Chapter 6

Broadband Broadcasting

For more than 60 years, over-the-air television broadcasters have held the distinction of being the dominant media providers to U.S. homes. But TV broadcasters are waging a losing battle trying to hold on to this well-deserved position.

The programming of commercial broadcast networks ABC, CBS, and NBC has consistently attracted the largest audiences of any of the competing information and entertainment providers. Entering the U.S. broadcast scene late, Fox Broadcasting, a subsidiary of News Corp., helped to shore up the overall numbers while reducing the share taken by the Big Three. UPN, WB, and PAX were added to this network hierarchy in 2002. These national networks and their affiliated stations, either directly or indirectly, reached more homes with the types of television programming the public consistently liked than did any other electronic delivery system, whether cable, wireless cable, or satellite.

In 1983 the programming of the national broadcast TV networks was drawing 84 percent of the national prime-time audience. In 2003, that number was down to 47 percent and falling.116 Beginning in 2002, basic cable programming attracted the largest number of viewers in TV’s regular season: an average of 29.1 million viewers in prime time for cable compared to 27.4 for broadcasters.119

In a puzzling development that happened during the years of their greatest ascendancy, U.S. television broadcasters gave over to others their rights of local carriage, to the extent that they are now in danger of being only minor players—if not shut out completely—in the business of delivering their own signals to

American homes. Something less than 15 percent of American households still get their programming directly from a local TV station, a marker that at one time stood at more than 90 percent.

Unhappily, broadcast television stations have been forced to rely on government regulation to ensure that their signals continue to be carried by cable, their most aggressive local competitor, and by satellite. Instead of fulfilling their promise as broadcasters, as the name implies, the U.S. commercial networks and public broadcaster PBS have found themselves relegated to the role of programmers, their signals more often than not to be relayed by others.

In 1998 the U.S. Congress and the FCC awarded each of the 1,400 or so full-strength broadcast television stations in the country sufficient additional spectrum to initiate digital HDTV service within their markets. The act of allocating a whole new block of 6 MHz over-the-air channels from the public spectrum was an act of faith—some say a requirement—by the government that the broadcast TV stations would continue to offer their signals to anyone who wanted to pick them up. Otherwise, what would the concept of “over-the-air free TV” mean when the only other way the public could access commercial network and local broadcast programming was through intermediaries who agreed to pass through the advertising-based and viewer-supported Public Broadcasting Service (PBS) programming for a subscription fee assessed on viewers?

With the advent of cable, satellite, and the Internet, the very definition of who is a broadcaster and what is a broadcast network has been called into question. Long-held regulatory assumptions that the spectrum represents a scarce resource, that the airwaves belong to the people, and that broadcasters must be licensed to operate in the public interest are under challenge and have been for some time.

With the increased viewing options that come with multichannel networks and the new interactive technologies for on-demand access, who owns the distribution system is rapidly disappearing as a matter of consumer interest. Viewers have become more focused on their favorite content than on their favorite networks, proving to be more loyal to individual shows than to the branded channel over which they appear. Viewers are now predominantly not “free TV” viewers but are paying customers. Program consumers are now in a buyer–seller relationship in which it is perfectly OK to ask their service providers to be more accommodating in terms of content variety, time, place, and format.

Broadcasters are smart enough to know they have become too dependent on program-interrupting advertising when viewers with other options no longer show up for their “free TV.” That writing has been on the wall for some time. The mass-media model faces a limited future when it only works for some of the people some of the time. On the agenda is a whole new way of thinking about what broadcasters must do to reach and retain viewers and about from where the revenue streams that replace advertising will come.

Multicasting, broadband Internet, streaming media, two-way television, and digital combinations of communications services and commercial transactions apart from the usual entertainment, information, and education fare make up that agenda.

When it comes to figuring out what to do in the onrush of technological innovation and more customer-centric programs and services, broadcasters are by no means all reading from the same script. This appears to be a very good thing.

What’s Happening in Broadcasting?

Commercial Radio
The same industry-wide consolidation taking place in telephony, cable, wireless, broadcast TV, and satellite sectors unleashed by the 1996 Telecommunications and Reform Act is also happening in radio.

Clear Channel Communications Inc. acquired AMFM Radio Inc., the largest radio chain in the United States for $23.5 billion in August 2000. With this $40 billion merger, San Antonio, Texas–based Clear Channel owned or held stakes in 19 TV stations, 425,000 outdoor billboard displays, and 1,170 radio stations in 187
of the 276 Arbitron-rated markets. In the same time frame, Clear Channel was acquiring SFX Entertainment, the world’s largest promoter and producer of live entertainment events, including concerts, theater, and sporting events.

Federal regulators required that Clear Channel divest about 125 of its acquired radio stations to comply with antitrust and ownership rules prohibiting broadcasters from owning more than eight stations in major U.S. markets (and fewer in smaller markets). Clear Channel proceeded to reinvest the $4.3 billion earned from the sale of these properties in the purchase of additional stations elsewhere, seeking to build regional media clusters. Company strategy was to cut costs, beef up programming, and boost profit margins by selling advertising packages across all three media sectors: radio, television, and billboards. Clear Channel also mounted an aggressive Internet rollout and assumed leadership in preparing for the advent of terrestrial digital audio broadcasting (DAB).

Digital radio has been in development in the United States for more than a decade. The NAB acquired exclusive U.S. rights to a European-developed system called Eureka-147 in 1991 as a way to head off the threat of competition from DARS services. When it became clear that the analog-to-digital conversions would be costly, and would require that the stations move to an entirely new frequency block higher in the electromagnetic spectrum, the European standard was promptly rejected by NAB member stations. Local station owners made it clear that they intended to stick to their assigned AM and FM bands until the engineers figured out a way for them to broadcast digital signals over their currently allocated frequencies.

Such a technology is now on the horizon. The two principal developers of terrestrial digital radio systems for the United States, Lucent Digital Radio and USA Digital, merged their operations to advance a single standard. The new company, iBiquity Digital Corporation, working with the National Radio Systems Committee of the NAB and the Consumer Electronics Association, said it would bring to market an “in-band on-channel” (IBOC) technology for embedding digital signals on either side of the analog signal.

If successful, this approach will permit stations to simulcast an analog and a digital signal without the need for additional spectrum and without service disruption. Stations will be able to keep their current location on the radio dial. The quality of FM translation is said to equal that of CD-audio; the quality of AM will equal that of high-fidelity stereo. Signal interference and distortion will be greatly reduced. Conversion costs will be more acceptable than earlier projections. Whereas the reworking of an average large-market TV station to accommodate digital is estimated to cost as much as $10 million, the projected cost of upgrading a large-market radio station to digital is expected to cost less than $200,000. New radio receivers will add about $100 to consumer costs.

iBiquity’s digital compression techniques will permit the transmission of additional wireless data services in a variety of consumer applications. Future home and in-vehicle radios and a host of consumer electronics devices, such as pagers, location devices, personal digital assistants, and smart phones, tuned to digital AM and FM radio stations will be able to receive and display song and artist information, stock market quotes, news, weather, and other data. Clear Channel Communications is one of 15 radio station group owners financially backing the iBiquity system.

**Commercial TV Networks**

Of the big four broadcast networks, the NBC subsidiary of General Electric Co., now called NBC Universal, is among those most aggressively diversifying its organizational structure and expanding its brand into other lines of business.

Entering the 21st century, NBC was engaged in prime-time program production for its broadcast network, something regulation had denied it the opportunity to do earlier. With high-profile partners Dow Jones, Microsoft Corp., and CNET, NBC broadcasting was sponsoring new cable ventures CNBC and MSNBC. And it had consolidated its multiple Web properties under the NBCi portal.

These steps were taken in search of new streams of revenue from both old and new program ventures and to greatly expand NBC’s base of operations. The company was counting on the subscriber
fees and advertising income generated by its cable holdings, the increased advertising and transactional revenues generated by the Internet, and the growth in electronic commerce folded into all these ventures to surpass revenues generated by its established broadcast business.

Shareholders were full of praise for NBC's actions, and media analysts were appearing on talk shows explaining to investors and others all the reasons why such diversification made good business sense, right up to the moment when the national economic recession of 2000–2002 put the broadcasters' plans in disarray. A dramatic shortfall in advertising revenues, the virtual failure of its Web businesses, and loss of confidence on Wall Street, savaged NBC's bottom line, forcing a reshuffling of priorities.

NBC bounced back in 2003 by greatly diversifying its holdings in the acquisition of European/American entertainment giant Vivendi Universal, but NBC was already recovering for a number of reasons. NBC could still pull a large audience, estimated at 98 million viewers weekly. Also, the peacock brand was widely recognized, its ties to advertisers have been historically close and profitable, and it had a unique ability to promote and market products through local stations, as well as through numerous global alliances. NBC's parent company General Electric had established itself as a front-runner in transacting Internet commerce on the Web. General Electric management made clear that it expected subsidiaries NBC and GE Capital to be growth engines for the giant conglomerate.

CNBC and MSNBC were already profit centers for NBC at the turn of the millennium. The 13 NBC owned-and-operated TV stations posted near 20 percent growth in 2000, largely because of the Olympics and the elections. The company's balance sheet benefited from the licensing and advertising revenues produced by the Australian Olympic Games and took a substantial share of the estimated $1 billion spent by political candidates in the U.S. presidential elections. NBC saw increased revenues from the syndication of programs it owned.

But NBC Interactive was struggling to find an Internet strategy that would work. NBC's stock, which topped $106 per share when it went public in February 2000, had plummeted to $1.50 per share by the end of the first quarter of 2001. Suffering losses of $40 million per month, NBC bought out the shares of the Internet portal it didn't already own and dramatically pared down its 800-person workforce.

NBC also announced a plan to save money on affiliate compensation. Sparking a storm of protest from NBC station affiliates, president and CEO Bob Wright moved to reverse the long-established practice of networks paying stations for carriage of their ad-supported programming. NBC had concluded it could no longer afford to pay cash compensation; indeed, some stations would be required to pay the network to maintain affiliation.

The old model, in which networks bore the burden of program acquisition while providing direct cash compensation to stations for carriage and giving up substantial amounts of advertising inventory, according to Wright, was no longer working. NBC preferred to put energy into helping affiliates generate additional revenues from their new digital spectrum and develop greater value from the Internet. NBC had already begun direct selling of goods and services to the viewing public and was shopping its first-run shows on the open market, strategies it wouldn't even have seriously considered before.

The NBC CEO, not an industry insider, had already been warning that changes needed to be made in the network-affiliate relationship. "We want to renew our arrangements with our affiliates, but they've got to be in a sensible fashion," Bob Wright told a television industry conference in March 1999. "In situations where that is not possible, we are not going to be looking across the street to go to another broadcast outlet. We're going to be looking to take our programming into cable as the most efficient distribution alternative."120 The new General Electric chairman and CEO Jeffrey Immelt told Electronic Media in January 2002, "I view

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120 Frank Beacham, "Networks Vow to Change TV Business," TV Technology, April 21, 1999, pp. 1, 10.
NBC as an asset we can invest in and grow.” He said he expected GE to save at least $1.2 billion in costs in 2002 and as much as $10 billion over the following 10 years from digitization of its subsidiaries, including NBC.112

NBC’s winning $2.2 billion bid for sponsorship of the 2010 and 2012 Olympic Games revealed an innovative strategy to offer 24-hour-per-day bilingual multiplatform coverage on NBC TV networks, MSNBC, and CNBC cable networks, and on its newly acquired Spanish language broadcast network Telemundo. The Olympic contract covered bundled IP–rights, VoD, pay-per-view, and other digital media venues as they might emerge. GE also took a big stake in the Olympic package that it will use for promotional purposes.122

With the Vivendi acquisition, NBC picked up cable channels USA Network, SciFi Channel, Trio, and NewsWorld International; Universal Movie Studios; and Universal Studios theme parks. The new NBC Universal was thought to be valued at $43 billion and was expected to generate $13 billion in revenues in 2004 and $15 billion in 2005.123

The $36 billion takeover of commercial broadcast network CBS Corp. by Viacom Inc. was one of the first major realignments among broadcast properties to come in the wake of government deregulation of the telecommunications industry.

Viacom had been created in the early 1970s when the FCC ruled that the three major networks could no longer own and syndicate their own programming. Regulators feared that ABC, CBS, and NBC would exercise such oligopoly power that the motion picture and television production industries, as well as the program syndicators and cable distributors, would suffer. In the case of CBS, program assets such as I Love Lucy, Gunsmoke, and the Andy Griffith Show became assets of Viacom.


At the time of the merger in 1999, Viacom was a $12.1 billion company with holdings in TV, film, cable, publishing, home video, and theme parks. Most prominent of its assets were the Paramount Station Group consisting of 19 TV stations covering 25.6 percent of the U.S. viewing audience; Paramount Pictures, Nickelodeon Movies, MTV Films, and United International Pictures; MTV and Nickelodeon cable networks with joint ventures in the Comedy, Sundance, Showtime, and other movie channels; Blockbuster and Paramount Home Video; Simon & Schuster and MTV Books; and Paramount Parks, Nickelodeon Studios, and Universal Studios of Florida.

CBS was a $6.8 billion company with TV, cable, radio, and Internet holdings. CBS assets included: 16 owned and operated (O&O) TV stations covering 33.7 percent of the national viewing audience; the CBS Television Network consisting of CBS Enterprises, CBS Entertainment, CBS News Media, CBS News, CBS Sports, Eyemark Entertainment, and CBS Broadcast International; cable stations Nashville Network, Country Music Television, Midwest Sports Channel, Home Team Sports, and Group W Network Services; radio stations Infinity Broadcasting (with 163 stations); TDI Worldwide Inc. (outdoor advertising); and Internet investments in CBS.com, Country.com, Jobs.com, MarkerWatch.com, Office.com, Medscape, SportsLine USA, StoreRunner Inc., Switchboard.com, ThirdAge.com, Wrench zach.com, and a broadcast news alliance with AOL.

With relaxation of the government’s financial interest and syndication rules and removal of caps on ownership of more than one TV station per market, the new media giant emerged hosting the largest TV station group in America, with most of its stations located in top 20 markets. The result is a company with the means for nationwide content distribution and promotional support provided by radio and TV stations, outdoor billboards, Internet associations, and cable networks. Although Viacom Inc. was buffered in the economic slump along with the others, the company’s strategy has epitomized the vertical ownership and horizontal programming synergy that has become the model for broadcast network survival.
The Walt Disney Co., parent of ABC, also took advantage of the buoyant 1990s to forge ventures with cable operators, wireless mobile and satellite providers, and content and software producers. Among its cable holdings are the Disney, ESPN, A&E, History Channel, and Lifetime networks. Disney owns the Mighty Ducks NHL franchise, the California Angels baseball team, and the U.S. and international Walt Disney theme parks. Disney’s on-line operations have been consolidated and revamped. In the media company’s deal-making, ABC Radio/TV networks are only one of the platforms Disney uses to leverage its branded content and character franchises.

**TV Station Groups**

In an era of flat advertising revenues, disappearing network compensation, loss of program exclusivity from their network connections, and increased competition from a growing number of multichannel video providers in their home markets, TV station owners are wondering how they should leverage their local franchises to get greater control over their destinies.

Under consideration among station groups are ideas for linking up in program creation and purchasing ventures to reduce dependence on network programming, developing innovative new applications based on their digital spectrum, and transitioning off-line assets to the on-line world.

Dallas-based A. H. Belo Group is a good example. With holdings in TV stations and newspapers, Belo has looked more closely at opportunities for print and broadcast synergies on the Internet and is relying on “smart partnerships” in building local and regional strengths. Belo formed a joint venture with Time Warner Cable to create local news channels in Houston and San Antonio so that Belo broadcast stations could share news with the cable operators in those markets. Belo also made a deal with cable MSO Cox Communications to launch a Spanish language cable news channel in Phoenix, Arizona, to be produced at its local TV station there.

Not all of its ventures have been successful. Belo and group owner Hearst-Argyle Television each invested $10 million in Geocast Network Systems, a company with an innovative technology for helping TV stations deliver personalized video and data to home computers as well as TVs using over their new digital spectrum. The Geocast system, which included installation of an over-the-air antenna, cabling, and a set-top box on-site, was of particular interest to broadcasters because the add-on technology could potentially make more efficient use of local station content via digital transmission. Geocast suspended business operations in March 2001.

iBlast Networks is an apparently surviving service backed by at least a dozen other television station groups covering about 80 percent of the country. These groups include Tribune Co., Gannett Broadcasting, Cox Broadcasting, Post Newsweek Stations, and Scripps Howard Broadcasting. iBlast formed a national consortium of stations agreeing to dedicate a portion of their spectrum to the delivery of music, video, games, and software to PCs, TVs, and laptops with digital tuners at speeds up to 18 Mbps.

iBlast’s business model is to charge content providers for delivery but to offer the service to consumers free of charge. Early promoters were saying that revenues from iBlast’s digital delivery system could reach one-third to one-half of a station’s cash flow, but the slow transition to DTV broadcasting, the faltering economy, and a lack of interest in receiving digital data in the home has shown these projections to be unrealistic. In 2004 when iBlast’s iBlast.com Web site was checked, the latest update was in 2003.

An even more ambitious proposal was being aired at the April 2004 NAB conference in Las Vegas. Emmis Communications and about a dozen other station groups were pushing the idea that local broadcasters should pool their DTV spectrum for the purposes of launching a nationwide “Digital Antenna System” that would provide an over-the-air (OTA) alternative to cable in the local markets. “We don’t have to launch a satellite for $400 million,” Emmis Chairman and CEO Jeff Smulyan told fellow broadcasters. “Our industry has already paid $4 billion for building out the digital infrastructure.” He argued that a multichannel Digital Antenna Service would allow broadcasters to take back some of the revenue
stream now owned by cable without spending a lot of additional money on infrastructure.\textsuperscript{124}

The broadcast TV networks have asked affiliates to partner with them in national businesses that will more effectively use the digital spectrum but relations have become so strained between the networks and their affiliates that few local stations are buying in.

**Public Television**

The Public Broadcast Service network is also in pursuit of new sources of revenue, if not a new identity. Unlike commercial networks NBC, CBS, and the others, PBS is greatly constrained in the types of changes it can make. For financial support, it must appeal to businesses for corporate sponsorships, to foundations for grants, and to the general public for volunteer pledges. Local, state, and federal government funding represents 30 to 40 percent of the overall income of PBS-affiliated stations. With government dollars come disproportionately heavy doses of politics and few guarantees for funding stability.

The 349 public broadcast station licenses are held by community organizations (51 percent), colleges and universities (32 percent), state authorities (12 percent), and local educational and municipal authorities (5 percent). Facing competition from the programming of well-funded cable operators such as A&E, Discovery Channel, Disney, History Channel, and Nickelodeon and needing to be well along with its own DTV strategy when commercial broadcasters convert to digital, PBS stations have been examining a variety of strategies, including the forging of new vendor and community partnerships.

Early on, public broadcasters were looking to HDTV to give it the distinctive fare needed to compete with the commercial operators. In the same way that public television was first among the national broadcast networks switching to satellite signal distribution, PBS had hopes of being first to market with the premium pictures of digital television. The cost and complexity of nationwide analog-to-

digital conversion made that difficult, given the loose confederation holding together public broadcast stations and the unwillingness of the U.S. Congress to give much of a hand. The FCC did put public broadcasters on a more extended conversion schedule: the public stations were expected to be on the air with a DTV signal in 2003, one year after the commercial operators.

About half of the public stations were on the air with digital signals by the deadline, which was somewhat better than the performance of the commercial stations in meeting their digital conversion goals by deadline.

Former Turner Broadcasting and CNN executive Pat Mitchell assumed the position of PBS president and CEO in 2000. She quickly established relationships with congressional leaders of both parties and traveled among the states meeting with governors and state legislators to seek funding assistance in addressing the estimated $1.7 billion digital conversion costs. It was clear that multidimensional funding would be needed to get the job done, with help from state and federal taxpayer dollars, from corporate and foundation grants, and from public fund-raising.

At PBS's June 2001 annual meeting in Philadelphia, Pennsylvania, president Mitchell introduced her draft "Declaration of Interdependence," which was the outline of a strategy for strengthening the PBS union of stations based on building strong brands, mobilizing their core supporters, sticking to noncommercial services, fostering "social capital" with its programs and services, and providing universal service. Article IX of the Declaration stated, "We shall not allow 'digital' to be the Great Divider, but instead the Great Unifier," and Article X stated, "We shall not fear the changes of the times: new innovations of distribution, new technologies, new gatekeepers. We shall make each expand the reach of our mission.\textsuperscript{125}

PBS national programmers were asking for a major increase in the number of prime-time hours that could be designated for


\textsuperscript{125} "PBS Offers a Declaration of Interdependence," Current, July 2, 2001, p. 15.
“common carriage.” That is, clearances locking all stations into a common schedule would be given for some 550 hours annually. Not all stations were happy with this plan, but its purpose was compelling: to build a stronger base of underwriting so that programming, especially new programs, could be promoted on a national basis.

PBS strategy was to look to corporate and foundation sponsors when creating new program series and national corporate underwriting increased about 22 percent from 1997 to 2001. PBS upped its 15-second limit on national underwriting credits to 30 seconds, creating a category of “premier sponsorships” to generate new money.126 Almost everyone was surprised when a federal appeals court in May 2003 ruled that public TV stations were eligible to offer subscription services, including advertising services, on a portion of their digital spectrum.127

Given the open possibilities of digital, local stations are still trying to figure out what kinds of programming and services they might realistically offer. At least three options were under consideration. PBS stations could continue to be broadcasters providing news, information, and entertainment to a mass audience, or they could become multichannels providing content to targeted niche audiences. They might also become datacasters providing an information conduit to fixed or mobile information appliances yet to be developed. For some stations, all of these may be possible.

It is thought that public TV stations will carry prime-time fare, such as News and Masterpiece Theater, in HDTV, while news, weather, and other locally produced programming will be transmitted in standard definition (SDTV) formats. Stations will do datacasting wherever opportunities arise. With the promise of a subdividable 19.4 Mbps digital data stream, either a single HDTV signal or up to four independent programs could be transmitted on each of their allocated channels.

The PBS network does not produce its own entertainment and public affairs programs, rather it relies on member stations and independent production companies to provide national programming. Such local stations as WGBH-Boston and Thirteen/WNET--New York were in the process of repackaging old shows and launching new ones on separate channels in 2004. One was the World Channel, featuring such science, history, and public affairs programming as “NOVA,” “Frontline,” and “BBC World News.” Another was the Create Channel, focusing on such personal interest programming as “Antiques Roadshow,” “This Old House,” and “Lidia’s Italian-American Kitchen.”

Webcasting
The Super Session forum at the 1999 NAB conference in Las Vegas entitled “Broadcasting in the 21st Century” was standing-room-only. Panelists were executive vice president of NBC, Tom Rogers; CEO of TeleCommunications Inc., Leo Hindery; and chairman of EchoStar Communications, Charlie Ergen; and co-founder of Yahoo! Inc., Jerry Yang, with CNN’s Jeff Greenfield as moderator.

Why Yahoo? Having an Internet portal provider on the NAB panel was a surprise to most of the people there, and many had never heard of Jerry Yang. Many did not even know what an Internet portal was. The answer lay in assumptions made by convention planners that the Internet could have a role to play in the future of broadcasting, even if it was still unclear at the time what that role would be.

The decision to invite Yang turned out to be more prescient than imagined. Three weeks before the convention, long after the convention brochure had gone to print, Yahoo! bought streaming-video provider Broadcast.com for $5.6 billion, a move that positioned Internet service provider Yahoo! to become a potential Webcast competitor to over-the-air broadcasters.

The initial public offering of Broadcast.com Inc., which debuted at $18 per share on July 17, 1998, rose to $62 per share on the first

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127 “Court Upholds Public TV’s Ad, Sub Rights,” Broadcasting & Cable, May 12, 2003, p. 2.
day of trading. This was the largest rise ever for an Internet-related IPO. Overnight, the Dallas-based Webcaster had achieved a market capitalization of just over $1 billion, one-eighth the value of network broadcaster CBS. The escalating stock price was an indication of the confidence investors had in a company taking a new approach to the broadcasting business, delivering audio and video programming on-line.

At that time, Broadcast.com was a little-known portal site for about 300 local radio stations. It had just pulled off an exclusive multiyear deal to audiocast the full slate of Major League Baseball games. Its business plan included bids for rights to other sporting events, such as tennis and golf, and plans to program more video of events such as live concerts and corporate conferences.

As a “content aggregator,” Broadcast.com was able to stream audio and video programming around the clock. A separate unit of the company produced and distributed feeds of press conferences and shareholder meetings for corporate clients. Its clients were those who had telecommunications lines of sufficiently high-speed to access broadband data-quality video on their PCs. Such video typically ran at frame rates and resolution levels below standard TV, but substantially above the levels that were possible with dial-up modems. Web users were able to download the necessary software to access these feeds from streaming technology providers such as RealNetworks, Microsoft, and Apple.

Broadcast.com’s ambitions to be a network in its own right competitive with broadcasters got the boost it was looking for when it was acquired by Yahoo! At the time, Yahoo! Inc. was a four-year-old Internet company serving more than 50 million mostly dialup telephone users per month. With Turbo Yahoo, a broadband version capable of taking advantage of the Broadcast.com streaming infrastructure, Yahoo! had high hopes of becoming one of the Web’s leading broadcast networks riding on such broadband telecom technologies as DSL and “open access” cable. That ambition began to pay off in 2003 when Yahoo!’s $9.95-per-month subscription service could boast more than two million users for its on-line Platinum video offering.

RealNetworks lays claim to being the first Internet-delivered TV network. Its approach is similar to traditional broadcast and cable networks in that it can reach large audiences, generate advertising revenues, and offer appointment viewing of programs. It is different in that it depends on a broadband telecommunications infrastructure not yet in place. It does not have the means to produce its own original programming but can offer broadcast content for others in either live or on-demand formats.

Some one million subscribers were paying RealNetworks $9.95 per month for a variety of on-line entertainment with no advertising in 2003. This was a surprising economic development so soon after the dot-com bust, and a major technological breakthrough. With broadband deployments approaching 20 percent of U.S. households, the company was streaming Major League Baseball games and ABC News live from the war in Iraq at 350 kbps. RealNetworks founder and CEO Rob Glaser told PC Magazine, “The reality is that the financial bubble came and went, but the innovation is still happening.”

**Broadband Technologies**

The big technological challenge facing broadcasters is to convert from everything-analog to everything-digital. Broadcast TV is struggling to get on board with the rapid convergence of video, communications, and computing to create the new media form that the industry is calling “advanced television.” ATV is more than a way of conveying clearer pictures and improved sound; it is a way of giving TV the interactivity of multimedia computers and the ubiquity of broadband landline and wireless networks.

Advanced television was a formulation of the FCC’s Advanced Television Systems Committee to replace NTSC. The NTSC was the industry-sponsored standards committee that, in 1941, set the black-and-white, 525-line, 30-frames-per-second television standard currently used in North American and in American-influenced countries, such as Canada, Mexico, Korea, and Japan. With the

move to digital, advanced television is popularly called digital television (DTV). In Europe, it is called digital video broadcasting (DVB).

An early prototype of ATV, HDTV began as an experimental product intended to provide TV viewers with a strikingly improved quality picture. HDTV was also seen by many as a way to arrive at a world television standard. This new approach more or less doubled the number of TV scanning lines for home receivers, replacing the incompatible 525 (NTSC) standard for the Americas and 625 (PAL and SECAM) standards for Europe and elsewhere.

Beginning in the 1970s, the Japanese were working on an HDTV format with more than twice as many lines (1,125) and a wider (16:9) height-to-width aspect ratio for the TV screen. First seen at world media expositions beginning in the early 1980s, some viewers favorably compared the HDTV pictures to those of 35mm film.

Better pictures and the prospect for a single world TV standard generated a lot of attention, but the barriers were huge. The proposed approach required top-to-bottom conversion of production, transmission, and viewing facilities for television that could only be implemented at significant additional cost to all players. A further problem that did not show up until later was that the early HDTV systems were all analog; the same format used in NTSC, PAL, and SECAM. HDTV was introduced too early to catch the digital wave. Rather than accelerate its adoption, the race to digital only delayed HDTV adoption.

Digital as a transmission format held great promise for broadcasters but implementation details set off unending battles between computer and TV set manufacturers, cable operators and satellite providers, and among television networks and their own affiliates. Rather than push the industry toward a single line standard, digital systems opened the door to a proliferation of standards. Instead of simplicity, convenience, and lower costs typically associated with digital, what emerged were systems that were unacceptably complex and expensive. The technological standards struggle was not just over the way digitized information was read to the screen but how content was created, stored, processed, and delivered.

**HDTV**

The immediate effect of increasing the number of scan lines and adding to the width of the television picture was to produce some 500,000 picture elements, or dots, that made up a single frame of video. This number of pixels represented approximately five times the amount of information that NTSC must manage, which meant that HDTV channels in analog format required up to 30 MHz of bandwidth for transmission. Since channel assignments for television were historically limited to 6 MHz, even the Japanese terrestrial broadcasters were unable to implement the system. Japanese consumer electronics industries were promoting around the world.

How might 30 MHz of picture information be squeezed into a 6 MHz channel? The Japanese solution was to transmit its HDTV programs via satellite, the only available direct-to-home distribution medium with sufficient channel capacity to convey the high-quality picture. In 1989 Japanese public broadcaster NHK began airing analog-formatted HiVision satellite programming an hour a day to the citizens of Japan. In 1991 the Japanese HDTV transmission schedule was expanded to eight hours a day. Meanwhile, the terrestrial broadcasters of Japan continued to broadcast in NTSC. Even though everyone who saw HDTV had high praise for the technology that could create and display such pictures, the innovation failed to achieve widespread adoption in Japan and everywhere else because the process of recording, editing, transmission, reception, and viewing its images was incompatible with all systems currently in place.

The technology caught the attention of U.S. legislators who saw HDTV as a way to boost economic growth and the competitive position of U.S. corporations. The FCC established broad guidelines for NTSC/HDTV compatibility in 1990, to ensure a phased-in transition to the new system once officially adopted. Unassigned UHF-TV channels were put on hold for broadcasters who would need a second channel on which to simulcast their NTSC and HDTV signals during the transition period.
The density of scan lines chosen by the ATSC committee was 1080 refreshed at 30 frames (or 60 fields) per second with 1,920 pixels per line, in excess of two million pixels per frame.

For the first time, the industry realized that the rich picture information of HD could be made to fit within the existing 6 MHz channel allocations of terrestrial TV stations. This was a major technological breakthrough. Many within the broadcast and related industries were confident that implementation of HDTV using a single standard, perhaps a single universal standard, could proceed.

**DTV**

The computer industry began to wake up and realize the HDTV standards-setting process was going in absolutely the wrong direction from their point of view. It was about 1997 when it became clear to computer manufacturers and computer software developers that future television would be digital, and that continuation of the interface approach would mean that TV sets would be incompatible with computers.

Computers scan pictures progressively (1, 2, 3, 4). Expensive conversions would be required to make PCs compatible with TVs. The computer industry began to lobby for the abandonment of interface and adoption of progressive scan, which they could show was in several ways a superior approach. ATV’s hard-earned consensus began to fall away. By 1998 it was clear that there would be digital television (DTV) in the United States, but it would not be a single standard. HDTV at 1080 lines might in fact be regarded as a minor by-product of the broadcast industry’s conversion to digital. Television would be just another form of data, and TV sets would be taking on many of the features of personal computers.

ABC and Fox were the first to announce that their stations would use their new FCC-assigned spectrum to broadcast digital programming in the progressive-scan format favored by the computer industry. Fox agreed to broadcast HDTV signals on some portion of its future schedule but at a less robust line resolution, namely 720p. "We are abandoning interlace since it is an obsolete technology," News Corp. news technology group vice president Andy Setos told those assembled at the 1998 NAB...
convention. “Progressive holds much more promise in terms of features, flexibility, and better-looking pictures.”

CBS and NBC declared that they would stick to the interlace format. Joe Flaherty, a CBS senior vice president for technology who had spent years working on HDTV issues, said, “Everybody is at 1080i but [ABC and Fox], That tells the story . . . These fellows are shoveling against the tide.” CBS announced its stations would broadcast in 1080i but that its schedule would include some less-than-HD programming at 480i format. NBC said that it would be in both the progressive and interlace camps. In addition to the 1080i standard, it would employ 480p for transmission of digital signals in standard definition.130

The Big Four networks each said they would use their O&O stations to start HDTV broadcasting in some form by late 1998 and early 1999. All stations, according to plans agreed to with the FCC, were expected to be HDTV-capable by 2006, and at least 85 percent of U.S. households would have HDTV receivers, at which time the analog channel would be returned to the government for assignment to other needy services. Public broadcasting stations were also expected to have made a complete transition to digital near the end of that schedule.

NBC’s Tonight Show became the first nightly television series to be broadcast in high definition beginning in April 1999. The Jay Leno talk show was produced in the 1080i format preferred by NBC. CBS was predicting that it would have virtually its entire prime-time fall 1999 lineup in high definition, also at 1080i. Not included would be those programs such as the news and reality show 60 Minutes and sitcom The Cosby Show originally shot on videotape or on 16mm film that would need to be up-converted to 35mm film prior to transfer to HDTV format.

ABC broadcast its first live sporting event in September 1999. A Miami Dolphins and Denver Broncos game was produced in HDTV with the help of a Panasonic-equipped 720p standard mobile truck and relayed to 25 O&O and affiliated ABC stations nationwide. The network reported minor glitches but was quite happy with the sound and picture quality. ABC affiliate station WFAA-TV in Dallas, a member of the A.H. Belo Group with a preference for the higher resolution 1080i standard, was converting the 720p broadcasts to 1080i.131

Although ABC, CBS, and NBC were each providing prime-time programming in HDTV in 2002, it was clear that the infrastructure for delivering DTV over the air was not yet in place. The process of digital conversion was more expensive, more fraught with difficulty, and a lot slower than broadcasters could ever have imagined. Station owners were still lobbying for time extensions and other regulatory solutions from the U.S. Congress and the FCC. Only half—about 885 commercial stations—were broadcasting a digital signal at the time the FCC deadline rolled around.132

Affordable digital-ready TV sets were not in the marketplace. Not all DTV/HDTV sets came with tuners for over-the-air reception. It was also not clear when cable systems would be equipped to deliver the full range of (480/480p, 720p, 1080i/1080p) digital television signals being broadcast by local stations. Even if new TV sets became available and cable companies upgraded for DTV carriage, the consuming public still had to be convinced that sufficient DTV/HDTV programming of interest was on the viewing schedule for them to throw out their old TVs and start over with a whole new system.

PCTVs
The enhanced capabilities of computers and television sets networked to the high-bandwidth capabilities of broadcast, cable, and satellite providers and the interactivity of the Internet set the stage for a flurry of growth in the convergence market, made possible by generous Wall Street financing.


131 Glen Dickson, “ABC Kicks Off HDTV Season,” Broadcasting & Cable, September 1999, p. 63.

The DTV terminal market was divided into at least four sectors: PC/TV systems, scan converters, TV tuner cards, and interactive set-top boxes. The set-top box market was forecast to have a high rate of growth, since the telephone, cable, terrestrial wireless, broadcast, and satellite providers all needed a way into and around the home with their new digital offerings. There were over 100 million U.S. households and about 98 percent of residents who owned one or more TV sets, almost all of which were analog. More than 50 percent of residents households also had computers and computer-like devices, but these were digital.

With scan converters, digital signals can be read to analog TV screens and with TV tuner cards, analog TV signals can be displayed on computer monitors. In the rapidly evolving world of digital image processing and monitors with increased scan lines, the perceptual advantages of TV screens over computer display units have now begun to disappear. TVs and computers both produce images by focusing a beam of electrons on a phosphor-coated glass plate, but the computer's scan rates (the speed with which images are painted and refreshed on that plate) are already giving the edge to the computer.

Television's refresh rates are standardized at 60 times per second (60 Hz) in North America, while computer refresh rates are 80 times per second (80 Hz) and getting faster. Moreover, while NTSC television has a resolution of 640 horizontal by 480 vertical pixels (picture elements) per line and HDTV strives for 1,920 by 1,080, computers are now producing resolutions of 1,600 by 1,280 and going higher.

Chip makers were banking on the PC becoming the platform on which digital television (DTV) signals from broadcasters and cable operators would be received first. Pinnacle Systems and Hauppauge Digital Inc. are leading makers of TV cards for computers offering digital TV chips in the $300 to $400 price range. These plug-ins are capable of decoding the several DTV/HDTV formats so that viewers can watch, record, and play them back at 480-frame rates on PC monitors. The prices are attractive compared to the $2,000 to $6,000 cost of HDTV sets, but as yet, consumers in large enough numbers haven't seen sufficient

reason to capture television images on their home computers to make this effort profitable.

A trick of the modern multimedia computer is that it can handle video in scalable formats. In other words, integrated PC/TVs can be built that manage video at variable data rates and at a range of resolutions. When a single line standard is no longer necessary for TV reception/viewing, the concept of a universal TV standard will have become obsolete and very likely not even desirable.

With TV sets that operate like computers, home viewers will be able to switch from a Star Wars XIII movie (being read to screen from a DVD player at 24 frames per second) to a videophone conversation (coming in over cable or telephone lines at refresh rates of two frames per second) while downloading from satellite a fast-action sporting event (being recorded on a DVR-type internal hard drive at highest resolution at a rate of 10 minutes per hour of viewing time).

The big advantage that computers and computer networks bring to TVs of the future is that sounds and images can be created, edited, stored, retrieved, transmitted, switched, received, reconstructed, and retransmitted in user-friendly digital formats. As computer data, whatever is provided can be made unique to one viewer, either as programming or as a service, and any viewer can choose to take on the role of first-mile producer/distributor or last-mile consumer/user whenever he or she likes.

TV will undoubtedly continue to be what it has always been, a form of mass entertainment accessed and viewed linearly. In the newly digital first- and last-mile, however, TV can be whatever else users want it to be, including serving as a platform for personal broadcasting or for distance communication and commerce from one's home.

**Interactive TV**

The emergence of digital television, the award of additional spectrum to broadcasters, and government permission for broadcasters to more flexibly use their second channel have opened new opportunities for experimentation. While the most
immediate application of DTV is improving the quality of television’s picture and sound, the accessing and reconstituting of additional information as an integral part of the TV viewer and PC user experience may have an even bigger potential application.

For the moment, there are a lot more television sets in the marketplace than personal computers. This is the reason software developers and on-line operators such as Microsoft and AOL continue to look at the TV as a way for non-PC households to access and surf the Internet. This strategy also supports the multicasting ambitions of over-the-air broadcasters.

Broadcast data can now be downloaded to hard drives that reside in boxes sitting on top of TV sets. These boxes can convert the progressively scanned data of the computer world into a form that can be displayed on the interlaced format of the analog TV screen. To go out and actively search for additional information, subscribers will use whatever Internet path is available to the home. In the eventual transition to digital, converter boxes are expected to reside within the TV itself.

WebTV Networks Inc., a Silicon Valley company that came up with a digital set-top box for using the Internet on TV sets, was acquired by Microsoft Corp. in 1997. Microsoft immediately brought in R&D money and began applying a heavy marketing blitz to the enhanced Internet/TV product, which it renamed WebTV Plus. To make existing TV programming interactive, Microsoft sought out programming partners in the creative community and made deals with PBS Online, Warner Bros. Online, and others for the development of program-related content that made use of the Web.

On a partitioned TV screen, home viewers of network programming who purchased the WebTV units and paid the monthly subscription price could click on icons for additional information. Using the wireless keyboard and remote control, consumers could access ancillary information related to a television drama, a reality program, a sporting event, or a network evening news story, or they could surf the Internet via the provided 56 kbps modem.

Public reception of Microsoft’s WebTV and similar services were less than enthusiastic. In spite of the research showing that in many homes the TV set and the personal computer are located in the same room and are often in use at the same time, large numbers of non-computer users have yet to think of their TVs as a way to get connected to the Internet.

What once was called the VCR is now being called the DVR (or PVR). With the new personal digital video recorders, the options for connecting with media sources and for individualizing and managing information collected are greatly increased. DVRs are also useful devices by which broadcasters may gather information on audience preferences that can be shared with content providers and advertisers.

DVRs are storage, editing, and replay devices that can plug into the old analog TV sets, come incorporated within an advanced set-top box, or reside within the new DTV sets. The DVR technology enables users to digitally capture, encode, and store many hours of programming—currently from 20 to 120 hours, depending on the model—allowing viewers to time shift and customize a quantity of collected material. With its interconnected telephone modem, the DVR will be in touch with an up-to-the-minute electronic program guide (EPG) that monitors virtually every available cable, DBS, and broadcast TV network and can autonomously record programming based on user instructions.

NBC took a multimillion-dollar stake in the largest of the DVR manufacturers (Sunnyvale, California-based TiVo) in 1999, as a way to get into the business of VoD and to ensure that viewers will be able to find NBC-related programming in the competitive clutter facing consumers in the last mile. NBC also wanted access to the digital recording company’s subscriber base so that it could promote its programming and service offerings, targeting users based on their personal and family profiles.

CBS, Disney, Discovery, Comcast Communications, Cox Communications, DirecTV, AOL, Philips Electronics, and Sony Corp. of America also took equity shares in TiVo. The content providers all saw the service as a way to promote their wares. From
the TiVo-provided remote, subscribers could choose and record their favorite programs and watch these programs at their convenience. Sony Electronics customized a version of the TiVo personal video recorder to showcase programming from Sony Pictures Entertainment, Sony Music Entertainment, and Sony Online Entertainment. The TiVo unit and electronic guide provided enhancements and interactivity that allowed home viewers to play along with Sony game shows, such as *Wheel of Fortune* and *Jeopardy*.

A suit filed against manufacturer SonicBlue Inc. in a California District Court to stop the sale of PVR (ReplayTV 4000) and DVR (DDV 2120 dual-deck VCR) equipment illustrates how quickly this product became controversial. ABC, CBS, and NBC claimed that the device’s fast-forward feature allowed viewers to skip commercials, depriving the networks of revenue and incentive. The suit further claimed that the technology would induce and enable viewers to make unauthorized digital copies that could be further distributed, infringing copyright.

With support from the Consumer Electronics Association, SonicBlue argued that the VCR functions present in its technology were legal and that the suit represented an attack on consumers’ long-established “fair use rights” to record free-over-the-air broadcasting for later viewing.\(^{133}\)

In April 2002, in a case brought by television studios, a magistrate judge’s ruling required SonicBlue to remotely install software to monitor the viewing habits of customers who used Replay 4000. Monitoring would allow the studios to collect evidence of copyright infringement without the users’ knowledge. This ruling was overturned. “Forcing a company to change its product in order to conduct surveillance on its customers is unreasonable and inappropriate,” a spokesman for the Consumer Electronics Association told *TV Technology*.

Potentially chilling effects a ruling of this type could have on consumer behavior and technological innovation.\(^{134}\)

Even though some media executives continued to argue that the ad-zapping, time-shifting features of the DVRs were destructive to the TV business, contributing to lower ratings, lower advertising revenues, and loss of copyright, the industry as a whole resigned itself to the view that the technology was not going to go away. The technology could in fact provide them with a new promotional tool and better insight into TV viewing and consumer behavior.\(^{135}\)

**Datacasting**

Datacasting on the Web is broadcasting in another form. Internet entrepreneurs have borrowed a page from the broadcasters’ strategy book for taking some of the work out of getting needed information to consumers using a “push” model to provide just-in-time IP content.

For many users and for many applications, manually searching the Web is perceived to be a time-consuming, sometimes frustrating method for arriving at information. Datacasters say that, with a little advance planning, they can minimize the effort and deliver in a timely fashion the specific types of content that individual Web users want; no surfing required.

Through subscription services, users can now detail the types of information they would like to receive. Individual user profiles are submitted to the Webcasting services and stored on databases. Via the user’s modem, software delivers in with updates that are displayed in the subscriber’s computer window, ticker, or screen saver. In work environments, information is often downloaded automatically to a corporate server, and then relayed to employees at their desks or while moving about. Some companies have their own media channels for Webcasting corporate news.

\(^{133}\) “Networks Sue over ReplayTV,” *TV Technology*, November 28, 2001, p. 10.


The streaming of video is a rapidly emerging business. With the installation of broadband residential and enterprise networks operating in IP format, broadcasters now see the opportunities (and the potential threat) of Webcasting. Media-streaming software from RealNetworks' RealVideo, Microsoft's Windows Media, and Apple's QuickTime has reached the point where it can be used by media providers to deliver content of high visual quality. In broadcast mode, content can be sent and received anywhere in the world.

The threat comes to broadcast (and cable providers as well) when a large number of households have access to their own tools for streaming media over broadband connections and media companies have no way of limiting where any user goes for programming, or with how many others that user shares those programs.

Managing data over the DTV spectrum is not without constraints. Although broadcasters have a huge customer base and highly desirable content, few have either the business plans or sufficient infrastructure (at the station or in the home) to profit from such a business right away. Delivery and reception standards are still under development. U.S. broadcasters have been in dispute over two very different digital modulation standards (8-VSB and COFDM) for over-the-air DTV broadcasting. Although 8-VSB has been reaffirmed as the ATSC transmission standard for the United States, enough doubt remains about the rightness of this decision that the business of broadcasting data over the airwaves suffers.

Competitors may not face the same constraints. Sirius Satellite Radio is moving ahead with plans to deliver digital video to mobile users as a complementary service. The first application is thought to be the delivery of up to four channels of family-oriented video to the rear-seat video screens of cars and vans using a combination of satellite and terrestrial repeaters. "Sirius has built a significant all-digital communications infrastructure that runs at a rate of 4.4 megabits per second," Sirius Vice President Terry Smith told TV Technology. "Our primary business will continue to be our radio service of one-hundred channels, but we can easily re-assign some of our (bandwidth) for video in order to provide 'fresh content' to mobile TV screens."136

**Broadband Business**

It must seem to broadcasters that the media environment has suddenly become crowded. The U.S. commercial television networks and their affiliated stations, which once had the field pretty much to themselves, now face 200 or more plausibly competitive channels in every market every hour of every day. Although the public broadcasters are funded differently, they feel the extra competition no less.

These additional viewing options were due to cable and satellite predominantly, but also to upstart broadcasters such as WB Television Network, United Paramount Network, and Paxson Communication Corp. Added to these were the home video store options and, more recently, the Internet broadcasters Yahoo!broadcast.com, RealNetworks' RealOne, Digital Island, MSNBC.com, NBA.com, AOLTV, ABCNEWS.com, Warnerbros.com, MTV.com, BroadcastAMERICA, and iCraveTV.

Certainly, a lot more programming is out there than any viewer can attend to. With only a single 6 MHz (19.4Mips) channel to work with, it is not surprising that TV station owners are wondering whether broadcasting is still a good business to be in.

It was in the last decade of the 20th century that the media environment became so much more diverse. This was demonstrated by the growth of such 24-hour news and sports networks as Bloomberg Television, CNBC, MSNBC, CNNFN, CNNNSI, ESPN-2, ESPN Classic, and ESPNNEWS. In addition to the FOX News Channel, there was the FOX Family Channel, the FOX Movie Channel, and FOX Sports World. The E. W. Scripps Co. launched Home & Garden Television, Food Network, Do It Yourself, and Fine Living networks. PBS not only had its local station fare but the national PBS feed, PBS KIDS Channel, and the

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education-focused PBS-You via satellite. The BBC had its own 
BBC America channel.

Loyalty to the broadcast networks is still high, but many viewers 
have drifted away. ABC, CBS, and NBC share of the national 
audience in prime time plummeted from about 90 percent in 1980 
to 50 percent in 2000 (60 percent with Fox and the other broadcast 
audiences added in). With media fragmentation and increased use 
of DVRs at home that let viewers skip commercials, broadcasters 
can guarantee advertisers no more than 15 percent of the 
population in prime time, a number that was 40 percent in the mid- 
1980s. Coca-Cola Co. President Steven J. Hyer told a Madison 
Avenue Audience in 2003 that “the days of mass, homogenous 
marketing are behind us.”

In their 1999 report titled “The Digital Decade,” Morgan Stanley 
Dean Witter predicted that only a dozen program networks would 
remain to dominate the TV landscape in the first 10 years of the 
millennium.

The report suggested that companies like Time Warner and the 
Walt Disney Company, who had broad content portfolios and were 
able to leverage their broadcast, cable, and film brands, and 
companies such as Comcast Corp., EchoStar Communications, and 
Hughes Electronics (parent of DirecTV), who are able to provide 
multiple channels of programming consisting of both local and 
international fare in digitally interactive format, would be strong 
contenders. No more than two of the existing broadcast networks 
are likely to be among the surviving corporations, they said.

Wall Street analysts were warning as early as 1998 that broadcasting 
was going to be a difficult business. In addition to fragmenting 
audiences, broadcasters would face greater costs in the production 
of new program series and in acquiring sports programming. They 
predicted advertisers would balk at network rate increases and the 
growing clutter in the ad schedule. Larger numbers within the 
viewing public would express their resentment in being treated as 
captive audiences to promotions and commercial advertisements 
by looking for better ways to spend their time. This happened even 

faster than predicted.

Broadcast Industry Options
How have broadcasters responded to such pessimistic predictions? 
“Every conceivable response” is the answer. As evidenced by the 
number of stations up for sale, some were clearly hoping to be 
bought out. Others went shopping for bargains, hoping to meet the 
competition with greater heft. Some were working toward leaner 
and more efficient operations; most were thinking about the ways 
they could expand into other lines of business. Relationships 
between networks and affiliates were being renegotiated. New out- 
of-sector partnerships were being entertained. And both network 
and local station broadcasters were praying that their new business 
models built around emerging technologies would save them.

To their credit, broadcasters were the ones stepping forward to 
take the lead in converting U.S. media systems to digital. This was 
no small step and as it has turned out, a much more precarious, 
time-consuming, and expensive path to embark upon than anyone 
could have imagined. But in doing so, they have perhaps found 
their path to a future.

Having multiple scalable channels of video and data to work with 
was an unexpected new prospect. Once operating in the milieu of 
digital, broadcasters learned they would be in a position to bring 
VoD to either the TV set or to the desktop or to handheld devices. 
IP-streaming of content would permit them to capture dollars not 
just from advertising but from the products and services they were 
spreading. Broadcast-controlled Web portals, if properly 
managed, could be expected to draw Internet users in, allowing 
programming to be customized and individualized. Relationships 
between broadcasters and their audiences might even become 
interactive and more viewer-centric.

Broadcasters now see that not all content need have mass appeal; 
some content can be very local, very personal. In the new

137 Dean Foust and Brian Grow, “Coke: Wooing the TiVo Generation,” 
138 Diane Mermigas, “Elite Few Will Lead Digital Revolution,” Electronic 
multichannel universe, programming can have more depth, come
with more choices, be more personally engaging, and reach new
and different audiences (as with the Internet). The problem
of course is that few of those models and little of that type of content
currently exists in digital format. Broadcasters must once again go
to the creative community to come up with compelling new
programming to fill a range of niche interests, to the providers of
innovative technologies to make it happen, and to the capital
markets to fund it. Broadcasters will not only be changing their
control rooms and transmitters in such a process, they will be
changing an old mindset about what broadcasters must do to make
a living.

Broadcast Industry Mergers and Affiliations
In his keynote address to the NAB convention in 1999, Sony
America CEO Howard Stringer told the assembled audience that
the old “friends and enemies” model that the broadcast industry
had tended to follow over the years was a self-defeating model. “In
this new age, the enemy of my friend turns out to be my friend,”
Stringer said. “Even my own enemy turns out to be a friend from
time to time. Strategic partnerships increasingly will parallel, even
supersede, traditional rivalries. At least for the foreseeable future,
we’ll all move forward together or not at all.”

It was clear by 2000 that broadcasters would not be the only ones
carrying the digital flag. The whole of media and
telecommunications was going digital. To survive the competition,
broadcasters had no choice but to seek mutually beneficial alliances
wherever they could find them.

Partnerships with the cable enemy had become a necessity long
before Stringer reminded them of it. As over-the-air antennas had
come down from rooftops in communities across America, the
broadcasters were forced to negotiate with local cable operators to
be certain their signals would still reach home viewers. Without
waiting for the government to mandate “digital must-carry,”

network broadcasters were already out negotiating DTV/HDTV
signal carriage arrangements with cable operators.

CBS initiated early talks with Time Warner Cable to be certain that
when its own 14 O&O stations began broadcasting in high
definition, the cable networks could and would accommodate to its
new 1080i format. As CBS merged with Viacom in 2000, these
agreements took on even greater importance because there was
need to ensure carriage for such lucrative cable channels as MTV
networks.

Fox Television Stations Inc. worked out a 10-year deal with AT&T
Broadband to retransmit the digital signals of its 22 O&O stations,
also seeking to ensure carriage of its cable news, sports, and
entertainment channels. Fox had to be certain its 720p-format
programming was going to be received by the viewing public on
both traditional TV sets and those equipped with the new digital
TV tuners.

Early on, both broadcast networks and cable operators were
making it a point to say that there was no need for government
intervention in such arrangements. The hundreds of television
stations not owned by the four major networks were, however,
worried that they were at great risk without the help of
government-imposed must-carry regulation. Independents were
spending millions of dollars to upgrade their facilities without
guarantees that cable would pick up and deliver their digital signals.

TV broadcasters were dependent on satellite carriers as well.
Terrestrial broadcasters had been partners and clients of satellite
operators for more than 20 years. The first of the broadcast
networks to distribute its national signal to affiliated stations was
PBS in 1978. And in the digital age, the 349 PBS stations will have
to rely on satellite-delivered pass-through HDTV service until they
are ready to assume HD production on their own.

May 2003 was the date public stations were to have a digital signal
on the air. At that time only cable MSOs Time Warner Cable and
Insight Communications had made commitments to carry PBS
stations in digital format. PBS stations were resorting to putting

pressure on local officials to include blanket carriage among their demands in cable refranchising negotiations. The NCTA was arguing that cable operators were already providing their customers with analog versions of the public stations and that to carry multicast digital streams of public content would overstretch cable capacity.

Inevitably, broadcasters will have to negotiate with the telephone industry as well. As telcos exercise their options to become full-service information providers to the home, many will be providing multichannel video services in direct competition with cable TV. Thus broadcasters will not only be competitors of the local telephone companies for audience, for advertising revenues, and in the sale of products and services, they will greatly need telco carriage.

Digital television is one of the areas in which the telcos and broadcasters should think of themselves as allies. Telcos are bringing high-capacity fiber-optic lines into urban neighborhoods and making massive digital upgrades to their in-place copper. In some instances, as with Bell South in Atlanta, the fiber lines are being run right to the home. The capacities of fiber and high-speed versions of DSL provide more than enough space for HDTV-type signals. Such developments will move along the digital television transition in which the broadcast networks and local stations have high stakes. Such developments will add value to the digital content that the media companies have experience producing.

Alliances with telcos are already helping broadcasters with the return channels for data broadcasting and enhanced TV services. With the broadband Internet in place and VoD services an option, the broadcasters have new ways to repurpose their prized content. The telco carriage option promotes broadcaster interests in that it does not leave them relying only on cable or satellite to relay their signals into and out of homes.

Broadcasters also have a history of working successfully with manufacturers and vendors. The NAB exhibit floor at its annual conventions is one of the largest in the world. Equipment and service relationships have been and will continue to be cultivated.

The relationship between Harris Corporation and PBS, in which a fully equipped “Digital Express” truck toured the United States for a year in advance of the rollout of HDTV, was a noteworthy example. Pacts between CBS and Mitsubishi and between ABC and Panasonic designed to move HDTV off-center and into public view were significant. In 1998, Panasonic built ABC’s HDTV Release Center, which the network used to originate its 720-progressive broadcasts of *The Wonderful World of Disney* and other theatricals. Panasonic worked with ABC to build a high-definition production truck that would use the network’s 720-p scan HD format. Under its agreement with CBS, Mitsubishi Digital Electronics America paid to convert up to 15 hours of CBS’s prime-time shows to an HDTV format each week during the 1999–2000 season. The costs were estimated to be $20,000 per hour for the conversion.

For the 2000–2001 season, the CBS HDTV sports lineup included the NFL play-offs, the Super Bowl, the Masters Golf tournament, and the Final Four college basketball tournament. As a result of vendor support, CBS was able to more quickly add to its slate of HDTV programming, the production companies providing CBS with programming were able to retain off-network syndication and international sales rights, and Mitsubishi products, including its HDTV sets, got exposure on CBS shows.\(^{141}\)

HDNet, a sports, entertainment, and news programmer, had two HDTV production vehicles on-site in Salt Lake City to provide technical support and satellite uplinking for NBC’s 1080i signals at the 2002 Winter Olympics. HDNet claimed to be the nation’s first all-HDTV network.\(^{142}\) HDNet is a creation of Mark Cuban, the

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founder of Broadcast.com, which relies principally on satellite for distribution but is attracting cable affiliates as well. This service features live sports like NHL and MLS games, boxing, drama series, concerts, and original news and documentary programming and a 24-hour schedule of blockbuster movie titles from Warner Bros., Sony, and other major studios.

By 2004, even Fox Network had a digital transition plan in place. Fox's strategy was to begin delivering HD signals in 720-p format to its 197 affiliates, with the understanding that most stations would not be originating HD programming on their own. Rather, affiliated stations would rebroadcast the Los Angeles–originated satellite signal, using a special up-converter called a splicer to insert logos and other local content into the network transmission.¹⁴³

Broadcast Industry Constraints
The challenges facing ATV broadcasters are too many to be itemized. Economic, technical, and regulatory issues are among those most worrisome. Since continuing to operate "in the public interest" and the public's continued acceptance of what broadcasters have to offer are key to broadcasters' long-term success, social factors have to be considered as well.

Economic Issues
The broadcast networks took the lead in moving the United States toward a new digital standard. Getting the local stations to come along has not been easy, however. The principal reason broadcasters have been reluctant is their inability to see how they can be more profitable in digital than they were in analog. And they are probably right. Few local stations will ever be as profitable in digital as they were at the height of their analog years.

Implementation of DTV/HDTV is an add-on expense, possibly a non-recoverable expense. For ATSC systems to work, modifications must be made at every level of the broadcast chain. The high-ticket items are the tower, transmitter, master control, and ATSC encoder. For stations to be HDTV production-

support analog NTSC, at least through the year 2006. ATSC high-definition production will mean that stations must implement a completely new architecture for creating, routing, storing, processing, and transmitting their signals in data format and that staff must have the training to make it work.

Station conversion costs will vary depending on the reach and sophistication of the station and the quality of the existing plant. The basic cost of equipping a station only to retransmit network digital feeds is estimated to cost $2 million. To add a new tower is to add $1.5 million. To insert and retransmit syndicated programming and local commercials using playback equipment, the cost goes up another $2.5 million. Studio upgrades to produce local news and originate local programming could bring the cost up $3 million more, so the additional cost beyond the $3.5 million needed for basic pass-through can be as high as $5.5 million per station.

Technical Issues
Television engineers are pressed to solve a number of troublesome problems whose solutions remain elusive. Many of these problems also have economic and regulatory implications. Among them are unresolved issues concerning the reception quality of over-the-air digital transmissions, the standardization of DTV-compatible receivers and set-top boxes, and finding an acceptable industry-wide standard for copyright protection.

The choice of a broadcast signal standard is still a matter of controversy. Beginning in 1998, the Sinclair Broadcast Group led tests that showed the quality of indoor reception of the digital signals to be inferior to that of analog, leading to the conclusion that outdoor rotational antennas would need to be installed for over-the-air reception. Sinclair proposed that the ATSC modulation scheme, called 8VSB, be replaced with the more robust European COFDM system, to ensure that quality pictures will be available to those households not connected to cable or satellite.

When it became clear that 8VSB was probably not the best choice for delivery of data services to mobile antennas or laptops and other wireless devices, ABC and NBC joined Sinclair and others in asking the ATSC to reconsider the standard. The ATSC did take up several modifications they thought would address some of the shortcomings of 8VSB but supported the standard. Abandoning the standard, the committee said, would not only make obsolete the DTV receivers already in the marketplace, it would upset the Consumer Electronics Association (CEA) and the manufacturers of antennas and TV sets on which the success of DTV/HDTV is dependent.144

By mid-2000 Sony Electronics had decided to postpone the introduction of its new line of cable-ready digital and HDTV sets and related equipment. It cited uncertainty over transmission standards as well as uncertainty over copy-protection standards as reasons. Sony executive Ed Grebow, who was on the FCC Advisory Committee when 8VSB was chosen, told Electronic Media, “For mobile applications, COFDM is superior. For a traditional suburban family with an antenna on the roof, 8VSB is better. For cable and satellite connections, the transmission standard is irrelevant. The problem with having two standards is that it raises the cost of receivers and production equipment.”145

Failure to resolve the 8VSB problem, in effect, confirmed that digital television signals would not be received in a large number of homes over-the-air. Home users would more likely get their DTV/HDTV from carriers other than terrestrial broadcasters.

Unfortunately, cable carriage of DTV signals is not in place either. Three affected groups—the CEA, responsible for building DTV-compliant set-top boxes, the entertainment industry represented by the Motion Picture Association of America (MPAA) and the cable industry—only achieved agreement on a standard interface between the DTV sets and the set-top boxes in 2003.

The cable industry backed a transmission format of its own, called QAM modulation, which allowed cable operators to fit two 19.4 Mbps HDTV channels inside a 6 MHz channel. However,

none of the new digital TV sets were designed with QAM demodulator chips in them, nor were any of the digital set-tops. Thus new sets and new set-tops needed to be purchased to decode HDTV programming.

Both Time Warner Cable and AT&T Broadband (now Comcast) placed large orders for HD-compliant set-tops that would demodulate a QAM HDTV signal, decode it, and output an analog signal for display on existing TV sets. That analog output, however, had no copy protection, which meant that very-good-quality copies could be made of PPV and other programming. The Hollywood studios were not at all happy about this prospect.

The CEA and the cable groups did agree on the type of interface that should ideally exist between the set-top and the TV set—the IEEE 1394 standard called Firewire—and the components needed for TV sets to display digital-cable programming, including adoption of a new cable card for descrambling premium programming. The broadcasters were happy because the deal included an agreement that the new DTV digital-ready sets would now come with off-air tuners installed. All parties, including the MPAA, were hoping these schemes would work and could be made available quickly. Given the add-on requirements to already expensive hardware, almost no one was optimistic that retail costs would be acceptable to consumers.

**Regulatory Issues**

The U.S. government has a long history of keeping a watchful eye over the broadcast industry. As an industry trade group, the NAB has a much-deserved reputation as one of the most successful lobbies in Washington. A big chapter in the history of give-and-take between the NAB and the U.S. Congress is still being written in America's transition to DTV/HDTV broadcasting.

To make the change-over easier for viewers as well as broadcasters, every TV station in the United States was given a second 6 MHz channel, either VHF or UHF, to make possible the simulcast of analog and digital signals until the year 2006, at which time a sufficient number of digital receivers (it was predicted) would be in the marketplace and the FCC would ask for the analog channel back.

Part of the government's motivation for pushing this new technology was to bring broadcasting into the digital age, hoping thereby to increase local competition and stimulate domestic growth in all sectors of media and telecommunications. The U.S. Congress and the FCC also had an eye on innovation and the competitiveness of American computers, digital broadcast and cable equipment, and software in the global market. A window of opportunity had opened in which the United States had a chance to accomplish in the new millennium what Japan had failed to do in the last two decades of the 20th century: to become the driving force in establishing a worldwide de facto standard for advanced television.

The government needed broadcasters' agreement and full participation to accomplish such an ambitious agenda. As an incentive, regulators not only made free spectrum available—estimated by some to be worth $70 billion dollars to governments — but also gave tacit agreement to continuing certain protections on behalf of the industry. One of these protections was to ensure that broadcast station signals would be carried by its multichannel competitors. This was a big step to take, for it meant that the government would help resurrect and privilege an advertising-supported "free over-the-air TV" model for broadcasters that had, for the great majority of U.S. households, ceased to exist.

Unless a consumer trend undergoes a dramatic reversal, very few rooftop antennas are likely to be left standing in 2006, when the last U.S. TV station ceases to transmit an analog TV signal. The fact that the consuming public will find such a purchase and installation unnecessary will ensure that this is so. But there is another more fundamental reason: broadcasting to the masses on a preset schedule with 15 minutes of every hour devoted to commercial messages interrupting programming will have ceased to

be profitable because audiences will have found more satisfying ways to spend their time.

**Social Issues**

In March 1997 the U.S. White House impaneled a 22-person commission to advise it on what, if any, new public service obligations should accompany broadcasters' switch to digital. Vice President Al Gore was chair of this panel. Among the major recommendations of the December 1998 Gore Commission Report were the following:

- The FCC should adopt minimum public interest requirements for digital television broadcasters, and require broadcasters to regularly disclose their public service activities.
- The NAB should adopt an updated voluntary code of conduct.
- If Congress undertakes comprehensive campaign finance reform, broadcasters should commit to do their part to reform the role of television in campaigns, voluntarily providing five minutes each for candidate-centered discourse in the 30 days before the election.
- Broadcasters should keep diversity in mind when making decisions regarding programming, political discourse, hiring, promotion, or business opportunities. Closed captioning and emergency warning services should be provided.
- Congress should create a trust fund to ensure permanent funding for public broadcasting.\(^\text{147}\)

Although influential broadcasters were on the panel, and most of the action steps recommended were voluntary, the report was not well received within the industry. The NAB kicked off a new award to honor broadcasters for community service and initiated surveys among members to place a monetary value on public services provided, the results of which claimed that services given back to local communities totaled $8.1 billion.\(^\text{148}\) The NAB figure was contested by journalists and others who found fault with the methodology used in calculating the dollar value of the public services provided and with NAB’s characterization of what the money accomplished.

The free airtime recommendation was a contentious issue in the Congress, in FCC deliberations, and in the public press up to and through the 2000 presidential elections. Former CBS News anchor Walter Cronkite was co-chair of the Alliance for Better Campaigns along with former U.S. presidents Jimmy Carter and Gerald Ford. One of the items advocated by the alliance was that five minutes of candidate discourse per day be made available by broadcast stations in the 30 days before Election Day, the recommendation made by the Gore Commission in 1998.\(^\text{149}\)

The Alliance claimed that issue coverage by broadcasters was down 27 percent from coverage in 1996, even though the 2000 presidential election race was far more competitive. For the first time, two of the four major networks chose not to air a single presidential debate. Local network affiliates in the nation’s top five media markets offered a nightly average of just 45 seconds of candidate-centered discourse in the opening nights of the 30-day pre-election window.

"The broadcasters don't own the airwaves, the public does," Cronkite said. "We lend the industry billions of dollars worth of our airwaves, free of charge, in return for a pledge to serve the public interest. Profiteering on democracy shouldn't be part of the deal." Wall Street firm Paine Webber was projecting that local TV


stations across America would take in up to $1 billion from sale of political ads in 2000.\(^{150}\)

The U.S. Congress took up the matter of campaign finance reform in 2002 but the Republican-controlled House stripped the bill sent to the president language that would have required local TV stations to sell ad time to federal candidates at reduced prices. The House also voted to delay the bill’s implementation until after the fall elections so that candidates’ “soft money,” the unlimited contributions that corporations and unions made to political parties, could still be spent in 2002 on political ads.\(^{151}\)

The FCC cast a landmark vote in June 2003 further deregulating U.S. media and opening the door for even greater media consolidation. By a partisan vote of 3 to 2, the Republican-dominated regulatory agency cleared the way for “a single company to own up to three TV stations, a daily newspaper, eight radio stations, and a local cable TV system in each of the nation’s largest markets.”\(^ {152}\) This decision followed intense lobbying by the big media companies that was given an obligingly receptive ear on the part of the FCC oversight committee in the U.S. House of Representatives and by the FCC chair.

Media ownership regulation, like campaign finance reform, turned out not to be strictly a partisan issue. The FCC’s decision brought a storm of protest from such diverse citizen groups as the National Rifle Association, who worried that minority views would be less likely to be heard, the Parents Television Council, who worried about “New York-based-mega-corporations who have little or no understanding of or interest in community standards” and the California Small Business Association, who worried that the FCC had not taken into consideration effects on small businesses.\(^ {153}\)

\(^{150}\) Laura Meckler, “Political Ads Could Generate up to $1 Billion for Local TV,” Associated Press, September 24, 2000.


John McCain, the Republican senator from Arizona who was one of the architects of the 1996 Telecommunications and Reform Act aimed at bringing about government deregulation, told Business Week, “I’ve come to believe there must be some limits on media ownership.”\(^ {154}\) Texas Senator Kay Bailey Hutchinson, also a Republican, said she believed there was already an “alarming amount of concentration . . . I don’t want to see other cities get into that kind of concentration.” And the Republican senator from Maine Olympia Snowe was quoted as saying, “It most assuredly is a victory for free enterprise but it is not a victory for free speech.” The Democratic senator from South Carolina Ernest Hollings said, “This order has turned the people’s public interest commission into an instrument of corporate greed.”\(^ {155}\)

Many studies have pointed to connections between television programming and various social ills. Research by the Parents Television Council, a conservative watchdog group, found that levels of sex, violence, and profanity on television nearly tripled during the last decade of the 20th century.\(^ {156}\) A report released by the Washington-based Center for Media and Public Affairs found that an average of one scene of serious violence occurred every four minutes on television, movies, and music videos. A Federal Trade Commission report said that Hollywood and the television studios were deliberately using violence to appeal to kids.

A study commissioned by the Screen Actors Guild found that the faces on television were not representative of the faces of America: men outnumbered women 2 to 1 in prime time and Asian Americans, Latino/Hispanics, Native Americans, and people, people who are disabled, and seniors remained underrepresented. The Multi-Ethnic Media Coalition, tracking involvement of Asian, Latino, and American Indians in television

\(^{154}\) Catherine Yang, “Mad as Hell at the FCC,” Business Week, June 16, 2003, p. 37.


programming complained in 2002 that almost no progress had been made since the networks agreed in 1999 to increase diversity.\textsuperscript{157}

Almost all the discussions focusing on the role media should play in maintaining diverse and caring communities were going on while the Congress and the courts were wrestling with questions of finance reform, ownership restrictions, affirmative action, gun control, school violence, and protected speech. Implicit in almost all arguments were assumptions, long-held in American society, that socially responsible programming is expected in exchange for the free use of the public airwaves.

**Applications**

To ensure their future success, what technological, business, and other strategies are broadcasters pursuing? And how are these applications playing out?

**Digital Strategies**

Advanced television almost certainly will not be a single universal standard. The Japanese gave up on the goal of a one-world HDTV format when digital systems sped past the 1150-analog line standard they had worked so hard to force upon the market. The Japanese in effect said to the world, “You tell us what the standards will be and we will manufacture and market to those specifications.”

The American broadcast networks and their local stations will be broadcasting in at least four line standards (480i, 480p, 720p, and 1080i) using 24 as well as 30 frames per second. The Europeans have gone their own way with a European Union–endorsed DVB standard that is incompatible with any U.S. system. To the surprise and disappointment of the American backers of ATSC, the Taiwanese have adopted the DVB approach and South Korea and Argentina may do so as well.\textsuperscript{138}

But will it matter? Perhaps not. Just as computers are able to translate one computer language into another, so will video encoders be able to translate one line standard into another. In the digital world, bit streams are scaled up and down to fit channel capacities and processor speeds; so will video streams be adjusted to match the capabilities of digital editors, recorders, playback machines, set-top boxes, and TV receivers and monitors of different types.

Although more costly to manufacture, TV sets will be built to handle progressive as well as interlace scanning. The same will be true of PCs. When the data rates flowing into and out of PCs, TVs, DVRs, and set-top boxes can be scaled to fit a range of up- and downstream applications, the argument over a single world standard for TV sets becomes a non-issue.

DTV brings to consumers improved sound and image quality and to stations increased spectrum flexibility. In sports programming, the greater resolution made possible by an increased number of scanning lines may be preferable. In news, where resolution is less important, conserved bandwidth can be applied elsewhere. Stations will have the option of transmitting digital bit streams of both lower and higher resolutions. These bit streams can be viewed on more than one type of digital receiver—on a TV, a PC, or some sort of handheld device. Within the broadcast day, broadcasters will switch formats and subdivide their spectrum to maximum advantage.

With digital compression, more information can be squeezed into the channels allocated. The compression standard selected by the ATSC is MPEG-2 (Motion Picture Expert Group). Digital compression allows broadcasters the option of providing four (and maybe more) streams of the 480-line standard or a single stream of 1080-line HDTV on each of their 6 MHz (19.4Mbp) channels.

Comcast can now transmit digital TV signals to cable head-ends using as little as 1.5 Mbps of bandwidth. By adding IP streaming at the origination point and using a special set-top box at the destination, Comcast expects to send MPEG-2 compressed video at 600 kbps. A more recent format for video compression called


MPEG-4 promises even greater flexibility in managing bandwidth for 3-D and other graphically rich applications.

**Interactive Strategies**

If broadcasters intend to stick with over-the-air transmission, augmenting their new DTV programming with interactive elements will be requisite since that is what the competition is doing. But to continue to attract and retain viewers in large numbers, broadcast TV will have to get unstuck from its legacy as a one-way program provider. How might this be possible?

Using the vertical blanking interval (VBI) as a way to transmit interactive enhancements to specially equipped TV sets has not been widely adopted in the United States for a variety of reasons. Although economical and available, the bandwidth (for the same service that delivers closed captioning) is modest, the delivery rate is slow and the telephone line as a return channel is not convenient.

A wireless return-path is available in the form of an Interactive Video and Data Service (IVDS), but broadcasters haven’t picked up that option either. IVDS was approved by the FCC in 1994 as a way to direct additional information from stations to households and serve as a return channel from home viewers. IVDS is an over-the-air communications technology making use of the 1 MHz of bandwidth adjacent to television channel 13 (218–219 MHz). At the time these frequencies were auctioned, potential applications were thought to be in home shopping, home security, meter monitoring, interactive gaming, and interacting with instructional television programming.

The IVDS home unit includes a set-top box equipped to receive broadcast digital information and transmit a return signal to a local wireless cell site. The set-top box generates on-screen graphics that allow subscribers to choose those television programs with which they would like to interact. The cell site relays return data to the place of program origin, such as a broadcast station or cable company. In the case of networked programming or services, satellites may be used to connect to a national operations center.

In 1996 when the IVDS service appeared to be foundering in its search for workable applications, the FCC permitted IVDS licensees to provide mobile services—to include digital wireless two-way messaging, e-mail, and Internet access. Each of these ancillary services holds potential interest for DTV broadcasters but until now, attempts by wireless cable operators to get broadcasters interested in their two-way channels has gone nowhere.

Almost all broadcasters make use of the Internet to promote, complement, or enhance their over-the-air programming. CBS teamed with Microsoft Corp. to produce and deliver interactive content over WebTV (now MSN TV), a set-top device for using the TV set to access the Web. Microsoft payed CBS some $20 million for the opportunity to repurpose about 500 hours of programming across all genres. Microsoft had plans to install its MSN TV platform and Internet Explorer Web-browsing software in digital television receivers as well as cable and satellite set-top boxes and mobile handheld devices, but the initiative appears to have foundered.

CBS Entertainment had some success in attracting Internet users to participate along with viewers of its highly rated *Survivor* and *Big Brother* reality shows. The BigBrother.com site, developed in cooperation with AOL, drew 8.5 million users between July and September 2000, according to Nielsen//NetRatings. This number represented about 8 percent of Internet users. The site was the single most popular feature on the new high-speed AOL Plus service.\(^{139}\)

Super Bowl XXVII was a big opportunity for ABC sports and Walt Disney Internet Group’s enhanced TV division (ETV) to cooperate in delivering live PC–based interactive TV services during its January 2003 football playoff telecast. ETV coverage began during the pregame show and continued through the postgame show. Applications included two interactive games played live, one letting Internet viewers build a roster of fantasy players and the other testing viewers’ knowledge of the game using...

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game, player, career, and team statistics. More than 1.5 million fans checked out ETV programming during the 2002–2003 football season.\footnote{143}

Advances in digital processors forecast a time when broadcasters will bypass the set-top boxes of telephone, cable, and satellite operators and address PCs, TVs, and portable receivers directly, with the Internet serving as the return channel. Chip manufacturers have been shifting interactivity from the external set-top box to processors embedded within new model TV sets. The CPU chip's architecture includes frame buffer, memory, phone modem, and standards-compliant signal decoding functions, plus interfaces to cable modems and DSL, adding about $50 to the price of TV receivers.

**Internet Strategies**

A lot of money has been lost trying to make money on the Internet. For the time being, the Internet appears to be best at helping media and telecommunications be more organizationally efficient and in showing the way to new market opportunities.

General Electric, parent company to NBC, is unusual as an on-line success story. GE was among the first corporations listed in the Dow Jones Industrial Average index in 1896 and the only one of those remaining on the index 108 years later. The company paid quarterly dividends for 102 of those years. Yet GE made almost no use of the Internet for marketing and sales or for internal corporate activities prior to 1999.

General Electric now integrates e-commerce into almost all aspects of its operations and considers the Internet to be its principal method of doing business. In 2001, one of its most difficult business years in more than a decade, the on-line activities of GE produced $13 billion in revenue. The corporation was expecting that number to increase to $19 billion in 2002 and surpass that in 2003.\footnote{144} The company pushed to establish internal transactional capabilities within all its divisions and used the Internet for staff training. It migrated its clients and customers onto the Internet for faster, more efficient service. The profits came as an indirect benefit.

Although NBC encountered the same difficult economy as its peers, it has remained profitable. In what ways the Internet will ultimately benefit NBC are less clear than those with its parent GE. The broadcaster took an ambitious leap with a Web portal relying on advertising to pay its way. Its failure was costly. A probable future scenario will be for NBC to integrate the Web into its day-to-day business, as GE has done. For NBC this will likely mean looking for ways to add value to its programs and services and digitizing its basic infrastructure to cut costs.

The Walt Disney Co. pared down its Internet operations after a disastrous experience with its Go.com portal. The Walt Disney Internet Group was created in 1999 by combining Infospace and Disney's Buena Vista Internet Group. It now runs such sites as ABC.com, Disney.com, ESPN.com, Mr. Showbiz, and NFL.com. Disney's Internet initiative seeks to capitalize on its entertainment brands. Disney teamed up with DoCoMo of Japan to use the telecom company's Internet-enabled mobile phones to offer wireless-content services to 10 million subscribers in that country. ABCNews.com teamed up with RealNetworks Inc. to stream 24-hour video news as a subscription service for broadband users, while continuing to offer live video through its ABC News on Demand portal for $4.95 per month or $39.95 a year.\footnote{145}

Disney's strategy to counter the tough economic times through aggressive investing has not played well on Wall Street. Disney wants to own more content, create or acquire additional cable channels, and invest in new distribution technologies to stimulate a

\footnote{143} Daniel Luzadder, "GE: Lighting the Way to E-Commerce," Interactive \nWeek, November 5, 2001, p. 54.

\footnote{144} Karen Brown, "ABCNews.com Broadens Real Reach," Multichannel \nNews, June 16, 2003, p. 46.
synergistic effect. Internet will be a part of each of these, though apparently not as ambitiously as in the dot-com era.

**Content Strategies**

Even though not all these strategies have worked out well, the combining of content and delivery systems within the umbrella of a single company is in fashion. The timely delivery of content that offers consumers more choice is thought to win the day, especially when those customers can be enticed into a “walled garden” of company-owned assets.

This was motivating the merger of CBS Corp. and Viacom Inc. The alliance of these two powerful companies joined Viacom’s highly profitable MTV, VH1, Nickelodeon, Showtime and other cable networks, United and Paramount movies, and Paramount Station group with CBS’s O&O broadcast stations, sports, and entertainment groups. These have been sorted into packages attractive to advertisers seeking committed viewers and the ability to cross-promote. A slightly different approach, but with much the same effect, is the example presented by the E.W. Scripps Company.

E.W. Scripps Co. is a $1.3 billion media group headquartered in Cincinnati, Ohio. It is one of the few companies seeing its stock go up during the 2000–2002 recession: from a low of 54.70 to 79.56. Scripps group owns 10 network-affiliated TV stations across the United States, publishes 21 daily and 16 non-daily newspapers. It sponsors the Scripps Howard News service and *Adventures in Dining* magazine, operates United Media and Cinetel Productions (licensing/syndication and production companies) and is the creative force behind the cable networks Home and Garden TV and the Food Network.

Scripps sold its cable systems to Comcast Corp. in 1996, preferring to be in the business of producing print, broadcast, and cable programming. Former Scripps president and CEO William Burleigh Jr. told *Broadcasting & Cable* in 1998, “Category television has a lot more growth potential going forward than either newspapers or television.” The company’s strategy for growth was based less on the mass media of publishing and broadcasting, he said, than on targeted cable networks that can deliver a select group of viewers to a select group of advertisers.163

Scripps’ success story is Home & Garden Television, which it created from scratch in 1995 with an estimated investment of $125 million. Home & Garden Television became profitable in 1998 and now reaches 78.2 million cable and satellite subscribers, and others via Web sites on the Internet. The recipe for “category television,” the Scripps executives say, is to find a topic that appeals to an attractive demographic, craft low-cost original programming and retain ownership, and create a library that the company can put to multiple uses.164

Synergy, branding, and owning content are the keys. The category Scripps seeks to own with Home & Garden Television is that of home decorating, improvement and maintenance, and landscaping and gardening. Advertisers spend lots of money each year to reach people interested in such things. With Home & Garden Television and Food Network, and its more recent additions Do It Yourself (DIY) and Fine Living, as its base, Scripps programmers are better able to build easily identifiable and advertiser-friendly brands, and market these across more than a single medium.

**Conclusion**

The home TV set is like the telephone in that it is an appliance few can imagine being without. TV is a comfortable and convenient way to pass the time, get the news, and be entertained. Broadcast services are free to those who live within range of stations transmitting to rooftop (or in-home rabbit ear) antennas and are available on a subscription basis from most cable and satellite operators. Broadcasters spend a lot of money seeking out the most popular programs and scheduling those programs at convenient times. So what is wrong with this picture?


From the broadcasters’ perspective, what’s wrong is the overwhelming competition. Competitors are giving people whatever they want, whenever they want it. People have too many options. Although the programs available via cable, satellite, and home video are subscription-based or pay-per-view, they draw away the broadcasters’ audiences because they appeal to individual interests, are offered at more convenient times, or are uninterrupted by commercial advertisements. Much of this programming is the kind of content that can’t be received over the air. Much of it is under viewer control. Even the types of programs broadcasters offer is now showing up on the Internet at off hours or in on-demand formats.

For 50 years broadcasting has been a lucrative business to be in. Even when stations have been traded several times and are highly leveraged, the prices paid for stations have brought good returns to owners. But the ground is shifting underfoot—the result of deregulation, consolidation among media players, changing consumer expectations, and new delivery systems. Digital television, interactive video services, and the Internet are still unproven businesses. Reinvestment costs are too high for comfort when the market is fragmented and consumer behavior cannot be controlled or even predicted.

These factors have created uncertain times for broadcasters. With a great legacy of public service and access to advanced technologies, capitalization, and creative talent, broadcasters are well-positioned to take their place in the marketplace of communications and commerce as well as in information, education, and entertainment, but this transition is going to take some smart management to figure out.