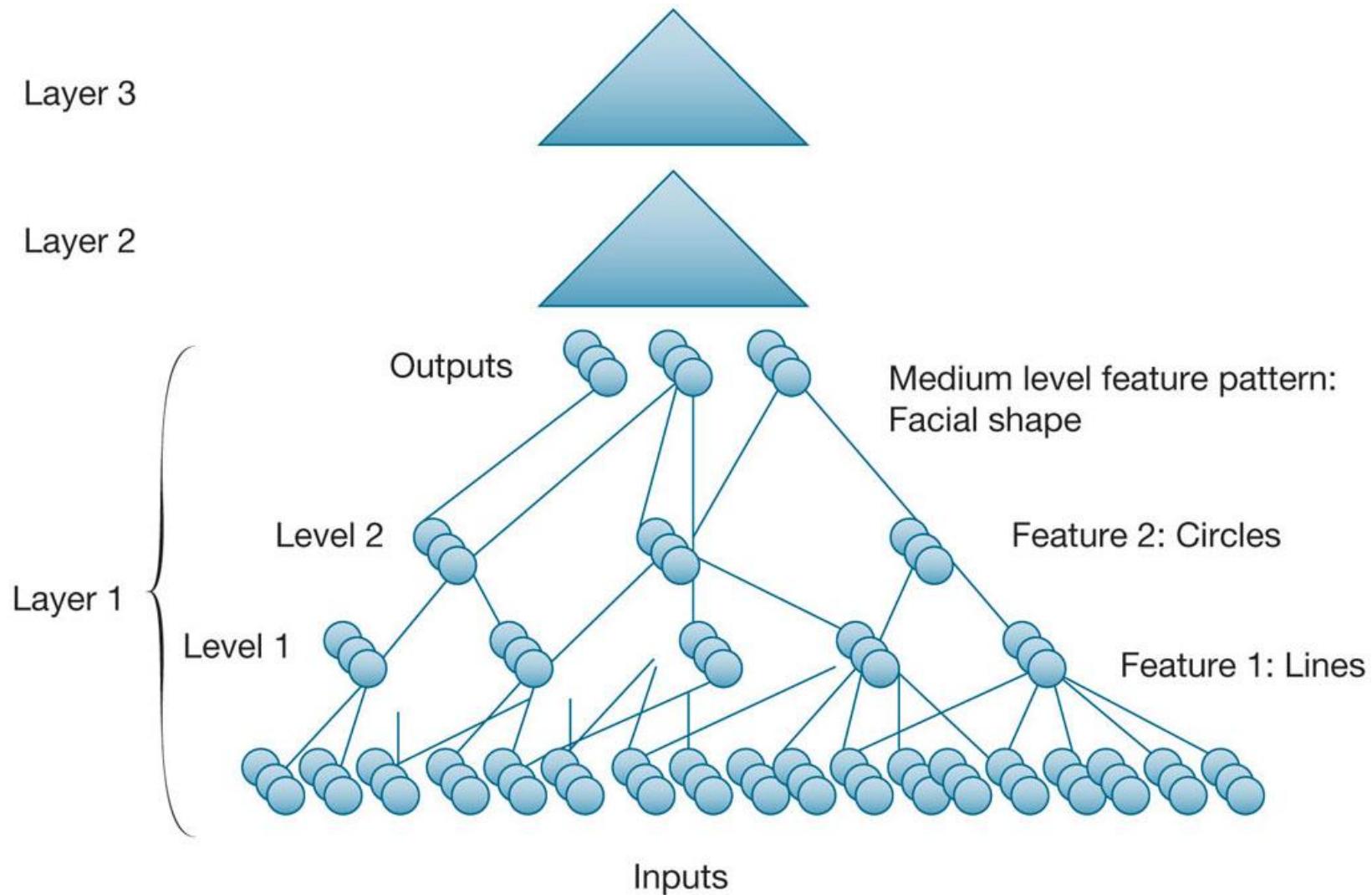


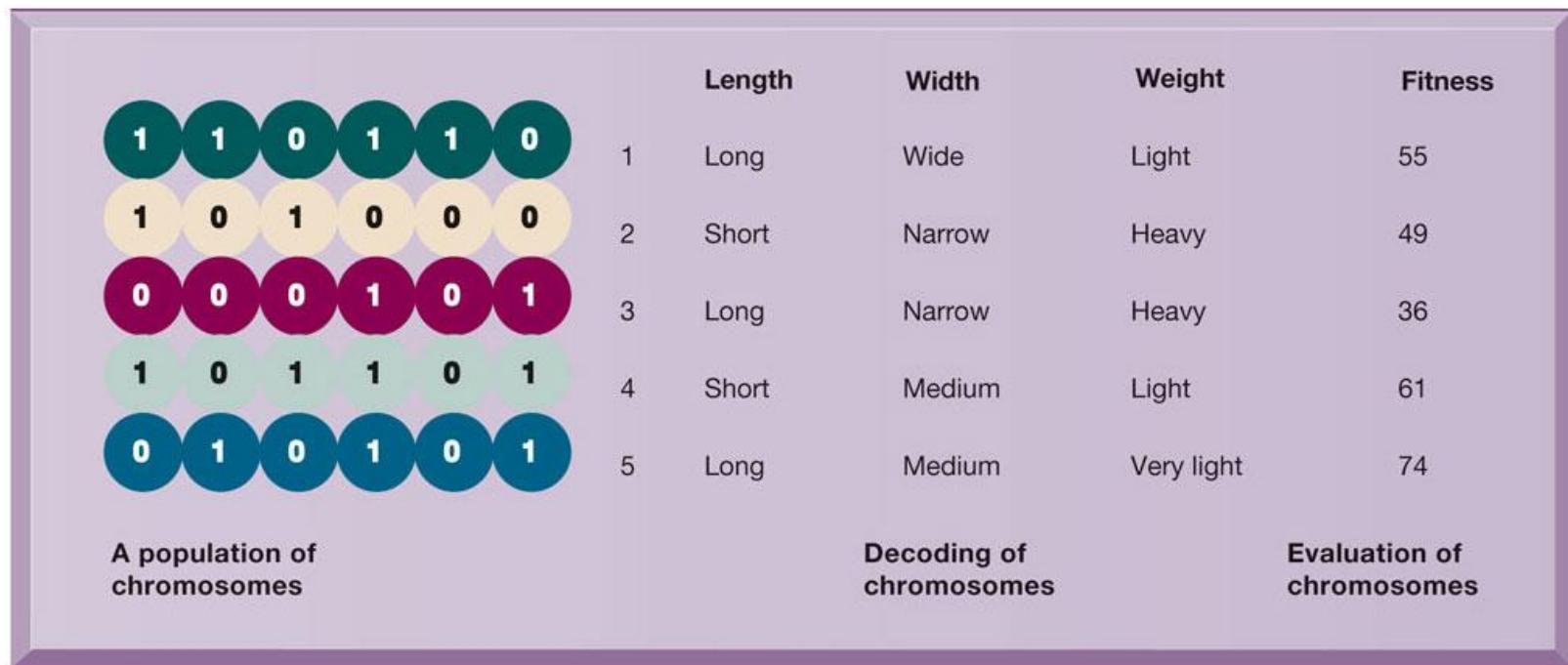
Figure 11.5 A Deep Learning Network



Genetic Algorithms

- Useful for finding optimal solution for specific problem by examining very large number of possible solutions for that problem
- Conceptually based on process of evolution
 - Search among solution variables by changing and reorganizing component parts using processes such as inheritance, mutation, and selection
- Used in optimization problems (minimization of costs, efficient scheduling, optimal jet engine design) in which hundreds or thousands of variables exist
- Able to evaluate many solution alternatives quickly

Figure 11.6 The Components of a Genetic Algorithm



Natural Language Processing

- Understand, and speak in natural language. Read natural language and translate
- Typically today based on machine learning, aided by very large databases of common phrases and sentences in a given language
- Example: Google Translate
- Spam filtering systems
- Customer call center interactions: What is the customer's problem? What solutions worked in the past?
- Digital assistances: Sire, Alexa, Cortana, Google Assistant
- Not useful for an ordinary common sense human conversation but can be very useful in limited domains, e.g. interacting with your car's heating system.

Computer Vision Systems

- Digital image systems that create a digital map of an image (like a face, or a street sign), and recognize this image in large data bases of images in near real time
- Every image has a unique pattern of pixels
- Facebook's DeepFace can identify friends in photos across their system, and the entire web
- Autonomous vehicles can recognize signs, road markers, people, animals, and other vehicles with good reliability
- Industrial machine (robot) vision
- Passport control at airports
- Identifying people in crowds

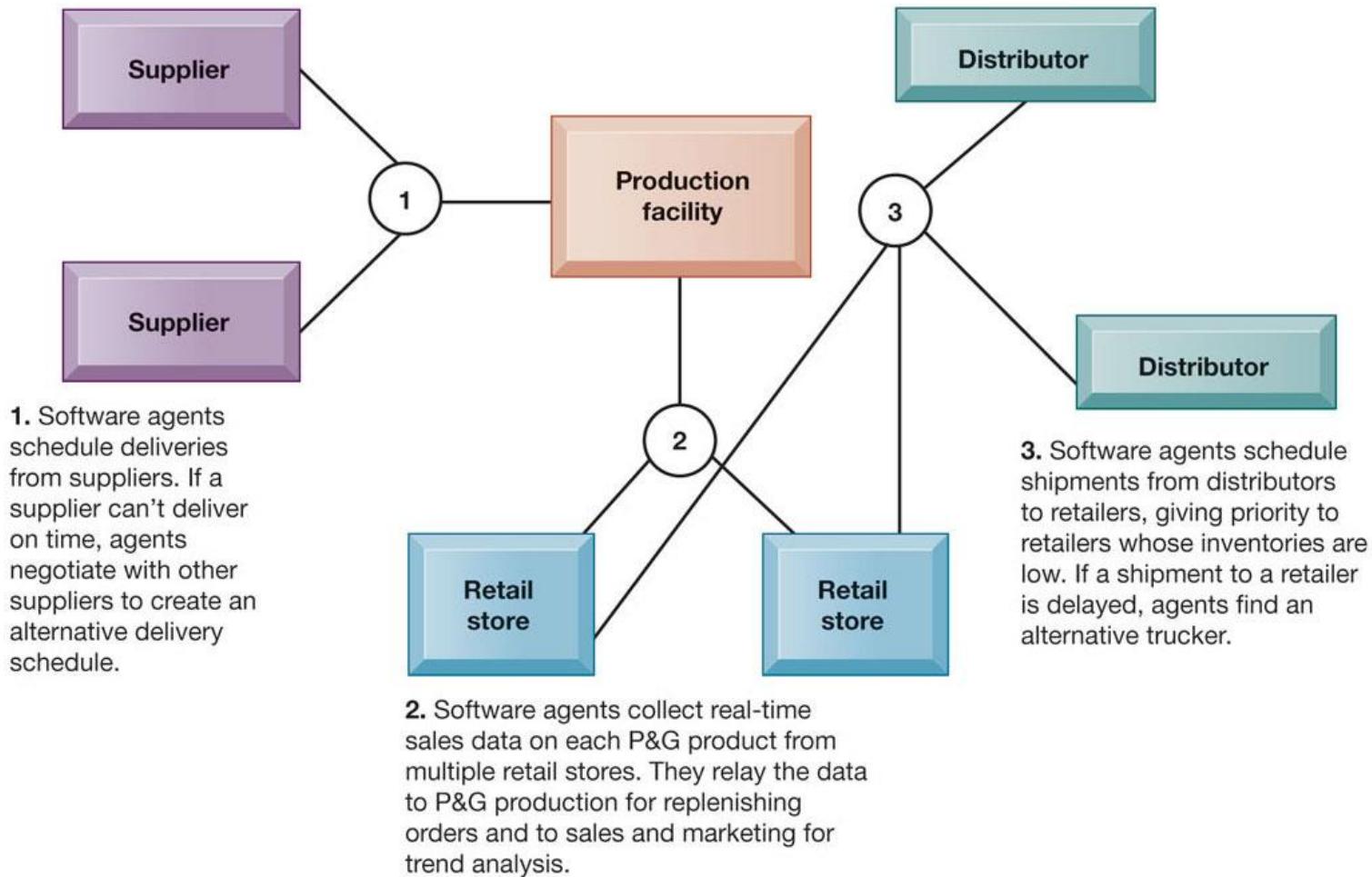
Robotics

- Design, construction, and operation of machines that can substitute for humans in many factory, office, and home applications (home vacuums).
- Generally programmed to perform specific and detailed actions in limited domains, e.g. robots spray paint autos, and assemble certain parts, welding, heavy assembly movement.
- Used in dangerous situations like bomb disposal
- Surgical robots are expanding their capabilities

Intelligent Agents

- Work without direct human intervention to carry out repetitive, predictable tasks
 - Deleting junk e-mail
 - Finding cheapest airfare
- Use limited built-in or learned knowledge base
 - Some are capable of self-adjustment, for example: Siri
- Chatbots
- Agent-based modeling applications:
 - Model behavior of consumers, stock markets, and supply chains; used to predict spread of epidemics

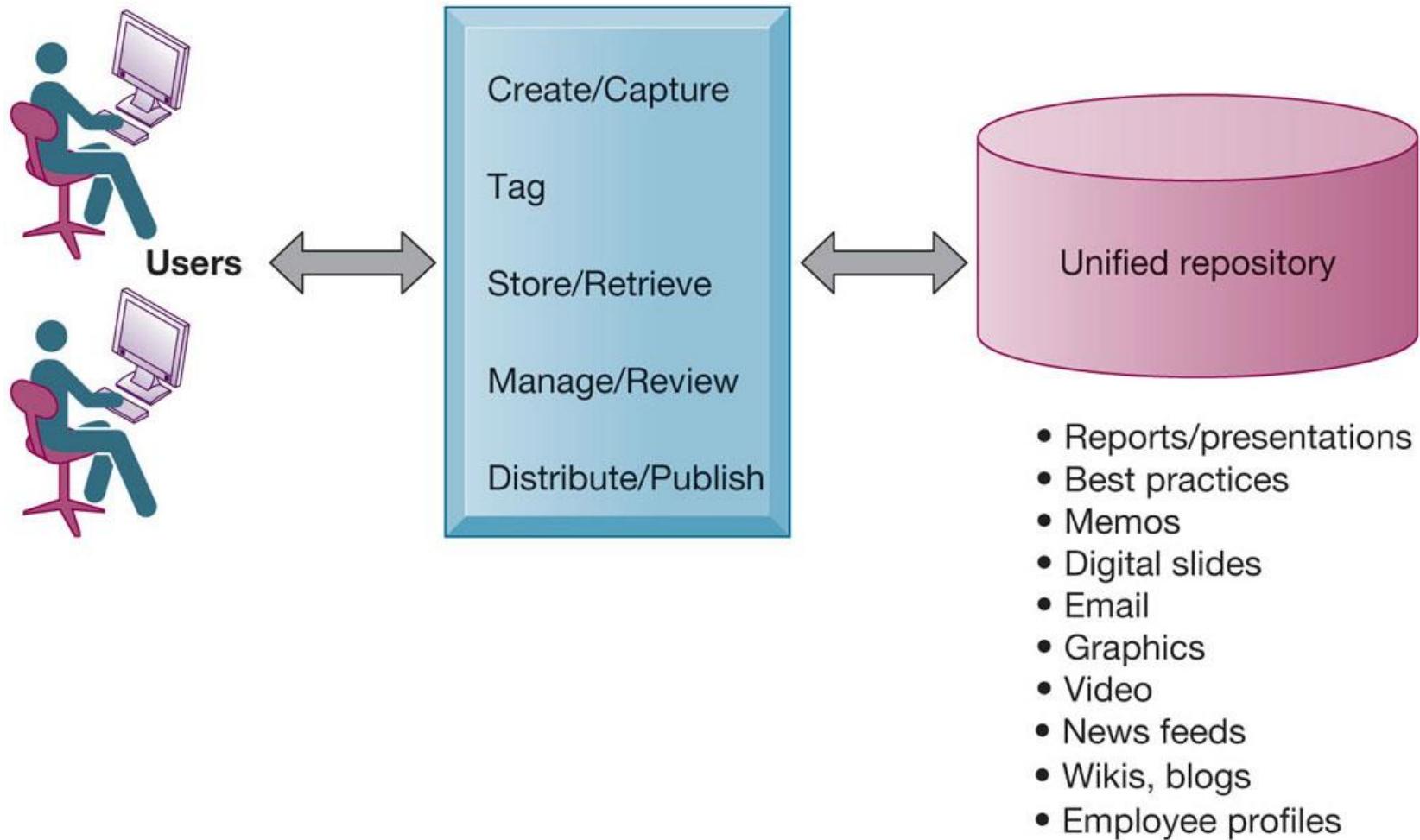
Figure 11.7 Intelligent Agents in P&G's Supply Chain Network



Enterprise Content Management Systems

- Help capture, store, retrieve, distribute, preserve documents and semistructured knowledge
- Bring in external sources
 - News feeds, research
- Tools for communication and collaboration
 - Blogs, wikis, and so on
- Key problem: developing taxonomy
- Digital asset management systems

Figure 11.8 An Enterprise Content Management System



Locating and Sharing Expertise

- Provide online directory of corporate experts in well-defined knowledge domains
- Search tools enable employees to find appropriate expert in a company
- Social networking and social business tools for finding knowledge outside the firm
 - Saving
 - Tagging
 - Sharing web pages

Learning Management Systems (LMS)

- Provide tools for management, delivery, tracking, and assessment of employee learning and training
- Support multiple modes of learning
 - CD-ROM, web-based classes, online forums, and so on
- Automates selection and administration of courses
- Assembles and delivers learning content
- Measures learning effectiveness
- Massively open online courses (MOOCs)
 - Web course open to large numbers of participants

Knowledge Workers and Knowledge Work

- Knowledge workers
 - Researchers, designers, architects, scientists, engineers who create knowledge for the organization
 - Three key roles
 - Keeping organization current in knowledge
 - Serving as internal consultants regarding their areas of expertise
 - Acting as change agents, evaluating, initiating, and promoting change projects
- Knowledge work systems
 - Systems for knowledge workers to help create new knowledge and integrate that knowledge into business

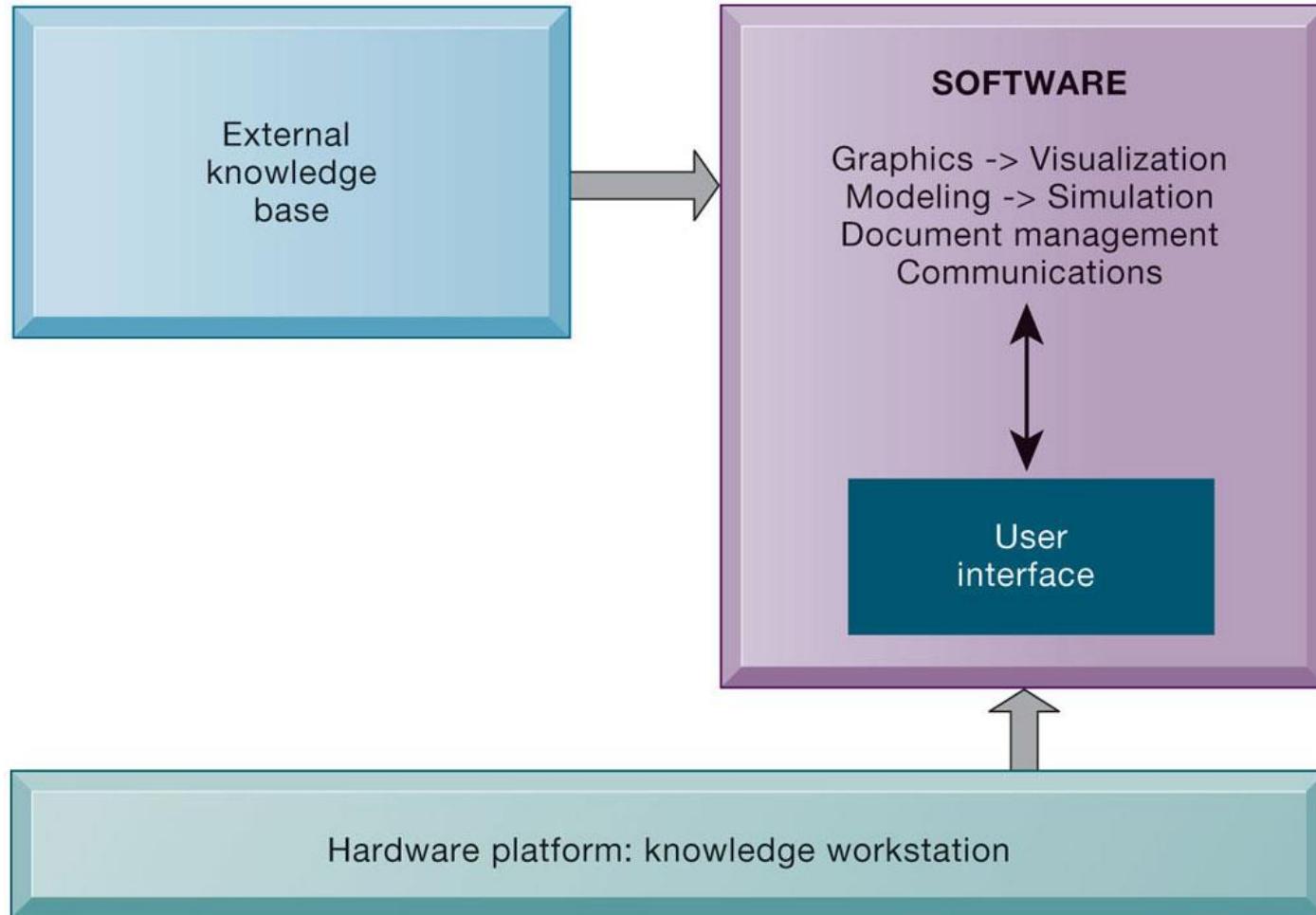
Interactive Session: Management: Sargent & Lundy Learns to Manage Employee Knowledge

- Class discussion
 - How is knowledge management related to Sargent & Lundy's business model?
 - Identify the knowledge management problem faced by Sargent & Lundy. What management, organization, and technology factors contributed to this problem?
 - Describe the solution selected for this problem. Was it effective? Why or why not? How much did it change the firm's operations and decision making?
 - What management, organization, and technology issues had to be addressed in selecting and implementing the solution?

Requirements of Knowledge Work Systems

- Sufficient computing power for graphics, complex calculations
- Powerful graphics and analytical tools
- Communications and document management
- Access to external databases
- User-friendly interfaces
- Optimized for tasks to be performed (design engineering, financial analysis)

Figure 11.9 Requirements of Knowledge Work Systems



Examples of Knowledge Work Systems

- CAD (computer-aided design)
 - Creation of engineering or architectural designs
 - 3D printing
- Virtual reality systems
 - Simulate real-life environments
 - 3D medical modeling for surgeons
 - Augmented reality (AR) systems
 - VRML

What Are the Business Benefits of Using Intelligent Techniques for Knowledge Management?

- Intelligent techniques: Used to capture individual and collective knowledge and to extend knowledge base
 - To capture tacit knowledge: Expert systems, case-based reasoning, fuzzy logic
 - Knowledge discovery: Neural networks and data mining
 - Generating solutions to complex problems: Genetic algorithms
 - Automating tasks: Intelligent agents
- Artificial intelligence (AI) technology:
 - Computer-based systems that emulate human behavior

Interactive Session: Technology: The Reality of Virtual Reality

- Class discussion
 - If your company wanted to implement a virtual reality application, what management, organization, and technology factors should it consider?
 - Should all businesses use virtual reality? Why or why not? What kinds of organizations will benefit most from this technology?
 - Do you think Facebook's virtual reality strategy will be successful? Explain your answer.

How Will MIS Help My Career?

- The Company: RazzleDazzle Technology
- Position Description: Entry-level sales assistant
- Job Requirements
- Interview Questions
- Author Tips

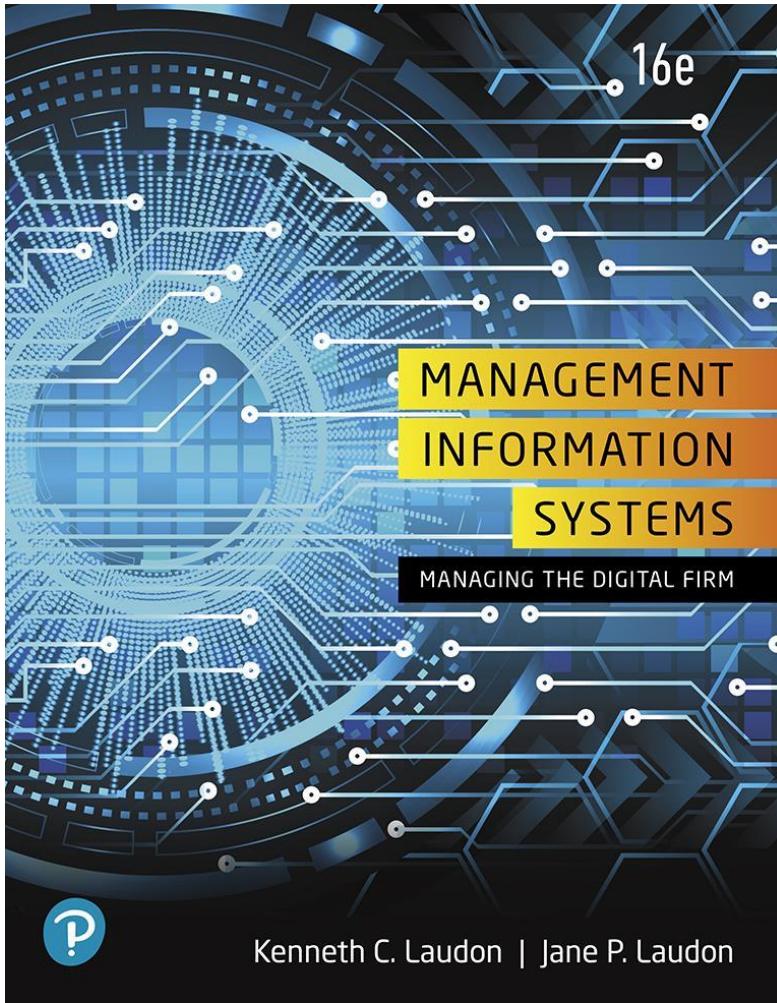
Copyright



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

Management Information Systems: Managing the Digital Firm

Sixteenth Edition



Chapter 12 Enhancing Decision Making

Learning Objectives

- 12.1** What are the different types of decisions, and how does the decision making process work?
- 12.2** How do information systems support the activities of managers and management decision making?
- 12.3** How do business intelligence and business analytics support decision making?
- 12.4** How do different decision-making constituencies in an organization use business intelligence, and what is the role of information systems in helping people working in a group make decisions more efficiently?
- 12.5** How will MIS help my career?

Video Cases

- Case 1: PSEG Leverages Big Data and Business Analytics Using GE's PREDIX Platform
- Case 2: FreshDirect Uses Business Intelligence to Manage Its Online Grocery
- Case 3: Business Intelligence Helps the Cincinnati Zoo Work Smarter

Big Data and the Internet of Things Drive Precision Agriculture (1 of 2)

- Problem
 - Explosive population growth
 - Opportunities from new technology
- Solutions
 - Identify technologies
 - Develop improvements for farmer processes
 - IoT wireless sensors
 - Supercomputer processing
 - Analytic software
 - Web links to farmers

Big Data and the Internet of Things Drive Precision Agriculture (2 of 2)

- Precision Agriculture Systems
- Demonstrates IT's role in providing information and business intelligence that help small business like farmers improve efficiency
- Illustrates how information systems can improve an entire industry

What Are the Different Types of Decisions, and How Does the Decision Making Process Work?

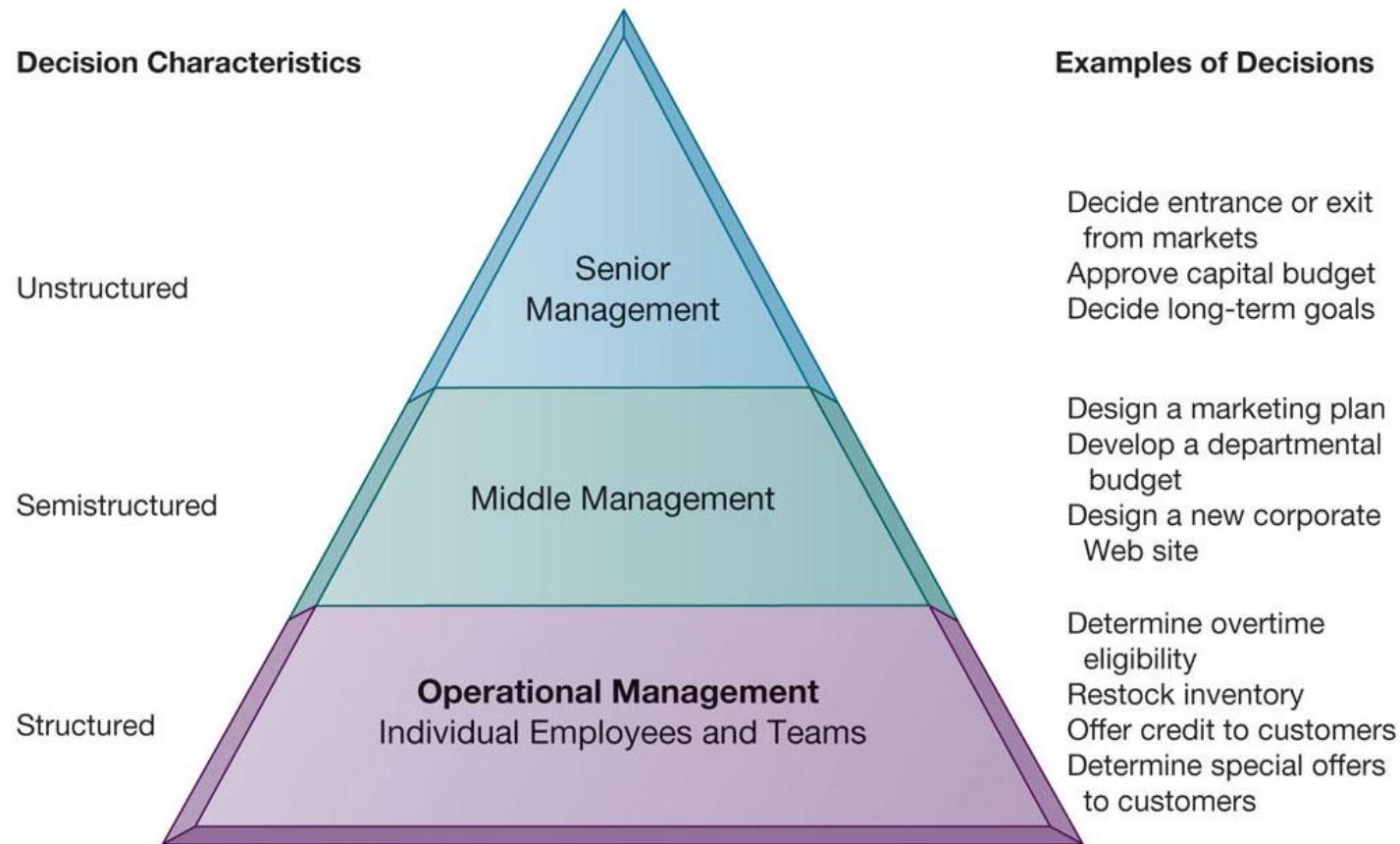
(1 of 2)

- Business value of improved decision making
 - Improving hundreds of thousands of “small” decisions adds up to large annual value for the business
- Types of decisions
 - Unstructured: Decision maker must provide judgment, evaluation, and insight to solve problem
 - Structured: Repetitive and routine; involve definite procedure for handling so they do not have to be treated each time as new
 - Semistructured: Only part of problem has clear-cut answer provided by accepted procedure

What Are the Different Types of Decisions, and How Does the Decision Making Process Work? (2 of 2)

- Senior managers
 - Make many unstructured decisions
- Middle managers
 - Make more structured decisions but these may include unstructured components
- Operational managers and rank and file employees
 - Make more structured decisions

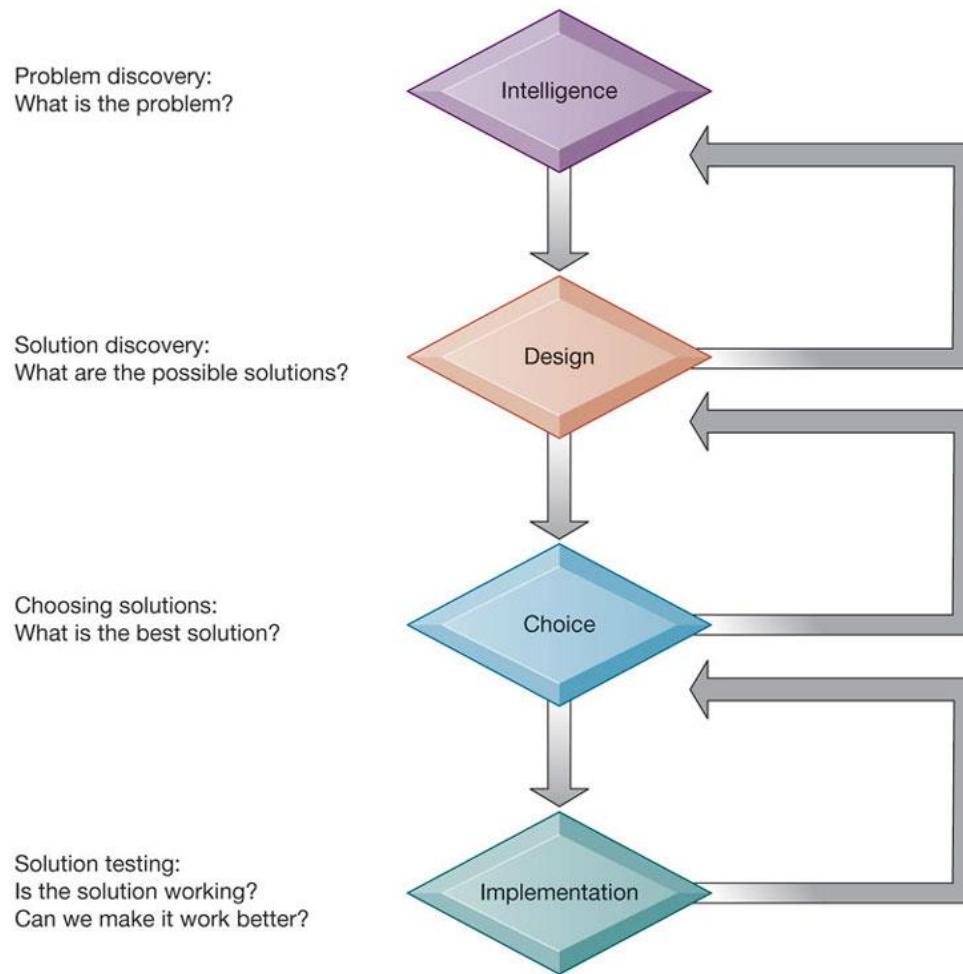
Figure 12.1 Information Requirements of Key Decision-Making Groups in a Firm



The Decision Making Process

- Intelligence
 - Discovering, identifying, and understanding the problems occurring in the organization
- Design
 - Identifying and exploring solutions to the problem
- Choice
 - Choosing among solution alternatives
- Implementation
 - Making chosen alternative work and continuing to monitor how well solution is working

Figure 12.2 Stages in Decision Making



Managerial Roles

- Information systems can only assist in some of the roles played by managers
- Classical model of management: five functions
 - Planning, organizing, coordinating, deciding, and controlling
- More contemporary behavioral models
 - Actual behavior of managers appears to be less systematic, more informal, less reflective, more reactive, and less well organized than in classical model

Mintzberg's 10 Managerial Roles (1 of 2)

- Interpersonal roles
 - Figurehead
 - Leader
 - Liaison
- Informational roles
 - Nerve center
 - Disseminator
 - Spokesperson

Mintzberg's 10 Managerial Roles (2 of 2)

- Decisional roles
 - Entrepreneur
 - Disturbance handler
 - Resource allocator
 - Negotiator

Real-World Decision Making

- Three main reasons why investments in IT do not always produce positive results
 - Information quality
 - High-quality decisions require high-quality information
 - Management filters
 - Managers have selective attention and have variety of biases that reject information that does not conform to prior conceptions
 - Organizational inertia and politics
 - Strong forces within organizations resist making decisions calling for major change

High-Velocity Automated Decision Making

- Made possible through computer algorithms precisely defining steps for a highly structured decision
 - Humans taken out of decision
- For example: High-speed computer trading programs
 - Trades executed in 30 milliseconds
- Require safeguards to ensure proper operation and regulation

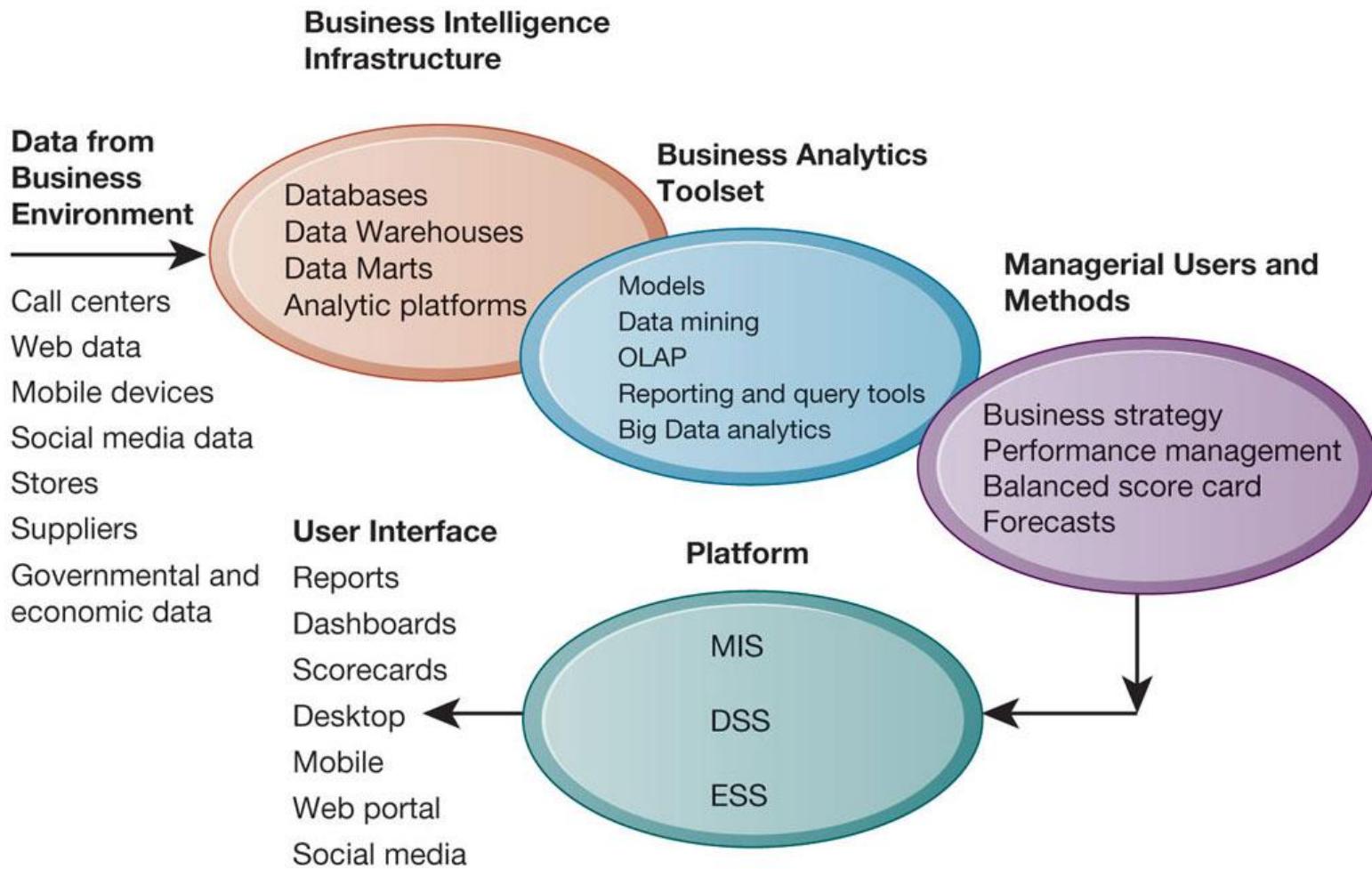
What is Business Intelligence?

- Business intelligence
 - Infrastructure for collecting, storing, analyzing data produced by business
 - Databases, data warehouses, data marts
- Business analytics
 - Tools and techniques for analyzing data
 - OLAP, statistics, models, data mining
- Business intelligence vendors
 - Create business intelligence and analytics purchased by firms

The Business Intelligence Environment

- Six elements in the business intelligence environment
 - Data from the business environment
 - Business intelligence infrastructure
 - Business analytics toolset
 - Managerial users and methods
 - Delivery platform—MIS, DSS, ESS
 - User interface
 - Data visualization tools

Figure 12.3 Business Intelligence and Analytics for Decision Support



Business Intelligence and Analytics Capabilities

- Goal is to deliver accurate real-time information to decision makers
- Main analytic functionalities of BI systems
 - Production reports
 - Parameterized reports
 - Dashboards/scorecards
 - Ad hoc query/search/report creation
 - Drill down
 - Forecasts, scenarios, models

Interactive Session: Technology: Siemens Makes Business Processes More Visible

- Class discussion
 - How did information technology change the game of 1. Identify the problem in this case study. What management, organization, and technology factors contributed to the problem?
 - Describe the capabilities of process mining software. Was this an effective solution? Explain your answer.
 - How did process mining change decision making at Siemens?
 - What management, organization, and technology issues need to be addressed when implementing process mining systems?

Table 12.4 Examples of Business Intelligence Predefined Production Reports

Business Functional Area	Production Reports
Sales	Forecast sales; sales team performance; cross-selling; sales cycle times
Service/call center	Customer satisfaction; service cost; resolution rates; churn rates
Marketing	Campaign effectiveness; loyalty and attrition; market basket analysis
Procurement and support	Direct and indirect spending; off-contract purchases; supplier performance
Supply chain	Backlog; fulfillment status; order cycle time; bill of materials analysis
Financials	General ledger; accounts receivable and payable; cash flow; profitability
Human resources	Employee productivity; compensation; workforce demographics; retention

Predictive Analytics

- Uses variety of data, techniques to predict future trends and behavior patterns
 - Statistical analysis
 - Data mining
 - Historical data
 - Assumptions
- Incorporated into numerous BI applications for sales, marketing, finance, fraud detection, health care
 - Credit scoring
 - Predicting responses to direct marketing campaigns

Big Data Analytics

- Big data: Massive datasets collected from social media, online and in-store customer data, and so on
- Help create real-time, personalized shopping experiences for major online retailers
- Smart cities
 - Public records
 - Sensors, location data from smartphones
 - Ability to evaluate effect of one service change on system

Operational Intelligence and Analytics

- Operational intelligence: Business activity monitoring
- Collection and use of data generated by sensors
- Internet of Things
 - Creating huge streams of data from web activities, sensors, and other monitoring devices
- Software for operational intelligence and analytics enable companies to analyze their big data

Location Analytics and Geographic Information Systems

- Location analytics
 - Ability to gain business insight from the location (geographic) component of data
 - Mobile phones
 - Sensors, scanning devices
 - Map data
- Geographic information systems (GIS)
 - Ties location-related data to maps
 - Example: For helping local governments calculate response times to disasters

Figure 12.4 Business Intelligence Users

Power Users:
Producers
(20% of employees)

IT developers

Super users

Business analysts

Analytical modelers

Capabilities

Production Reports

Parameterized Reports

Dashboards/Scorecards

Ad hoc queries; Drill down
Search/OLAP

Forecasts; What if
Analysis; statistical models

Casual Users:
Consumers
(80% of employees)

Customers/suppliers
Operational employees

Senior managers

Managers/Staff

Business analysis

Support for Semistructured Decisions

- Decision-support systems
 - Support for semistructured decisions
- Use mathematical or analytical models
- Allow varied types of analysis
 - “What-if” analysis
 - Sensitivity analysis
 - Backward sensitivity analysis
 - Multidimensional analysis / OLAP
 - For example: pivot tables

Figure 12.5 Sensitivity Analysis

Total fixed costs	19000					
Variable cost per unit	3					
Average sales price	17					
Contribution margin	14					
Break-even point	1357					
		Variable Cost per Unit				
Sales Price	1357	2	3	4	5	6
	14	1583	1727	1900	2111	2375
	15	1462	1583	1727	1900	2111
	16	1357	1462	1583	1727	1900
	17	1267	1357	1462	1583	1727
	18	1188	1267	1357	1462	1583

Figure 12.6 A Pivot Table That Examines Customer Regional Distribution and Advertising Source

The screenshot shows a Microsoft Excel spreadsheet titled "MIS13 Figure 12-6 [Compatibility Mode] - Microsoft Excel". The PivotTable Tools ribbon tab is selected. The main table (A1:I19) contains data for 16 customers with columns for Cust ID, Region, Payment, Source, Amount, Product, and Time Of Day. A PivotTable Field List window is open, listing the same fields. The PivotTable itself (J1:M6) displays the count of customer IDs by region and source, with a Grand Total row.

Region	Email	Web	Grand Total
East	24	77	101
North	28	64	92
South	33	73	106
West	57	154	211
Grand Total	142	368	510

Decision Support for Senior Management (1 of 2)

- ESS: decision support for senior management
 - Help executives focus on important performance information
- Balanced scorecard method
 - Measures outcomes on four dimensions
 - Financial
 - Business process
 - Customer
 - Learning and growth
 - Key performance indicators (KPIs) measure each dimension

Figure 12.7 The Balanced Scorecard Framework



Decision Support for Senior Management (2 of 2)

- Business performance management (BPM)
 - Translates firm's strategies (e.g., differentiation, low-cost producer, scope of operation) into operational targets
 - KPIs developed to measure progress toward targets
- Data for ESS
 - Internal data from enterprise applications
 - External data such as financial market databases
 - Drill-down capabilities

Interactive Session: Management: Anthem Benefits from More Business Intelligence

- Class discussion
 - Why did Anthem need better data and analytics tools for Human Resources? What management, organization, and technology factors contributed to Anthem's need for better HR data and analytics?
 - Describe the business intelligence capabilities of the PDC portal.
 - What groups in the company benefited from Anthem's new analytics tools? Explain your answer.
 - How did Anthem's new data analytics capabilities change the Human Resources function at the company?

Group Decision-Support Systems (GDSS)

- Interactive system to facilitate solution of unstructured problems by group
- Specialized tools
 - Virtual collaboration rooms
 - Software to collect, rank, edit participant ideas and responses
- Promotes collaborative atmosphere, anonymity
- Cisco's Collaboration Meeting Rooms Hybrid (CMR)
- Skype for Business

How Will MIS Help My Career?

- The Company: Western Well Health
- Position Description: Entry-level data analyst
- Job Requirements
- Interview Questions
- Author Tips

Copyright



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.