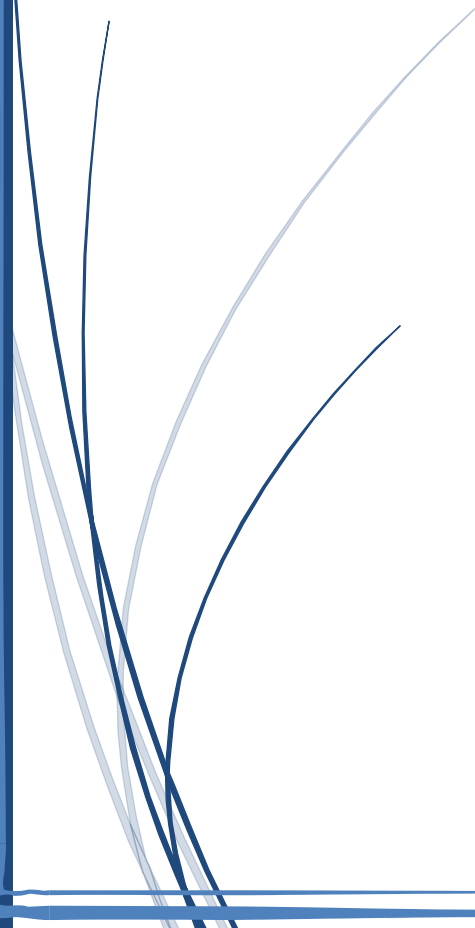


E-COM101

www.SEU1.Org

MEDTERM 1-6

By Toka Akrad



Chapter 1

What Is E-commerce ?

- Use of Internet and Web to transact business
- More formally: Digitally enabled commercial transactions between and among organizations and individuals Copyright.

What Is E-business?

- Digital enabling of transactions and processes within a firm, involving information systems under firm's control.
- Does not include commercial transactions involving an exchange of value across organizational boundaries.

-
- E-commerce technology is different, more powerful than previous technologies
 - E-commerce brings fundamental changes to commerce.

Traditional commerce:

* Consumer as passive targets *Sales-force drive *Fixed prices *Information asymmetry

Eight Unique Features of Ecommerce Technology!

1. Ubiquity 2. Global reach 3. Universal standards
4. Information richness 5. Interactivity 6. Information density
7. Personalization/customization 8. Social technology

What is the web 2.0 ?

User-centered applications and social media technologies !

- User-generated content and communication
- Highly interactive, social communities
- Large audiences; yet mostly unproven business models

E.g.: Twitter, YouTube, Facebook, Instagram, Wikipedia, StumbleUpon, Tumblr, Pinteres.

Types of E-commerce

1. Business-to-Consumer (B2C)
2. Business-to-Business (B2B)
3. Consumer-to-Consumer (C2C)
4. Social e-commerce
5. Mobile e-commerce (M-commerce)
6. Local e-commerce

Origins and Growth of E-commerce Precursors:

- Baxter Healthcare
- Electronic Data Interchange (EDI)
- French Minitel (1980s videotex system)
- None had functionality of Internet
- E-commerce fastest growing form of commerce in United States

Potential Limitations on the Growth of B2C E-commerce

- Expensive technology
- Sophisticated skill set

- Persistent cultural attraction of physical markets and traditional shopping experiences
- Persistent global inequality limiting access to telephones and computers
- Saturation and ceiling effect

Understanding E-commerce - Just Read ...

Technology: Development and mastery of digital computing and communications technology

Business: New technologies present businesses with new ways of organizing production and transacting business

Society: Intellectual property, individual privacy, public welfare policy

Academic Disciplines Concerned with E-commerce

Technical approach

1. Computer science
2. Management science
3. Information systems

Behavioral approach

1. Information systems
2. Economics
3. Marketing
4. Management
5. Finance/accounting
6. Sociology

Chapter 3

Internet

- Interconnected network of thousands of networks and millions of computers
- Links businesses, educational institutions, government agencies, and individuals

World Wide Web (Web)

- One of the Internet's most popular services
- Provides access to billions, possibly trillions, of Web pages

The Internet: Key Technology Concepts

Defined as network that:

- ✓ Uses IP addressing
- ✓ Supports TCP/IP
- ✓ Provides services to users, in manner similar to telephone system

Packet Switching

- Slices digital messages into packets
- Sends packets along different communication paths as they become available
- Reassembles packets once they arrive at destination
- Uses routers
 - Special purpose computers that interconnect the computer networks that make up the Internet and route packets
 - Routing algorithms ensure packets take the best available path toward their destination
- Less expensive, wasteful than circuit-switching

TCP/IP

- Transmission Control Protocol (TCP):

- ❖ Establishes connections among sending and receiving Web computers
- ❖ Handles assembly of packets at point of transmission, and reassembly at receiving end
- Internet Protocol (IP):
 - ❖ Provides the Internet's addressing scheme
- Four TCP/IP layers
 - ❖ Network interface layer
 - ❖ Internet layer
 - ❖ Transport layer
 - ❖ Application layer

Internet (IP) Addresses

- IPv4:
 - ❖ 32-bit number
 - ❖ Four sets of numbers marked off by periods: 201.61.186.227
 - ❖ Class C address: Network identified by first three sets, computer identified by last set
- IPv6
 - ❖ 128-bit addresses, able to handle up to 1 quadrillion addresses (IPv4 can only handle 4 billion)
- Domain name: IP address expressed in natural language
- Domain name system (DNS): Allows numeric IP addresses to be expressed in natural language
- Uniform resource locator (URL): Address used by Web browser to identify local
- Client/Server Computing
- Powerful personal computers (clients) connected in network with one or more servers
- Servers perform common functions for the clients
 - ✓ Storing files
 - ✓ Software applications
 - ✓ Access to printers, etc.

The New Client: The Mobile Platform

- In a few years, primary Internet access will be through:
 - ❖ Tablet ➤ Supplementing PCs for mobile situations
 - ❖ Smartphones ➤ Disruptive technology:
 - Shift in processors, operating systems ➤ 25% of all cell phones

Cloud Computing

- Firms and individuals obtain computing power and software over Internet
e.g., **Google Apps**
- Fastest growing form of computing
- Radically reduces costs of:
 - ❖ Building and operating Web sites

- ❖ Infrastructure, IT support
- ❖ Hardware, software

Other Internet Protocols and Utility Programs

- Internet protocols
 - ❖ HTTP
 - ❖ E-mail: SMTP, POP3, IMAP
 - ❖ FTP, Telnet, SSL/TLS
- Utility programs Ping .. Tracert

Internet Service Providers (ISPs)

- Provide lowest level of service to individuals, small businesses, some institutions
- Types of service
 - ❖ Narrowband (dial-up)
 - ❖ Broadband: Digital Subscriber Line (DSL) / Cable modem / T1 and T3 / Satellite.

Intranets and Extranets

- Intranet: TCP/IP network located within a single organization for communications and processing
- Extranet: Formed when firms permit outsiders to access their internal TCP/IP networks

Who Governs the Internet?

Organizations that influence the Internet and monitor its operations include:

- 1) Internet Architecture Board (IAB)
- 2) Internet Corporation for Assigned Names and Numbers (ICANN)
- 3) Internet Engineering Steering Group (IESG)
- 4) Internet Engineering Task Force (IETF)
- 5) Internet Society (ISOC)
- 6) World Wide Web Consortium (W3C)
- 7) International Telecommunications Union (ITU)

The First Mile and the Last Mile

- GENI Initiative Proposed by NSF to develop new core functionality for Internet
- Most significant private initiatives Fiber optics , Mobile wireless Internet services .

Telephone-based Wireless Internet Access

- Competing 3G standards
 - GSM: Used world-wide, AT&T, T-Mobile
 - CDMA: Used primarily in U.S., Verizon, Sprint
- Evolution
 - 3G cellular networks: next generation, packet-switched
 - 3.5G (3G+)
 - 4G (WiMax, LTE)

Wireless Internet Access Network Technologies

- Wi-Fi High-speed, fixed broadband wireless LAN (WLAN). Different versions for home and business market. Limited range

- [WiMax](#) High-speed, medium range broadband wireless metropolitan area network
- [Bluetooth](#) Low-speed, short range connection
- [Ultra-Wideband \(UWB\)](#) Low power, short-range high bandwidth network
- [ZigBee](#) Short-range, low-power wireless network technology for remotely controlling digital devices
- [The Internet of Things \(IoT\)](#)
 - ✓ Objects connected via sensors/RFID to the Internet
 - ✓ Spearheaded by EU and China
 - [Hypertext](#)
 - ✓ Text formatted with embedded links
 - ✓ Links connect documents to one another, and to other objects
 - ✓ such as sound, video, or animation files o Uses Hypertext Transfer Protocol (HTTP) and URLs to locate resources on the Web
 - [Markup Languages](#)

[Hypertext Markup Language \(HTML\)](#)

- Fixed set of pre-defined markup "tags" used to format text
- Controls look and feel of Web pages
- HTML5 the newest version

[eXtensible Markup Language \(XML\)](#)

- Designed to describe data and information
- Tags used are defined by user

[Web Servers and Web Clients](#)

[Web server software](#): Enables a computer to deliver Web pages to clients on a network that request this service by sending an HTTP request

[Web client](#): Any computing device attached to the Internet that is capable of making HTTP requests and displaying HTML pages

[Features o Features on which the foundations of e-commerce are built:](#)

1. E-mail
2. Instant messaging
3. Search engines
4. Online forums and chat
5. Streaming media
6. Cookies

[E-mail](#)

- Most used application of the Internet
- Uses series of protocols for transferring messages with text and attachments from one Internet user to another

[Instant Messaging](#)

- Displays words typed on a computer almost instantly, and recipients can respond immediately in the same way

Online forum:

- Also known as a message board, bulletin board, discussion board, discussion group, board or forum
- Web application that enables Internet users to communicate with each other, although not in real time
- Members visit online forum to check for new posts

Online chat:

- Similar to IM, but for multiple users
- Typically, users log into chat room

Streaming Media

- Enables music, video, and other large files to be sent to users in chunks so that when received and played, file comes through uninterrupted
- Allows users to begin playing media files before file is fully downloaded

Cookies

- Small text files deposited by Web site on user's computer to store information about user, accessed when user next visits Web site
- Can help personalize Web site experience
- Can pose privacy threat

Online Social Networks Services that support communication among networks of friends, peers

Blogs Personal Web page of chronological entries

Really Simple Syndication (RSS) Program that allows users to have digital content automatically sent to their computers over the Internet

Podcasting Audio presentation stored as an audio file and available for download from Web

Wikis Allows user to easily add and edit content on Web page

Music and video services

- Online video viewing
- Digital video on demand

Internet telephony (VOIP) Voice over Internet Protocol (VOIP) uses Internet to transmit voice communication

Intelligent Personal Assistants Software that interacts with the user through voice commands

Features

- Natural language; conversational interface
- Situational awareness
- Interpret voice commands to interact with various Web services o e.g., Siri, Google Now

Chapter 4

Imagine Your E-commerce Presence

❖ What's the idea?

Vision/ Mission statement/ Target audience/ Intended market space / Strategic analysis/ Internet marketing matrix/ Development timeline and preliminary budget

❖ Where's the money?

Business model : Portal, e-tailer, content provider, transaction broker, market creator, service provider, community provider

Revenue model : Advertising, subscriptions, transaction fees, sales, and affiliate revenue.

❖ Who and where is the target audience?

Describing your audience

- ✓ Demographics (Age, gender, income, location)
- ✓ Behavior patterns (lifestyle)
- ✓ Consumption patterns (purchasing habits)
- ✓ Digital usage patterns
- ✓ Content creation patterns (blogs, Facebook)
- ✓ Buyer personas

Characterize the marketplace

- ✓ Demographics
- ✓ Size, growth, changes
- ✓ Structure (Competitors/Suppliers/Substitute products)

Most important management challenges:

- ✓ Developing a clear understanding of business objective
- ✓ Knowing how to choose the right technology to achieve those objectives

Main areas where you will need to make decisions:

- ✓ Human resources and organizational capabilities
 - Creating team with skill set needed to build and manage a successful site
- ✓ Hardware/software
- ✓ Telecommunications
- ✓ Site design

The Systems Development Life Cycle

Methodology for understanding business objectives of a system and designing an appropriate solution ..

Five major steps:

Systems analysis/planning * Systems design * Building the system * Testing * Implementation.

System Analysis/Planning

Business objectives: List of capabilities you want your site to have

System functionalities: List of information system capabilities needed to achieve business objectives

Information requirements: Information elements that system must produce in order to achieve business objectives

Systems Design:

System design specification: Description of main components of a system and their relationship to one another

Two components of system design:

- ✓ **Logical design:** Data flow diagrams, processing functions, databases
- ✓ **Physical design:** Specifies actual physical, software components, models, etc.

Build/Host Your Own vs. Outsourcing

Outsourcing: Hiring vendors to provide services involved in building site

Build your own requires team with diverse skill set; choice of software tools; both risks and possible benefits

Hosting: Hosting company responsible for ensuring site is accessible 24/7, for monthly fee

Co-location: Firm purchases or leases Web server (with control over its operation), but server is located at vendor's facility

Testing ; Unit testing*System testing*Acceptance testing

Implementation and maintenance:

- ✓ Maintenance is ongoing
- ✓ Maintenance costs: Similar to development costs
- ✓ Benchmarking

System architecture Arrangement of software, machinery, and tasks in an information system needed to achieve a specific functionality

Two-tier Web server and database server

Multi-tier Web application servers *Backend, legacy databases

Site Management Tools

Basic tools Included in all Web servers, e.g.,

- ✓ Verify that links on pages are still valid
- ✓ Identify orphan files

Dynamic Page Generation Tools

Dynamic page generation: Contents stored in database and fetched when needed

Common tools: CGI, ASP, JSP, ODBC

Advantages:

- ✓ Lowers menu costs
- ✓ Permits easy online market segmentation
- ✓ Enables cost-free price discrimination
- ✓ Enables content management system (CMS)

Web application servers: Provide specific business functionality required for a Web

E-commerce Merchant Server Software

Provides basic functionality for sales

- ✓ **Online catalog** List of products available on Web site
- ✓ **Shopping cart** Allows shoppers to set aside, review, edit selections, and then make purchase

✓ **Credit card processing** Typically works in conjunction with shopping cart And Verifies card and puts through credit to company's account at checkout.

Merchant Server Software Packages

Integrated environment that includes most of functionality needed

Key factors in selecting a package

1. Functionality
2. Support for different business models
3. Business process modeling tools
4. Visual site management and reporting
5. Performance and scalability
6. Connectivity to existing business systems
7. Compliance with standards
8. Global and multicultural capability
9. Local sales tax and shipping rules

Hardware platform: Underlying computing equipment needed for e-commerce functionality

Objective: Enough platform capacity to meet peak demand without wasting money Important to understand the factors that affect speed, capacity, and scalability of a site

Right-Sizing Your Hardware Platform:

Scalability: Ability of site to increase in size as demand warrants

Ways to scale hardware:

- ✓ **Vertically ;** Increase processing power of individual components
- ✓ **Horizontally ;** Employ multiple computers to share workload
- ✓ **Improve processing architecture**

Tools for Web site optimization

- Metatags, titles, content
- Identify market niches, localize site
- Offer expertise
- Links
- Search engine ads
- Local e-commerce

Tools for Interactivity and Active Content

- Web 2.0 design elements: Widgets, mashups
- CGI (Common Gateway Interface)
- ASP (Active Server Pages)
- Java, JSP, and JavaScript
- ActiveX and VBScript
- ColdFusion

Personalization Ability to treat people based on personal qualities and prior history with site

Customization Ability to change the product to better fit the needs of the customer

Cookies: Primary method to achieve personalization

Privacy policy Set of public statements declaring how site will treat customers' personal information that is gathered by site

Accessibility rules Set of design objectives that ensure disabled users can affectively access site

Three types of m-commerce software

1. Mobile Web site - Responsive web design
2. Mobile Web app
3. Native app

Planning and building mobile presence

Use systems analysis/design to identify unique and specific business objectives

Developing a Mobile Web Presence

Performance and cost

1. Mobile Web site: Least expensive
2. Mobile app: Can utilize browser API
3. Native app: Most expensive; requires more programming

Chapter 5

What Is Good E-commerce Security?

To achieve highest degree of security

- New technologies
- Organizational policies and procedures
- Industry standards and government laws

Other factors

- Time value of money
- Cost of security vs. potential loss
- Security often breaks at weakest link

The Tension Between Security and Other Values

- **Ease of use** The more security measures added, the more difficult a site is to use, and the slower it becomes
- **Public safety and criminal uses of the Internet** Use of technology by criminals to plan crimes or threaten nation-state

Three key points of vulnerability in e-commerce environment:

1. Client
2. Server
3. Communications pipeline (Internet communications channels)

Most Common Security Threats in the E-commerce Environment

Malicious code

1. Viruses
2. Worms
3. Trojan horses
4. Drive-by downloads
5. Backdoors
6. Bots, botnets
7. Threats at both client and server levels

Potentially unwanted programs (PUPs)

1. Browser parasites
2. Adware
3. Spyware

Phishing

1. E-mail scams
2. Social engineering
3. Identity theft

Hacking

1. Hackers vs. crackers
2. Types of hackers: White, black, grey hats
3. Hacktivism

Cyber vandalism:

- Disrupting, defacing, destroying Web site

Data breach:

- Losing control over corporate information to outsiders

Credit card fraud/theft

- Hackers target merchant servers; use data to establish credit under false identity

Spoofing (Pharming)

Spam (junk) Web sites

Denial of service (DoS) attack

- Hackers flood site with useless traffic to overwhelm network

Distributed denial of service (DDoS) attack

Sniffing

Eavesdropping program that monitors information traveling over a network

Insider attacks

Poorly designed server and client software

Social network security issues

Mobile platform security issues

- Same risks as any Internet device

Cloud security issues

Technology Solutions

- Protecting Internet communications (Encryption)
- Securing channels of communication (SSL, VPNs)
- Protecting networks (Firewalls)
- Protecting servers and clients

Encryption Transforms data into cipher text readable only by sender and receiver
Secures stored information and information transmission

Provides 4 of 6 key dimensions of e-commerce security:

1. Message integrity
2. Nonrepudiation
3. Authentication
4. Confidentiality

Symmetric Key Encryption Sender and receiver use same digital key to encrypt and decrypt message and Requires different set of keys for each transaction.

Strength of encryption Length of binary key used to encrypt data

Advanced Encryption Standard (AES) Most widely used symmetric key encryption

Public Key Encryption

Uses two mathematically related digital keys

1. Public key (widely disseminated)
2. Private key (kept secret by owner)

Both keys used to encrypt and decrypt message

Once key used to encrypt message, same key cannot be used to decrypt message

Sender uses recipient's public key to encrypt message; recipient uses private key to decrypt it.

Hash function: Mathematical algorithm that produces fixed-length number called message or hash digest.

- Hash digest of message sent to recipient along with message to verify integrity
- Hash digest and message encrypted with recipient's public key

Address weaknesses of:

- **Public key encryption :** Computationally slow, decreased transmission speed, increased processing time
- **Symmetric key encryption :** Insecure transmission lines
- ✓ Uses symmetric key encryption to encrypt document
- ✓ Uses public key encryption to encrypt and send symmetric key

Digital Certificates and Public Key Infrastructure (PKI)

Digital certificate includes:

1. Name of subject/company
2. Subject's public key
3. Digital certificate serial number
4. Expiration date, issuance date
5. Digital signature of CA

Public Key Infrastructure (PKI):

- ✓ CAs and digital certificate procedures
- ✓ PGP

Secure Sockets Layer (SSL) and Transport Layer Security (TLS)

- ✓ Establishes a secure, negotiated client-server session in which URL of requested document, along with contents, is encrypted

Virtual Private Network (VPN):

- ✓ Allows remote users to securely access internal network via the Internet

Protecting Networks

Firewall

- ✓ Hardware or software
- ✓ Uses security policy to filter packet
- ✓ Two main methods: Packet filters / Application gateways

Proxy servers (proxies) Software servers that handle all communications originating from or being sent to the Internet

Protecting Servers and Clients

Operating system security enhancements

- Upgrades, patches

Anti-virus software:

- Easiest and least expensive way to prevent threats to system integrity
- Requires daily updates

Managing risk includes

Technology - Effective management policies - Public laws and active enforcement

Types of Payment Systems

Cash

- 1- Most common form of payment
- 2- Instantly convertible into other forms of value
- 3- No float

Checking transfer Second most common payment form in United States

Credit card

Credit card associations

1. Issuing banks
2. Processing centers
3. Credit card associations

Stored value

- Funds deposited into account, from which funds are paid out or withdrawn as needed
- Debit cards, gift certificates
- Peer-to-peer payment systems

Accumulating balance

- Accounts that accumulate expenditures and to which consumers make period payments
- Utility, phone, American Express accounts

Payment System Stakeholders

1. **Consumers** Low-risk, low-cost, refutable, convenience, reliability
2. **Merchants** Low-risk, low-cost, irrefutable, secure, reliable
3. **Financial intermediaries** Secure, low-risk, maximizing profit
4. **Government regulators** Security, trust, protecting participants and enforcing reporting

E-commerce Payment Systems

- Credit cards
- Debit cards
- Limitations of online credit card payment: Security, merchant risk and Cost and Social equity

Mobile Payment Systems

- Use of mobile phones as payment devices established in Europe, Japan, South Korea
- Near field communication (NFC)

Digital cash Based on algorithm that generates unique tokens that can be used in "real" world e.g., Bitcoin

Virtual currencies Circulate within internal virtual world

Chapter 6

Study of consumer behavior

- Attempts to explain what consumers purchase and where, when, how much, and why they buy

Consumer behavior models

- Predict wide range of consumer decisions
- Based on background demographic factors and other intervening, more immediate variables

Background Demographic Factors

- **Culture:** Affects entire nations
- **Subculture** Subsets formed around major social differences (ethnicity, age, lifestyle, geography)
- **Social networks and communities**
 - ✓ Direct reference groups
 - ✓ Indirect reference groups
 - ✓ Opinion leaders
 - ✓ Lifestyle groups
- **Psychological profile**

The Online Purchasing Decision

Psychographic research

- ✓ Combines demographic and psychological data
- ✓ Divides market into various groups based on social class, lifestyle, and/or personality characteristics

Stages in consumer decision process:

1. Awareness of need
2. Search for more information
3. Evaluation of alternatives
4. Actual purchase decision
5. Post-purchase contact with firm

General online behavior model

1. Consumer skills
2. Product characteristics
3. Attitudes toward online purchasing
4. Perceptions about control over Web environment
5. Web site features: latency, usability, security

Clickstream behavior

Clickstream factors include:

1. Number of days since last visit
2. Speed of clickstream behavior
3. Number of products viewed during last visit
4. Number of pages viewed
5. Supplying personal information
6. Number of days since last purchase
7. Number of past purchases

Clickstream marketing Developed dynamically as customers use Internet

- ✓ One-third of offline retail purchases influenced by online activities
- ✓ Online traffic also influenced by offline brands and shopping
- ✓ E-commerce and traditional commerce are coupled: Part of a continuum of consuming behavior

Two most important factors shaping decision to purchase online:

- **Utility:** Better prices, convenience, speed
- **Trust:** Asymmetry of information can lead to opportunistic behavior by sellers
Sellers can develop trust by building strong reputations for honesty, fairness, delivery

Marketing (Concepts)

- Strategies and actions to establish relationship with consumer and encourage purchases
- Addresses competitive situation of industries and firms
- Seeks to create unique, highly differentiated products or services that are produced or supplied by one trusted firm

Net Pricing Strategies

- **Pricing** Integral part of marketing strategy and Traditionally based on: Fixed cost / Variable costs / Demand curve
- **Price discrimination** Selling products to different people and groups based on willingness to pay
- **Free and freemium** Can be used to build market awareness
- **Versioning** Creating multiple versions of product and selling essentially same product to different market segments at different prices
- **Bundling** Offers consumers two or more goods for one price
- **Dynamic pricing:** Auctions / Yield management / Flash marketing

Long-Tail Marketing

- Internet allows for sales of obscure products with little demand
- Substantial revenue because
Near zero inventory costs / Little marketing costs / Search and recommendation engines

Channels: Different methods by which goods can be distributed and sold

Channel conflict: When new venue for selling products or services threatens or destroys existing sales venues

The Revolution in Internet Marketing Technologies**Internet's main impacts on marketing:**

- Scope of marketing communications broadened
- Richness of marketing communications increased
- Information intensity of marketplace expanded
- Always-on mobile environment expands marketing opportunities

Internet marketing technologies:

- Web transaction logs
- Tracking files
- Databases, data warehouses, data mining
- Hadoop and Big Data
- Customer relationship management systems

Tracking Files Users browsing tracked as they move from site to site

Four types of tracking files

1. **Cookies** Small text file placed by Web site and Allows Web marketers to gather data
2. **Flash cookies**
3. **Beacons ("bugs")**
4. **Apps**

Database: Stores records and attributes

Database management system (DBMS):

Software used to create, maintain, and access databases

SQL (Structured Query Language):

Industry-standard database query and manipulation language used in a relational database

Relational database:

Represents data as two-dimensional tables with records organized in rows and attributes in columns; data within different tables can be flexibly related as long as the tables share a common data element

Data warehouse:

Collects firm's transactional and customer data in single location for offline analysis by marketers and site managers

Data mining: Analytical techniques to find patterns in data, model behavior of customers, develop customer profiles

- ✓ Query-driven data mining
- ✓ Model-driven data mining
- ✓ Rule-based data mining

Big data" Web traffic, e-mail, social media content

- Traditional DBMS unable to process the volumes—petabytes and exabytes

Hadoop

- ✓ Open-source software solution
- ✓ Distributed processing among inexpensive servers

Customer Relationship Management (CRM) Systems

Create customer profiles:

1. Product and usage summary data
2. Demographic and psychographic data
3. Profitability measures
4. Contact history
5. Marketing and sales information

Customer data used to:

1. Develop and sell additional products
2. Identify profitable customers
3. Optimize service delivery, etc.