Chapter 6

Telecommunications, the Internet, and Wireless Technology

LEARNING TRACK 5: THE NEW WEB 2.0

Learning Objectives

After reading this Learning Track you will be able to:

1. Define and identify the unique characteristics of Web 2.0
2. Describe the technologies which enable Web 2.0
3. Identify the social technologies of Web 2.0
4. Describe Web 2.0 business applications
5. Identify the key components of Web 3.0

Learning Track Outline

Introduction

The Internet was originally designed to be a simple network to support e-mail and file transfers among remote computers. Communication among experts was the purpose. Tim Berners-Lee created the World Wide Web (the Web) as a way to use the Internet to display simple pages and allow the user to navigate among the pages by linking them together electronically.

You can think of this as Web 1.0–the first Web. Most Web sites today still simply display Web pages that do not allow the user to control the experience. In this sense, Web 1.0 is like slow television, where the user is a passive recipient of information, and where information is viewed in almost total isolation from other users on the Internet. Millions of users download information from a central server, much like millions of television viewers view information by selecting a "channel."

Beginning in 2000, the Internet and the Web began to evolve into something very different from their initial models that focused on one-to-one email communication and the display of static Web pages. This new model is referred to generally as Web 2.0. Web 2.0 is both a technological and a social phenomenon. While this "new" Web draws heavily on the "old" Web 1.0, it is nevertheless a clear evolution from the past.

1. Web 2.0: The Interactive, Real-Time, Social, and User-Generated Web

If you have a Facebook page, shared photos over the Internet at Flickr or another photo site, created a blog, used Wikipedia, or added a widget to your Facebook page, then you've used services that are part of **Web 2.0**. If you haven't done any of these things, you have a lot to look forward to. Today's Web sites don't just contain static content–they enable people to collaborate, share information, and create new services online. In short, today's Web is a "social media," all about using the Internet to collaborate, contact, and share with others. Web 2.0 refers to these second-generation interactive Internet-based services. With Web 2.0, the Web is not just a collection of destination sites, but a source of data and services that can be combined to create applications users need. Web 2.0 tools and services have fueled the creation of social networks and other online communities where people can interact with one another in the manner of their choosing.

A working definition of Web 2.0 is that it is a set of applications and technologies that allows users to create, edit, and distribute content; share preferences, bookmarks, and online personas; participate in virtual lives; and build online communities.

The term was first used by Tim O'Reilly in 2004 to refer to the new ways that software developers were using the Web as an application development platform, and new ways that end-users were using the Web, primarily as a community building tool (O'Reilly, 2004). Web 2.0 goes beyond the PC and browser basis of Web 1.0, and expands into a much larger Web-space where users find applications running on the Web, and the emphasis shifts from information retrieval to collaboration and sharing.

Web 2.0 provides users with a new kind of experience. It has four defining features: interactivity, real-time user control, social participation (sharing), and user–generated content (Figure 1-1).

Figure 1-1

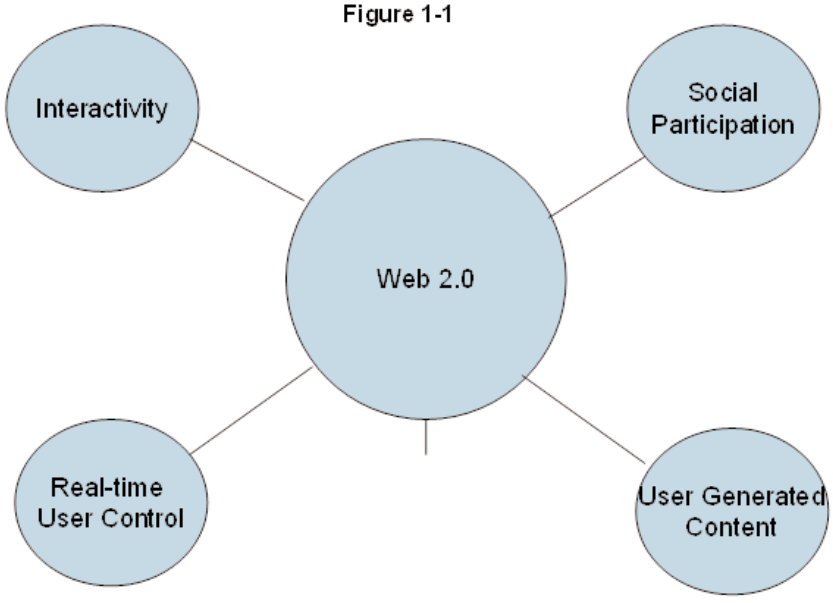


Figure 1-1: Web 2.0 has three primary dimensions: high levels of interactivity, social participation, real-time user control, and user generated content

Examples of Web 2.0 Applications and Sites

One way to understand the significance and meaning of Web 2.0 is to look at exemplary Web sites. Let's look at some examples of Web 2.0 applications and sites:

• **Social Web photo sites** enable users to store, collect, distribute and share digital photos. In 2009, about 111 million digital cameras were sold in the United States, and along with the existing stock of older models (estimated to be about 150 million still in active use), there will be an estimated 25 billion amateur digital photos shot in 2009 in the United States (IDC, 2008; CNET 2008). Next to television and cell phones, digital cameras are among the most successful digital consumer products in history with a growth trajectory of 25% annually. With an intense desire to share their photos, amateur photographers were quick to respond to Web sites which offered to store, collect, and distribute photos to family members and friends. Social photo sites were among the first widely popular social applications because they emphasized the sharing of photos with friends and family, and the user-creation of social networks.

Photobucket (formed in 2000) zoomed in its first four years of operation from 4 million to 50 million users and over 5 billion **user-generated** images and videos to become the most popular Web photo posting site, offering users an easy way to post and send photos and video to their friends and family, and providing a convenient link to YouTube, MySpace, and blog pages (Photobucket.com, 2009). Photobucket built on the functionality and success of sites like Shutterfly (1999), Ofoto (2000) and Flickr (2000) which allow users to make their photos public, and to add tags to their public photos. Today, each of these sites stores over 5 billion photos customers for free. The sites make money charging for premium services, photo prints, albums, and custom design. Flickr was one of the first sites in 2000 that allowed users to tag their photos (and other public photos as well), creating a **collaborative tagging system** or **folksonomy** (as a opposed to a top-down taxonomy). Folksonomies are described below.

• **Social video sites** enable users to store, collect, distribute and share amateur (and professional) digital videos. In 2009, over 30 million digital video camcorders will be sold in the United States, and the total stock of existing video cameras will rise to just over 62 million functioning units (IDC, 2008b). Around 23% of the adult population owns a video camera, about 52 million people (some own more than one camcorder). In addition, most digital cameras and cell phones also have the capability to record digital videos. As with photos, the millions of people who create home videos are intensely interested in sharing those videos over the Internet with friends and relatives.

YouTube has grown to become the largest online consumer-generated video posting site. It was formed in 2005 by PayPal employees, and is now owned by Google after a $1.65 billion purchase in 2007. YouTube offers free posting and storage of user-generated videos, enables sharing, and offers YouTube **widgets** for embedding YouTube videos in user personal Web pages.

Over 65,000 videos are uploaded each day in the United States, and 3 billion video streams are launched each month to more than 70 million monthly visitors. YouTube is among the top three most visited sites on the Internet. The total number of videos stored on YouTube's U.S.-based servers is estimated to be over 100 million. YouTube streams about 200 terabytes of video per day in

the United States. This one site accounts for over 60% of all videos watched online (Nielsen, 2008).

• **Social networking sites** enable users to build communities of friends and professional colleagues. The first step when joining a networking site is to create a profile, which in fact is a Web page hosted by the networking service for free (most of the time). You can typically post photos, videos, and MP3 files to your profile. Once created, users share their profiles by asking others on the service to become their "friends" or "contacts." In most social networking services, both users must confirm that they are friends before they are linked. Social networks usually have privacy controls that allow users to select who can view their profile or contact them.

In terms of the four dimensions of Web 2.0 identified in Figure 1-1, social networking sites are highly interactive, offer real-time user control, rely on user-generated content, and are broadly based on social participation and sharing of content and opinions.

Early social network sites included Classmates.com (1995) (creating communities of former high school and college friends), and SixDegrees.com (1997). Neither of these sites achieved acceptance. The first really popular Web 2.0 social networking site was Friendster (2002), which introduced the idea of "virtual communities," followed by MySpace (2003), and Facebook (2004).

Online communities are not exactly "new." Social networking sites were preceded by early computer-mediated community-building tools like Usenet (1980), where users could post and read public messages organized into various discussion groups ("newsgroups"); LISTSERV (1986)(an e-mailing list management program to support groups of people who shared an interest or association); and even earlier bulletin board services like BBS (1978). These pre-Web.1.0 services did not allow users to create their own profiles, nor post photos and videos.

For many commentators, social networking sites are the defining Web 2.0 application, and for others, a defining Internet cultural experience that will radically change how people spend their time online; how people communicate and with whom; how business people stay in touch with customers, suppliers, and employees; how providers of goods and services learn about their customers; and how advertisers reach potential customers.

In terms of numbers of participants, time spent online, and breadth of impact, these commentators may be right. MySpace ("A place for friends") and Facebook have rocketed to the lead of online social networking sites, each with over 100 million Web socialites (Facebook, 2009; News Corporation, 2008). Professional sites such as LinkedIn attract additional millions of adults looking for online connections. Social networking sites have quickly risen to be among the most commonly visited pages on the Web (Table 1-1).

TABLE 1-1 TOP 25 SOCIAL NETWORKING SITES (THOUSANDS OF UNIQUE VISITORS AND % CHANGE PREVIOUS YEAR)

SITE	MAY 2008 VISITORS	%CHANGE
MySpace	73,691	7%
Facebook	35,594	34%
Flickr	17,021	101%
Classmates Online	14,867	23%
Reunion	11,249	77%
Windows Live Spaces	8,602	8%
AIM Profiles	8,210	na
Freewebs	7,941	28%
Vlaze Media Networks	7,162	na
Webshots	6,666	na
Digg	6,321	90%
AOL Hometown	6,231	na
imeem	6,097	na
Yahoo! Groups	5,964	-10%
Yahoo! Buzz	5,786	na
Buzznet	5,427	70%
Angelfire	5,096	-27%
Bebo	4,948	33%
AOL Community	4,235	na
LinkedIn	3,933	138%
deviantART	3,914	13%
Kaboodle	3,878	na
Propeller	3,515	na
hi5	3,433	37%
MSN Groups	3,086	-23%
Total US social networking audience	131,808	
Total US Internet audience	190,858	

Note: home, work, and university locations; excludes blogging sites

Source: comScore Media Metrix as cited by ClickZ, June 20, 2008

There are hundreds of social networking sites, each with different audiences and capabilities. Overall, in 2008 over 130 million Internet users in the United States used at least one social networking site.

The top five sites (MySpace, Facebook, Flickr, Classmatesonline, and Reunion) account for nearly 80% of all social networking activity. Social networking sites—perhaps more than other recent Web application—exemplify Web 2.0. Nearly all content is user-generated. Users exercise control over the contents of their Web pages. The systems operate in near real-time, and have grown exponentially largely because of their unique ability to help users share their lives, and communicate with their friends.

While Facebook, MySpace and other large social networking sites continue to retain the lion's share of users, there is a growing trend toward more niche markets. While these sites have far fewer members than the large, general purpose sites, the members of niche sites are more intensely involved, stay longer on the sites, and contribute more. Because they are highly focused on a single subject, their members are more likely to respond to focused advertising. Ning.com (founded in 2005) is a site dedicated to helping people develop their

own social networks by providing the online tools, storage space, and templates for group pages. Ning supports itself by selling ads on these user-created networks. In 2009, Ning was hosting over 500,000 small social networks.

Social networking sites generally are free and support themselves by selling banner ads on their billions of pages. This has been a difficult business because large advertisers do not want their ads to appear next to amateur videos, or amateur content, that may embarrass the company. At the same time, people who use networking sites do not go there to look at ads, and they have a high propensity to click past ads. eMarketer estimates that ad spending on social networking sites reached $920 million in 2008, of which 8.2% went to niche networks. This year, spending will increase to $2.1 billion, with 10% going to niche sites (eMarketer, 2008). Both MySpace and Facebook are thought to be profitable, while YouTube has had less success. Nevertheless, given the huge audiences using social networking sites, advertisers remain committed.

The large social network sites are morphing into application development platforms where members can create and sell software applications to other members of the community. MySpace has permitted users to develop small software applications call widgets that users can download and put on their own pages. Companies such as Slide.com, RockYou!, and YouTube were all launched on MySpace as widgets providing additional functionality to the site. Not to be outdone, Facebook finally launched its software development platform in 2007. In 2009 there are over 400,000 developers who have developed 35,000 applications from chess and Scrabble word games, to Video, for sharing videos, and Events for notifying friends of your upcoming events.

You can get an idea of the future of social networking sites by looking at their plans and rollouts of new features. Social networks hope to become a "social operating system" or platform which coordinates users' email, Twitters, other social sites, videos and music. Social networks hope to displace Yahoo! and other portals as the primary entrance point for users to the Internet.

In March 2008 AOL purchased the number 3 networking site, Bebo, for $850 million. The site is being re-built to attract new users. One new new tool is a "command-and-control center" for users' online life. Called the Social Inbox, the system provides users one-stop access to email from a number of partners, including Yahoo, Google and, of course, AOL. AOL's instant-messaging services are integrated into the site as well.

Among the new features, Bebo members will be able to receive their feeds from outside Web sites, such as social-messaging site Twitter and YouTube. A media-recommendation tool will suggest TV shows, online videos or music accessible on the site, based both on users' expressed preferences and other data, such as what their online friends are watching or listening to. AOL is putting the finishing touches on a slew of other features. MySpace and Facebook are building similar features for their Web sites.

• **Social television sites.** Americans spend over 3,800 hours each, on average, annually, consuming various media (Statistical Abstract, 2009). The most consumed media is television, with 1700 hours per year per person, followed by radio (778), and then the Internet (218). Time spent on the Internet has doubled in the last five years, overtaking newspapers, music and magazines. Watching Hollywood videos at home ranks a distant eighth (108).

Joost.com becomes the first Internet television channel with financing of $50 million and agreements with networks to deliver TV programs to any Internet-connected device such as an iPod, MP3 player, cell phone, TV set top

box, or any wirelessly connected PC or device. In 2009, Joost offers 28,000 TV shows and 250 channels. Suddenly TV is unleashed from cables, wires and national television networks or even local stations. Programming becomes user programming by allowing users to set their time and place, and choose the content. Sharing of favorites among users, and a recommender system based on group purchasing patterns add a social, shared dimension. (Joost.com, 2009).

Hulu.com offers hit TV shows such as The Simpsons, The Daily Show with Jon Stewart and The Office the morning after they air, movies like Men in Black, Ghostbusters, and The Karate Kid, and clips from Saturday Night Live, Friends and other popular TV shows and movies, all for free, from more than 130 content providers, including Fox, NBC Universal, MGM, Sony Pictures Television, Warner Bros. and more. Hulu gives users the ability to customize their viewing experience online (viewers can watch videos anytime, anywhere) and Hulu's search feature helps users find any premium video online even if it is not directly available on Hulu.com. Hulu is also easy to use (all users need is a Flash 9.0 enabled-computer with an Internet connection) and offers users the freedom to share full-length episodes or clips via e-mail or embed on other Web sites, blogs and social networking pages. Hulu is co-owned by NBC Universal, News Corp. and Providence Equity Partners and uses an advertising supported business model. Launched in March 2008, Hulu currently has around 24 million monthly unique visitors. On average, a visitor watches 10 videos on Hulu in a month (in December 2008, Hulu streamed around 220 million videos), which is good enough to place Hulu sixth in the number of videos viewed online. Although YouTube still far outstrips Hulu in popularity, many believe Hulu is more appealing to advertisers, and that Hulu's ad revenues could equal YouTube's by the end of 2009.

- A **Search and Application site** like Google attracts the largest Internet audience with 140 million unique monthly U.S. users, and over 575 million international users, with a continual stream of innovations such as Google Apps, Google Maps, GoogleView (a photo database of U.S. neighborhoods from the street level), video and photo posting and sharing, Gmail, and Google Scholar. Over 25% of Google search results on the world's top 20 brands provide links to consumer-generated content such as reviews, blogs, and photos. While Google is best known for its search engine–which produces over 95% of its revenue through the sale of text ads–Google is also a thriving application development environment and platform for the delivery of software-as-a-service (Saas). Google Apps is a group of Web-based services offering free office productivity tools such as Google Docs, calendar, spreadsheet, and collaborative tools. What makes Google a Web 2.0 phenomenon is that fact that it allows users to create their own experiences online using various Google tools, and share those with others. For instance, Google has made its Maps application available to all developers who can included Google maps in their applications.
- **Blogs** are another Web 2.0 application that has taken the Web by storm. There are over 112 million blogs on the Web in the United States, with 175,000 are created each day, and there are 1.6 million blog postings each day (Technorati, 2008). Around 67 million people read blogs regularly, and 21 million have created a blog (Pew Internet & American Life Report, 2008). A blog, or weblog, is a personal Web page that typically contains a series of chronological entries (newest to oldest) by its author, and links to related Web pages. The blog may include a blogroll (a collection of links to other blogs) and TrackBacks

TABLE 1-2 TOP 10 BLOGS IN THE US, RANKED BY UNIQUE VISITORS (IN THOUSANDS), MAY 2007 AND MAY 2008

FUNCTIONAL AREA	MAY 2007	MAY 2008	%CHANGE
Blogger	28,007	39,341	40%
WordPress.com	6,351	17,134	170%
Six Apart Typepad	10,582	11,165	6%
TMZ.com	7,287	8,034	10%
LiveJournal	4,186	4,737	13%
TheHuffingtonPost.com	1,327	4,715	255%
sports.aol.com/fanhouse	na	3,944	na
PerezHilton.com	1,701	2,139	26%
Engadget	1,518	2,046	35%
Gawker	851	2,016	137%

Source: Nielsen Online as cited by Marketing Charts, June 17, 2008; eMarketer, 2008.

(a list of entries in other blogs that refer to a post on the first blog). Most blogs allow readers to post comments on the blog entries as well.

There are many different kinds of blogs, from celebrity blogs, to political news and commentary, and new tech gadgets. There are many ways to measure the audience size of blogs also. Table 1-2 shows the top ten blogs in 2008 ranked by overall number of unique visitors and their growth in the last year.

Creating a blog is referred to as "blogging." Blogs are either hosted by a third-party site such as Blogger.com (owned by Google), LiveJournal, Typepad, Xanga, Wordpress, or Microsoft's Windows LiveSpaces, or prospective bloggers can download software such as Moveable Type and bBlog to create a blog that is hosted by the user's ISP. Blog pages are usually variations on templates provided by the blogging service or software and hence require no knowledge of HTML. Therefore, millions of people without HTML skills of any kind can post their own Web pages, and share content with friends and relatives. The totality of blog-related Web sites is often referred to as the blogoshpere.

The content of blogs range from individual musings to corporate communications. Blogs have had a significant impact on political affairs, and have gained increasing notice for their role in breaking and shaping the news.

While blogs have become extremely numerous, no one knows how many of these blogs are kept up to date or just yesterday's news. And no one knows how many of these blogs have a readership greater than one (the blog author). In fact, there are so many blogs you need a blog search engine just to find them (such as Google's search engine), or you can just go to a list of the most popular 100 blogs and dig in.

• **Virtual life sites** like Second Life offer 3-D virtual worlds built and owned by "residents" who have established lives by building over almost 15 million avatars. In this virtual "world," participants spend Linden dollars, owning real estate, and build and share "creations," which include clothing, interior designs, or writing, among other items. Second Life had over 27 million unique visitors each month in 2008. Residents spend over $2 million real dollars each day to buy things on the site for their virtual lives, and convert the real dollars to Lindens (Second Life currency) (Secondlife.com, 2009).

• **Wikis** allow users to easily add and edit content on a Web page. (The term wiki derives from the "wiki wiki" (quick or fast) shuttle buses at Honolulu Airport). Wiki software enables documents to be written collectively and col-

laboratively. Most wiki systems are open source, server-side systems that store content in a relational database. The software typically provides a template that defines layout and elements common to all pages, displays user-editable source code (usually plain text), and then renders the content into an HTML-based page for display in a Web browser. Some wiki software allows only basic text formatting, whereas others allow the use of tables, images, or even interactive elements, such as polls and games. Since wikis by their very nature are very open in allowing anyone to make changes to a page, most wikis provide a means to verify the validity of changes via a "Recent Changes" page, which enables members of the wiki community to monitor and review the work of other users, correct mistakes, and hopefully deter "vandalism."

The largest wiki is Wikipedia.com, the online encyclopedia which is now the seventh most frequently visited Web site in the United States with more than 62 million unique visitors a month. Wikipedia allows contributors around the world to share their knowledge and in the process has become the most successful online encyclopedia, far surpassing early "professional" encyclopedias such as Encarta or even Britannica. Wikipedia is one of the largest collaboratively edited reference projects in the world. As of January 2009 there were over 2.6 million articles in English, and over 75,000 active contributors working on more than 10 million articles in 250 languages. Wikipedia relies on volunteers, makes no money, and accepts no advertising. The Wikimedia Foundation, Inc., a not-for-profit organization that relies on fund-raising and donations to survive, owns Wikipedia (Wikipedia.org, 2009; Pew Internet and American Life Project, 2008; ComScore, 2008).

Common Themes of Web 2.0 Sites

What do all these applications and new sites have in common? First, they rely on **user- and consumer-generated content**. These are all "applications" created by people, especially people in the 18-34 year-old demographic, and heavily in the 7-17 age group as well. "Regular" people (not just experts or professionals) are creating, sharing, modifying, and broadcasting content to huge audiences.

Second, a powerful **search** capability is a key to their success. Third, they are inherently **highly interactive**, creating new opportunities for people to socially connect to others. They are **"social" sites** because they support interactions among users through email, instant messaging, and sharing of content and opinions. Fourth, they rely on **broadband connectivity** to the Web. Last, many of these sites act as **application development platforms** where users can contribute and use software applications for free. Briefly, it's a whole new world from what has gone before.

With the exception of Google, Web 2.0 sites are currently **marginally profitable,** and their business models unproven despite considerable investment. While they attract extremely large audiences when compared to traditional Web 1.0 applications, exceeding in many cases the audience size of national broadcast and cable television programs, owners of these sites have been unable to monetize these large audiences through the use of advertising. In general, people who use social networking sites have tended to ignore advertiser messages, and do not expect to have their social lives interrupted by ads. Advertisers for large national brands do not want their products associated with amateur video and content they cannot control. Nevertheless, these large Web 2.0 audience relationships are intensive and long-lasting interactions with mil-

lions of people. In short, these sites attract eyeballs in very large numbers and they are increasingly "sticky." Hence, they present marketers with extraordinary opportunities for targeted marketing and advertising. They also present consumers with the opportunity to rate and review products, and entrepreneurs with ideas for future business ventures.

2.0 Evolution of Web 2.0: Technology Background

While some of the unique features described above were first developed during the Web 1.0 era, few sites combined all four elements at a single site. The emergence and strengthening of these elements depended in large part on new or improved technologies which began to appear in 2000.

Beginning in 1999, programmers began developing software applications that allowed users to control features of static Web pages. The first "interactive Web pages" or "rich Internet applications" began to appear in 2000. These techniques are loosely referred to as AJAX (asynchronous JavaScript and XML). AJAX and other similar techniques download small computer software programs to the user's computer which allow for a continuous stream of communications between the user's computer and the Web page server. For the first time Web users could enter information on screen, using small software applications that were downloaded to their computers when they opened the page. These user interactions take place without interfering with the display and behavior of the existing page. One of the first widespread applications of AJAX was Google Maps, which allowed users to move the maps displayed, change locations, and change their zoom levels in real time without causing the entire page to be reloaded. Google Maps first appeared in 2005. This was very different from Web 1.0 where every change requested by the user would require a new page to be displayed.

While the Web was becoming more interactive and less static, other changes were occurring in both technology and the social world. By 2000, the cost of storing information on hard drives, and the cost of processing information, had fallen drastically. This meant that Web sites could inexpensively store very large amounts of personal information and large digital objects (like photos and video) on huge Internet disk farms.

These disk farms would be useless without the ability of users to send and retrieve information nearly instantaneously. By 2000, broadband Internet connections were growing rapidly, and allowed users to send very large amounts of information to Web site storage sites, and retrieve that information in a few seconds. In 1999, the most common Internet home connection in the United States was a 64 kbps (kilobits per second) telephone modem. By 2004, 40% of American homes had broadband connections with an average speed of 768 kbps (kilobits per second), twelve times faster than a telephone modem. In 2008, 70% of American homes had broadband with an average speed of 1 mbps, fifteen times faster than a telephone modem. In terms of a standard size digital photo stored as compressed JPEG file of about 1 megabyte, it would take a 64 kbps telephone modem about 2 minutes to upload the picture to a shared picture site. Today with the much faster broadband connections, it would take about 8 seconds. An iTunes music track of 3 megabytes can be downloaded in about 20 seconds with a broadband connection. It would take 8 minutes with a 64k telephone modem.

These enhancements to technology could not have been implemented with another innovation: cloud computing. Cloud computing is the subject of a separate Learning Track. Cloud computing enables computers in different physical locations on the Internet to work together cooperatively to store, process, and distribute content (data). This development greatly expanded the amount of computing power that can be drawn upon to deliver routine high bandwidth applications, and also to meet the demands of peak loads, such as a photo site might experience during the holiday period (November-December).

One of the first wildly popular applications of these new storage and communication capabilities was Ofoto.com (now Kodak Gallery), a site for storing users' digital photographs, and sharing those photos with friends, launched in December 1999 along with a competing service called Shutterfly. Today, Kodak Gallery and Shutterly each have over 50 million users and store more than 1.5 billion photos.

3. Social Technology: User Content Generation and Social Networking

Many experts argue that the single most important dimension of Web 2.0 is its ability to enable online social networking, as well as other "social" features like permitting users to create, publish, and distribute their content; share their preferences and opinions; and to control or "program" their own unique online environments through such capabilities as selecting the timing and location for listening to music, watching videos, or TV programs. Briefly, blogs and social networking sites have led to a veritable explosion in writing, reading, and communicating in the United States.

Web 2.0 is a sociological phenomenon as much as a technological phenomenon that involves millions of users creating online interactive and communal environments. These online communities generally reflect offline communities, but they can also lead to the generation of new, ad hoc, specific purpose communities such as political action communities that arise for a specific candidate or party.

In a way quite different from all previous technologies, the Internet and e-commerce technologies have evolved to be much more social by allowing users to create and share content in the form of text, videos, music, or photos with a worldwide community. Using these forms of communication, users are able to create new social networks and strengthen existing ones.

Web 2.0 is based on a many-to-many communications model. All previous mass media in modern history, including the printing press, use a broadcast model (one to-many) where content is created in a central location by experts (professional writers, editors, directors, actors, and producers) and audiences are concentrated in huge aggregates to consume a standardized product. The telephone would appear to be an exception but it is not a "mass communication" technology. Instead the telephone is a one-to-one technology. The new Internet and e-commerce technologies have the potential to invert this standard media model by giving users the power to create and distribute content on a large scale, and permit users to program their own content consumption. The Internet provides a many-to-many model of mass communications that is unique.

4. Related Web 2.0 Services, Applications and Concepts

We have described the most significant Web 2.0 applications, but there are a number of other concepts and applications that are associated with the Web 2.0 phenomenon. Below is a brief description of some of these related concepts and applications.

Really Simple Syndication (RSS)

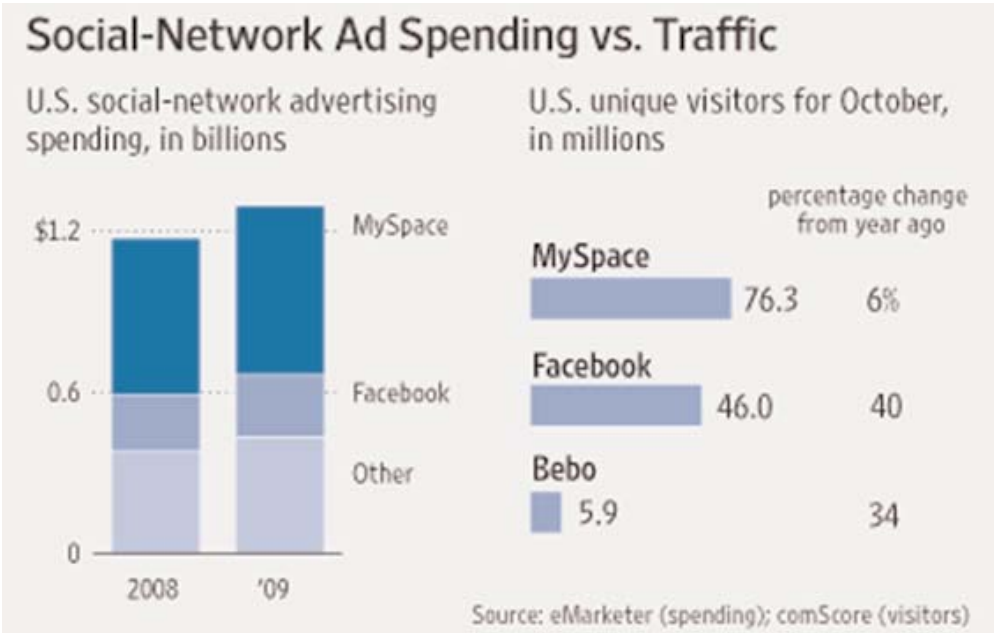
The rise of blogs is correlated with a new distribution mechanism for news and information from Web sites that regularly update their content. Really Simple Syndication (RSS) is an XML format that allows users to have digital content, including text, articles, blogs and podcast audio files, automatically sent to their computers over the Internet. An RSS aggregator software application that you install on your computer gathers material from the Web sites and blogs that you tell it to scan and it brings new information from those sites to you. Sometimes this is referred to as "syndicated" content because it is distributed by news organizations and other syndicators (or distributors). Users download RSS aggregators and then "subscribe" to RSS "feeds." When you go to your RSS aggregator's page, it will display the most recent updates for each channel to which you have subscribed.

RSS has rocketed from a "techie" pastime to a broad-based movement. No one knows how many people have downloaded RSS client programs, but at The New York Times, the subscriber base for RSS feeds (which include headlines, summaries, and links to full articles) went from 500,000 when first introduced in 2003 to more than 10 million today. In fact, so many users are requesting RSS feeds that online publishers are developing ways to present advertising along with the content. Microsoft has included an integrated RSS reader in Vista, the current version of its Windows operating system, and Google and Yahoo are selling advertising options for RSS.

Social Network Marketing and Communications

The two key elements of Web 2.0 are the rapid growth of user-generated content and the use of the Internet for socializing and sharing. Around 40% of

FIGURE 1-2 SOCIAL NETWORK AD SPENDING VS. TRAFFIC



Internet users visit a social networking site at least once a month. With 72 million monthly MySpace users, 32 million Facebook users, 67 million blog readers, and 70 million YouTube visitors, it's little wonder that marketers and advertisers are joyous at the prospect of advertising and marketing to this huge audience.

Microsoft's purchase of an interest in Facebook, and Google's purchase of YouTube, suggest the excitement in the marketing community for the advertising potential of social networking. Although in the past, major brands have been reluctant to risk advertising on sites whose content they cannot control, they are beginning to experiment with a number of new formats. In 2009, all forms of social marketing are expected to generate $2.8 billion in revenues, and it is expected these revenues will double to over $4 billion 2012.

It is difficult to define 'social marketing' precisely, but a working definitionmight be that it is advertising which adopts a many-to-many model as opposed to a one-to-many model of traditional advertising, where a central broadcaster sends the same message to millions of people. For instance, over 400,000 viewers saw Microsoft's Halo 3 video trailer on YouTube in a single month after being posted by a handful of posters. About 2,500 added the video to their favorites lists, which are broadcast to all their friends. So an existing social network composed of many people distributes the Microsoft message to a great many other people. A simpler definition is that 'social marketing and communications' is any marketing that takes place on "social Web sites" broadly defined to include networks, blogs, wikis, widgets, and a host of related Web 2.0 tools.

This kind of marketing is "social" because like traditional word-of-mouth and viral marketing, it relies on pre-existing social networks to spread the message. However, in this case, the social networks exist on the Internet, and they are digitally enabled networks whose members have extraordinary tools to spread the message far, wide, and very quickly. The vast majority of online social network members are also friends offline, or friends of friends offline (Ellison, et. al., 2006). Hence the offline world and the online world are intimately connected.

Blog Marketing and Advertising

Blogs are very high on the list of advertising tactics that marketing executives consider. In 2009, blog advertising revenue will be about $549 million (out of a total online ad spend of $30 billion) during that year. However, it is expected to grow to $746 million by 2012 (eMarketer, Inc., 2008). Blogs have proved difficult to monetize because few blogs attract large audiences, and the subject matter of most blogs is highly personal and idiosyncratic. Search engines have a difficult time "reading" blogs, understanding their content, and making a judgment about the appropriateness of their ad inventory. Advertising dollars are therefore concentrated in the top 100 blogs, which have a coherent theme that consistently attracts larger audiences. Because blog readers and creators tend to be more educated, have higher incomes, and be opinion leaders, they are ideal recipients of ads for many products and services that cater to this kind of an audience. Advertising networks that specialize in blogs provide some efficiency in placing ads, as do blog networks, which are collections of a small number of popular blogs, coordinated by a central management team, and which can deliver a larger audience to advertisers. One solution is to build an advertising network of bloggers and allow bloggers to subscribe to this network,

agreeing to display ads on their blogs, and then paying them a fee for each visitor who clicks on the ad. CrispAds.com is one such network. Users of this service can choose from categories of ads to display. CrispAds also allows users to place ads in their RSS feeds to other sites. Blogads.com provides a similar service.

Google's AdSense is also a major blog marketer. The AdSense service "reads" a blog and identifies the subject of the blog's postings. Then AdSense will place appropriate ads on the blog, adjusted to the blog's content. For instance, BoingBoing.net, a very popular technology blog known for its love of gadgets, displays ads from major advertisers like HP, Verizon, and RackSpace.

The metrics of blog marketing at this time are not well understood. No one knows the size of the blog marketing phenomenon or the revenues produced by blog marketing at this time. The authors estimate that less than 5% of online advertising and marketing expenditures occurs on blogs. Given the growth of this phenomenon—well over 50% a year in the past few years—and the novelty, blog marketing will likely show substantial gains over the next several years. There may be limits on this phenomenon just as with e-mail marketing. The blogosphere (the Internet's aggregate blogging community) is already buzzing about blogs set up merely for personal financial gain. The founder of one site on asbestos litigation, for instance, freely admits he set up the site in order to tap into the revenues flowing to individuals and law firms in connection with asbestos litigation. Firms are tempted to hire bloggers to report favorably on their products, leading to what one wag called "blogola." This behavior reduces the credibility and effectiveness of blog marketing, and makes larger advertisers fearful of advertising on blogs when they cannot control the content of the blog.

The Wisdom of Crowds: Collective Judgments

Is it possible that decisions, predictions, or estimates made by a large group of people are often far better and more accurate than decisions made by any individual, or small group of experts, in the group? In 2004 James Surowiecki wrote a book titled the "Wisdom of Crowds" exploring this thesis. There are plenty of precedents for the notion that large aggregates produce better estimates and judgments than individuals or small groups of experts. For instance, one premise of democracy is that a very large number of diverse and independent voters will produce superior political decisions than a single dictator, king, bureaucrat, or committee. Economists have studied the problem of how to find the best restaurant in a strange town. Answer: the restaurant with the largest crowds (surely the locals know what is good food). In financial theory the best estimate of the current value of a firm can be found in free, open markets where millions of participants vote with their pocketbooks. In statistics, the best estimate of the value of a parameter is the mean or average arrived at by taking thousands of independent samples of the population.

In general, crowds are wise when there are many decision makers who make decisions independent of one another, come from diverse backgrounds, and where there is a mechanism (like a market) that can aggregate opinions to produce a single outcome or choice.

There are many crowds which do not fit these conditions, and the result can be a failure of collective judgment. Mobs, herds, and runaway stock market bubbles are examples of where crowds can produce very bad estimates and decisions. In these cases the lack of diversity and independence among partic-

ipants can lead to an "information cascade" which prevents independent judgments. Nevertheless, when the four conditions of wise crowds are met, Surowiecki argues, crowds produce superior judgments, forecasts, and estimates. In the eyes of many, the conditions for crowds to be "wise" are quite rare, especially so in a "connected" Internet world where millions of people are blogging, networking, and emailing. Being connected to others, millions of others, reduces the independence of participants and makes them more susceptible to manipulation and hysteria.

The idea of the social basis of wisdom and knowledge is reflected in many Web 2.0 applications. For instance, Wikipedia is based on the idea that millions of diverse contributors can produce an encyclopedia of knowledge which is superior to those produced by small groups of experts. Additional examples follow.

Prediction Markets

While all markets make predictions or estimates of value based on buy-sell transactions among a group of participants, or bets among a group of bettors with a "gambling house" clearing the bets, prediction markets are established as peer-to-peer betting markets where participants make bets on specific outcomes of, say, quarterly sales of a new product, or outcomes of political elections. Participants make bets with their own funds that a certain outcome will occur. Others bet against that outcome. The result is that an asset is created (a contract for example) which reflects the markets aggregate value for that outcome. The world's largest commercial prediction market is Betfair.com, founded in 2000, where you bet for or against specific outcomes on football games, horse races, and whether or not the Dow Jones will go up or down in a single day. The Iowa Electronic Markets (IEM) is an academic market examining elections where positions are limited to $500. You can place bets on the outcome of local and national elections. The IEM allows traders to buy and sell contracts based on political election results and economic indicators. The contract is the asset with a value determined by long buyers and short sellers. For instance, IEM offered a contract labeled "DEM08_WTA" which had the following payoff: $1 if the Democratic Party nominee receives the majority of popular votes cast for the two major parties in the 2008 U.S. Presidential election, $0 otherwise. It's price in January 2007 was 52.5 cents. You could sell this contract short by borrowing the asset, selling it for 52.5 cents, and hoping it would fall in value over time to, say, 20 cents, and then buying the contract back as the election approached, pocketing the difference between your short sale revenue of the borrowed asset, and your final sale value. Or you could bet long by buying the contract at 52.5 cents and hoping it would go up in value as your candidate becomes more popular (in your estimate). When hundreds of thousands of people make these bets, the market value of the contracts are usually as good as, and sometimes better, than the election polls produced by experts.

Folksonomies and Social Tagging

Another application of the 'wisdom of crowds' is the use of a large number of people to classify objects, which could be movies, photos, books, PowerPoint slides, or consumer products. Folksonomy is a play on the term "taxonomy" which refers to any classification schema for organizing a collection of objects. Generally, taxonomies are created by individuals or a group of experts. Folksonomies are created by groups of people looking at a set of objects, and

then tagging them (or bookmarking them) using their own criteria. Folksonomies are a bottom up, self-organizing activity in which thousands of people classify objects.

A related phenomenon that relies on large numbers of online users to identify and classify events or content is social tagging. Social tagging sites allow millions of people to post their bookmarks or "favorite" content to a single site where others can review the links. If your Diggs become popular as other people Digg them, they will bounce to the top of the list of Diggs where millions more people can see and review them.

Social Shopping

Want to know what books, clothes, music, video, or digital gadgets your friends are buying? Many Web 2.0 sites think so. The idea is that consumers will tend to buy what their friends buy and recommend. At Yub.com, which has several patents on **social shopping**, users can view their friends' purchases and interests, click an image of the products, and link to a Web site where they can buy the products. Yub.com keeps the referral fees of 10%-15%. Friendster uses similar techniques to send customers to Amazon, keeping a referral fee. Other online retail sites are attempting to create their own user communities. At Overstock.com, users of that site's auction service are invited to create free online profiles, and share news of their recent purchases with friends at the site. Other examples of social shopping sites are Yelp Kaboodle, and a number of Facebook widgets (Stylefeeder) that permit users to create communities of consumers, and enable shopping in a social environment.

Podcasting: Audio and Video Casts

A podcast is an audio or video presentation—such as a radio show, audio from a movie, simply personal audio presentations, or a video from similar sources, or that you made—posted to the Web. Viewers and listeners download the files from the Web and play them on their players or computers. While commonly associated with Apple's iPod portable music player, you can listen to podcast MP3 files with any MP3 player. Podcasting has transitioned from an amateur independent producer media in the "pirate radio" tradition, to a professional news and talk content distribution channel. More than one-third of American adults own an iPod or an MP3 player and about 20% of all Internet users report that they have downloaded a podcast (Pew Internet & American Life Project, 2008). Celebrities such as Paris Hilton and Fortune 500 firms now vie with thousands of independent producers by posting podcasts to get their messages out. Major advertisers are looking at podcasts as a new advertising channel. Microsoft has included podcast creation tools in Vista. No one knows for sure how many podcasts exist, but Apple's iTunes Web site provides a directory to over 300,000 podcasts. While podcasts started as audio presentations, video podcasts not constitute a sizable percentage of all podcast postings to iTunes.

Collaborative Filtering (Recommender systems)

Ever find yourself in a video store wondering what video to rent? Or go online and spend an hour browsing titles? There are many occasions in life when you feel confused by a bevy of alternatives, none of which are compelling. Put yourself in the position of a merchant like Netflix with over 70 million DVDs to rent, or Amazon, with over a million products to sell. How do you get customers onto the site, solve the problem of selection for them, and encourage a

transaction? One answer to these questions are recommender systems (originally called collaborative filter systems) that keep track of customer behavior, find other customers with similar behavior, and then recommend choices to customers based on what other people "like themselves" purchased or rented.

The idea here is related to the 'wisdom of crowd' concept above. Rather than rely on expert reviewers, consumers are encouraged to listen to their fellow consumers for music, video, and product choice.

Crowdsourcing

Crowdsourcing is the use of online virtual labor markets, and social networks, to perform jobs rather than do them yourself or have an employee do them for you. Crowdsourcing is a bit different from outsourcing but obviously the two are related. Generally, outsourcing involves one corporation sending requests for quotes (RFQs) to a pre-selected group of other firms. Crowdsourcing generally involves small firms or individuals sending out a general call for a solution to a corporate problem or challenge from the community of customers or suppliers. For instance, TomTom, the manufacturer of GPS units for autos, launched a feature it calls MapShare, in which the TomTom user community collectively acts to provide updates and fixes to the map. So far tens of thousands of customer-recommended changes have been made. In another example, iStockphoto, created a market place for "amateur" digital photographers who respond to requests from customers for new photos or stock photos. Rather than rely on professional photo sites like Corbis or Getty Images, customers can find solutions from amateurs at a much reduced price. Starbucks (starbucks.com) has a link on its Web site called "My Starbucks idea" where visitors can share, vote, discuss, and see new ideas to make Starbucks a better business.

Mashups

Mashups were initially developed by the music industry. Disk jockeys—at first in England and later in the United States and other countries—developed a new style of remix, known as mashups, in which two or more songs are melded together. Often, the resulting track features the melody of one song and the vocals of another. The idea is to take different sources and produce a new work that is "greater" than the sum of its parts. Generally, the more the sources differ from one another, the more fun they are to listen to, and the more humorous the process of discovering the source soundtracks.

On the Web, the term mashup has taken on a whole new meaning. In the spirit of musical mashups, Web mashups combine the capabilities of two or more online applications to create a hybrid that provides more customer value than the original sources alone. So far, the area of greatest innovation involves the mashup of mapping and satellite image software with local content. For instance, the City of Portland, Oregon, created a site called PortlandMaps.com which integrates Google Earth's satellite imagery with city data on land use, zoning, street construction, household income, crime rates, and other data locked in City computers. GasBuddy.com provides searchable maps showing current gasoline prices. And thousands of real estate agents have integrated Google Earth or Microsoft Maps into their Web sites so customers can see online what a house and neighborhood really looks like.

In May 2007, Google introduced a toolkit called Google Gears that allows programmers and just ordinary folks to integrate eight Google applications such as

Web search, chat, maps, calendars, scheduling, and advertising into their own Web sites. Its MyMaps service makes it easy for users to create customized maps. Yahoo and Microsoft are providing similar tools. You can think of mashups as a kind of software Legos.

For Calin Uioreanu, creator of a site called Simplest-shop.com, Web services means that he can offer his customers the same functionality as Amazon-because it is Amazon's system he is using. Uioreanu rents a server that communicates with Amazon servers throughout the day and night to obtain continual updates on prices, availability, products, and shipping information. On some items, customers have a choice of buying from Amazon or from Simplest-Shop.com. Uioreanu makes a 15% referral fee on Amazon sales, and a full markup on products he sells. Uioreanu won't discuss profits or revenue, but claims he has about 2 million monthly hits.

Probably the fastest growing type of mashups are geomashups which combine maps with specialized niche information and knowledge. Between April 2007, when Google released MyMaps, through July 2008, users created over 8 million customized maps. Examples include HealthMap.org, a site that provides a global mapping of current infectious diseases and Chicagocrime.org, which uses Google Maps to display where crimes occur in Chicago. Other non-map-based mashups include Plaxo.com, a site that provides the integration of your contact information including built-in calendar and schedules; Bookburro.com, which allows users to compare book prices based on Amazon's API and other screen-scrapping tools that scour the Web for other book sites' prices; and Indeed.com, which pulls job listings from many different Web job sites and organizes them by city. The YouTube Plugin allows you to search YouTube, select a video from the results and add it to your post. Even the browser developers are getting into the action. An add-on to the Firefox browser called Greasemonkey allows users to install scripts on their computer that customize the way a Web site works on a specific computer.

Widgets

One easy way to pump up the energy on your Web site is to include some appropriate widgets (sometimes called gadgets, plug-ins, or snippets). Widgets are small chunks of code that execute automatically in your HTML Web page. They are pre-built and many are free. Millions of social network and blog pages use widgets to present users with content drawn from around the Web (news headlines from specific news sources, announcements, press releases and other routine content), calendars, clocks, weather, live TV, games and other functionality. You can copy the code to an HTML Web page. A good place to start is Google Gadgets and Yahoo Widgets.

Table 1-3 illustrates the most popular Widgets available for sale on Facebook.

Popularized by platforms like Google and Facebook and providers like RockYou and Slide, widgets are downloaded to desktops, or can be embedded in social-media profiles or blogs, or passed along to friends.

ESPN offers a widget for user homepages that displays up-to-the-minute NBA rankings. Weather.com offers a widget that always displays ski conditions at various ski resorts; music lovers can receive videos and exclusive downloads; film fanatics, industry trailers and games; and news junkies, RSS feeds and polls.

Widgets put users in control of content and functionality. They are also a tool for distributing advertising. According to Razorfish (a Web metrics firm),

TABLE 1-3 MOST POPULAR WIDGETS AVAILABLE ON FACEBOOK

WIDGET	UNIQUE VIEWERS (THOUSANDS)	% OF FACEBOOK VISITORS
Top Friends (Slide)	6,230	18.50%
Movies (Flixster)	5,199	15,40%
SuperPoke! (Slide)	3,626	10.80%
Compare People (Chainn)	3,503	10.40%
iLike (iLike)	3,449	10.20%
Super Wall (RockYou)	3,237	9.60%
Likeness (RockYou)	2,693	8.00%
Quizzes (Eric Diep and Joe Winterhalter)	2,583	7.70%
FunWall (Slide)	2,107	6.30%
Graffiti (Mark Kantor, Tim Suzman, Ted Suzman)	1,647	4.90%
Total US Facebook application visitors	20,649	61.30%
Total US Facebook visitors	33,660	100.00%

Source: comScore Widget Metrix as cited in press release, January 24, 2008

55% of "connected consumers"—people with broadband who use social networks and digital media—use widgets on their desktops with some frequency, and 62% use them on sites such as Facebook and iGoogle.

5. Business Uses of Web 2.0

When many people think of Web 2.0 applications they think of adolescents and teenagers on MySpace for too many hours, or IMing or Twittering one another, and the entire phenomenon is written off as an entertainment media. Popular conceptions are wrong: the largest group of participants on Facebook are 34-45 years of age. LinkedIn, the largest professional network is composed of all adults (over 21). Web 2.0 from the beginning in 2004 was seen as a "business development" platform and not merely as a social entertainment media. The idea was that traditional businesses could use these new capabilities to extend their brands, and entire new businesses would form, mostly online, to deliver Web 2.0 services.

There are numerous serious Web 2.0 business applications. Entire books have been published in 2008 describing the business uses of Web 2.0 and social media (see References sections). Briefly, the gist of these books is that Web 2.0 is bringing about a revolution in business operations, and marketing.

Here we can only briefly summarize Web 2.0 business applications in the form of Table 1-5.

TABLE 1-5 BRIEF SUMMARY OF WEB 2.0 BUSINESS APPLICATIONS

WEB 2.0 FEATURE	BUSINESS USES
Social photo sites	Real estate agents use these sites to share photos of houses for sale; engineers use to share site photos and plans.
Social video sites	YouTube used as an advertising space by thousands of businesses.
Social networking sites	Used by advertisers to target consumers; businesses use to stay in touch with employees, customers, and suppliers.
Social television sites	Media companies use these sites to extend the market for older TV series and long tail marketing.
Search and application development platforms	Hundreds of corporations embed Google Maps and Google Earth code into their Web sites; thousands of firms adopt Google Apps rather than Microsoft Office.
Blogs	Advertisers target bloggers based on their interests; firms monitor blogs to ensure they are seen favorably in the blogosphere. Firms pay bloggers for favorable comments, and insert favorable comments themselves as shills.
Virtual life	Firms like IBM and HP develop virtual sites where customers can see their products and engage in conversatiosn with remote sales people.
RSS	Content owners use RSS to stream real-time content to subscribers; firms use RSS to keep customers informed of price changes and new products.
Prediction markets	Firms ask employees to predict earnings for future products, or quarterly earnings for the entire firm; customers involved in product design by voting on potential future products.
Folksonomies and social tagging	Knowledge management: rather than impose taxonomies on content and documents, firms ask emmployees to classify documents; online video sites use customer classifications as one alternative to traditional video taxonomies, e.g. action adventure, drama, comedy, et
Social shopping	ThisNext.com, Kaboodle.com, Wists.com and StyleHive.com combine shopping and social networking. Consumers interested in products can find others who bought these products, or others looking so they can compare notes.
Podcasting	Firms create audio and videos to demonstrate their products online.
Recommender systems	Amazon, NetFlix, and hundreds of other Web retailers aggregate their choices of thousands of users, and look for patterns in customer behavior in order to make recommendations to customers.
Crowdsourcing	IdeaScale enables companies to build communities focused on the development of an idea. IdeaScale is based on the simple model of crowdsourcing. It begins with an idea posted to an IdeaScale community by a user. Each idea can be expanded through comments by the community. The ultimate measure of an idea is determined by a voting system. Any idea can be voted to the top or buried back down to the bottom. It combines "the wisdom of crowd" concept with Web 2.0 models like Digg.
Mashups	Software firms create new applications based on code supplied by third parties. Small businesses use Amazon code to display products, and clear transactions.
Widgets	Widgets are used by many business Web sites to extend the reach of their site and brand name.

6. Social Impacts of Web 2.0

In the popular mind and press, Web 2.0 is nearly universally celebrated as a socially beneficial development which has unleashed the creative energies of millions of Internet users, enhanced writing and reading throughout the society at all levels, and created new opportunities for entrepreneurs and traditional businesses to innovate. Among professional Web acolytes that attend technical conferences and Web seminars, Web 2.0 is a significant extension of the Internet.

Nevertheless, because it effects so many dimensions of life, Web 2.0 has on occasion strained the civic sensibilities of many, including its most ardent fans and supporters. Below we discuss three areas of social strains created or enabled by Web 2.0: accountability, privacy, and intellectual property.

Accountability, Identity 1.0, and Trust

When you read a blog or entry to a blog online, or a post, how do you know who it really comes from? When anyone can establish a Web identity that is anonymous or does not reflect their true identity, and when that person can find a forum to create and distribute content to very large audiences, the situation is rife for imposters, fraudsters, and criminals to create and distribute patent falsehoods for their personal gain (monetary or social). While the Web might have evolved into Web 2.0, identity is still rooted in Identity 1.0: there is no control over identity on the Web and imposters are many.

In this environment, it can be very difficult to assign identity, and hold people accountable. One result is a lack of trust in what people say in Web 2.0 environments. In fact, for many people, there is an expectation that online statements have a high likelihood of being false and misleading, and without merit.

Where identity and accountability are difficult to ascertain, and trust is low, the likelihood that crowds are wise is diminished. Traditional media like radio, television, and newspapers are operated by "professionals," and usually have a legitimate business interest in "getting it right" and staying within the law. Generally, the speakers are identified. In many Web 2.0 applications, contributors do not have an interest in "getting it right," and in some cases are encouraged to violate the law because they believe their identify cannot be established.

Two examples serve to illustrate the issues.

False rumors. In the financial debacle of 2008, Bear Stearns, one of the world's largest investment banks, was forced to close its doors in part because false rumors spread on Internet blog sites and coursing through innumerable social networks. During the week of March 10, 2008, rumors spread about liquidity problems at Bear Stearns, eroding faith in the company and its ability to meet its financial commitments. Its stock price fell, counterparties were unwilling to make secured funding available on customary terms, and, according to the Securities and Exchange Commission, "a crisis of confidence" occurred.

Most people believe banks are nearly impregnable, guaranteed by the federal government, and trustworthy institutions. In fact, banks and investment banks in particular are very sensitive to public trust and confidence because they lend out anywhere from ten to fifty times as much money as depositors

place with them. Should depositors and investors get the idea that their money is not safe, they will demand immediate repayment ("run on the bank"). Or trading partners will stop doing business with bank by refusing to accept their credit. No bank, not matter how well run, can satisfy the demands of a bank run.

It is difficult for authorities to identify the originators of false rumors because of the difficulties of establishing timing, and identity. Sometimes they do identify the perpetrators. On April 24, 2008, the SEC (Securities and Exchange Commission) filed an injunctive action in federal district court in New York against Paul Berliner, a proprietary trader at Schottenfeld Group, alleging that he intentionally spread false rumors about The Blackstone Group's acquisition of Alliance Data Systems while selling ADS short.

The SEC's complaint alleged that after ADS had entered into a definitive agreement to be acquired by Blackstone at a price of $81.75 per share, Berliner sent instant messages to numerous individuals, posted on blogs, and informed others on various social network sites, including traders at brokerage firms and hedge funds, spreading false rumors that ADS's board of directors was meeting to consider a revised proposal from Blackstone to acquire ADS at $70 per share. These rumors allegedly caused the price of ADS stock to drop from $77 per share to an intraday low of $63.65 per share, a 17 percent decline. Berliner allegedly profited by short selling ADS stock at the same time he was disseminating the false rumors, making approximately $25,000 in trading profits before the stock price recovered later in the day.

The SEC charged Berliner with securities fraud and market manipulation. Without admitting or denying the SEC's allegations, Berliner agreed to settle the case by consenting to the entry of an injunction against him, disgorging $26,129 in profits and interest, paying a $130,000 civil penalty, and being permanently barred from association with any broker or dealer.

SEC Chairman Christopher Cox stated that the message of the case was "simple and direct": The SEC "will vigorously investigate and prosecute those who manipulate markets with this witch's brew of damaging rumors and short sales." In fact, while Berliner was a small player and just the top of the iceberg in terms of Internet-enabled market manipulation, the SEC has not vigorously investigated or prosecuted in this area.

Malicious behavior. Nationwide, more than four in 10 teens have been victims of taunts and threats via social network Web sites such as MySpace and Facebook, instant messages and text messages from cell phones, a new survey says. One in eight reported feeling scared enough to stay home from school, according to the survey by the National Crime Prevention Council.

Lori Drew, 49, was a mother in St. Louis who wanted to support her daughter in a disagreement with another girl, Megan Meier. After her teenage daughter had a falling out with Megan Meier, who lived nearby, Drew reportedly created a MySpace.com profile under the fictional name Josh Evans and established a romantic, online relationship with Megan. After a month long flirtation in late 2006, "Josh" ended the relationship on Oct. 16, 2006, according to reports. Distraught, Meier ran up to her room and hung herself. She died the next day.

In May 2008, a grand jury in California where MySpace has its headquarters handed up an indictment charging Drew with one count of conspiracy and

three counts of unauthorized computer access. She now faces a maximum of five years in prison on each of the federal charges.

Of course Bear Stearns might have failed on its own account regardless of false Internet rumors. And mean-spirited people can use a variety of tools other than the Internet to attack others, and cause great harm. Nevertheless, both these cases illustrate how things can go wrong in a highly connected Web 2.0 culture which empowers criminals and misanthropes just as much as the average citizen.

Information rights: Privacy and the Market Value of Your Personal Information

Personal privacy is often identified as the one public value most threatened by Web 2.0. Privacy is the claim of individuals to control their own personally identifiable information, and to put limits on what information can be gathered by government, private firms, and other individuals. Privacy is a bedrock value of a democracy: how else can citizens formulate their ideas, express themselves, and work together to support their views politically unless they are free to think without interference? Unfortunately, a great deal of money is to be made invading your privacy.

Web 2.0 sites are intended to be places where you reveal information about yourself. They enable you to create personal profiles, share them with friends and sometimes complete strangers; share your home videos and photos, and your political opinions. While some of this sharing can take place behind aliases and user names, a great deal of sharing is not so protected from personal identity, and many people, especially young people, forego restrictions on sharing and essential "go public."

In an age of Web 2.0 it seems on the surface that privacy is voluntarily forsaken by participants. Generally, Web 2.0 sites have not been successful advertising platforms despite the fact these firms command considerable value when sold. For instance, in October, 2007 Microsoft purchased a 1.6% interest in Facebook for $240 million, valuing Facebook at a whopping $15 billion! How could this be for a Web site whose advertising revenue was a paltry $240 million in 2008 (which barely covers the costs of bandwidth to service its users)?

Answer: much of the market value of Web 2.0 sites like MySpace, Facebook, Digg, Delicious, and Flickr and others comes from the fact that they know so much about their users that they can profitably sell this to advertisers. In other words, the market capitalization value behind many Web 2.0 social sites comes from their potential for selling your personal information—your tastes in movies, travel plans, product mentions and preferences, reading, etc.—gathered at Web 2.0 sites to other third parties without your consent or control. This is the only way most Web 2.0 sites have been able to "monetize" their operations.

But just because Web 2.0 sites attract so many users and so many self-expose their personal information does not mean privacy is not important to Web 2.0 users. On social network sites, for instance, you can limit access to your personal profile to whomever you want and hence retain control over its distribution (although you cannot limit how the social network site will use this information). Remember, "control over your personal information" is the key to privacy. In fact, people care a great deal about control over their personal information, as Facebook found out in 2007.

On November 7, 2007 Facebook introduced the world to Facebook Beacon, a program that allowed over forty other Web sites to post user activities to their Facebook profiles as "social ads," and then share this information with the user's friends on Facebook. Beacon would take personal browsing information from forty-four Web destinations and mash it up with Facebook's internal information to help build more focused advertising messages. Facebook then planned to sell this information to advertisers so they could spin highly targeted ads to users on Facebook—all without the users' consent, and based on automatic sign up which forced users to "opt out" if they did not want to participate.

Some of the "partner sites" that would allow the Beacon program to collect data on Facebook users were Kongregate, LiveJournal, NYTimes, Sony Online, Blockbuster, Bluefly.com, STA Travel, The Knot, TripAdvisor, Travel Ticker, TypePad, viagogo, Vox, Yelp, WeddingChannel.com and Zappos.com. On the sell side, large advertisers such as Coca-Cola (KO), Sony Pictures, Verizon and forty other firms signed up to get access to Facebook users' personal information in order to sell them targeted ads.

In a few days, over 45,000 Facebook users signed an online petition objecting to the invasion of privacy and the manipulation of their social networks for commercial gain. Thousands of bloggers reaching millions of Internet users helped spread the word further. By December 7, 2007, the CEO of Facebook, Mark Zuckerberg, announced substantial changes in Beacon, including changing to an "opt in" rule. Since then, Beacon has attracted no major advertisers who themselves did not want to be identified as privacy indifferent.

Other privacy concerns about Facebook involve the difficulty of removing user profiles from Facebook servers, difficulty protecting personal information from outside hackers, and Facebook's privacy policy which essentially allows Facebook to use personal information users place on its site for any commercial purpose or third party use whatsoever.

Web 2.0 has not meant the end of demands for personal privacy although it has presented Web 2.0 firms and large advertisers with opportunities for invading personal privacy on a scale hitherto unknown. Concerned citizens have successfully used the Web and even Web 2.0 to organize opposition to privacy invading plans. The key issues remain:

- User informed consent
- Control over personal information
- Transparency in the user of personal information
- Selling of personal information to third parties
- Security of personal information held by Web 2.0 sites

The message behind of Facebook's Beacon experience is not simply that social networking sites want to sell your personal information to make a buck, but that online privacy-regarding communities can effectively block these efforts of networking sites. Beacon shows us that privacy is alive and well on the Internet.

Intellectual Property Rights

Because Web 2.0 applications and Web sites make it easy for just about anyone to post information to their blogs, YouTube, and social network profiles, Web 2.0 enables the violation of intellectual property rights by allowing users to post copyrighted material without permission of the its owners.

Intellectual property is intangible property which is a product of the mind that is fixed and expressed in some sort of medium, e.g. video, television, print, etc. Intellectual property is protected in law by copyright, patents, and trade secrets. The Internet in general has made it difficult for intellectual property owners to protect their rights. Web 2.0 has exacerbated the problem by making it really easy for millions of people to violate intellectual property rights.

While the history of pirated music on the Internet is well known, less well known is the piracy of Hollywood movies and music videos on sites like YouTube and Facebook. YouTube for instance is estimated to be the largest repository of music videos on the Internet. These videos were posted by thousands of individuals without the permission of copyright holders like Viacom (owner of music). Viacom estimates that nearly 80% of the page views on YouTube involve visits to pirated music videos and other video owned by production studios. While millions of people post amateur home videos on YouTube, the vast majority of these are viewed by a few friends. The real money at YouTube is made from being a repository of high quality, professional video that have been posted without the permission of its owners.

In March 2007 Viacom (one of the world's largest media companies and owner of MTV networks which produces and sells music videos) filed suit against Google seeking more than $1 billion in damages for allowing users to upload clips and copies of Viacom's copyrighted material on the Google-owned YouTube site. Google argues that the law provides a safe harbor for online services so long as they comply with copyright takedown requests. The Digital Millenium Copyright Act (DMCA) requires all Web sites to remove copyrighted material when the copyright owner requests a takedown. Viacom in turn claims this imposes an extraordinary burden on copyright owners, and in any event is not sufficient because YouTube has not provided the means to quickly ascertain the presence of stolen copyrighted videos. YouTube claims that it cannot tell what music videos or music is copyrighted.

Viacom has requested that Google turn over every record of every video watched by YouTube users, including users' names and IP addresses. Viacom hopes to prove that infringing material is more popular than user-created videos, which could be used to increase Google's liability if it is found guilty of contributory infringement. If infringing material is found to be larger than or even close to the popularity of user-created videos, the courts may well reason as they did case against Kazaa and Grokster that the primary intended purpose of YouTube is to offer visitors stolen content that is very popular in order to make a profit from the stolen content. Google argues that it really cannot control what its users post to YouTube (similar once again to Kazaa's argument in prior cases). In July 2008 the court agreed with Viacom and ordered Google to turn over the logs on a set of four tera-byte hard drives.

The Viacom temporary legal victory is one example of courts in the United States and Europe ruling in favor of content owners. In Europe, Louis Vitton and Tiffany have been successful in cases against eBay whose members were selling counterfeit products under the Vuitton and Tiffany brands. The Brussels Court of First Instance delivered its verdict in February 2007 in the case opposing Google's reproduction of newspaper headlines and short news extracts belonging to Belgian newspapers and collecting societies. The Court ruled that the reproduction and publication of this material, and the use of Google's cache and the publicly available data storage of articles and docu-

ments, violate the law on authors' rights. The Court ordered the search-engine to stop reproducing extracts from Belgian newspapers.

Web 2.0 site owners have often taken an aggressive stand against copyright owners and intellectual property law in general in large part because a very large part of their revenue is dependent on the unfettered us of high quality content owned by others. Exceptions to this generality are photo sharing sites which generally are almost entirely based on user contributed photos.

7. Web 3.0: The Future Web

Every day about 75 million Americans enter 330 million queries to search engines. How many of these 330 million queries produce a meaningful result (a useful answer in the first three listings)? Arguably, fewer than half. Google, Yahoo!, Microsoft, and Amazon are all trying to increase the odds of people finding meaningful answers to search engine queries. But with over 50 billion Web pages indexed, the means available for finding the information you really want are quite primitive, based on the words used on the pages, and the relative popularity of the page among people who use those same search terms. In other words, it's hit and miss.

To a large extent, the future of the Web involves developing techniques to make searching the 50 billion Web pages more productive and meaningful for ordinary people. Web 1.0 solved the problem of obtaining access to information. Web 2.0 solved the problem of sharing that information with others, and building new Web experiences. **Web 3.0** is the promise of a future Web where all this digital information, all these contacts, can be woven together into a single meaningful experience.

Sometimes this is referred to as the **Semantic Web.** "Semantic" refers to meaning. Most of the Web's content today is designed for humans to read and for computers to display, not for computer programs to analyze and manipulate. Search engines can discover when a particular term or keyword appears in a Web document, but they do not really understand its meaning or how it relates to other information on the Web. You can check this out on Google by entering two searches. First, enter "Paris Hilton". Next, enter "Hilton in Paris". Because Google does not understand ordinary English, it has no idea that you are interested in the Hilton Hotel in Paris in the second search. Because it cannot understand the meaning of pages it has indexed, Google's search engine returns the most popular pages for those queries where 'Hilton' and 'Paris' appear on the pages.

First described in a 2001 Scientific American article, the Semantic Web is a collaborative effort led by the World Wide Web Consortium to add a layer of meaning atop the existing Web to reduce the amount of human involvement in searching for and processing Web information (Berners-Lee et al., 2001). Views on the future of the Web vary, but they generally focus on ways to make the Web more "intelligent," with machine-facilitated understanding of information promoting a more intuitive and effective user experience. For instance, let's say you want to set up a party with your tennis buddies at a local restaurant Friday night after work. One problem is that you had earlier scheduled to go to a movie with another friend. In a Semantic Web 3.0 environment, you would be able to coordinate this change in plans with the schedules of your tennis buddies, the schedule of your movie friend, and make a reservation at the restaurant all with a single set of commands issued as text or voice to your

handheld smartphone. Right now, this capability is beyond our grasp. Work proceeds slowly on making the Web a more intelligent experience, in large part because it is difficult to make machines, including software programs, that are truly intelligent like humans. But there are other views of the future Web. Some see a 3D Web where you can walk through pages in a 3D environment. Others point to the idea of a pervasive Web that controls everything from the lights in your living room, to your car's rear view mirror, not to mention managing your calendar and appointments. Other complementary trends leading toward a future Web 3.0 include more widespread use of cloud computing and SaaS business models, ubiquitous connectivity among mobile platforms and Internet access devices, and the transformation of the Web from a network of separate siloed applications and content into a more seamless and interoperable whole. These more modest visions of the future Web 3.0 are more likely to be realized in the near term.

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