Introduction to Information Systems

Data Science Education Program

Chapter #6

The Web, E-Commerce, and M-Commerce

Introduction to Information Systems

Chapter #6 Overview

CHAPTER 6
The Web, *E-Commerce,* and *M-Commerce*

LEARNING OBJECTIVES

1 Identify and provide examples of four goals an organization might choose as it develops its web strategy, and explain how websites are named.

2 Provide examples of different website information architectures, explain the importance of usability and accessibility, and describe how websites are created with various software tools.

3 Explain how e-commerce works, and why security and trust are critical ingredients.

4 Define m-commerce, and explain how mobile payments work.

5 Explain how organizations market their websites using search engine optimization and web advertising, and describe some of the challenges of online marketing.

6 Explain how the evolving web continues to develop by incorporating attributes such as crowdsourcing, expanded data sources, the "Internet of things," machine learning, and "big data."

An online, interactive decision-making simulation that reinforces chapter contents and uses key terms in context can be found in MyMISLab™.

Chapter #6 Key Terms and Concepts

KEY TERMS AND CONCEPTS

infomediary

e-marketplace

business to consumer (B2C)

business to business (B2B)

consumer to consumer (C2C)

consumer to business (C2B)

uniform resource locator (URL)

Domain Name System (DNS)

hypertext transfer protocol (http://)

file transfer protocol (ftp://)

top-level domain

Internet Corporation for Assigned Names and Numbers (ICANN)

hierarchical website architecture

multidimensional website architecture

sequential website architecture

usability

web accessibility

assistive technologies

web browser

hypertext markup language (HTML)

JavaScript

AJAX

World Wide Web Consortium (W3C)

content management system

cascading style sheets (CSS)

e-commerce

shopping cart software

payment gateway

mobile commerce (m-commerce)

near field communications (NFC)

search engine optimization (SEO)

tag cloud

click-through rate (CTR)

cookie

third-party cookies

crowdsourcing

Introduction

Overview

- In this chapter there are many areas where we have covered the topics in Info 151

- Therefore:

  - This lecture will only present a brief overview of the major topics introduced in this chapter

  - The chapter addresses *e-commerce* and *m-commerce* but the terms are frequently used interchangeably as they address on-line commercial activities

  - There are small differences as on-line activity requires different approaches to design for a PC (e.g., a laptop), a mobile phone, and a tablet for example

- As always:

  - Designing for usability and security (with the *trade-off*) is paramount

Overview

- ## Web strategy:
  - Identify and provide examples of four goals an organization might choose as it develops its web and social media strategies and explain how websites are named

- ## Website information architectures:
  - Provide examples of different website information architectures, explain the importance of usability and accessibility, and describe how websites are created with various software tools

- ## E-commerce:
  - Explain how e-commerce works and why security and trust are critical ingredients

Overview

- ## M-commerce
  - Define m-commerce and explain how mobile payments work

- ## Website marketing
  - Explain how organizations manage digital marketing for their website, their social media presence, and their mobile apps

- ## Web 2.0
  - Explain how the evolving web continues to develop by incorporating attributes such as:
    - Crowdsourcing / expanded data sources / the Internet of Things / machine learning / big data

Developing a web strategy

Choosing a Goal

- The primary motivation for most organisations fall into five broad categories:
  - Inform and entertain the audience
  - Influence the audience (for example): product or service marketing
  - Product or service sales
  - Note: sales and marketing is not the same thing
    - Marketing strategies are designed to create a market and sales strategies are designed to exploit a market (sell products or services)
  - Facilitate offline relationships

Inform or Entertain the Audience

- Organisations aim to inform or entertain offer content to drive web site traffic based on the following concepts:
  - An Infomediary
  - E-marketplace
  - Business-to-consumer (B2C)
  - Business-to-business (B2B)
  - Consumer-to-consumer (C2C)
  - Consumer-to-business (C2B)

infomediary
Focuses on informing visitors and empowering them with aggregated information about products from different suppliers.

e-marketplace
A website that facilitates transactions by bringing together buyers and sellers from all over the world.

business to consumer (B2C)
E-commerce relationship in which businesses offer products for online sale to consumers.

business to business (B2B)
E-commerce relationship in which businesses can buy and sell products or services online to one another.

consumer to consumer (C2C)
E-commerce relationship in which individual consumers can buy and sell to one another over the Internet.

consumer to business (C2B)
E-commerce relationship in which individual consumers can sell products or services to businesses.
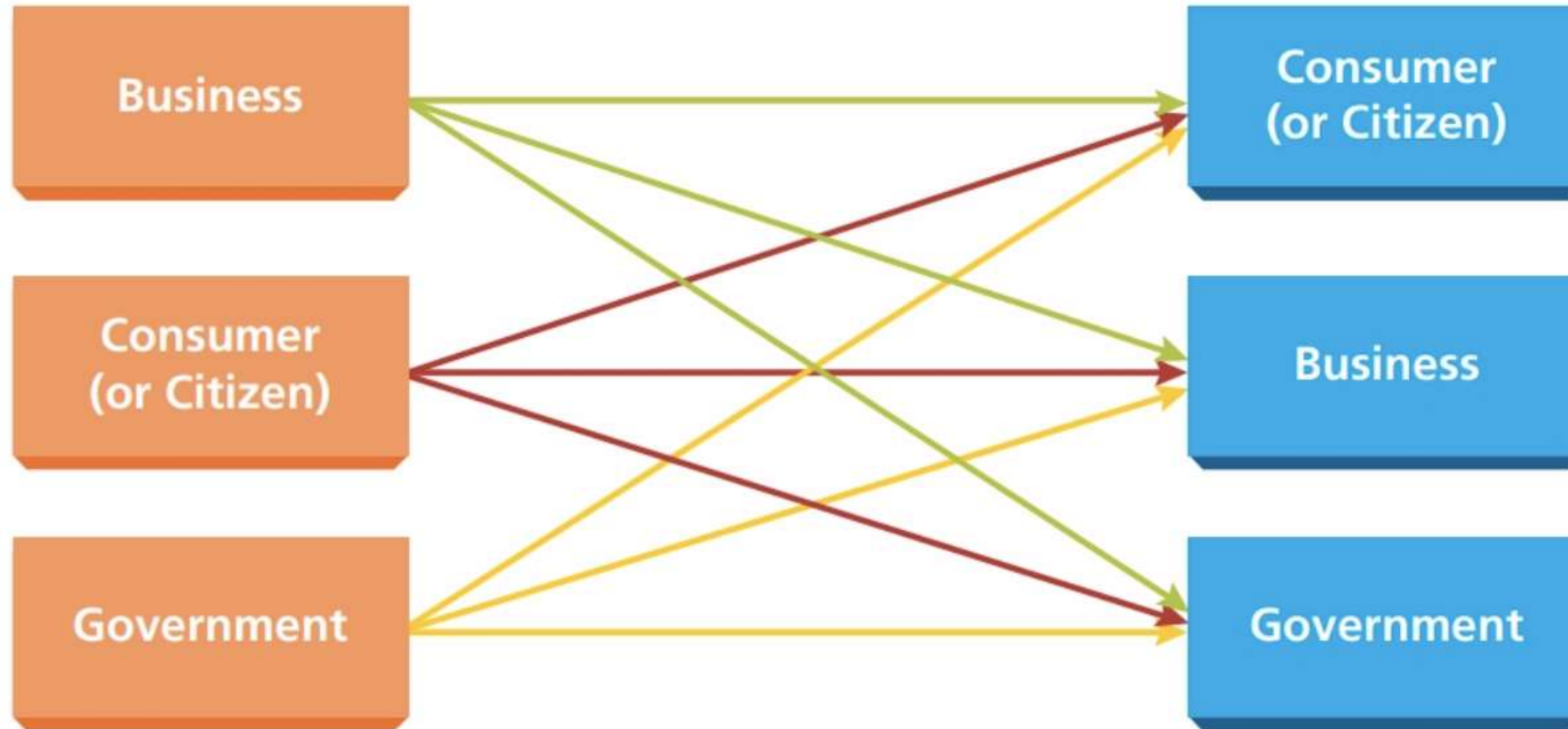
Types of E-Marketplace

FIGURE 6-1
Types of e-marketplaces.

Influence the Audience

- Product or service marketing
  - Not actually selling a product or service
  - The aim is to (for example):
    - Increase brand awareness
    - Promote a new class or type of product or service
    - Persuade the audience to adopt new technologies
- Non-profit organisations (charities) aim to:
  - Promote their organisation and disseminate information
  - Attract support and volunteers

Sell Products and Services

- The sale of products and services is a primary goal of a commercial organisation:
  - Sales may be direct on-line (or)
  - Click-and-collect using an on-line sale with the goods collected from a physical shop
- For non-profit organisations:
  - E-commerce is a vehicle for attracting donations
  - Selling products to raise funds

Facilitate Off-Line Relationships

- For organisations such as hotels / restaurants / shops / universities / etc the goal is to:
  - Create an off-line relationship with potential customers
- Academic institutions will:
  - Provide information for prospective students
  - Enable on-line applications
  - Provide an alumni portal
  - Provide college news
- The design of the web-site is vital in creating the correct image

Naming the website

Naming Web-Sites

- Website naming requires:
  - Uniform resource locator (URL)
  - Domain name system (DNS)
  - Hypertext transfer protocol (http://)
  - File transfer protocol (ftp://)
  - Top-level domain

FIGURE 6-2
Heritage Dogs web page.

uniform resource locator (URL)
The unique global address for a web page or other resource on the Internet.

Domain Name System (DNS)
The hierarchical naming system that maps a more memorable URL to the actual IP address.

hypertext transfer protocol (http://)
A URL component that specifies the resource is a web page containing code the browser can interpret and display.

file transfer protocol (ftp://)
A URL component that indicates the resource is a file to be transferred.

top-level domain
The last string of letters in a URL that indicates the type of organization or country code.

Internet Corporation for Assigned Names and Numbers (ICANN)
The nonprofit organization charged with overseeing the Internet's naming system, establishing policies, and resolving disputes.

Web-Site Address Components

Component	Examples	Description
Protocol identifier	http://microsoft.com (web page)	Identifies the protocol that will be used to connect to the address following the forward slashes.
Registered domain name	http://www.etrade.com http://www.umd.edu http://www.edu.cn	Maps to the unique IP address of the destination location.
Top-level domain	http://youtube.com http://www.whitehouse.gov http://www.army.mil http://redcross.org http://www.dw-world.de http://canada.gc.ca	The top-level domain typically indicatesthe type of organization or the country of origin, such as those below. New rules passed in 2011 clear the way for using brand names, cities, or general keywords as well. .com—commercial .edu—education .org—usually nonprofits .gov—U.S. federal government .ca—Canada .de—Germany .cn—China .tn—Tunisia
Filename (optional)	http://www.starhotel.com/ FAQ.htm	Specifies a particular web page within a site, in this case, one with the filename of FAQ.htm.
Port (optional)	http://www.baseball.com:95	Directs the connection to a specific port on the server. If absent, the default http port (80) is used.

FIGURE 6-3
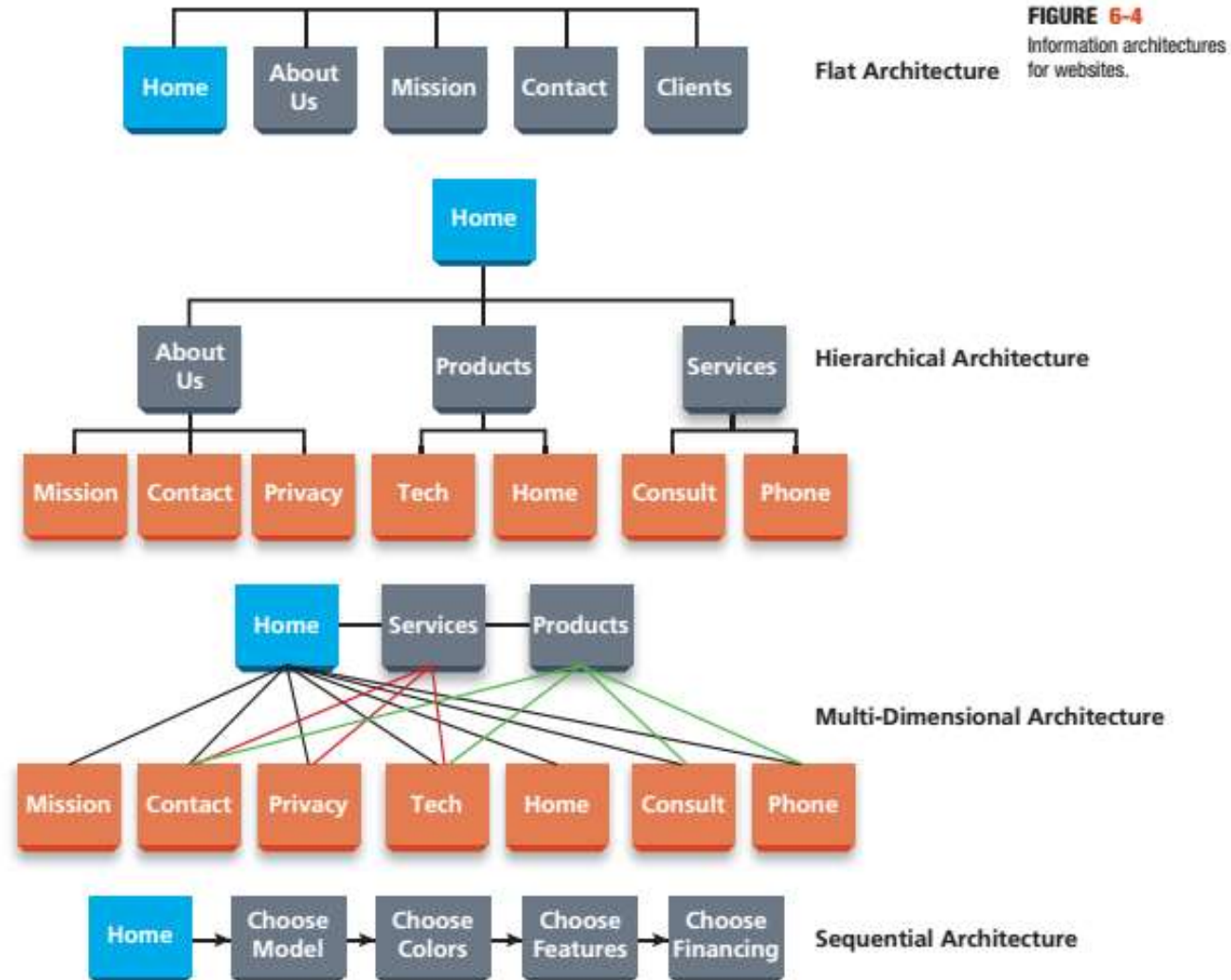Components of the web address, or uniform resource locator (URL).

Managing Domain Names

- The Inter*net Corporation for Assigned Names and Numbers* (ICANN):
  - Manages Internet domain names
  - Receives applications for new domain names
  - Assigns new domain names
- Legal disputes and extensions to the range of domain languages including disputes over domain names including *cyber-squatting* and *typo-squatting*:
  - *cyber-squatting*: where someone registers a domain name that is a company's trademark, hoping to resell it to the company at a profit
  - *typo-squatting*: where a domain name is registering a replica site with a misspelling in the trademark name that users might easily mistake for the real thing and enter personal information and passwords for the squatter's fraudulent use

Building the website

Website architecture and navigation

Introduction to Information Systems

Website Architecture

FIGURE 6-4
Information architectures for websites.

Flat Architecture

Hierarchical Architecture

Multi-Dimensional Architecture

Sequential Architecture

Usability and user interface design

Web-Site Interface Design

- Website design must consider:
  - Usability
  - Accessibility as users may be:
    - Visually impaired
    - Have hearing issues
    - Be color blind
    - Have physical disabilities
  - Web-sites may incorporate assistive technologies:
    - Such technologies are generally a feature of operating systems

usability
Refers to the ease with which a person can accomplish a goal using some tool, such as a website, a mobile phone, or a kiosk.

web accessibility
Refers to how easily people with disabilities can access and use web resources.

assistive technologies
Devices and software that help people with disabilities, such as screen readers for the visually impaired.

Web-Site Interface Design

FIGURE 6-5

Elements of website usability.

Element	Sample Metrics
Ease of learning	To what extent can a user accomplish simple tasks on the first visit?
Efficiency	After learning the site's basic design, how quickly and efficiently can a user perform tasks?
Memorability	When a user returns to the site after a period of time, how much effort does it take to regain the same level of proficiency?
Error rates	How many mistakes do users make when they attempt to accomplish a task, and how easy is it to recover from those mistakes?
Satisfaction level	How do users rate their experiences on the site? Do they describe it as pleasant and satisfying, or frustrating?

FIGURE 6-6

Designers use color to manage the visitor's attention on a web page.

Web-Site Interface Design

FIGURE   6-7

Tips for effective user interface design.

- ▶ Keep it structured. Use a clear and consistent design that is easy for users to recognize throughout the site.

- ▶ Keep it simple. Make the common tasks very simple to do, so users can accomplish them on the first try without frustration.

- ▶ Keep users informed. Let users know in clear language when something on the website changes, or the user has completed an action.

- ▶ Be forgiving of errors. Let users easily undo their actions or return to previous states.

- ▶ Avoid distractions. Especially when the user is engaged in a sequential task, avoid adding unnecessary links or options.

click-through rate (CTR)
A metric used to assess the impact of an online ad; computed as the number of visitors who click on the ad divided by the number of impressions.

cookie
A small text file left on a website visitor's hard drive that is used to personalize the site for the visitor, or track web activities.

third-party cookies
Small text files that a website leaves on a visitor's computer that are not deposited by the site being visited; used by ad networks to track customer behavior across all their client websites.
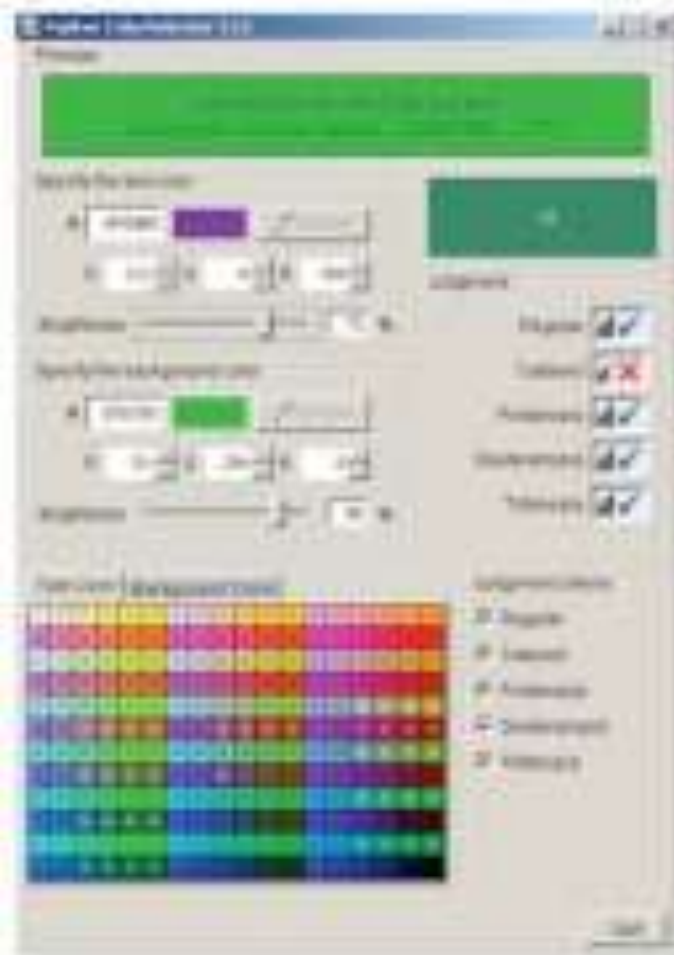
Web-Site Interface Design

FIGURE 6-8

Can you see a number in each of the circles? People with some forms of color blindness have difficulty with certain color combinations, and web designers must avoid those combinations to ensure accessibility.
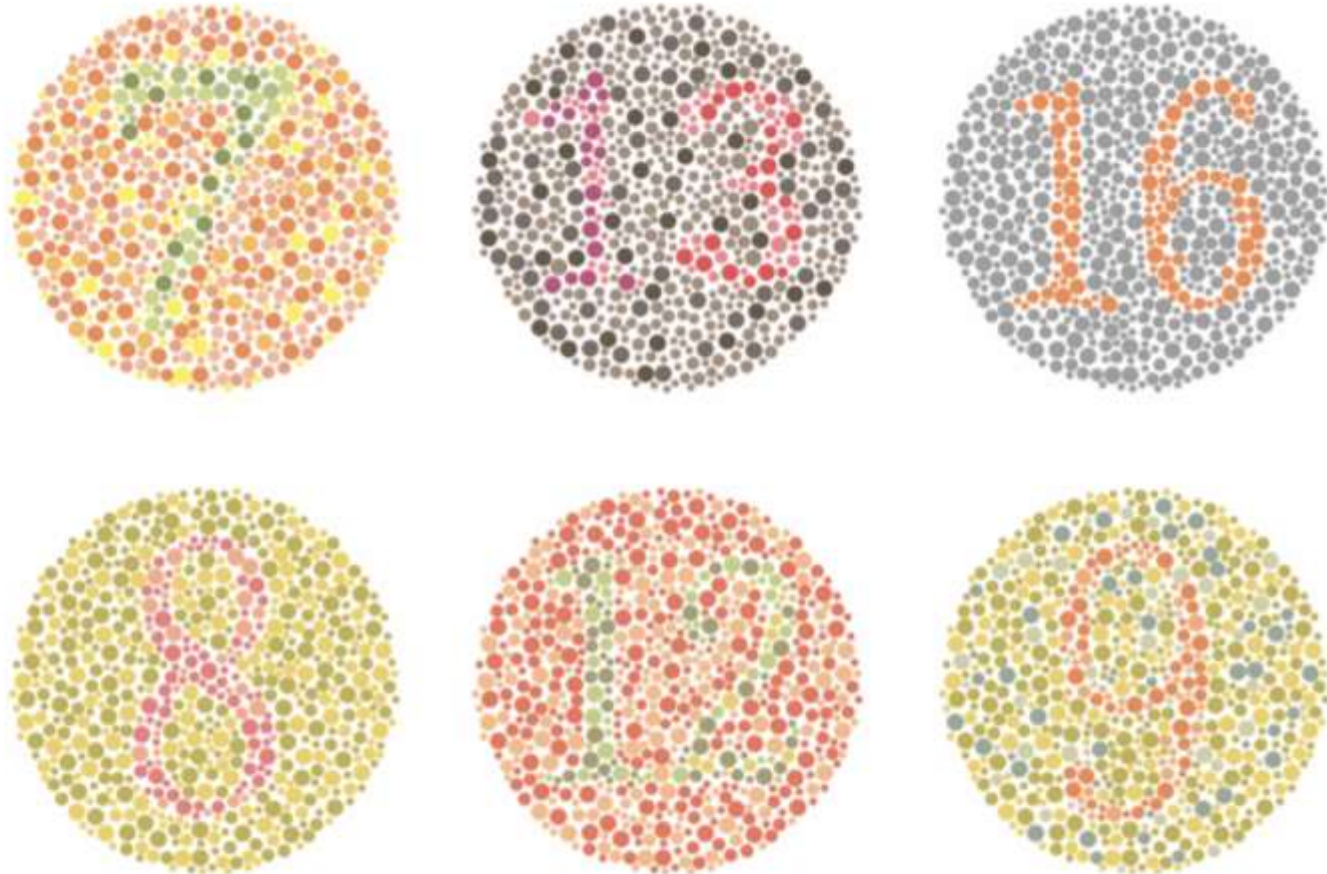
Source: Eveleen/Shutterstock

Web-Site Interface Design
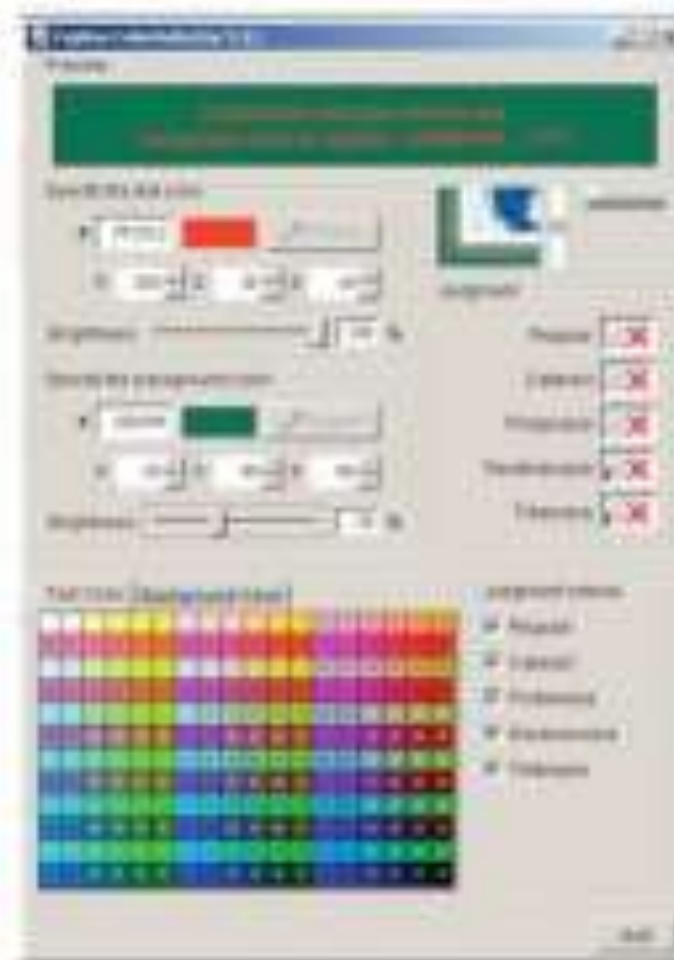

Source: http://www.fujitsu.com.

FIGURE 6-8

Software tools can help designers audit website accessibility. Fujitsu's free software alerts developers when their color combinations for background and text may be unreadable for people with cataracts or one of several types of color blindness.

Web-Site Interface Design

Source: Origin Instruments Corporation
www.orin.com.

Source: Origin Instruments Corporation.

FIGURE 6-9

Wireless sensor mounted on the laptop picks up tiny head movements from the small blue tracking dot on the boy's forehead and converts the motion to mouse movements. The HeadMouse® Extreme from Origin Instruments is designed for people with limited use of the hands.

Web-Site Interface Design

FIGURE 6-10

Design tips for improving website accessibility.

Do:
- Add alternative text tags for every image, so visually impaired people know what the image is.
- Use self-explanatory links.
- Use "More on cosmetic dentristy" rather than "click here for more."
- Make bold headings, short paragraphs, and orderly paragraph arrangements, so screen readers follow the flow correctly.
- Create text-only alternative versions for devices such as tablets or mobile phones.

Don't:
- Use fixed text sizes, which may make it impossible for visually impaired people to use the site.
- Create very tiny clickable areas, which hinder those with limited mobility or motor function.
- Implement forms that require a mouse click, which prevents keyboard-only users from typing in their information.
- Use overly complicated designs with no simple alternative for browsing on a tablet or mobile phone.

FIGURE 6-11

Major web browsers.

Web Browser	Market Share	Description
Microsoft Internet Explorer	45%	Microsoft initially bundled its browser with the operating system to gain an early lead in the "browser wars."
Google Chrome	24%	Google's web browser, developed using the open-source model; rapidly gained market share in recent years.
Mozilla Firefox	19%	Developed in the open-source model, Firefox has a loyal following with its many useful add-ons, such as one that blocks all advertising.
Apple Safari	10%	Dominant browser for Apple computers, laptops, and mobile devices.
Other	2%	Opera, Gecko, and others

Web-Site Accessibility and the Ethical Factor

THE ETHICAL FACTOR — Website Accessibility: Why Is Progress So Slow?

Why are organizations so slow to make their websites and mobile apps accessible to people with disabilities? One reason is that the legal obligations are somewhat uncertain, and the technology keeps changing. Companies are reluctant to invest in massive upgrades when they might still be sued for noncompliance.[10]

Some web developers are concerned that there is a conflict between usability and accessibility and that an accessible website will have to bypass many of the rich features and graphical elements that make them pleasing and attention-getting.

Although the challenge of creating accessible websites is not trivial, organizations can make tremendous progress by building in accessibility from the start. A common obstacle for visually impaired people, for instance, is a button that can only be accessed with the mouse. One university's new virtual student union had that flaw on its "Let's get started!" button, so blind students couldn't ever get started.[11] But it is just as easy to program the button to also respond to a key press if the designers keep that feature in mind.

Though many organizations see efforts to improve accessibility for people with disabilities as additional costs, others are learning that accessibility adds strategic benefits in the form of heightened corporate social responsibility and Internet visibility. Making the site more accessible from the beginning also broadens the potential base of customers and thus makes good business sense.

Software development strategies for the web

Web-Site Interface Design

- Hypertext markup language (HTML 5.2)
- CSS
- JavaScript
- PHP
- Ajax
- Related scripting languages
- Plus: Adobe flash (now deprecated)

HTML code

River Hair Salon
--Where beauty is our vision--
Directions

River Hair Salon
—Where beauty is our vision—
Directions

Formatted on the web page

Web-Site Interface Design

AJAX

A mix of technologies that builds on JavaScript and draws on live data to create interactive online displays.

World Wide Web Consortium (W3C)

An international body that establishes and publishes standards for programming languages used to create software for the web.

content management system

Software used to manage digital content in collaborative environments. The web content management system supports teams that develop and maintain websites.

cascading style sheets (CSS)

The part of a website template that controls the fonts, colors, and styles that appear when an editor identifies some text as a page heading, a paragraph title, or some other style.

e-commerce

The buying and selling of goods and services over the Internet or other networks, encompassing financial transactions between businesses, consumers, governments, or nonprofits.

shopping cart software

Computer software that tracks purchases as customers navigate an e-commerce site and click "add to cart" as they go. The software tallies the purchase, calculates taxes based on the customer's location, computes shipping costs, and also posts a discount if the customer enters a valid promotional code.

Web-Site Interface Design

FIGURE 6-13

Interactive map showing population by congressional district using AJAX.

E-Commerce

On-line Commerce

- On-line commerce benefits both companies and their customers (including potential customers searching the Internet)
- The important considerations and functions are:
  - *Online transactions*
  - *E-commerce software*
  - *Security*
  - *Trust*
- These features of web systems and services have been introduced in Info 151:
  - The following slides present a summary of e-commerce

Mobile devices and M-commerce

- Mobile systems are arguably the future
- Website designers must address the *mobile applications* vs *mobile websites* including financial considerations and *NFC*
- The designer must apply mobile friendly design principles (see Figure 6.15)

Choosing between Building Apps and Creating a Mobile Friendly Website

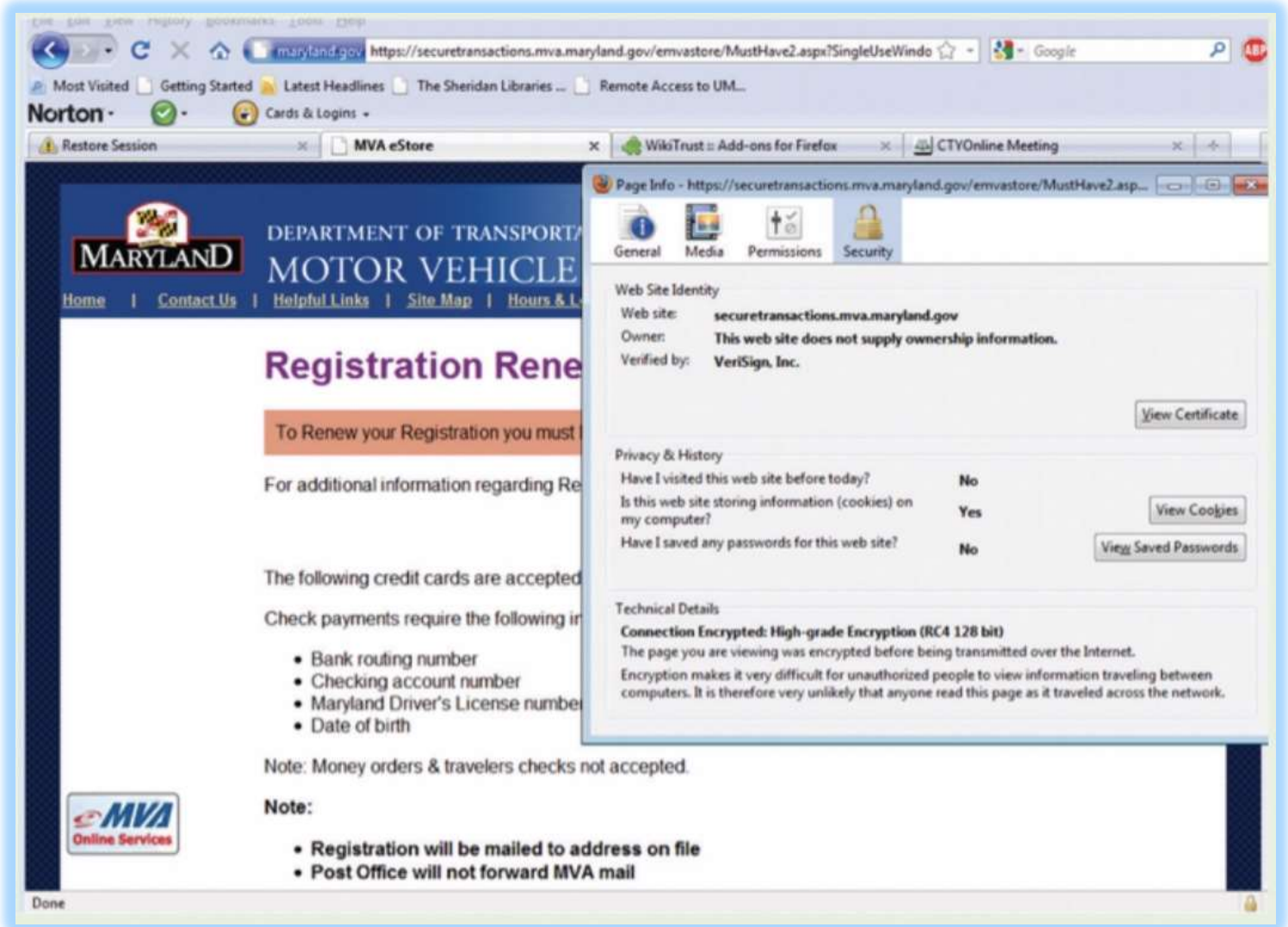| App	Mobile Friendly Website
▶ Higher cost	▶ Lower cost
▶ Best for interactive games	▶ Customers don't need to download anything
▶ Customers will use the app regularly and personalize it	▶ Mobile website is accessible across many different devices
▶ The app will perform complex calculations	▶ Customers can find your website with search engines
▶ Customers will want to use the app without an Internet connection.	▶ Easier to update
▶ Easier to delete	▶ Can't be deleted

FIGURE 6-15
Mobile apps vs. mobile-friendly websites.

Content Management Systems

- Organizations need ways to create and manage web-sites
- While web-sites are built using HTML
  - Web-sites are built in the 'real-world' using web-site creation software
- Content management systems include:
  - Software
  - Templates
  - HTML with cascading style sheets, JavaScript, PHP, ASP, etc.
- Web-sites will be delivered using web systems and services

Content Management Systems

- The secure connection confirmed by the https:// protocol relies on a certificate issued by a recognized authority such as the VeriSign Trust Network

- With most browsers, you can click on the padlock symbol to see encryption details

- Details about the website's security, Note also the "https://" protocol in the URL, indicating transmission is encrypted. (Figure 6-14)

Mobile Friendly Design

FIGURE 6-16
Mobile-friendly design for Cruisin'
Fusion Food Truck.

- Recall we introduced dynamic website design and creation in Info 151 where different screen resolutions were discussed:
  - Designers must focus on the important links and information and display it with fonts large enough to read without zooming (while avoiding scrolling)
  - Fusion buttons or links should be large enough for 'clumsy thumbs'
  - The design should be a slimmer, leaner version of the organization's main website (so that users recognize the brand)
- Figure 6-16 shows how *Cruisin' Fusion* (the food truck company featured in this chapter's online decision-making simulation) might slim down a website to make it mobile friendly
- Figure 6-17 shows suggestions for mobile-friendly design

Mobile Friendly Design

- Website designers must consider the following considerations (see Figure 6.17):
    - Display the most important content first
    - Avoid popups, flash animations, and large photos (images)
    - Use branding consistent with the main site
    - Use a single column design format
    - Use font large enough so that users need not zoom in
    - Make links and buttons large enough so that users can click them with fingertips
    - Ask users to test out your design on different mobile devices
    - Avoid using Adobe flash (now deprecated and is a security risk)

Mobile Apps and User Friendly Design

► Display the most important content first.
► Avoid popups, Flash animations, and large photos.
► Use branding consistent with the main site.
► Use a single column design.
► Use fonts large enough so that users need not zoom in.
► Make links and buttons large enough so that users can click them with fingertips.
► Ask users to test out your design on different mobile devices.

FIGURE 6-17
Tips for mobile-friendly design.

Mobile Apps and User Friendly Design

setter

collie

wolfhound pet

akita

ridgeback

country

retriever

breed dog

puppy heritage spaniel
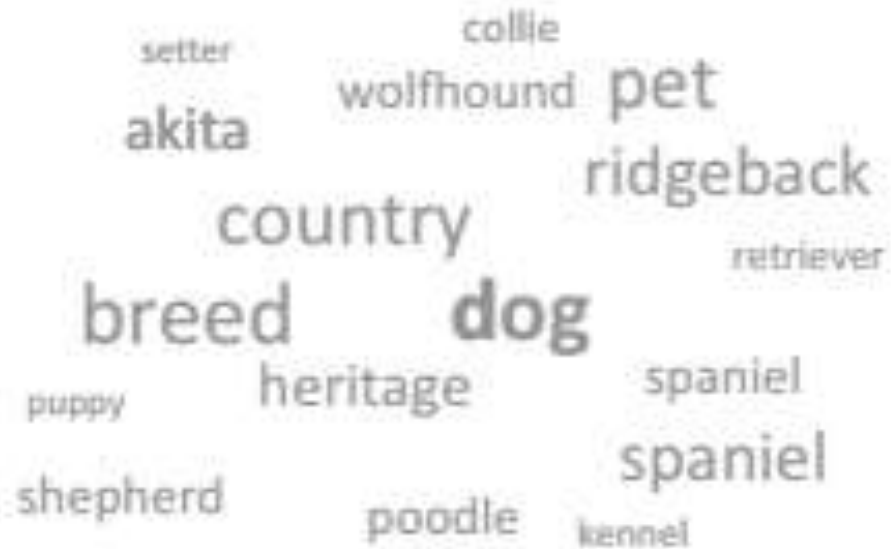
spaniel

shepherd

poodle kennel

FIGURE 6-18

Sample tag cloud for country dog breeds.

PRODUCTIVITY TIP

You can adjust the settings in your browser to control how it handles cookies as you browse—to prohibit third-party cookies or prompt you for permission to download them, for example. Try overriding automatic cookie handling to see how your favorite sites are using cookies.

mobile commerce (m-commerce)
The use of wireless, mobile devices to conduct e-commerce.

near field communication (NFC)
A set of standards that supports communication between mobile devices when the two are very near one another.

search engine optimization (SEO)
An Internet marketing strategy used to increase the quantity and quality of traffic from search engines, often by improving the site's position in result lists.

tag cloud
A visual depiction of keywords related to the search, with font size and position indicating relevance.

payment gateway
An e-commerce application that facilitates online shopping by mediating the interconnections to the merchant's bank, the bank or other entity that issued the card, and then back to the original website to approve or decline the purchase.

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Marketing the website

Introduction to Information Systems

Web-Site Search Results

- In the field of information retrieval search engine results are generally measured using three terms *precision*, *recall*, and *f-measure*:

- *Precision*
  - Is the fraction of retrieved documents that are relevant to the search query
  - High accuracy with lower number of search results

- *Recall*
  - Is the fraction of the relevant documents that are successfully retrieved
  - High number of search results but lower accuracy

- *F-measure*
  - Is a measure that combines precision and recall is the *harmonic mean* of precision and recall, the traditional F-measure or balanced F-score

Precision and Recall
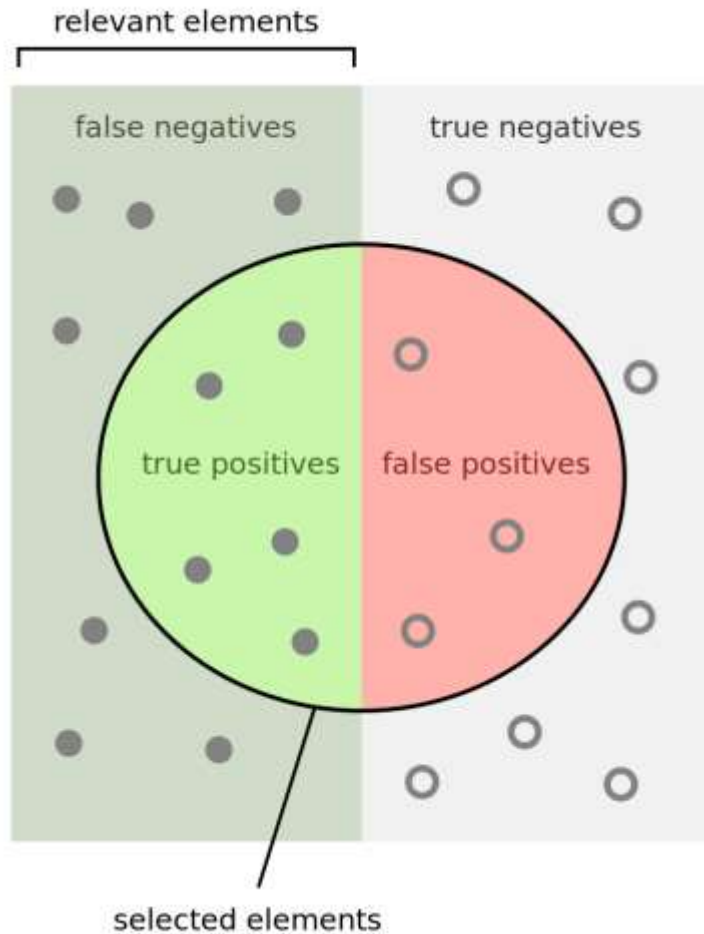
Introduction to Information Systems

Disseminating the Web-Site

- Search engine optimization
    - Google / Bing / Baidu
    - Algorithms
    - Indexing and 'spiders' (software that 'crawls' the available web sites meta data)
- Search terms and keywords
    - In HTML in the document object model the head element and the metadata is used as index terms and keywords
    - Ignores natural language
- Page ranking
    - Search engine scams

Page Ranking and Relevance

- The Google page rank system is based on:
  - Links
  - Popularity
  - Weighting based on votes
- Improving the page rank of a web-site
  - There are companies whose only purpose is to improve the page rank of a web-site
  - Web marketeers will mount link-building campaigns to improve the page rank of a web-site

Web Advertising

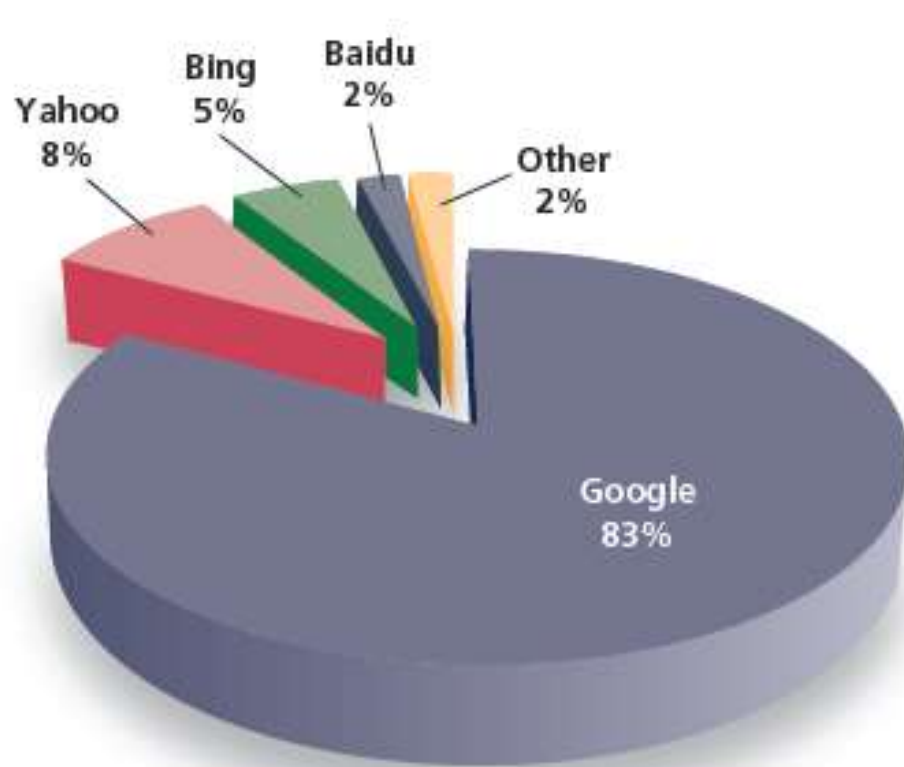- Search engines may prioritize search results from advertisers
- Web advertising employs a number of strategies:
  - The Click-through-rate
  - Target advertising
  - YouTube (Google) advertisements
  - Promotions by celebrities (YouTubers)
  - Facebook targeted advertisements
- Monetisation of web-sites
  - Generally based on advertising revenue
  - May also use ad-free by paying a subscription

Web Advertising

- Search Portals

- On-line marketing

  - Potential benefits

  - Potential issues and challenges

- Cookies

  - Controversial from a privacy perspective

  - Also used by Adobe flash (now deprecated)

  - Tracks user interactions

  - For many we-sites essential

Web Advertising
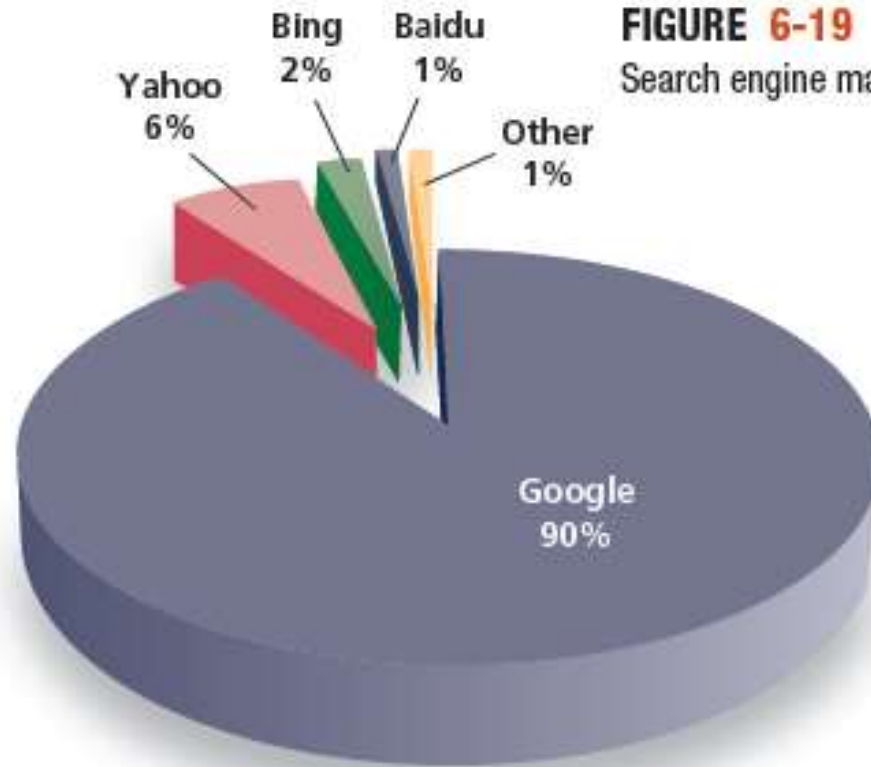
FIGURE 6-19
Search engine market shares.

Desktop computers:
- Yahoo 8%
- Bing 5%
- Baidu 2%
- Other 2%
- Google 83%

Mobile devices:
- Yahoo 6%
- Bing 2%
- Baidu 1%
- Other 1%
- Google 90%

Web 2.0 and beyond

Web 2.0

- Enables user interaction with web-sites

- Expanding data and sensory input: the 'Internet-of-things'

  - The range of data and data sources is greatly increased

  - Has been termed: 'Web 3.0' (a term that is often disputed)

- The learning web:

  - The range of available interactions has been used in pedagogic (teaching and learning) systems

  - Such systems include distance learning available *anytime* and *anywhere*

  - Pedagogic systems include virtual reality portals

  - Moodle is an example of a Web 2.0

Web 2.0 and the Learning Web

FIGURE 6-21
For China's urban residents, GPS geography analysts add map details relevant to pedestrians or bicyclists who want the quickest routes through crowded streets.

Crowdsourcing and Collective Intelligence

- Crowdsourcing:
  - An on-line method of fundraising
  - Many diffuse groups volunteer contributions
  - Delegates tasks to a large number of diffuse groups or communities who can volunteer their contributions
- Collective intelligence - examples
  - Google
  - Amazon
  - Git-Hub
  - Wikipedia is an example of collective intelligence
  - Linux user groups and forums

Chapter #6 summary, case studies, and coursework

Chapter #6 Reading and Coursework

- Read and understand subjects and concepts introduced in Chapter #6
- Learn the meanings of the *key terms and concepts* introduced
- Read and work through:
  - The *Cruisin' Fusion* on-line simulation (see also Figure 2.16)
  - The (two) *case studies*
  - The (two) *e-projects* (located on page 226 at the end of Chapter #6)
- At the end of the chapter you will find:
  - Chapter review questions
  - Projects and discussion questions
  - Application exercises
  - Work through these to understand the subjects and concepts in Chapter #6

Cruisin' Fusion

A Role-Playing Simulation on Website Development for a Chain of Concession Stands

You inherited a mobile concession truck from your uncle, who sold tacos and bottled drinks at lunchtime. Uncle Al liked talking to people and his stand had become a local legend. He served only top of the line mahi mahi, chicken, and cheese tacos in freshly baked shells. He also grew his own herbs to make "fusion" sauces that blended flavors from Mexico, Thailand, Korea, and India. His curried chicken taco was a favorite and long lines formed every day.

You're not sure what to do with the concession truck, but a couple of your friends think Al was onto something with his unusual taco food truck. They want to partner with you to expand, targeting sports events, outdoor concerts, political rallies, holiday marches, and other events where customers might pay a little more for a very distinctive and healthier meal. With the right marketing, this could be a promising business venture. Log in when you're ready to start planning the website....

LEARNING OBJECTIVES

1 The Internet is a disruptive technology that causes waves of creative destruction, and an organization's web strategy is increasingly critical to its success. Four major goals that organizations choose to stress for their websites are (1) inform or entertain the audience; (2) influence the audience; (3) sell to the audience; and (4) facilitate or extend offline relationships. The website's name in the form of its URL uniquely identifies the site on the Internet, mapping to its numerical IP address. The URL's components include the top-level domain, such as .com, .gov, .org, .cn, or .de, which reflects the organization's mission or country code. Name disputes are common and are resolved by ICANN.

2 Building a website requires paying attention to the site's information architecture, which might adopt a hierarchical, multidimensional, flat, or sequential structure. Usability should be assessed early, and the user interface should follow design principles that will make it easier for visitors to accomplish their goals on the site. The website should also support accessibility for people with disabilities. Software development for websites starts with HTML, the programming language used to format web pages. HTML 5 is the latest version that reduces problems for web developers, reduces the need for browser plug-ins like Flash, and adds new features, especially for mobile devices. Media-rich and interactive websites are created with other programming tools, such as JavaScript, AJAX, Flash, and programming languages that interface with back-end databases. Web content management systems enable teams to work together on a website, offering simple ways to format content and providing support for version control and other features.

3 E-commerce is the buying and selling of goods and services on the Internet. E-commerce software, including shopping carts, can support secure and encrypted transmissions, manage product catalogs, and track transactions. Trust is a critical element in e-commerce, and independent organizations audit websites, granting a seal of approval to those that meet minimums standards. Social commerce (s-commerce) also helps tap trust by engaging friendship networks in shared shopping experiences.

4 Use of mobile devices, such as smartphones and tablets, is growing extremely rapidly, and they offer small size and light weight, mobility with wireless connectivity, and versatility. Their features require web developers to design mobile-friendly websites and specialized applications. Mobile commerce (m-commerce) takes advantage of these mobile devices to conduct e-commerce on the go. Mobile devices can serve as digital "wallets" to make mobile payments using technologies such as near field communications, eliminating the need to carry cash or credit cards.

5 Marketing strategies on the web start with search engine optimization (SEO), which seeks to improve a website's position on result lists returned by search engines. Organizations choose appropriate keywords and encourage links from external sites to achieve higher rankings in the search results. Web advertisers also use pop-up ads, banners, floating ads, and other techniques. Ad networks use third-party cookies to track user behavior across multiple websites, gathering data used to improve targeting. Search engine marketing, in which relevant text ads are served alongside results for the user's query, are most effective. Online marketing raises ethical issues, especially because tools such as third-party cookies can threaten privacy.

6 Web 2.0 represents the current generation of web capabilities, which rely particularly on crowdsourcing and collective intelligence, expanded data sources, and input from sensors. As the web continues to evolve, the massive amount of data contributed by individuals, companies, governments, and the "Internet of things" is greatly enhancing its power and potential, opening new opportunities for innovation. The growing sources of "big data" also support machine learning, so the web can continue to grow smarter.

KEY TERMS AND CONCEPTS

infomediary
e-marketplace
business to consumer (B2C)
business to business (B2B)
consumer to consumer (C2C)
consumer to business (C2B)
uniform resource locator (URL)
Domain Name System (DNS)
hypertext transfer protocol (http://)
file transfer protocol (ftp://)

top-level domain
Internet Corporation for Assigned Names and Numbers (ICANN)
hierarchical website architecture
multidimensional website architecture
sequential website architecture
usability
web accessibility
assistive technologies

web browser
hypertext markup language (HTML)
JavaScript
AJAX
World Wide Web Consortium (W3C)
content management system
cascading style sheets (CSS)
e-commerce
shopping cart software
payment gateway

mobile commerce (m-commerce)
near field communications (NFC)
search engine optimization (SEO)
tag cloud
click-through rate (CTR)
cookie
third-party cookies
crowdsourcing

CHAPTER REVIEW QUESTIONS

6-1. What are the four goals an organization might choose as it develops its web strategy? Categorize the websites of Amazon, YouTube, Facebook, and WWF based on the primary goals of the organizations.

6-2. How is a URL related to a registered website name? Why does a URL include a protocol identifier? What are the components of a website address? What are typical suffixes that identify top-level domains?

6-3. What kinds of information structure can be used to organize a site's information?

6-4. What is the difference between usability and accessibility? How do website developers test for usability? How can website design improve accessibility? How do text and background color combinations relate to website accessibility? What are the benefits of designing accessible websites?

6-5. List some software development strategies used for websites. What is an advantage to using basic HTML? How does HTML 5 reduce problems for web developers? What is an advantage to using JavaScript? Why is AJAX used to develop websites? What role does a content

management system play in website development? Why do content management systems use templates?

6-6. What is e-commerce? What activities does it include? How do online transaction sites use databases and shopping cart software? Why is security critical for e-commerce success? Which protocol supports secure Internet transactions? Why is trust critical for e-commerce success? Aside from having a well-known brand name, how do online sellers signal their trustworthiness to potential customers?

6-7. What is m-commerce? What is near-field communication and how does it facilitate mobile payments?

6-8. What is search engine optimization (SEO)? What are two examples? How do organizations improve their position on search result lists?

6-9. How are cookies used to target advertisements to individuals? What privacy concerns can they create?

6-10. What is Web 2.0? What is crowdsourcing? What is an example of crowdsourcing? How do Web 2.0 capabilities change the way in which people and organizations use the web?

PROJECTS AND DISCUSSION QUESTIONS

6-11. VeriSign is a recognized authority on website security, and the VeriSign seal tells online customers they can trust the website to encrypt sensitive data that is transmitted over the Internet. Visit verisign.com to learn more about the VeriSign Trust Seal. In addition to verifying encryption, what else does this seal tell consumers about the websites on which it appears? What is SSL security? How does it work? Prepare a brief report of your findings.

6-12. Pop-ups, such as windows that open to provide a return shipping label, and web browser add-ons, like

the Google toolbar, can make browsing more fun or more effective, but sometimes they can slow down your computer or cause the browser to shut down unexpectedly. Most add-ons require user consent before they are downloaded, but some might be downloaded without your knowledge and some may be tracking your browsing habits. How do you know which add-ons are running on your computer? Click on Tools to learn about your browser's settings. How do you allow some pop-ups and disallow others? Review your add-ons. Which ones are allowed on your browser? What

6-19. EXCEL APPLICATION:
Heritage Dogs Website Metrics

The board of directors at Heritage Dogs is meeting to consider how its website is serving the needs of volunteers, donors, and potential adoptive pet owners. The website coordinator has asked you to create an Excel spreadsheet to help her analyze quarterly data for several key indicators including percentage of repeat visitors, page views per visit, and bounce rate. The bounce rate is the percentage of visitors who view only one page. Together, these are a measure of website "stickiness"—the ability to keep visitors interested and coming back for more. Additionally, she wants two line charts that display website usage statistics.

Create the spreadsheet shown in Figure 6-21 and add calculations for Total Visitors, Percentage Repeat Visitors, Page Views per Visit, and Bounce Rate. To calculate Bounce Rate, divide Page Views by Single Page Views.

Create one line chart that shows Visits, Total Visitors, and Page Views. Create a second line chart that shows the Bounce Rate and the Percentage Repeat Customers. For both charts, select a layout that includes a chart title, axis title, and a legend.

How would you describe the pattern of website usage in terms of visits, total visitors, and page views? How would you describe the website in terms of "stickiness"?

6-20. ACCESS APPLICATION:
Springfield Animal Shelter

The Springfield Animal Shelter manages a volunteer foster program in which volunteers care for sick and immature animals in their homes and take in injured or abused animals when the shelter facility is full. Animals may be in foster care for a few weeks or a few months, depending on the need. When the animal is healthy and ready to be adopted, the shelter will post its picture and story on the website. Foster parents are given first choice to adopt the animal but are not required to do so. Volunteers enroll in the program on the shelter website, and the information they provide is stored in an Access database. Download the Springfield Animal Shelter database Ch06Ex03 and create three detail reports for the shelter manager. A detail report displays all information for each volunteer.

The first report will list all active volunteers who specified they wish to care for a cat. The second report will list all active volunteers who wish to care for a dog. The third report will list all inactive volunteers regardless of animal preference. Review the information being collected about volunteers and suggest other types of information that may be useful to the shelter manager.

FIGURE 6-21

Heritage Dogs website metrics.

	A	B	C	D	E	F	G	H	I
1					Heritage Dogs				
2					Website Metrics				
3									
4		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
5	Visits	128	143	275	290	365	468	605	681
6	First Time Visitors	82	98	162	172	218	304	436	439
7	Repeat Visitors	12	24	48	28	58	56	98	110
8	Page Views	210	200	480	520	569	780	1004	1265
9	Single Page Views	65	55	125	154	160	250	305	425

CASE STUDY #1

Mobile Payments and the Digital Wallet

In a country where cash is king and almost everyone owns a cell phone, Japan's NTT Docomo led a major drive into mobile payments and m-commerce. The mobile phone carrier pioneered the use of "near-field communications" (NFC) chips inside its cell phones, enabling them to exchange data wirelessly over a few centimeters. More than 56 million people subscribe to Docomo's wireless voice network, and they can all pay for their cappuccinos at participating stores by tapping their cell phone against a special terminal or just waving it nearby.

When a customer taps the cell phone to pay, the expense is automatically logged into a digital expense report and charged to the customer's account. Called osaifu keitai in Japanese, the cell-phone wallet frees people from carrying cash. Consumers use their cell-phone wallets to buy subway, train, and airline tickets, and the phone's chip also serves as an electronic key to control access to buildings and homes. Cell-phone wallet holders can check their balances, loyalty points, and purchasing history from the handset and receive promotional discounts.

In the United States, mobile payments have been slow to take off, partly because credit cards are so popular and also trusted. The credit card industry builds in essential safeguards against fraud, and also offers incentives such as cash advances, frequent flyer miles, or reward points. Switching to mobile payments would be a major change in customer behavior.

Many mobile payment trials are underway, however, involving NFC chips, barcodes, QR Codes, or other strategies. For example, Dunkin' Donuts customers can use their Apple Passbook mobile wallet to purchase coffee by letting an employee scan the pass on their phone, which is actually a QR Code.

While Apple may become a major player in the mobile payment industry, the company has had some slip-ups that make customers wary. While waiting for his tech support appointment at a New York Apple store, one customer decided to purchase some headphones. He used the Apple app to scan the barcode, and charged the purchase to his iTunes account. Later, when he started to leave with his headphones in a bag, an employee asked to see a receipt. He located the app on his smartphone, but then found the transaction had not completed. Instead of letting him click the last button to confirm, the clerk called the police and the customer was arrested for shoplifting.

In Japan, NTT Docomo had to take over a bank to build its osaifu keitai services, so it would have the financial backbone to actually handle electronic payments. In the United States, though, the credit card companies or other well-established payment services, such as Paypal, are likely to be major players or partners.

Mastercard, for example, unveiled its own version of a digital wallet in 2013, called PayPass. The technology uses an NFC chip in a card, key fob, or smartphone, and users can use the mobile payment feature at participating retailers.

Consumers will need more incentives to try out any of these new services, and they must develop the kind of trust they already have in credit cards, debit cards, checks, and cash. Convenience is one incentive, but creative retailers can tap other features that tie mobile phones to purchasing. Teen clothing chain Aeropostale, for instance, offered an app that let customers choose what music the store would play. The teens hung around the store for 30 minutes or more to hear their selection. The long wait offered plenty of time to shop, and the company learned a great deal about their customers' music preferences.

As mobile payment experiments play out, and technologies like NFC become more widespread, those lines at checkout counters may get shorter and shorter. Leather wallets stuffed with credit cards, loyalty cards, photos, and cash may become extinct.

Discussion Questions

6-21. What are the potential benefits of this technology for consumers? What are the potential benefits for retailers?

6-22. What are the risks for consumers and retailers? What are some ways that these risks could be overcome?

6-23. How could this technology impact the telecommunications and consumer banking industries?

6-24. Will the use of this technology be as widespread in other countries as well? Why or why not?

SOURCES: Analysis: How has m-commerce evolved? (December 21, 2012), *Retail Week*, http://search.proquest.com/docview/1242202472?accountid=11752, accessed June 10, 2013. Chaley, C. (March 20, 2013). Partnerships provide the muscle in the mobile payments war. *Fast Company*, http://www.fastcompany.com/3007281/industries-watch/partnerships-provide-muscle-mobile-payments-war, accessed March 24, 2013.

NTT Docomo, Inc. Hoover's Company Records. (March 25, 2013). LexisNexis Academic, http://www.lexisnexis.com.proxy3.library.jhu.edu/hottopics/lnacademic/, accessed July 8, 2013. Siwicki, B. (March 11, 2013). Dunkin' Donuts customers can now pay through Apple's passbook. Internet Retailer, http://www.internetretailer.com/2013/03/11/dunkin-donuts-customers-now-can-pay-through-apples-passbook, accessed April 3, 2013.

CASE STUDY #2

Pandora Internet Radio: The Net Threatens the Music Business (Again)

Music CD sales collapsed when Napster began its online music site, where visitors could find the song they wanted and download it for free. Though Napster ran afoul of copyright law and was shut down, the demand for single-song downloads was so intense that Apple's iTunes store became an instant hit. Reluctantly, record labels such as Sony and Warner made royalty deals with iTunes, Amazon, Rhapsody, and even Walmart.

Now, the music industry's business model is under assault once again. Song download sales are shrinking, and analysts predict that streaming Internet radio services such as Pandora will take a chunk out of the market.

Billed as the station that "plays only music you like," Pandora.com offers music lovers access to their own customized "radio stations." Pandora's website visitors can submit a favorite song, artist, or composer, and Pandora's software builds a playlist of similar songs. The company focuses on effortless usability for its websites, and mobile-friendly designs for its apps.

The software that powers the playlist emerged from the Music Genome Project, launched by Pandora founder Tim Westergren. He and a team of musicians and musicologists analyze 10,000 songs a month for hundreds of attributes—harmony, rhythm, lyrics, instrumentation, vocals, genre, and others. The result of their efforts is an immense and continuously growing database that powers a recommendation engine to suggest music with similar attributes—the same musical "DNA."

A visitor who asks to hear Glenn Miller's music of the 1940s will be offered old favorites such as "Heart and Soul" or "Smoke Gets in Your Eyes." An Usher fan's playlist will fill with songs by artists such as Chris Brown and T-Pain. The musicologists don't count popularity as an attribute, so unknown bands appear regularly, giving them a welcome opportunity for exposure. Though artists earn a royalty from Pandora each time their song plays, the service is far less profitable for them than paid song downloads. A song must be streamed at least 200 times to earn the same royalty as one download.

As users rate each song in the playlist with a thumbs up or down, the company collects "big data" about over 175 million users and their musical preferences. Even skipped songs provide useful information. The company uses Hadoop to analyze the data, the open source database software that processes immense datasets that span hundreds of computers.

Pandora relies on targeted advertising and premium subscriptions for revenue. Westergren says, "If you're a car or beverage company, you can come to Pandora and say I'd like to put this advertisement in front of men in their 30s listening to rock music in Kansas." People can buy subscriptions for a few dollars a month to omit the ads.

Although most users initially enjoyed Pandora's services while sitting at their computers at home or work, they can now add the streaming, customized radio service to their smartphones. The shift makes their "radio" mobile, and this is what threatens to disrupt the music industry's business model again. "It's impossible to overstate [the smartphone]," says Pandora's founder. "The iPhone has ... almost doubled our growth rate overnight." This time around, the online stores that sell MP3 downloads will also have some adapting to do.

One of Pandora's major challenges comes from their royalty arrangements with record labels. Pandora pays 0.11 cents per song, a rate set to rise to 0.14 cents in 2015. While Pandora pays out almost half of its revenue in royalties, other radio services, such as Sirius XM, average just 7.5%. Pandora is lobbying to reduce royalty payments.

Although Pandora claims 74% of the Internet radio market, competition is intensifying. Pandora is only available in a small number of countries outside the U.S., and other companies, such as Spotify, may get a headstart over Pandora in places such as Europe. When rumors circulated that Apple was launching an Internet radio service, Pandora's stock shares plummeted. Despite challenges, however, Pandora has an enormous lead with its attractive and easy-to-use website, and its gigantic hoard of data to match musical DNA with each user's taste.

Discussion Questions

6-25. What are the various components of Pandora's business?

6-26. What are some shortcomings of downloading music?

6-27. How does Pandora address some shortcomings of downloading music?

6-28. How is Pandora using customer information to maintain its lead in the Internet music market?

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E-PROJECT 1 Examining Top M-Commerce Sites

The success of m-commerce depends partly on the quality of the user's experience when accessing the site from an Internet-enabled mobile phone. Load time is important, and Figure 6-22 shows the average load time for three retailers in 2013.

6-29. Create the spreadsheet in Figure 6-22 in Excel. Then visit each of the retailers using an Internet-enabled mobile phone. Time how long each one takes to load, using a stopwatch (www.online-stopwatch.com). Enter your data in the "Current load time" column.

6-30. Enter the formula to compute the Percentage Change in the row for Target and copy the formula to the other cells in the column.

6-31. Which retailer's m-commerce site has shown the most change since 2013?

6-32. What factors contribute to a site's load times? Why would your data be different from a classmate's when accessing these sites?

6-33. Conduct an experiment to compare m-commerce at Walmart and Target. Start the stopwatch, load Walmart's site, and search for a Fodor's travel guide to Mexico. Add the product to your cart, check out up to the point at which you would enter a credit card number, and then write down the time from the stopwatch. Do the same experiment at Target's site. How did your time estimates compare for the two m-commerce experiences? Overall, which site do you think offers the best user experience?

Retailer	Website	Load Time (seconds) 2013	Current Load Time (seconds)	Percent Change
Target	www.target.com	7.43		
eBay	www.ebay.com	9.8		
Sports Authority	www.sportsauthority.com	14.86		

FIGURE 6-22
Key metrics for m-commerce sites.

Source: Data drawn from http://www.internetretailer.com for week ending March 24, 2013.

E-PROJECT 2 Exploring Pandora's Web Analytics

In this e-project, you will explore the Pandora website to learn more about its web model. Then, you will examine the site's analytics using Alexa, a web information company that offers free information about traffic to websites.

6-34. Visit www.pandora.com and click on Register. (You don't need to register unless you would like to.) Why does the site ask for your birth year? Why does it collect your zip code? Why does it ask for gender?

6-35. Visit www.alexa.com and search for Pandora.com to retrieve the website's analytics. Click on Get Details.

a. What is Pandora's Alexa Traffic Rank, and what does that term mean? Compare Pandora's global traffic rank to the site's traffic rank in the United States. What accounts for the large difference?

b. How would you generally describe Pandora's main market? Check out the section called "Who visits Pandora.com?"

c. Which other websites are Pandora visitors most likely to come from just before they go to Pandora (upstream sites)?