

# CONVERGING MEDIA

## An Introduction to Mass Communication

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# Digital Media: Online and Ubiquitous

# 6

**The still frames from** an early Lumiere film, *Man Hammering Wall*, may seem an unlikely example to use when talking about digital media. However, when one considers the size and resolution of the images there is a striking parallel to early video on the Internet. With tiny video screens on computer monitors, poor resolution and the jerky motions of streaming video that too often freeze completely, many today ask why anyone would want to watch television over the Internet. They conclude that online video has no future.

But consider further parallels between early film and online video. Lumiere asked himself much the same question about films such as *Man Hammering Wall*: How long would people be willing to pay to see something they could see every day? His question was valid only as long as that was what filmmakers confined themselves to filming





and as long as the technology never improved—both of which of course turned out to be false assumptions.



He did not see that technology would improve the images and that filmmakers would use human imagination to portray stories previously only dreamed of.

The same considerations can be applied to online digital media today. If technology freezes at its current level, then the naysayers are probably correct—online video and multimedia likely do not have a future. But a more important point to consider, and perhaps the most important lesson to be learned from this chapter and even from this book, is that digital media do not have to be simply the same old media delivered digitally. With creativity and imagination, they can be much, much more.

## OBJECTIVES

In this chapter we will:

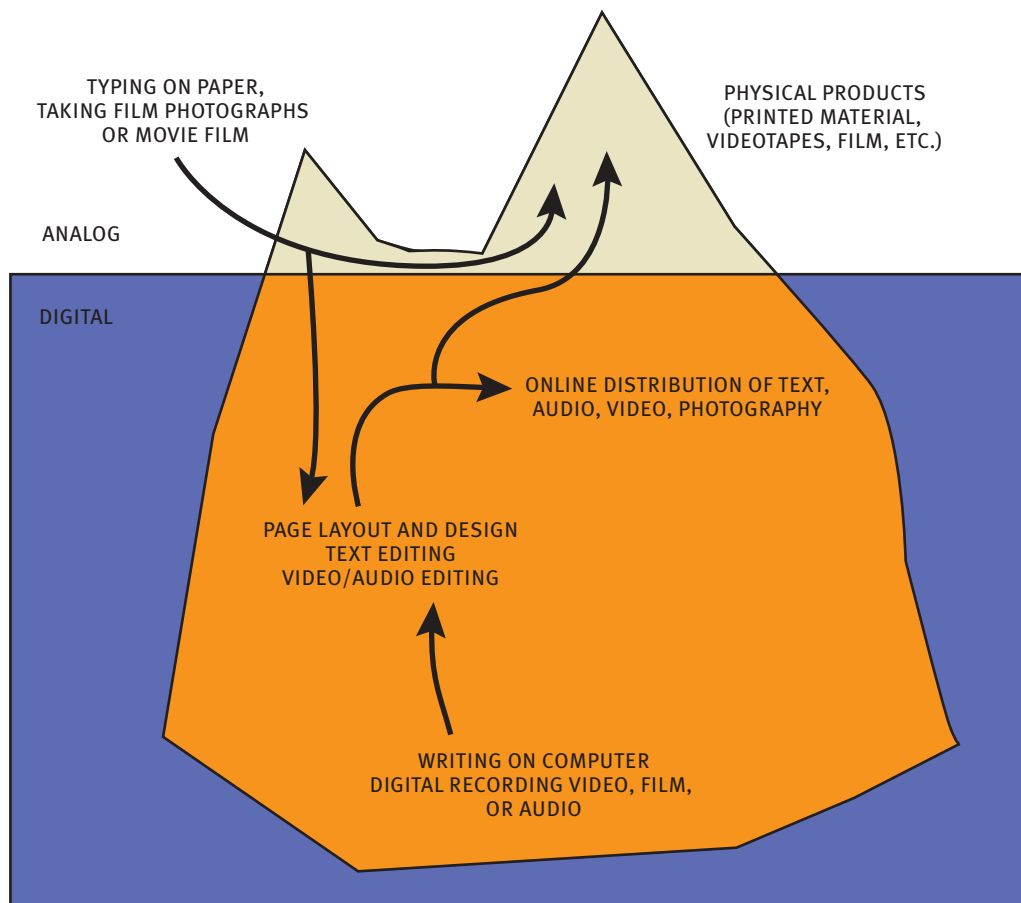
- Describe what makes digital media ubiquitous and different from other types of media.
- Outline the main forms of online media content relative to traditional types of media.
- Examine how traditional types of media content are likely to change in a world of digital media.
- Compare potential business models for online media companies.
- Describe current and future trends in digital media and how these will affect existing media companies.

# Prologue

It should be clear by now that digital media are not simply improvements on or enhancements of other forms of media in the same way that broadcast television could be thought of as “radio with moving images,” for example. Changes in media brought about by digitization and the Internet are much more fundamental and transformative.

Yet ironically many of these fundamental changes will not be immediately apparent to the average media consumer. People will still watch movies and television; will still read books, magazines, and newspapers; and will still want to listen to music. For many people it will not matter that a song was created, produced, and even distributed digitally. But as we have seen in previous chapters and will see in the next section, digitization of media alters and threatens existing media business models, creates new opportunities for media content creators, and causes shifts in how media consumers access, use, and interact with media.

A useful analogy in comparing the state of digital and analog media today is to picture an iceberg floating in the ocean (see Figure 6-1). Just as only a small percentage of the whole iceberg is visible above the water, in today’s media world the primarily analog media products we see, such as books or videotapes, are only a small part of the overall media creation process. Most mass media today already utilize digitization in some way, even if the final product is still predominantly analog. But this will change over time as consumers get more of their media content digitally.



**Figure 6-1. Media iceberg**  
Digitization of media can be seen as a floating iceberg, with analog products as an increasingly small part of the media production and distribution process.

Four key concepts of digital media discussed in Chapter 1—**multimedia**, **interactivity**, **automation**, and their ethereal quality—are worth reviewing briefly here:

**multimedia**—a combination of different types of media in one package; thus film or video with sound is a type of multimedia because it combines visual and audio elements. Web pages that combine text, video, animation, audio, or graphics are another type of multimedia.

**interactivity**—although an exact definition is still being debated, for digital media purposes interactivity can be defined as having three main elements: 1) a dialog that occurs between a human and a computer program, 2) a dialog that occurs simultaneously or nearly so, and 3) an audience that has some measure of control over what media content they see and in what order they see it.

**automation**—a process in which machines or computer programs do the work that was formerly done by humans. In mass communication terms, automation can range from spreadsheet programs that sort data in a variety of ways to Web site search engines and other such programs.

**collaborative filtering**—a process carried out by software that records a Web site user's viewing or buying patterns and then compares those with similar patterns by other users to determine some likely areas of common interest. Amazon.com is the most famous example of a company using collaborative filtering to help suggest books and products of interest based on previous activity on the site.

- **Multimedia:** Combining video, audio, and text is not unique to digital media—everyday television is just such an example of multimedia—but digital media allow for easier creation of multimedia than in analog media and provide for greater opportunities in fully integrating media types to complement each of their strengths.
- **Interactivity:** The ability to interact with media content and obtain unique, personalized, or localized information is a powerful force in changing how the public uses and perceives media. It greatly shifts the balance of power from passive media consumers to active media consumers and creators.
- **Automation:** By creating various programs and automated functions such as search tools, **collaborative filtering** (automatically determining likely interests based on previously viewed or purchased material and comparing that to what others who have purchased the same material also bought or viewed), and updating content, computers greatly reduce the amount of work humans must do and, increasingly, can supplant some human roles in the media production workflow process.
- **Ethereal quality:** Digital media are not actually physical products, like books, photographs or CDs, although they usually are eventually represented in some kind of physical product.

But even as far-reaching as these elements are in changing the media landscape, they are still incomplete without one important element: a network that connects computers or media devices to each other so they can communicate. There are many kinds of networks, but we will concentrate primarily on the Internet and the World Wide Web. Because all data that pass through the various networks—telephone, cable, or satellite—are at one or more stages digital, we will use the term “digital media” to mean not only digital but networked, or online, media as well.

Out of all modern media, the Internet/World Wide Web reached 50 percent of U.S. households faster than any other media technology. As of June 2002, Nielsen Netratings show that 58 percent of U.S. households, or 166 million persons, went onto the Web.<sup>1</sup> It is important to note here, however, that the Internet is more complex in its requirements for adoption than all other media. One can't simply go out and “buy an Internet” as one could for most other media, such as radio or TV. Instead, one must first have a computer and a means of connecting it to the Internet, plus a higher level of technical media literacy to use the computer than is required for a television or even VCR (see Table 6-1).

## What Is Online Communication?

The broader topic of online communications, of which the Internet is a vital part, must be clarified. Although many may consider the term *online* as synonymous with the Internet, *online* is in fact a term with a larger meaning. *Online* refers to

**Table 6-1: Number of Years to Reach a 50 Percent Penetration of U.S. Households**

Technology/Medium	Years
Newspapers	100+
Telephone	70
Phonograph	55
Cable Television	39
Personal Computer	19
Color Television	15
VCR	10
Radio	9
Black & White Television	8
Internet/World Wide Web	7

Sources: John Carey<sup>2</sup>; Electronic Industry Association; U.S. Dept. of Commerce.

the interconnected, networked media that permit the direct, electronic exchange of information, data, and other communications. Everything from local area networks to wide area networks, such as the Internet, are part of the online world. (Local area networks allow communication in limited environments, such as inside an organization.) In other words, the Internet and the World Wide Web are part of the online communications world; they are not the entire online world. However, the Internet and the Web are among the most important parts of the online world for mass communication, because they are where much digital, online media content resides and is available to the public.

## Social Implications of Digital, Online Media

Digital media of course plays a role in every communication function that analog media plays, ranging from surveillance to entertainment. Whether democracy and society ultimately will be better served by an Internet-connected society is impossible to say. However, there is no doubt digitization and online media are changing and will continue to change mass communication and the public that receives almost all of its entertainment and information from mass media. Media organizations face many challenges, as have been mentioned in previous chapters, but so do media consumers. Three general trends can be discerned with digital, online media that will affect our interactions with media.

### Nonstop Media

A 24/7 media environment is quickly emerging, if not already here. Newspapers have had to create policies so their online versions do not scoop their printed morning edition the next day—as much so they do not tip off their competitors as



Twenty-four-hour news stations such as CNN have made the public used to having media access around the clock.

for not wanting to hurt their own newspaper sales. With cable TV there is of course 24-hour entertainment and news, and the always-on nature of the Internet has taught the public that they can obtain specific media content on demand as long as they are connected to the Internet. Even media that we are accustomed to thinking of as “set” once created, such as magazines or books, can easily be updated at any time if they are distributed in digital form.

A nonstop media environment, although increasing the opportunities for news, information, and entertainment, also has its negative side. With new messages being delivered all the time and a huge choice of media to interact with, it can be very easy to become distracted with flashy entertainment or essentially “drown” in information.

## Pervasive Media

The pervasiveness of the media system means that wherever one goes, there is likely to be unprecedented access to mass communication. A new media pioneer who works as a civilian researcher in a naval research lab once remarked that he was leaving for a week’s vacation in the Caribbean on an island where there was no Internet, no phone service, and no communication services of any kind. He had to escape. Unfortunately, with today’s global satellite communications, it’s not possible to truly “escape” anywhere on the planet. In May 1996, climber and guide Rob Hall was trapped high on Mt. Everest for more than a day after a sudden storm hit. Unable to descend and unable to be rescued, he did talk to his pregnant wife in New Zealand by satellite phone, the last communications he made.<sup>3</sup>

Increasingly portable media devices and flat-panel screen technology improvements also mean that we have a growing ability to take our media with us and access it (or have it thrust upon us) in places where we previously did not





Portable media devices such as Web-enabled cell phones are part of a growing trend of pervasive media in our lives.

encounter media. Displays in elevators are one example of how advertisers are using technology to reach a captive audience.

Pervasive mass communication means better access to entertainment, commercial information, and news. Such access means there is at least the potential for a better-functioning democracy, because more information is available. Of course, better access may not come evenly to all or allow everyone to benefit equally from that access. Simply providing more information into the media system may often result in a widening, rather than a narrowing, of the gap in knowledge between those in high and low socioeconomic groups.<sup>4</sup>

## Personal Information Space

The convergence of digital media is leading to the development of a **personal information space**. A personal information space is a virtual location assembled and accessed online where an individual keeps data, or information. It is more than just a digital personal library, however. In a personal information space, one can process private voice, fax, and e-mail communications, and create, access, and store Web-based media content, including multimedia, all from any location around the world. No longer is one's personal information space limited by geography, time, or culture. One can access a personal information space when mobile computing and communications devices are connected to global, wired, and wireless telecommunications networks.

Increasingly, the personal information space is being integrated with public information space (i.e., the content generated by media organizations and others). Unfortunately, the personal information space is also subject to various threats and dangers, such as erosion of privacy, computer hackers, or technical failures.

**personal information space**—a virtual “space” online in which a user has stored information about him- or herself, contact information, and material the user may have received from the Internet.

## Exploring the Foundations of Online Media

Is computer code protected by the First Amendment? Is a hyperlink a form of free speech, or is it simply a device to take a user elsewhere? Can an Internet Service Provider (ISP) such as Earthlink be sued if one of its members conducts illegal activities through its network, such as selling child pornography or distributing music that a member does not own the rights to? What if an article online libels a person according to his or her libel laws, but the server for the Web site is located in another country with more liberal libel laws?

These examples are all based on actual cases that have been in the news the past few years, and it is guaranteed that there will be more like these. These cases highlight the fact that the convergence of digital technology has blurred the lines in many legal matters that were never an issue in the analog media world. It means that if we are to understand the ripple effects that technology changes have brought to the media world and the ways we use media, then we have to understand at least some basic aspects about digital and online technology.

Why is there a need to understand media technology in order to understand how mass communication affects our lives? It was never necessary to know how a printing press worked to understand if a piece of writing was libelous or was protected by the First Amendment. It is necessary to understand the basic workings of digital and online technology for the same reasons that they are changing mass communication—they create functionalities that no other media has previously been able to do. Hyperlinks are a fairly simple, yet illustrative, example.

Until the creation of **hypertext transfer protocol (HTTP)** in 1991 by Tim Berners-Lee, there was no such thing as hyperlinks except in the imaginations of some researchers. But after it was created and started being used by large numbers of people, new issues began to arise. Although in theory hyperlinks can take the user anywhere else on the Web, in practice many organizations have protested the practice of **deep linking**, or linking to one of the Web site's inside pages, such as a particular story. This is because commercial media sites charge advertising rates based on how many visitors come to their home pages, and deep linking skirts this. On the other hand, it does little use to provide a link with a specific story in mind only to send users to another Web site's homepage and make them find it themselves. But some Web sites compiled links of other Web sites and put them under their own Web address, making it look like the content was theirs.

Another issue has arisen regarding whether a hyperlink is a form of free speech. Another issue has arisen regarding whether a hyperlink is a form of free speech or simply a device that takes a user elsewhere. The answer, according to a federal court in *Universal City Studios v. Reimerdes* (2000) is that links are both expressive and functional and could be subject to regulation. The object of contention in this case was a computer program known as DeCSS, which enabled users to effectively copy DVDs. The judge ruled that it was illegal to not only publish the program on the Web but also, more extraordinarily, to link to any Web site containing the illegal computer code. However, simply writing the Web site address without actually linking to it would be protected as free speech.

In the case of hyperlinks, without an understanding of how they work and what characteristics make them different from traditional media, it is impossible

**hypertext transfer protocol (HTTP)**—a protocol that enables the standardized transfer of text, audio, and video files, as well as e-mail from one address to another.

**deep linking**—a hypertext link to another Web site's inside page or pages rather than its homepage.



Are hyperlinks protected by the First Amendment, or are they simply a device and therefore subject to regulation?

to fully understand how online media are changing the overall media framework economically, legally, and in terms of media use. The same reasoning can be applied to many aspects of online and digital media.

## Historical Development of the Internet and World Wide Web

Prior to the era of the Internet, institutions or organizations that had computers had no simple way for the computers to communicate with each other, even if they were connected by a wire, as computers ran machine-specific languages and programs that could not be understood by other computers.

In 1969, the foundations for the Internet were laid when the Defense Advanced Research Projects Agency (DARPA) launched the Advanced Research Projects Agency network, or ARPAnet. ARPAnet was the first national computer network, connecting many universities around the country for advanced, high-speed computing applications and research. It was not yet the Internet, but it was the beginning of online communications. But there was still no “common language,” or protocol, that computers could use to easily transmit information via the network.

### Creating an Internet Protocol

In 1974, Vinton Cerf, now senior vice president at Microwave Communications Inc. (MCI), and Robert Kahn, now president of the Corporation for National Research Initiatives (CNRI), published their classic article, “A Protocol for Packet Network Intercommunication.” In the article, they specified the design of a **transmission control protocol (TCP)** as a part of the main protocol for the Internet and introduced the first use of the term “Internet.” Also important to the creation of the Internet was the work of Jonathan Postel, who when a graduate student at UCLA outlined along with Cerf some of the key principles that underlie today’s Internet protocols (IP).

**transmission control protocol (TCP)**—a method for computers to have a common language to send messages to each other over a network and communicate.

Although it is difficult to pin down an exact date when the Internet officially started, in 1982 the Defense Department adopted TCP/IP as the basis for the ARPAnet. Moreover, at this time researchers began defining an “internet” (lower case *i*) as a connected set of networks using TCP/IP, and the “Internet” (upper case *I*) as a set of connected TCP/IP internets.<sup>5</sup>

## Creating the World Wide Web

For the first decade of the Internet’s existence, its usage was limited largely to researchers. Use of the Internet required knowledge of a variety of arcane commands and terminology. The limited, specialized nature of the Internet underwent a fundamental change in 1991 when Tim Berners-Lee, an MIT researcher at a physics laboratory in Switzerland, invented the World Wide Web and began to open the use of the Internet to a much wider set of users.

The advent of the Web as a global publishing medium made possible the most fundamental shift in human communication since the advent of the printing press five centuries earlier. The Web enabled easy many-to-many communication over distance and time. In addition, in contrast to traditional media of mass communication, anyone can create and publish on the Web for very little cost or expertise.

The World Wide Web (WWW) is a subset of the Internet and is perhaps best described as a global electronic publishing medium accessed through the Internet. Technically speaking, the Web is made up of an interconnected set of computer servers on the Internet that subscribe to a set of TCP/IP network interface protocols. These technical protocols include assigning to a Web site a Uniform Resource Locator (URL) based on its TCP/IP Internet address, which is the Web site address that Web users are familiar with. URLs include the instructions that are read by a Web browser, a navigational tool to travel the Web.

A Web page is any document, or collection of content, that resides on a Web site. The content can take any form, including text, graphics, photographs, audio, video, or interactive features, such as surveys or discussion forums. A Web site can consist of one page of content or many such pages and can include hyperlinks to other Web sites.

Content on a Web page is tagged, or marked up, using what is known as **hypertext markup language**, or **HTML**, to format the content so it displays correctly on a screen. In addition, each document uses hypertext transfer protocol

**hypertext markup language (HTML)**—the language used to create Web pages and determine how they appear; allows pages to have hypertext links and other interactive features.

## Media Timeline: Milestones in the Early Development of the Internet

<b>1958</b> In response to the 1957 Soviet launch of Sputnik, the U.S. Department of Defense established the Defense Advanced	<b>1958</b> Research Projects Agency (DARPA), whose mission was to develop advanced communications capabilities.	<b>1969</b> Laying the foundations for the Internet, DARPA launched the Advanced Research Projects Agency network, or ARPAnet, the first	<b>1973</b> Vinton Cerf and Robert Kahn developed the basic concept and architecture for the Internet.	<b>1974</b> Cerf and Kahn specified the design of a transmission control protocol (TCP), the basic protocol for the Internet, and coined the term <i>Internet</i> .
		national computer network.		





Tim Berners-Lee

(HTTP), which enables the standardized transfer of text, audio, and video files, as well as e-mail from one address to another.

## Creating Graphical Web Browsers

Another huge gain in making the Internet accessible to even more people was the creation in 1993 of Mosaic by Marc Andreesson, then at the National Center for SuperComputing Applications (NCSA) at the University of Illinois at Champaign–Urbana. Mosaic, which eventually became Netscape, provided a graphical user interface with the Web that computer users who had Macs or Windows PCs could quickly understand and use. Although GUI browsers Viola and Erwise were also created in 1992, by the end of the year Mosaic was being written about in mainstream media and became the most well-known Web browser.

**1975**

Researchers successfully conducted the first TCP communication tests via satellites linking locations across the Atlantic and Pacific oceans.

**1991**

Tim Berners-Lee created the World Wide Web, a global publishing platform, on the Internet.

**1993**

Mark Andreesson and others created Mosaic, a browser, or graphical user interface for the Web, that permits anyone to easily navigate and view pages on the Web using a computer mouse and keyboard. This helped bring the Web out of the specialized domain of scientists and into the mainstream of media and the public.

**1994**

Mosaic Communications Corp. (later Netscape) was formed by Marc Andreesson and colleagues who left the NCSA.

## Media Inventors and Innovators

### E-mail Is Where It's @

It is easy to forget just how much e-mail has changed the way people communicate. It is usually one of the first things people learn to do when getting on the Internet, and it doesn't take long even for computer novices to get hooked enough to check their e-mail inboxes several times a day. More messages are sent via e-mail now than through the U.S. Postal Service. E-mail combines aspects of casual conversation with the permanence of text, as well as speedy transmission of messages.

"E-mail kind of announced itself," said Ray Tomlinson, the computer engineer who invented e-mail in 1971. After debugging his program and several trials to make sure it worked properly, he sent a message to his coworkers saying they could now communicate with people on other computers. The first e-mail message? According to the *Guinness Book of Records*, it was QWERTYUIOP—the keys on the third row of the keyboard. Tomlinson said that testing and debugging his original program was a process of trial-and-error,

and he actually doesn't remember what the first message was.

Once messages could be moved from one machine to another, Tomlinson had to decide on a symbol that would separate the name of the individual from the machine he or she was working on. He said that the symbol @ ("at") was the obvious choice, as any single letter or number could cause confusion. "As it turns out, @ is the only preposition on the keyboard. I just looked at it and it was there. I didn't even try any others," Tomlinson said.<sup>6</sup>

Microsoft created their own graphical browser, Internet Explorer (IE), in 1996 to compete with Netscape's browser, then called Netscape Navigator. By offering Internet Explorer free and eventually bundling it with the Windows operating system, IE was able to become the dominant Web browser in only four years, with 75 percent usage compared to Netscape's 25 percent. In 1999 Netscape was bought by AOL, a year before AOL acquired Time Warner.

As any regular Web user can attest, Web sites and text size often look different not only on different browsers but on different versions of the same browser. More advanced functions or codes on Web sites may not show up on earlier browser versions, thus making it difficult for Web designers and content companies to create Web sites that are consistent across the online audience.

## Millions of Web Pages

Reflecting the continued dramatic, almost exponential growth of the Web, by 2001 millions of individuals and organizations had published "home pages" on the Web. With the cost barriers to entry in the global publishing arena removed or dramatically lowered, the Web for the first time brought press freedom to virtually any citizen with access to a computer and a phone line. Of course, more than half the world lack either or both of these, so we're still a long way off from realizing the dream of fully democratic communications. Still, by comparison, only some 45 percent of households in the United States subscribe to a daily newspaper, whereas almost 60 percent of U.S. adults had Internet (and thereby Web) access as of June 2002. In some Scandinavian countries Internet penetration has reached 75 percent. So even traditional mass media aren't by any means



Weblink

Last Page of the Internet

[[www.1112.net/lastpage.html](http://www.1112.net/lastpage.html)]

necessarily universal relative to the Internet and the Web. Yet, when one considers the fact that only a tiny fraction of the U.S. or world's population has its own printing press, television, or radio station, the Web has dramatically increased the diversity of media voices available. Of course many of these voices are lost in the global cacophony of the Web, but that is a different issue.

## The Internet Today

In its broadest sense, the Internet encompasses virtually all other media, as well as a broad cross-section of human culture, commerce, and creation. Virtually anything one can think of almost certainly exists in some form on the Internet, from information in the Library of Congress to deliberately misleading information created by hate groups or individuals. As distinguished communications scholar Fred Williams once observed, "Going on the Internet is like going through someone else's trash."

The Internet as we know it now is not controlled by any one person or organization. It is a medium of multimodal (i.e., it involves the various senses) content and interactive communications, in particular e-mail, where users (and organizations) send and receive text and increasingly audio, video, photos, graphics, and hyperlinks.

Although much of the content on the Internet is available free to users, there is a growing trend among media and technology companies to start charging consumers, especially after advertising dropped off sharply after the dot-com meltdown in 2000. Content or services that were previously free, such as a given amount of disk space or the ability to check remote e-mail accounts through Web e-mail accounts such as Hotmail, for example, were starting to be offered only to paying consumers. This trend of partially free services or content and payment for what is considered "premium" content can also be seen among media companies online, and it is still too early to tell whether these strategies will be successful in



The creation of a graphical Web browser made the Web more accessible to a greater number of people.

generating revenues. Online media companies are also experimenting with increasingly obtrusive online advertising, such as larger pop-up ad windows or automatic pop-under ads that are changing the look and experience of the Web for users. In the early 1990s there were many debates among users of online discussion groups about whether *any* advertising should even be allowed on the Internet, considering the fact that it was created by using taxpayers' money.

## The Nature of Computer Networks: Key Concepts

Networks have long been a fundamental part of mass communication, especially broadcasting. Networks, or systems of interconnected communication vehicles, can take many forms. In broadcasting, networks of affiliated local stations provide a means of distributing shared programming to audiences across large geographic regions, most typically the entire country. Traditionally, these networks have been linked through analog technology. Today's networks are increasingly digital. This offers several advantages in mass communication, most importantly the ability to transmit multiple streams of information, including audio and video content, text, or other types of data.

In addition, computer-based networks permit the distribution of content to be more flexible, so if one route of the network is unavailable, the network can automatically and efficiently reassemble through a different route. Digital networks permit compression of data, which enables a mass communicator to send more information in the same amount of space on the network. Finally, a computer network easily permits downstream and upstream communications (from the source to the receiver, and vice versa), whereas traditional networks were largely one way and relatively expensive.

A **modem** (a foreshortening of **modulate–demodulate**) is used to convert the digital information in a computer to analog signals for transmission over a phone or cable TV line and to convert analog signals to digital information for a computer. Modems can also operate wirelessly by converting data into radio signals. Modems were invented in the 1960s, before the days of the personal computer, as a means of letting “dumb terminals” (i.e., electronic machines where users typed information on keyboards) dial into a remote computer. These early modems converted the typed characters into audio tones that were sent over the telephone line and then were converted back on the other end of the line where they were received by the computer, which processed the information received.

Today's modems operate in a much more efficient and faster fashion. Whereas early modems were hard-pressed to convert and transmit 300 bits per second, today's modems can convert and send millions of bits per second. This allows them to rapidly send or receive not just text but also audio and video.

### Bandwidth

Bandwidth is a crucial element for online communication to reach its full potential to be a mass medium. Without what is called high-speed, high-bandwidth, or

**modem**—derived from the terms **modulate–demodulate**; a device that converts digital signals from a computer to analog signals for transmission over a phone line, as well as analog signals being transmitted to digital signals.



**Table 6-2: Connection Speeds to the Internet by Carrier Type**

Carrier Technology	Speed*	Physical Medium
Dial-up Access	2400 bps to 56 Kbps	Twisted pair (regular phone lines)
ISDN	64 Kbps to 128 Kbps	Twisted pair
Cable	52 Kbps to 512 Kbps	Coaxial cable
ADSL	512 Kbps to 8 Mbps	Twisted pair (used as a digital, broadband medium)
Wireless (LMCS)	2 Mbps or more	Airwaves
Satellite	400 Kbps	Airwaves
T1	1.544 Mbps	Twisted pair, coaxial cable, or optical fiber
T3	44.736 Mbps	Optical fiber

Source: Internet Connection Speed Comparison Chart

\*bps = bits per second; Kbps = kilobits per second; Mbps = megabits per second

**broadband** connections to the Internet, most people online are unable to receive audio or video in real time or at the same quality as they are used to from television or radio. **Narrowband** is the term used for low bandwidth communications, such as dial-up phone modems. Bandwidth available for Internet service has traditionally been narrowband via dial-up modems, typically delivering anywhere from 28 kilobits to 56 kilobits per second. Video at these narrowband rates is very limited, usually a small window of jerky motion, of low-resolution imagery and only marginally better sound.

In a technical sense, bandwidth refers to the electromagnetic frequency or spectrum available for delivering content. Bell Labs scientist Claude E. Shannon in 1948 provided a precise mathematical definition of bandwidth, defining the capacity of a communications channel in terms of bits per second. A voice phone call, for example, uses about 3000 hertz (Hz) bandwidth, whereas a telephone modem operating at about 33.6 kilobits per second requires a little more bandwidth, or about 3200 Hz.<sup>7</sup> (See Table 6-2.)

Think of bandwidth not so much as electromagnetic frequency, however, but more in terms of how large a pipe is that comes to your home delivering data rather than a physical thing like water. Someone who is able to tap the large “data pipe” directly can access the flow of data at equally high speeds. Sometimes this is called a “fat pipe.” However, if the pipe that accesses the main pipes is very thin, data will come at only a trickle, no matter how fast his or her personal computer is.

As of 2002, the Internet was relatively limited in terms of available bandwidth. It varied depending on how a user connected to the Internet, such as a telephone modem or a cable modem, although a second generation of the Internet known as Internet 2 brought 45,000 times more bandwidth. At that time the Internet 2 was already providing a very high-speed connection among 170 universities. It promises in the future to bring such high-speed connectivity to a broader portion of society.

One of the great challenges that cable and telephone providers have begun to solve in the past decade is the so-called “last mile” obstacle (not always literally the last mile, but somewhere from a few hundred yards to more than a mile or so). For more than a decade, many cable and telephone companies have had

**broadband**—a network connection that allows for a large amount of bandwidth to be transmitted, which allows for more information to be sent in a shorter period of time. Although there are no agreed-upon transmission speeds that can define broadband, most experts agree it can include ADSL, DSL, ISDN, cable modem, satellite, and T1 and T3 lines, as well as fiber optic trunk lines.

**narrowband**—a network connection that does not provide very much bandwidth, thus receiving and sending information more slowly than broadband connections. Dial-up modems and some of the early wireless connection speeds of 56 kHz or under are considered narrowband.

Although most of the United States has high-speed fiber optic lines, wiring individual homes directly to the trunk lines, the so-called “last-mile” has been prohibitively expensive.



considerable bandwidth available in their backbone or trunk lines but have run into a problem connecting these broadband facilities over the “last mile” to the end consumer. The cost of making these final connections has been prohibitive. But as the cost of the technology has fallen and various technological innovations have occurred, it has become increasingly feasible to provide the last-mile connections. When this is completed, it means that consumers will have the same broadband access that currently only large organizations have.

## Telephone and Cable Company Broadband Services

In the world of telephony, development of the digital subscriber line (DSL) has made it possible to use standard telephone wire, the twisted-pair copper wire in most homes, to provide relatively low-cost broadband capabilities in the home. Other emerging network technologies, such as aDSL (asymmetric DSL, which means high-speed downstream, much slower upstream), are also being deployed by the phone companies.

Telephone companies have lagged somewhat behind in their delivery of high-speed Internet and broadband digital video services to the home, with DSL available in only a handful of markets. Many customers have complained bitterly about late or no installation, technical troubles with little customer support, and lack of communication between the telephone companies and the Internet Service Providers (ISPs) that have hampered easy installation of DSL services (see Table 6-3).

In the cable TV world, the cable modem and the set-top box have made it practical for many cable systems to begin rolling out digital cable services that not only provide digital TV program services to the home but also permit high-speed Internet access and telephone service. Broadband content delivery via already existing coaxial cable systems mean that cable modems are roughly 174 times faster than 56k modems.<sup>8</sup>

One problem of the cable modem is that the network is not switched; the network bandwidth is shared by the users within each local geographic area, or node. In other words, the more users on a given cable modem node, the slower the network becomes. Cable companies can put fewer users on nodes by increasing the number of nodes, but this of course increases their costs. TCI has already indicated that movies on demand or video on demand will be limited in its cable modem service to about 15 minutes in duration.

## Bandwidth Changing Consumer Patterns

Bandwidth availability is gradually increasing as low-cost bandwidth rolls out nationwide in the first years of the twenty-first century and low-cost digital consumer access devices enter the marketplace. The importance of broadband capability to usage patterns on the Internet may be profound.<sup>9</sup> Research shows that Internet users with broadband access already have substantially different behaviors than when they used dial-up connections. One trend that has been noted is that they are more likely to create and distribute media content than dial-up users. Online expenditures more than double for users of broadband services. David Clark says that broadband Internet could bring “Real-time high-fidelity music, telephone, videoconferencing, television and radio programs. . . . There will be new entertainment options, such as movies-on-demand, and new features, such as the ability to call up information about a movie’s director or its actors as they appear on screen. Users will be able to play online games—live—against many contestants scattered around the globe.”<sup>10</sup> Of course, the data on high-bandwidth users are hard to interpret, because those who have access to broadband capabilities in 2002 are, in general, what are called “early adopters.” They tend to have more income, are more educated, and are likely to be two-parent households. They are different by nature than the late adopters, and it may be in part these differences that account for the differences in how they connect to the Internet.

**Table 6-3: Broadband Internet Delivery in the United States  
(in millions of homes)**

Year	Cable Modem	Digital Subscriber Line	Satellite	Fixed Wireless	Total
2001	5.5	2.5	.3	.2	8.5
2002 (estimated)	7.9	4.4	.5	.4	13.2
2005 (estimated)	13.8	11.8	1.4	1.8	28.8

<sup>1</sup> John Carey, “The First 100 Feet for Households: Consumer Adoption Patterns,” paper presented to “The First 100 Feet: Options for Internet and Broadband Access” conference by The Freedom Forum in Arlington, Va. (October 29–30, 1996). Retrieved 20 June 2002, from <http://www.ksg.harvard.edu/iip/doconf/carey.html>.

# Media **Future:** Wireless Broadband Advances on the Horizon

Wireless broadband services are on the horizon in what is sometimes referred to as the third generation of wireless technology (3G). The first generation was analog cellular, and the second generation was digital. At its most basic, 3G wire-

less involves using digital technology to send voice, video, and other data signals over very high radio frequencies. The benefit? Information is sent at fiber-optic speeds while maintaining security and communications clarity. It works by

installing small antennae throughout communities and on towers in the countryside.





# The World of Online Media

In a sense, talking about online mass communication means talking about all of mass communication. Today, countless offline mass communication products, whether print or electronic, also exist in some form online, whether for free or fee. The *American Journalism Review* counts 4925 online newspaper sites, and all of the top-50 magazines by circulation have Web sites, as do thousands of specialized periodicals. Some use their Web sites mainly to showcase their printed material, but others publish original material online as well.

As bandwidth increases, most television stations will place more of their content online, just as an increasing number of radio stations do already. Similarly, more of the cinema and recording arts will become available online as connectivity and bandwidth continue to increase.

Many mass communication sites originally created solely online are also available, from one-person operations to major endeavors by large companies such as Microsoft in their creation of the online magazine *Slate*. Even companies not traditionally involved with mass communication have found that maintaining their own Web sites is an excellent way to communicate directly to a large audience.

The following discussion describes both the current state of and emerging trends in online mass communication and digital media beyond what was touched upon in earlier chapters with the various types of traditional media.

## Online Books

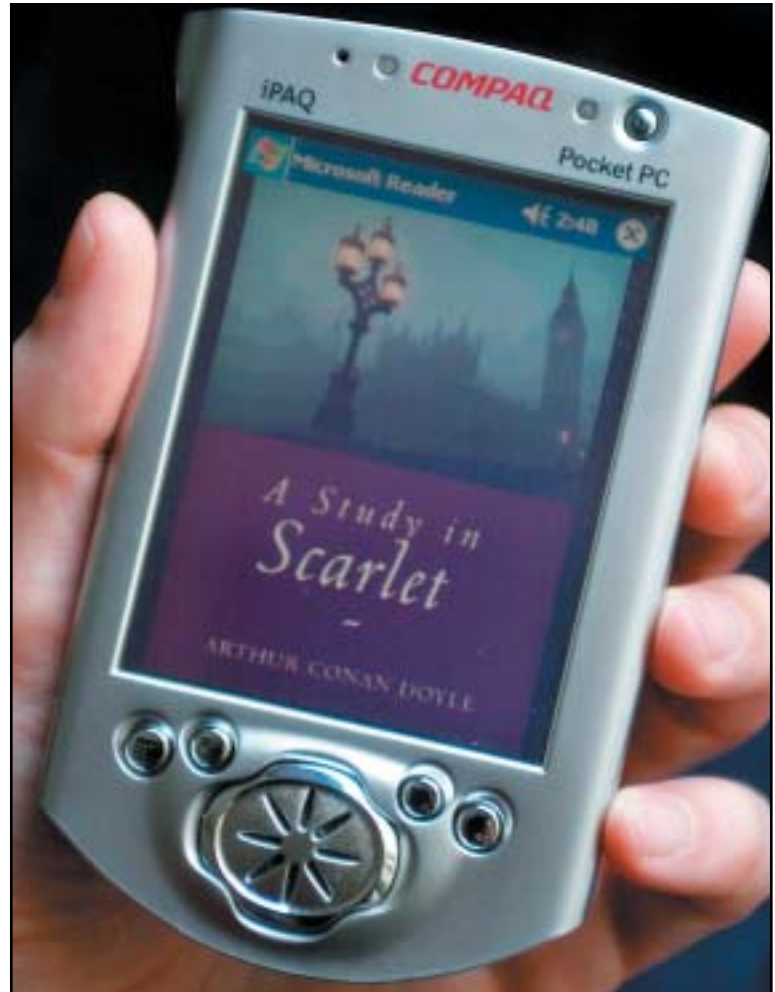
Digital books offer a variety of advantages over printed books, including permitting the reader not only to read the text but to make electronic annotations and bookmarks, access the content of the book via an interactive table of contents, and keyword search the entire text. Digital books and their sale online also point to a fundamental issue in the future of how mass communication industries will derive much if not most of their revenue: from online transactions, or what is called e-commerce.

Although few people still may want to read a book on a standard computer screen, the Internet has brought a growing number of books online and made them available universally. Much of the content of these online books may be most valuable as a research tool, but many may also find them a potentially viable way to read for pleasure. Segments of a book can be printed out, for example, saving weight and space when traveling, and as computer screen technology gets better and creates sharper images, reading on-screen will not be as tiring as it can be today.

In the late 1990s, major publishers prepared for a growing surge in consumer demand for electronic books, and many experimented with the online sale and distribution of digital books. However, after the economic slowdown in 2000, which hit technology and Internet companies particularly hard, and a subsequent slowdown in sales of digital books, publishers started to adopt a slower, more cautious approach.

However, many believe that just as young people powered the paperback revolution, the young are showing a voracious appetite for digital books. Dennis Dillon, a librarian at the University of Texas, was initially surprised at the popularity of electronic books.

Digital books allow readers to electronically annotate text, make bookmarks, and do keyword searches, among other useful functions. Screen clarity can still be an issue for the public, however, as reading text by computer screen for long periods can tire the eyes.



“No one was sure whether anyone was going to read any digital books,” said Dillon, the university’s head of collections and information resources. “We were somewhat skeptical.” After minimal promotion of the University of Texas’s newly purchased electronic books, with titles from *Euthanasia: A Reference Handbook* to *From Barbie to Mortal Kombat: Gender and Computer Games*, they are suddenly the most popular titles in the library. “Usually a book has a one-third chance of being checked out. So to have some titles checked out 25 times in two months—that’s shocking.”<sup>11</sup>

## Media Timeline: Selected Milestones in the Development of Online Media Content

1982

Eleven U.S. newspapers began daily electronic versions via CompuServe, which then had 10,000 subscribers.

1985

Stewart Brand and Larry Brilliant founded the Whole Earth 'Electronic Link (WELL), the first significant online community.

1990

*The Albuquerque Tribune* launched the first PC-based electronic newspaper system, *The Electronic Trib.*

January 19, 1994

*The Palo Alto Weekly* in California became the first newspaper to publish regularly on the Web.

1996

*The New York Times* launched its Web site, as did many other major newspapers (e.g., *The Wall Street Journal*, *Chicago Tribune*, *The Washington Post*).

1997

Streaming audio and video were delivered via the Internet on a regular basis.

Some of the leading online book publishers and distributors conduct their business exclusively online. Among the leaders are netLibrary, peanutpress, 1stBooks and Xlibris. NetLibrary and peanutpress sell and distribute exclusively digital books online. They carry large numbers of titles, ranging from books published by university presses to trade books. Xlibris and 1stBooks are print-on-demand (POD) publishers who specialize in helping authors publish their own books, but they also offer digital books for online distribution.



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 netLibrary  
[\[www.netlibrary.com\]](http://www.netlibrary.com)  
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 Xlibris  
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## Online Newspapers

Newspapers are among the leading providers of online news. Almost half of the top-20 news sites were newspaper Web sites in August 2002, including NYTimes.com, Washingtonpost.com, Gannet Newspapers and Newspaper Division, and Hearst Newspaper Digital.<sup>12</sup> One notable difference between the online and offline worlds, however, is that these “newspaper” sites are in direct competition with the leading national “broadcast” and “cable” television news sites, including the top news site since the terrorist attacks on September 11, 2001, CNN.com, second-place MSNBC.com, and fifth-place ABC.com.

Online newspaper sites also face direct competition on a number of other fronts in the online arena, including to some degree the general public, who can put online eyewitness accounts of events. Matt Drudge’s site was ranked twentieth in August 2002 of top news sites. News services such as AP or Reuters offer their breaking news content online on news aggregator/portal sites such as Yahoo! News, which was in third place. Newspaper Web sites have the potential to take back some of the ground in breaking news coverage that they lost to television, but this can create an odd situation of a newspaper Web site “scooping” its more established print version, which comes out on a set schedule.

The competition online newspapers face with cable and broadcast television news channels shows in part the complexity of the online mass communication world. For example, there is nothing stopping a newspaper from training some of their journalists to shoot and edit video footage, which could then be webcast on the newspaper’s site. The same could apply to audio recording. This is exactly what some newspapers have been doing, such as the Tribune Company, whose flagship newspaper the *Chicago Tribune* and flagship television station WGN are part of a converged news operation providing considerable quality online video news.

**1998**

Online gossip columnist Matt Drudge broke the Clinton–Lewinsky scandal via his Web site, *The Drudge Report*.

**1999**

ABC Television began the first regularly scheduled network-sponsored live Internet news program featuring one of its top correspondents.

**September 26, 1999**

NFL.com became the first major sports league to use the Internet to transmit video of its in-progress regular season games.

**2001**

With 55 million unique visitors to the entire site each month, Yahoo! became the number-one destination on the entire World Wide Web.

**2001**

WSJ.com had over 500,000 paid subscribers, making it the second largest paid news and information site on the Web (*Consumer Reports Online* had 600,000.)

Advertising is another big area in which newspaper companies are threatened by the Internet, especially classified ads. Classified ads make up a large portion of advertising revenues for most newspapers, but online classified ads aggregators can allow people to search far more ads than are usually covered in a newspaper's circulation area. If a consumer wants to look for an item in a region that is covered by four or five different newspapers, there is no reason for that person to go to each newspaper's Web site to look at classifieds when he or she can see them all on one Web site. Likewise, a consumer can visit an online auction site like eBay and reach a nationwide group of potential sellers or buyers.

## Online Magazines

Despite the low bandwidth requirements for online text, online magazines have not been very successful to date. There are very few purely online magazines, *Slate.com* and *Salon.com* being two of the most prominent ones, but even these two online magazines have not been profitable despite publishing articles from world-class writers. Print-based magazines have done little original online content, preferring to use online versions of their magazines mainly for promoting print stories or archiving past issues.

There are several likely reasons that online magazines have fared poorly, despite the apparent benefits the online world would seem to bring to magazines and long-form nonfiction writing in particular because of the lack of space limitations. One of the main reasons is technological; reading long blocks of text on computer monitors becomes tiresome because the resolution of computer monitors has not reached the same quality as text on a printed page. Even once computer monitors do achieve higher resolutions, there is still the issue of portability. In other words, unless monitors can compete with a printed magazine in terms of clarity and portability (and to some extent disposability), there is likely to be a barrier among people in reading anything of any length in a digital format. This of course is not unique to magazines, as digital books and newspapers face the same issues. E-ink or some other digital form of paper may solve this problem, but this will not reach consumers for a few years yet.

Online magazines have had difficulty attracting readers, but better screen resolutions and more portable devices may overcome the reluctance some people have to read online.





## Project Gutenberg: Reading the Classics Online

One of the most impressive collections of online books has been created by Project Gutenberg, with more than 3000 books from the public domain available digitally free via the Internet. In fact, many classic texts required for college English literature and other classes are in the public domain and available for free at this site, so students interested in cutting costs on required books might look online for considerable savings.

Project Gutenberg was started in 1971 by Michael Hart. There are three main categories of books in etext form; “light” literature such as *Alice in Wonderland* or *Peter Pan*, “heavy” literature such as *Moby Dick* or *Paradise Lost*, and reference works such as encyclo-

pedias and almanacs. Etexts are downloadable as plain text files or zipped files, which makes them viewable on the widest number of computer platforms and also makes the text easily searchable with a word processing program. Because of copyright restrictions, they usually do not have books published after 1923. Books are submitted by volunteers, who scan or type in the public domain works and submit them to Project Gutenberg.



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Changing behavior among the public in how they consume media is another factor weighing against long-form, text-based narratives like those found in *The New Yorker* or *The Atlantic Monthly*. With greater competition for their attention during the day, the public seems less willing to spend the time necessary to read long articles. In an online environment, readers are also more likely to click on hyperlinks to get more information rather than wait for the author to fully explain a point. Likewise, an article may be a starting point for a much more robust discussion among Web users in the form of online discussion groups.

However, there could be an important niche for magazines to provide a measure of distance and perspective on issues and to thereby be a voice of authority in their specialized area. If a magazine is perceived as having suitable authority and is respected highly enough by its readers, it seems that the public is willing to pay for online subscriptions. *Consumer Reports Online* is one of the few success stories in the online magazine world, with over 580,000 subscribers who can access archived articles and reviews on various products.



Musicians such as Sheryl Crow are trying to find ways to negate the threat digital media have on their business model and profits.

## Online Music

The MP3 file format represents an interesting example to illustrate how the new networked digital marketplace works. It's indicative how the recording industry is likely to sell much of its music in the future. The \$5 billion recording industry is faced with a dramatic shift as users embrace digital audio and all the flexibility and power it affords them.

The MP3 file format is used to compress near-CD-quality audio of music, which then lets the files, which generally range between 2 and 4 MB in size, be distributed easily over the Internet. There is nothing inherently illegal in the MP3 file format itself; it is simply the technology used to compress audio files. The problems with the recording industry arise because consumers can copy, download, and distribute music largely for free through file-swapping services such as KaZaA. The recording industry has long held that it is acceptable for an individual who purchases an album, cassette, or CD to make a copy for personal use, and it is of course not uncommon for friends to exchange copies of music among themselves. File-sharing of online music takes these exchanges to completely new levels, how-

ever. At any given time during the day, it is not unusual for 1.8 million users to be on a service such as KaZaA, exchanging close to 300 million files. These are not simply audio, of course, and can include video, text, and images as well, but it would be safe to say most of the files being shared are music files.

KaZaA, Morpheus, Grokster, the now-defunct Napster, and many other online peer-to-peer file sharing systems have been at the core of this phenomenon. The issues surrounding peer-to-peer networking, especially regarding the lawsuits against Napster and its subsequent demise, as well as the public sharing music online, are discussed in Chapter 9.

For now, suffice it to say that the major labels and everyone else in the recording industry value chain are enormously threatened by this development. They lose significant control and, they say, their profits and investments are being reduced along with the piracy of their intellectual property. In 2001, the major record labels finally began getting into the online music business themselves even as they maintained their lawsuits against file-swapping services. Warner Brothers, BMG, EMI, Arista, Virgin, Jive/Zomba, and others teamed up to launch MusicNet.com, a for-profit online music distribution service. Consumers pay \$9.95 a month to RealOne, which uses Real Networks to enable music downloads.

Even as the labels become more involved in digital distribution of their music—belatedly, many would say—other industries within the current music distribution industry will also be faced with drastic changes, such as those in the plastics industry, distributors, and retailers.

Finding new songs and artists that you may like may become more difficult than ever in the digital age. As production and distribution costs decrease, more people can create their own professional-sounding (although not necessarily good) recordings and distribute them digitally. One solution that is emerging is the use of intelligent agent-based collaborative filtering, a sort of music club for the digital age. Amazon.com and other e-commerce organizations already are making use of collaborative filtering to alert their customers to new books and music that they would be likely to find appealing, based on previous purchases and the purchasing patterns of people with similar buying tastes.

## Online Radio

Music is one of the most popular forms of online entertainment. Thousands of radio stations offer live webcasts of their regular over-the-air transmissions, although there are unsettled issues regarding royalty payments for webcasts of recorded music. In 2002, the U.S. Copyright Office decided that webcasters must pay 70 cents per song heard by 1000 listeners, half of what a government panel recommended they pay in a decision in February 2000 but still less than what the recording industry was asking. Webcasters also have to pay royalties retroactively from 1998, and many of them said the rates and retroactive payments would cost them hundreds of thousands of dollars and force them to shut down. Traditional radio stations are exempt from this new royalty payment method, successfully arguing in 1998 that they are helping promote the music.

The term *radio* is itself somewhat meaningless in an online digital world in which music is not broadcast over the air but retrieved by users on demand over



Weblink

Spinner.com

[www.spinner.com]



Weblink

Radio-Locator

[www.radio-locator.com]

/cgi-bin/nation]



Weblink

Indie Films

[indie.hollywood.com/]

ifilm

[www.ifilm.com]

BMW Films

[www.bmwfilms.com/]

### Digital Millennium Copyright Act (DMCA)—an act of

Congress in 1998 that reformed copyright law comprehensively in trying to update copyright laws for the digital age. Key provisions included the circumvention of copyright protection systems, fair use in a digital environment, and Internet service provider (ISP) liability for content sent through their lines.

the Internet. In that way, online “radio” is technically audio programming, and in some ways will seem much closer to the current state of on-demand online music downloads, even though the term *radio* may stay with us or change its meaning.

Regardless of the technical approach, online-only radio stations such as spinner.com are free of many FCC regulations and don’t require a license to operate. Moreover, they reach a global audience, and there’s no potential for signal interference. As a result, there are hundreds, possibly thousands of online radio stations. Many of these stations operate independently of any broadcast parent, although legislation is being drafted that will bring them under some of the same rules broadcasters face.

Online radio stations must abide by the **Digital Millennium Copyright Act**, however, which prohibits the advance posting of playlists, which would permit users to plan in advance when to copy songs. Even before the 2002 rulings on royalty payments for webcasts, some online radio stations paid royalties to one of the two music licensors in the United States, the American Society of Composers, Authors and Publishers (ASCAP), or Broadcast Music Inc. (BMI).

Live transmissions of sports events have emerged as an important part of online radio. In the case of major league baseball, Internet users must pay a fee (\$14.95 in 2002) to listen to live audio webcasts of professional baseball games. Some other professional sports, such as the National Football League (NFL), make the audiocasts of their games available for free online.

One of the challenges of listening to online radio is finding stations that are available. One list with more than 10,000 Internet radio stations from all around the world was created by WMBR-FM at the Massachusetts Institute of Technology. It allows for searches by country or region, call letters, format, or frequency.

## Online Film

The Internet has proven a valuable means of distribution for film, especially independent and short films, which have traditionally found distribution to be the most vexing bottleneck in becoming successful. Because independent and short films vary widely in quality and style and are produced outside the mainstream of Hollywood, few theaters, or theater chains, have been interested in showing them. Because of the low cost of online distribution and the potential to build audiences over time and space, a growing number of Web sites provide extensive independent and short films online, typically for free viewing.

Two of the leading independent film sites are Indie Films and ifilm. These advertising and e-commerce-supported sites feature hundreds of independent films and film trailers for free viewing. BMW Films is another interesting example of an online film site, in this case funding the production of independent short films—as long as all funded and shown films feature BMW cars. As commercially oriented as this may sound, the films produced have been of very high quality and not too crass in their commercialism. The quality of the online films available on the site, some done by famous directors, have been praised widely by leading independent critics.

## Online TV and Video

There is a wide variety of sources of video content online. Most television stations and all major networks maintain Web sites. A small but growing number of



them provide at least some of their programming via the Web. An even smaller but growing number of these and other programmers provide near-broadcast-quality video programming via the Web, some of it on demand.

One television station that is delivering video programming in real-time or on-demand via the Internet is San Francisco's KRON-TV, the local NBC affiliate. Viewers can go to the station's Web site and select from a variety of news and information options, including stories reported in text, audio, or video format. These various formats help add depth to the stories that video-only formats simply are not able to do because of the need for interesting visuals, sometimes at the expense of exploring related issues to a story.



Weblink  
KRON-TV Web site  
[[www.kron.com](http://www.kron.com)]

### **Costs of Digital TV and Online Video**

For established broadcast or cable stations, changing to a digital format that allows them to take full advantage of the capabilities of online video can be expensive. Jim Topping, former general manager of KGO-TV (KRON's ABC-owned competition in San Francisco) and then senior vice president (now retired) at ABC-owned TV stations, notes that the installation of a powerful video server cost KGO-TV \$9 million. Other technology to help the station become digital cost another \$12 to 14 million. This investment gives KGO-TV the capability of delivering any of its programming at high quality and on-demand via the Internet or other broadband media. However, the investment KGO-TV made is prohibitive for the majority of stations, especially those in smaller markets.

Of course, a \$9 million investment is not necessary to start transmitting digital video on the Internet. One small-market station has found a way around the high price tag. In Kingsport, Tennessee, DMA 93, WKPT got a digital signal on air for just \$125,000. George DeVault, president of Holston Valley Broadcasting Corp., owner of the ABC-affiliated station, decided to forego HDTV initially and bought and installed a digital system to put a standard definition television signal on air. This low-cost approach is what has opened the door to many independent producers who are now transmitting television-like programming on the Internet.

Public television stations are also converting to digital television. Jerry Butler, senior director for the DTV strategic services group at PBS, reports that as of May 2001, 29 of its member stations were broadcasting digital signals, covering 38 percent of U.S. households. Eight of the digital stations were in the top ten markets, and eleven are in the top twenty markets.

### **Online Programming**

A June 1999 Arbitron NewMedia Internet study showed that at that time almost three-quarters of Internet users in the United States spent up to 30 minutes a week watching streaming video. Nearly half planned to watch more streaming video in the future.

The development of television programming on the Internet has given rise to at least two main types of online video programming: that which has been transferred from off-line television and original Internet video programming. Because so much of online video or television is still in its infancy and still largely constrained by technological issues such as bandwidth, computer storage capacity, and screen resolution, it is likely that these two types will morph or change in

# Media Technology

## Streaming Media

The term *streaming media* refers to a method of delivering audio and video in real time over the Internet either live or on-demand. The quality of streaming media received by the audience depends on several factors, especially how the media content was encoded in the first place (at what level of quality the producer digitized the material, such as the video resolution and frame rate) and the available bandwidth.

For streaming media, a software program known as a codec (compression/decompression) buffers a few seconds of the video, and then the program begins playing on the client's (audience member's) computer, with a few more seconds of material continually being sent via the Internet. In today's network, if there's a great deal of demand on the server or the network, streaming may not always provide an uninterrupted

flow of content, thus causing video frames to freeze or become jerky. Most of the video streamed via the Internet today is fairly poor quality. It is often fuzzy, only a few frames per second, and only a few inches in image size, and often breaks up or is interrupted by network congestion. As the network improves, and as consumers get access to more bandwidth, streaming media will continue to improve in quality and reliability.

The main alternative to streaming media is downloading media content (i.e., transferring the entire video file to a hard drive). Downloading files can be very slow, even if the user has a broadband connection, because despite compression that greatly reduces the size of video files, they can be very large, even gigabytes in the case of high-quality feature-length motion pictures.



ways that we cannot foresee and create some kind of as yet uninvented form of online programming.

An early example of the type of hybrid that may develop is Alternative Entertainment Network TV (AENTV), which combines original Internet video programming and aggregates digital video originally aired on television. AENTV was named one of the “10 Great Video Sites on the Internet” by *Broadcasting & Cable* magazine and has collected hundreds of hours of programming from a variety of TV shows, all available on-demand and for free.



Weblink

AENTV

[[www.aentv.com/](http://www.aentv.com/)]

### Transferred from Television Programming

This type of programming, which simply serves up programming originally produced for television, is still perhaps most common, although there is no definitive study yet available to prove this. Although there are examples from virtually every type of programming category, most “television” programming of this type is simply promotional. Trailers, soap opera clips, and sit-com excerpts are put online to generate viewer interest in an upcoming show that will appear on television. One exception is Comedy Central, which provides much of its television programming online on-demand.

The most common type of nonpromotional programming thus far from over-the-air television stations is news and public affairs. CNN.com, MSNBC.com, CBS News, ABC News, Fox News, and NBC News are among the leaders in providing online video news. The CBS Boston affiliate WBZ provides exceptional regional online video news, as do Seattle CBS affiliate KIRO and NBC San Francisco affiliate KRON. A leading provider of international video news online is the BBC World, which provides live video news feeds online.

Viacom’s 2000 acquisition of CBS has begun opening up greater opportunities for television, or video, on the Internet. With its new Internet division, MTVi, including both MTV and VH1, as well as its recently acquired SonicNet, Viacom CBS is positioned well to provide not only online music but also online music video. Combined with CBS video news strength, the Viacom CBS empire is poised to take a leadership position on many online television fronts.

DTV can be interactive, which opens the door to more participation and interest in shows among viewers. ABC’s Enhanced TV synchronizes customized interactive content over the Web during many of its programs, such as *Who Wants to be a Millionaire* and *Monday Night Football*, which offers an interactive play-along synchronized game as well as live statistics and facts about the players and teams.

ABC has initially focused on the “two-screen” platform whereby viewers have an Internet-connected computer in the same room as their television, so it’s not truly interactive television. There are more than 40 million homes that today are capable of such TV-Internet convergence, which is closer to a critical mass than the current set-top box installation numbers. Currently several companies are trying to make the convergence complete, either as a PC-turned-TV or a TV-turned-PC.



Weblink

SonicNet

[[www.sonicnet.com/](http://www.sonicnet.com/)]

### Original Internet Video Programming

Television programming typically has been provided to the public by a limited set of program providers. They have made their programming available on a scheduled basis, packaged for mass audiences and broadcast according to a controlled



Universities and other organizations are beginning to use the Web to show video lectures of professors or guest speakers.

schedule. Just as online music distribution opens the music recording industry to potentially thousands of new artists (i.e., program providers), the Internet opens the TV business to thousands, perhaps millions, of new TV program providers.

Internet-original programming began with web cams, tiny cameras that attach to a computer that have enjoyed enormous popularity around the world. Web cams have provided typically live feeds of everything from a coffee pot at Oxford University to a seemingly endless series of individuals inviting the public to pay to watch their uncensored private lives.

This early experimentation among amateurs has given rise to much more serious original online video programming, however. Some of the most interesting are web cams set up by researchers to allow viewers from around the world to observe important, unusual, or simply interesting experiments or other research in action. Universities and not-for-profit organizations have also used online video to show lectures from famous guest speakers, panel discussions, or to highlight on-the-scene video footage shot elsewhere in the world that does not make it to mainstream media.

### **Navigating the Million-Channel Universe**

Online programming guides, also known as electronic program guides (EPGs) in digital television or video, are becoming a necessity as Liberty Media chairman



## CBS, Fox, and ESPN



CBS and Fox networks, although behind ABC and NBC in rolling out DTV terrestrial broadcasting, stand out in their use of digital production technology. CBS News and Special Events has been in the forefront in their use of digital technology for producing innovative news and information programming. Dan Dubno, producer and technologist, CBS News and Special Events, has spearheaded the use of a variety of digital tools for news gathering and storytelling. Among the most impressive uses to date have been Dubno's application of remote sensing imagery to generate three-dimensional "extrusions" of a variety of geographic locations, buildings, cities, and

regions for various news reports, including "fly-throughs" of the Middle East; Washington, DC; and other venues for major news stories.

Fox and ESPN have implemented digital technology in sports programming. Among their applications have been the use of digital objects in motion video, including the layering of a "first down marker" on the football field during National Football League games, as well as digital commercial messages layered into the field, the stands, and other locations. Fox also used a three-dimensional digital audio technology to broadcast immersive audio during Superbowl XXXV. Of course, only a few households could experience this immersive audio experience, but it was a sign of things to come.

John Malone's outdated notion of a "500-channel universe" is replaced by a "million-channel universe." Leading the way in the online program guides today is [tvguide.com](http://tvguide.com), the online version of *TV Guide*, with 50 million subscribers. [Tvguide.com](http://tvguide.com) offers viewers a fully interactive and keyword-searchable guide to the coming week's television programming from terrestrial broadcast to cable, satellite, and the Internet. The site also features daily news about television and other media, a database on more than 40,000 movies, and digital video.



Weblink

TV Guide.com

[[www.tvguide.com](http://www.tvguide.com)]

### Will DTV Learn Online Music's Lessons?

The same developments that have challenged the recording industry will start to emerge in the television industry as digital television enters the marketplace and broadband use increases, allowing for fast downloads of large files. Digital video files are much larger than what most people can accommodate in downloads, which has hampered the popularity of video file-swapping online. Fixed media, such as videotapes or DVDs, are still primarily used for on-demand, repeated viewing, although new technologies could easily change this as well and make fixed media obsolete.

The television industry has been closely watching what the recording industry is doing with the hope that they will not repeat the same mistakes. However, concerns about intellectual property theft and unwanted competition have limited some programmers' forays online. Large television companies, broadcasters, and cable companies generally see the Internet and digital video as threatening their loss of control and their existing franchises, and whether they learn from the experiences of the recording industry or follow them in litigation and political lobbying to stop potential threats to their control remains to be seen.

So far, attempts at creating secure digital media have not been successful. They have either been extremely clumsy and overly restricted consumers' ability to play media such as a CD on a variety of devices, have been foiled by low-tech mechanisms such as using a black marker pen to mask digital encoding, or have been extremely unpopular with consumers and thus failed, such as what hap-

pened with the DIVX format that forced consumers to pay per use of a digital video they “bought.”

## Digital Media Economics

Traditionally, media enterprises, like other industrial-age businesses, required heavy capital investment. Capital was required to build the transmission towers for television and radio stations. It was required to buy printing presses and to build cable systems. Not only was the infrastructure expensive, but it created enormous barriers to entry for prospective competition.

In the digital age, these rules are changing. Some of the most significant barriers to entry are shrinking. Capital costs are reduced, as anyone can go online and create a Web site and potentially compete with established media companies. It's part of why relative newcomers such as AOL, Yahoo!, and eBay have been so successful. Of course, the cost of producing quality original content is still relatively high, especially for video but less so for text or audio. Moreover, few media enterprises have found a formula for making profits in the online world, as most people seem unwilling to pay for content and advertising does not seem to be very effective.

Most large online media outlets have the backing of traditional media companies behind them, such as MSNBC.com, a joint venture between NBC and Microsoft, or CNBC.com. With advertising and other revenues being generated from the parent companies, these online endeavors can afford to take losses for a while as online revenue models can be tried and tested. Many smaller, independent media dot-com companies were not so fortunate, especially after the economy and stock market spiraled downward from spring 2000. Some severely scaled back their business plans, and others, such as award-winning online crime news Web site APBNews.com, went out of business. Other online media enterprises such as *Salon.com*, which are still creating quality original content, are now charging for what used to be free.

## Revenue Models for Digital Media

One of the most significant challenges all online media properties face is building a revenue stream not only to cover costs but to return a profit. As of this writing, few content sites had found a way to produce a substantial revenue stream, and, with the tightening economy of 2001–2002 and a substantial drop in venture capital and advertising revenues, the situation is even more difficult. There are several ways online media companies can generate revenues—at least in theory. These include traditional methods such as advertising, subscriptions, and syndication, as well as methods that are either unique or feasible in an online environment, such as e-commerce and micropayments. However, none so far have proven to be inherently better than other method, and dot-com companies as well as online media companies are still experimenting with methods to earn profits. It is likely that more advanced technology will open the door to creative revenue generating models that are unavailable today.

For the time being, the revenue streams that appear most viable for content sites involve a combination of advertising, subscription, and micropayments.

## BNNTV



One of the most innovative developers of quality programming in the online arena is also one of the best independent program producers in the offline television world. BNNTV (Broadcast News Network Television) is a 15-year-old company that embraces a philosophy that is much more tightly in tune with the redefined rule-book of new media.

Founder and BNNTV executive producer Steven Rosenbaum explains BNNTV's objective is to empower viewers to make television and act as an agent to package and polish the content to enhance value. He says *MTV Unfiltered*—which BNNTV helped launch in 1996—was slightly ahead of its time, and they had viewers call in, request cameras, and shoot their own stories, with extraordinary results. Rosenbaum believes that user content will demand stations to rethink the broadcast model by creating new

communities around digital video and storytelling that let the audience tell the broadcasters if that's what they want.

Rosenbaum believes this new mode of “participatory programming” will expand far beyond news and information.

Since its founding, BNNTV has grown with network clients including *CBS News*, *48 Hours*, A&E's *Investigative Reports*, Court TV, The Sci-Fi Channel, the History Channel, MTV, Fox Family, MetroChannels, and VH1.



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CameraPlanet  
[[www.cameraplanet.com](http://www.cameraplanet.com)]  
BNNTV  
[[www.cameraplanet.com/divisions/bnn/](http://www.cameraplanet.com/divisions/bnn/)]

AOL produces substantial revenues, but mostly from its monthly subscription fees, which are actually charges for online service rather than content per se. AOL does produce some revenue from online transactions in the form of online shopping. This may grow significantly in the future as more consumers become used to buying online.

### Advertising

Advertising has proved disappointing in generating revenues for all but the largest portal or content sites, such as Yahoo! or MSNBC.com, which attract millions of visitors. Media companies both offline and online charge advertisers for the cost per thousand (CPM) of audience members. This means a magazine with a circulation of 100,000 can receive more for carrying ads than a magazine with a circulation of 10,000.

In the online media environment, technology allows Web site owners not only to see exactly how many people have visited a given page on the site but to track whether people clicked on the advertisement on that page or not. Because the average numbers of click throughs on ads are generally extremely low (ranging between 0.75 percent for standard banner ads to 1.5 percent for large oversize ads in the center of the screen), advertisers have become more cautious about placing their ads online based simply on the numbers of visitors to a site. It may well be that ads are similarly ineffective in the analog world, but there is of course no way to measure that in the concrete terms that the online world can provide.

Online companies have tried a number of things to improve click-through rates on ads and thereby increase revenues. Larger ads, animated ads, pop-up and pop-under ads have all been tried, but with minimal success. In fact, most computer users seem much less patient with advertising than they are on television

and radio. This could be because the online media world is still relatively new and established rules of behavior have still not been agreed upon, or because media consumers are much more active in getting their media content so that intrusions in the form of advertising are more frustrating than in a passive medium like television, where there is little choice but to change the channel.

### Subscriptions

The most successful revenue-producing media sites have been those that have carved out an important content niche; produced original, quality content; and designed an effective, efficient online presence—and charged a subscription for their site. The two best examples are *The Wall Street Journal Interactive* and *Consumer Reports Online*. *Consumer Reports Online* provides all the content from its well-known magazine, plus additional customizable information and reports on product testing and ratings. With a fee of less than \$50 a year, *Consumer Reports Online* has captured 580,000 paid subscribers. This is only a fraction of the 3 million paid subscribers to its printed magazine, but it is nevertheless a significant number and revenue stream (nearly \$30 million a year).

Most other sites that have tried subscription models, however, have not been as successful. Financial news Web site TheStreet.com, for example, started with a subscription model when it launched but then switched to a free model in June 2000. After a while it moved to a partial subscription model, offering most content for free but charging subscriptions of from \$200 to \$2200 for specialty newsletters or other “premium content.” This partial subscription model is being tried by a number of online media companies as they look for what types of content the public is willing to pay for in a medium that started out and still has most of its information available for free.

### Syndication

Syndication is a long-held part of the business model in publishing and broadcasting, where content providers have licensed everything from opinion columns and comic strips to situation comedies to other content distributors. As the syndication model has migrated to the Internet, content providers such as Reuters, CBS, and Dun & Bradstreet have begun to license their content to Web sites, which subscribe to or pay to republish the content.

Moreover, traditional technologies for distributing syndicated content have proven unreliable and unscalable, which means they break down when large volumes of content need to be moved in short periods of time. For example, in August 2000 the satellite the Associated Press normally uses to distribute its content to its member newspapers and other news providers twice failed in a one-week period, interrupting the flow of news at critical times.

Internet-based content delivery, because of its noncentralized design, is very reliable by comparison. As a result, media content syndication of text, images, sound, and video via the Internet is forecast to become a more than \$6 billion industry by 2005 and will be a fundamental component of the media business model in the digital age.

### E-commerce

E-commerce refers to the electronic commercial environment that emerged in the 1990s, primarily on the Internet. Although the potential of e-commerce was



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*The Wall Street Journal  
Interactive*

[[www.wsj.com](http://www.wsj.com)]

*Consumer Reports Online*

[[www.consumerreports.org/](http://www.consumerreports.org/)]



probably overhyped in the late 1990s, it could be argued that it has likewise been looked at overly skeptically in the post-dot-com boom era.

Yet, e-commerce presents an interesting opportunity in the long run for media businesses operating in the digital age. The online arena is an environment in which consumers can not only get information about products on demand, but, conversely, media and other organizations can deliver promotional messages specifically targeted to individuals based on their online profiles. In many cases consumers can also purchase those products or services and even have them delivered digitally via the Internet, as is the case for music, computer software, digital books, videogames, and some other products. For those that can't be delivered electronically, most are shipped via commercial delivery services anywhere in the world.

A major issue for online media organizations is how to provide a secure environment for payments for online transactions. Many consumers are concerned about the safety of providing a credit card number via the Internet and thus are afraid of venturing online to make a purchase of any type.

Another issue that online media organizations must consider when venturing into e-commerce is maintaining viewer trust in their content and disclosing potential conflicts of interest or even the appearance of conflicts of interest. For example, an online magazine may have a book review on its site, along with a link to online bookseller Amazon.com. It would seem to be a convenient way for a reader who likes the review to buy the book, and it is. However, if the Web site is an affiliate member of Amazon, a common program in which a member receives a commission on each book sold if consumers come to Amazon through a link on the member's site, then the Web site's or reviewer's journalistic objectivity could be called into question. It is in their best financial interest to get people to buy that book, making it appear less likely that a reviewer would give a negative review or write reviews on books that might not sell very well. This kind of behavior, for which several large media organizations have been called to task in the past several years, further erodes public trust in content produced by media companies.

## Micropayments

**Micropayments** are small fees paid for each online transaction, perhaps as little as a penny or even less. The idea is that micropayments would be much like water or gas bills, in which the charged units are so small that users do not object to the costs and are based only on what is actually used. In an online environment, this would mean charging users for downloading media content, such as songs, text articles, or video. Currently, charges for individual songs, for example, are considered high and thus are not popular, and the technology to allow for payments less than a cent is not fully developed. It may seem economically infeasible to charge as little as ten cents or even a penny for a song, for example, but consider the revenue stream if that song is downloaded by millions of users and there are no added distribution or production costs to the producer of the content.

Micropayments could encourage the use of digital cash, a relatively secure form of online payment. With such purchases, a consumer would spend digital cash rather than give a credit card number. There are different digital cash models, but one of the most common is to pay in advance with an online bank account and then have charges deducted from that account. Another option is to place charges on one's monthly ISP bill.

**micropayments**—small fees, even under a penny, paid for each online transaction, such as downloading a song or text article.

## The Business Challenge to Media Organizations

Broadband digital media present both an opportunity and a threat for those in the media and communication industries. On the one hand, long-standing corporations, institutions, and entire industries are being turned upside down by the digital revolution. Businesses built on analog technologies of production and distribution are trying to figure out how to adapt in the digital age. New efficiencies of creating and delivering content in a digital, networked environment are emerging throughout the world. Long-held, highly profitable business models based on the analog world are less viable in a digital marketplace.

Yet, uncertainty prevails in the largely digital world. Dot-com stocks have plummeted. Converting to digital production and distribution costs a lot of money, and the returns are not guaranteed. No wonder so many executives in the media business are nervous about digitization choice and change.

Nevertheless, the new digital world means new business opportunities. It means opening new markets that formerly were restricted by political, economic, and geographic boundaries. It means new storytelling formats that bring true interactivity to television and radio. It means creating immersive audio and video on demand for consumers who want their media, in all its forms, customized according not only to their preferences but also to their current geographic location and many other factors.

Overall, the digitization of television and radio means an expansion of the business pie. In other words, the size of the marketplace is growing, which means extraordinary business opportunities for those brave enough, talented enough, and persistent enough to enter the fray in a creative manner. Established businesses face the additional hurdle of having to deal with their own corporate culture that insists on placing a priority on protecting their existing business interests. This short-sighted thinking opens new opportunities for entrepreneurial startups nimble enough to adapt to an uncertain and rapidly changing marketplace.

## The Convergence of Technology and Mass Communication in Leading Companies

There is perhaps no better example of how convergence of telecommunications companies and media companies is affecting mass communication than AOL Time Warner. There is certainly no larger example, as after Internet service provider (ISP) America Online acquired media giant Time Warner in January 2000 it became the largest media company in the world. The Time Warner portion of the company has already been discussed in previous chapters, with its interests in print, music recordings, film, video, and television. Here we will emphasize the AOL portion to see how it can be seen as a mass communication company in its own right as well, although its roots and strengths lie in the technology and Internet side of the business. Other Internet-only companies or technology companies such as Microsoft, CNET, and RealNetworks are also looked at for similar

reasons. The list is not meant to be comprehensive but simply to demonstrate how convergence blurs the lines between technology and media companies.

## AOL

America Online is the world's largest online communications service provider, with 34 million subscribers as of July 2002 and localized versions of AOL in eight languages in 17 countries. There are 120 million registered users of its popular instant messaging service, ICQ, which is available to non-AOL Internet users as well. AOL operates a unique, proprietary online communications service based on its own computer software authoring environment, as well as providing access to the Internet. This makes it the world's largest ISP as well.

Founded in 1985, the Dulles, Virginia-based firm in 1998 acquired the number-two ISP, Compuserve, which was among the earliest online services along with its then 2 million customers (now 3 million). In 1999, AOL acquired Netscape, a popular Web browser with 48 million users, positioning AOL for global leadership in the Internet and online communications markets. It also put the company in direct competition with Microsoft, which has the leading Web browser, Internet Explorer, and operates its own ISP, Microsoft Network (MSN).

AOL provides its members (what AOL calls its subscribers) with a wide variety of online services, including e-mail, Web browsing, online shopping, and instant messaging. In addition, AOL provides extensive content channels, including news, sports, and entertainment. Most content is provided to AOL by a variety of media content producers, including CNN, CBS News, and the Associated Press (AP). Entertainment content providers include *TV Guide*, EW.com (*Entertainment Weekly*), E Online, and *People*, while music and music-related news and entertainment is provided by sources such as *Rolling Stone* and Sonicnet.

AOL does produce some original content, mostly through its AOL TV, which is distributed both online and via DBS provider DirecTV. Mostly, though, AOL offers its users a convenient, user-friendly bundle of content and services packaged uniquely for AOL's members. An example would be AOL's nicely produced special interactive section on the 2001 Emmy Awards. It featured extensive coverage on the nominees, including text, audio, and video.

All this comes at a price, with subscribers paying an annual fee of about \$270, or a monthly rate of about \$25. Importantly, AOL is easy to install and use, making it a popular service among less technologically sophisticated users and leading to the charge by critics of AOL that it is "the Internet on training wheels." However, predictions by Internet pundits that once users became accustomed to being online they would then leave AOL and its pop-up ads in droves have not come true, although AOL's rate of growth in getting new subscribers has fallen off markedly in the past couple of years.

AOL's 2000 fiscal year (ended June) revenues were \$7.7 billion. AOL employed 15,000 (this is only a portion of the total employed by AOL Time Warner). AOL founder Stephen M. Case is now chairman of AOL Time Warner, the only executive from AOL still left in AOL Time Warner's top-level executive ranks. After the merger with Time Warner, and in the post-dot-com boom, AOL Time Warner's stock fell sharply, leading many investors and analysts to blame AOL for dragging Time Warner down rather than being the engine of growth it

was touted to be before the merger. After an executive shakeup in July 2002 that saw former AOL COO Robert Pittman forced to resign, Don Logan, previously chairman of the Time Inc. magazine division, was named chairman of a newly formed media group that includes AOL and Time Warner Cable as well as the books and magazine divisions. Jeff Bewkes, previously chairman of HBO, was named chairman of a newly formed entertainment division that includes television networks, film and television studios, and music.

## Microsoft

Ranked seventy-second in the Fortune 500, and with founder and Chairman Bill Gates ranked as the world's richest man, Microsoft is mentioned here primarily because of its powerful market influence in software that can in turn determine what types of media are available online. Most computer users look at and use Microsoft products. Although Microsoft is still primarily a technology or Internet company, its forays into content creation and development make it a potentially powerful force in the world of digital media. A merger with a media giant that has lots of content, such as Sony or Viacom, would create a media monolith along the lines of AOL Time Warner.

Microsoft is involved in every aspect of the technology behind content creation and distribution on the Internet. Its Windows Media Player to watch or listen to streaming media was created to compete with RealNetworks RealPlayer and Apple's QuickTime. Microsoft started integrating its Windows Media Player into its Windows operating system, making it easy for consumers to use.

Because Windows Media Player is incompatible with either of the other two proprietary streaming media formats, however, streaming content creators have to duplicate their streaming content for all formats if they want to reach the largest possible audience, which increases production costs. Hardware makers and media content companies in television and Hollywood are wary of relying on a single proprietary standard, however, and are likely to put pressure on streaming media makers to use an open, common standard such as MPEG-4, although these issues are still unresolved.

Microsoft is also an ISP, with its MSN network, and is increasing its broadband capabilities. Its .Net Passport services attempt to give Internet users an easy way to access various types of content and to conduct e-commerce in a secure environment. In a partnership with NBC, Microsoft is part of cable channel and popular news Web site MSNBC.

They have started competing with video game makers with their Xbox video game console and have been involved in development of interactive television, first with WebTV and then with UltimateTV, but cut back on research in the area as of early 2002 as their interactive television ventures had not met with great success.

In 2001, Microsoft had sales of \$25 billion and revenues of \$7.3 billion. They have almost 48,000 employees.

## CNET

CNET Networks is one of the top Internet companies, ranking as the Internet's thirteenth largest U.S. property in 2001 and one that most resembles a tradi-

tional media company in terms of what it creates. CNET Networks covers news in the technology industry through its CNET, ZDNet, TechRepublic, News.com, CNET Radio, and CNET Channel, as well as owning download.com and *Computer Shopper* magazine. In 2001, CNET had revenues of \$286 million, down from \$428 million in 2000.

## RealNetworks

RealNetworks makes the popular RealPlayer software that lets consumers locate and listen to streaming audio and video over the Internet. More than 250 million people have downloaded RealPlayer to stream audio, video, and other multimedia content. It used to be the dominant streaming media software, but Microsoft has made great inroads into its area by bundling its proprietary Windows Media Player for free into its operating system, much as they did with Internet Explorer when they started competing with Netscape's Web browser.

RealNetworks, although it still gets almost 60 percent of its sales from licensing its software to consumers and content providers, has also been striking deals with content providers such as MLB.com for the rights to stream games over the Internet. It is also embracing the open MPEG-4 video compression standard rather than its proprietary RealPlayer standard in order to better partner with mobile hardware production companies. In 2001 it had \$188 million in sales, growing almost 22 percent from the previous year, although it still lost \$75 million in 2001.

## Direction in Online and Digital Media

Digitization of media has lowered production costs and lessened training needed to create professional-quality media content (at least in terms of technical proficiency, if not always in terms of content quality). The Internet has created a networked environment that lets anyone reach a potential audience of millions of people for very little cost. The changes have threatened and will continue to threaten the interests of many established media companies unless they learn to adapt to the changing media environment.

Although rapid improvements in technology make it impossible to accurately predict what specific changes will affect media in the future, there are several basic trends that will influence online and digital media in the coming years. Some of these trends simply accelerate changes that have already been taking place with analog media, while others are unique to the digital, Internet-connected media world.

## From Scarcity to Plenty

It is already very easy to become overwhelmed by the amount of media available, and this trend is only likely to increase. The media world has gone from one of scarcity, where it was difficult to find certain items like rare editions of books, film, or music, to a world in which more than you could ever want can be found largely online or, if not there, then the Internet can show you where to find it.



Issues of space or time that publishers or broadcasters dealt with are no longer a factor online. There is no physical reason to cut a story to 300 words so it fits on a page, although there very well may be reasons of clarity or design to cut a story online. Likewise, it does not matter if an online video segment is longer than three minutes, as there are no advertisers who will get angry that their ad was not broadcast at a certain commercial break. Of course, these analog media limitations can be, and in some cases have been, placed on digital media, but there is no inevitable law that says it must be so.

What this means for media professionals is that they are no longer the gatekeepers of information, deciding what is deemed important enough, given limited resources, to be sent through the media system to be distributed to the public. Rather, they will be filters or matchmakers of information, processing the raw material that almost anyone can access, and shortening, clarifying, and putting it in a larger context for the audience.

This means media consumers will need to become more discriminating about what media they consume so they do not waste time or drown in information overload. Technologies such as collaborative filtering are likely to play a role in helping bring only the type of media content that a person wants.

## Greater Audience Fragmentation

Just as magazine audiences fragmented with the advent of television, and broadcast television audiences fragmented with the advent of cable, audiences are fragmenting even further in an online environment.

This audience fragmentation will have profound effects on advertising revenues, because under the current advertising-supported models media companies get more revenue when they can attract a larger audience.

Greater fragmentation also means that it is less likely that large groups of people will share media experiences and will therefore have less in common than they otherwise would have. The flip side of that argument is that those who do interact with a group that shares their interest can perhaps feel closer to others than if they were in a more homogenized, less fragmented media world.

## Lower Media Production Costs

Costs have always been relatively low for writers—a typewriter, paper, and some perseverance, and a person could see his or her name in print fairly easily, even if the published work did not receive a wide distribution. Computers and word processing software of course helped this process. Video and television production, however, have been a different story until recently.

At present, for less than \$10,000 someone can buy all the necessary equipment (computer, camera, and software) to digitally edit video at professional levels of quality, suitable for broadcast by mainstream media. It may still seem like a lot of money, but considering that even 15 years ago the costs for a similar set-up were more along the lines of \$100,000, costs have dropped considerably.

This is not to say that anyone can—or should—plan to be a television producer simply because it's possible. It takes practice and skill to learn to use tech-

nologically sophisticated equipment such as digital video cameras and computers proficiently, as well as learning the media grammar of video in terms of cuts, staging shots, and lighting. However, the fact that someone with the necessary training, practice, and skills can create something without years of apprenticeship in a traditional media company is a dramatic shift and will lead to more participation among the general public in creating and interacting with mass media.

The relatively low costs to create and produce media such as music or video will open the field to many more people creating media content. As with the text-heavy Internet now, much of that content will not be very good, causing some to long for the days of gatekeepers such as strict editors and record label executives who screened the abysmal from the mediocre, but there will be many more voices available to be heard and seen that would have otherwise been silenced in the traditional media world, and some of these will be worth listening to or watching, even if they do not have mass-market appeal.

## Widespread Broadband Connectivity

As broadband connections reach more and more households, the way the public uses the Internet will change. Online video and graphics will become a viable choice for receiving content, thereby changing the Web from its current text emphasis to a more visual, video-oriented medium. Text will still play a role, however, but could well be pushed to a largely secondary or supporting role when someone wants more in-depth content on a topic. Text will also continue on the Web simply because it is likely to be some time before broadband penetrates enough homes for content producers to ignore those with dial-up modems.

## Television/PC Convergence

It is still unclear at this stage whether the television will absorb the PC or the PC will absorb the television; but, as should be clear from points made earlier in this chapter, there will increasingly be little difference between the two. When one can watch a rerun of *Seinfeld* on demand and can do instant messaging with friends or check e-mail on the same screen while watching it, it will matter little to consumers whether that device is defined as a PC or a TV, because it will function as both.

Interactivity at some level will be an expected part of the “television” viewing experience, although there will also be times when the public are more than willing to be passive media consumers again and simply sit back and watch what they want. But for media and technology companies, the direction in which the PC/TV goes can be a matter of success or failure. Where will computer maker Dell be, for example, if the public starts buying Sony equipment that meets their computing and entertainment-viewing needs?

Video-on-demand will largely make the concept of programming at specific times obsolete, except for live shows, special events or breaking news. Audiences will not need to tune into a specific channel at a certain time to see a rerun of *The Simpsons*. It will, in a sense, always be “on”—just as all other episodes will be—all available from an on-screen menu that’s keyword searchable and that lets you choose what show or shows you wish to see.

## S U M M A R Y

All media of communication or information, including telephony, broadcasting, motion pictures, recorded music, books, newspapers, and magazines, are converting from their traditional analog or noncomputerized form to digital, computerized form. Digital media, in other words, are not simply a “new type” of media but encompass all types of media and mediated telecommunication currently used.

Many of these changes take place in areas of media production that are not seen by most of the general public, who still get much of their media in analog form as final end products. However, the analog product is usually only a small portion of the whole production and distribution process and will become increasingly less important as digital display devices become better and ubiquitous. The Internet, in connecting computer users to each other in decentralized networks, has played a key role in making digital media readily accessible to a worldwide audience.

Different media types have different levels of digitization and have been affected differently by it and the Internet. Many established media companies are severely threatened by the changes online digital media are bringing, with the recording industry and MP3 file-sharing services being the most commonly cited example. However, the same forces that have undermined the recording industry’s position also have the potential to undermine publishing and television. For different



reasons (technological as well as social), they have so far not had the same effect on publishing and television or video.

Media companies are experimenting with various revenue-generating models online, as advertising, the most profitable model in the analog media world, has so far not been very successful. Some models include, besides advertising, syndicating content,

subscriptions, e-commerce, and micropayments. None has established itself as a guaranteed success, and it is likely that some kind of hybrid system, or a system not thought of yet, will prove its worth.

What exactly constitutes a media company is also changing, as technology companies become involved in content creation and distribution or merge with traditional media companies. A company like AOL Time Warner can have a profound effect on what its over 50 million users worldwide see in terms of media content.

Digital media has accelerated some media trends, such as audience fragmentation, and created new trends, such as audience interactivity, lower costs and skill levels needed to produce and distribute media content, and the eventual obsolescence of television and radio programming as we currently know them. It will be less important to define media devices as PCs, radios, or televisions than it will be to answer how well a media device meets consumers needs in terms of delivering the kind of media content—interactive, personalized, and multimedia—that they want.

## Discussion Questions

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1. If electrical power was to go out, thus shutting down all computers, which mass media type would be most likely to be able to keep operating, if any? Why?
2. If online news Web sites merged into combined newspaper/radio/television news stations or channels, which group do you think would be better prepared to learn new skills—print journalists learning broadcast skills or broadcast journalists learning print skills? Why do you think so?
3. What are the primary reasons the recording industry is so threatened by file-sharing services? Are their reasons justified?
4. Why haven't the publishing industry and television, video, or film industries been as vocal in their opposition to online file-sharing as the recording industry?
5. Which revenue models have the most potential to be successful for digital media? Why?
6. Try to create the perfect media/technology company by taking units from various existing companies. What would the strengths and weaknesses of your company be? How could you enhance the strengths and reduce the weaknesses?
7. Describe your vision of how the media world will be for most consumers five years from now. Discuss audience behavior, expectations, media industries, and the ways people will access media content.

## Notes

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<sup>1</sup>Nielsen NetRatings, "Monthly Web Usage, June 2002," retrieved 19 August 2002, from <http://pm.netratings.com/nnpm/owa/NRpublicreports.usage.monthly>.

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