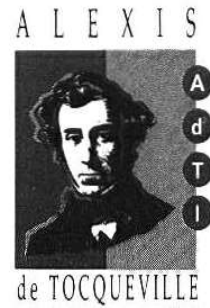


# Convergence and the Future of Broadcast Content



*“By the time Congress could determine how to best adjust cable access rates, convergent technologies will make the change in the marketplace automatically...”*

**Kenneth Brown**  
Director of Technology Programs  
Alexis de Tocqueville Institution  
October 15, 2003  
[www.adti.net](http://www.adti.net)  
[kenbrown@adti.net](mailto:kenbrown@adti.net)

# Table of Contents

- A. Executive Summary
- B. Convergence and the Future of Broadcast Content
  - a. Competing Suppliers and Recorded Content
    - i. New Models and Technology for Viewing Broadcast Content
    - ii. PC to TV Connectivity
    - iii. Market Gravity
  - b. Technology and 1<sup>st</sup> Time Content
    - i. Broadband – A Choice Delivery Means for Broadcast Content
    - ii. IPTV Technology
    - iii. IPTV Abroad
  - c. Conclusion
  - d. Additional Implications
  - e. References
  - f. Notes

# I. Executive Summary

Essentially, there are two types of broadcast content, 1<sup>st</sup> time content, any content viewed for the first time, and recorded content. Live products such as sports and news are the most popular 1<sup>st</sup> time products. 1<sup>st</sup> time products also include pre-recorded programming that is viewed for the first time like popular game shows or sitcoms. Although the programs are pre-recorded, the viewer sees the program for the 1<sup>st</sup> time, so it is termed as such.

Recorded content of course includes all reruns of previously seen shows. Some of the most popular recorded content includes motion pictures. Although, these movies have been previously seen in theaters, broadcast content providers have a considerable market replaying them for audiences again and again. Surprisingly, recorded content is more successful than 1<sup>st</sup> time content because it generates considerable residual revenues for its owners.

The conversation about new mediums for broadcast content competing with traditional providers takes two directions at the same time: the way that recorded broadcast content will reach the market and the way that live or 1<sup>st</sup> time content will reach the market. Due to rapidly advancing storage capability, recorded content providers will be the first to compete with traditional providers. As new technology enables seamless broadcast content distribution across the Internet, we will see significant competition for network and MSO audiences.

Technology shifts and innovation, commonly described as convergence, will significantly impact broadcast content and subsequently, the broadcast industry. This paper presents an overview of how and why each the shift will occur, as well as present evidence to suggest when they will occur. The significance of impending convergence is that the shifts will not only change their markets substantially, but force intersecting interests such as the investment community, the legal community and the regulatory community to redefine the industry.

## II. Convergence and the Future of Broadcast Content

Yesterday you bought a cell phone. Today you can buy a cell phone/camera. Tomorrow, you may be able to buy a cell phone/camera/radio. The topic of convergence is not only about how various technologies will intersect, but how they will evolve and ultimately survive. Device portability, content mass storage and voice digitization are just a few of the dozens of topics commonplace in technology convergence discussions. Everyday, convergence is producing new applications of technology that compete with traditional models. Examples include, Apple selling music, NetFlix renting movies, and XM Satellite selling radio news.

Broadcast content providers such as the major networks (such as ABC, NBC and Fox), and MSO's (multiple service operators) such as cable and satellite tv providers will be directly impacted by convergence as well. And like every other convergence discussion, while it is questionable what types of technologies will best compete, it is undeniable that convergence will inevitably impact traditional television audience models.

### A. Competing Suppliers and Recorded Content

Owning large movie libraries has always had its advantages and disadvantages. Ownership is freedom, but it is also management and maintenance. Malfunctioning DVD or VHS movies mean replacement. Other shortcomings of libraries include storage and continual investment in new content. Finally, the movie product itself deters ownership because an individual rarely views a 2 hr+ movie that many times a year. Each of these factors has fostered significant growth in the movie rental industry. The movie rental business is an \$8 billion/yearly market that only continues to grow<sup>1</sup>. Blockbuster with a 40%<sup>2</sup> market share has 3 million customers a day<sup>3</sup> at its 5,500 stores nationwide.<sup>4</sup>

Conversely, millions still choose to buy VHS and DVD movies; DVD movie sales alone are projected to reach \$10 billion by the end of 2003<sup>5</sup>. While rental outlets enjoy brisk rental business, there remains growing interest in movie ownership. Both sales and rental models will continue to vie aggressively for network and MSO audiences.

To answer this threat, MSOs are leasing/selling recordable media devices to households called Digital Video Recorders (DVRs). They would much rather

<sup>1</sup> The Beaufort Gazette, "Wal-Mart Sees Future in Video Rental", July 29, 2003

<sup>2</sup> Dallas Morning News, "Rumor of Blockbuster Merging Well Received", September 20, 2003

<sup>3</sup> www.blockbuster.com

<sup>4</sup> Washington Times, "Rewinding Movies is Becoming a Thing of the Past", Anna Bakalis, June 23, 2003

<sup>5</sup> Mercer Management Consulting, "DVD Hits the Big Time" www.mercermc.com/mmj

have subscribers wait to watch motion pictures and various content on its networks, but wide availability of recorded content is forcing MSO's to offer devices that allow consumers to record media for replay at a later date. The DVR strategy is designed to directly compete with the expanding VHS and DVD industry.

Some cable firms are offering DVR technology built within the set-top cable boxes that are placed on top of the TV<sup>6</sup>. These devices enable customers to record about 50 hours of programming. DirecTV will release an HD-compatible<sup>7</sup> DVR next year with 30 hours of capacity, but hasn't yet set a price. The Dish Network's HD-ready recorder comes out in November with 25 hours of HD capacity and a price tag of \$999.<sup>8</sup>

Nevertheless, the VHS and DVD industry will steadily erode TV and cable audiences. It is true that with the exception of DVRs, each of these models has battled one another for many years. However, new considerations make it questionable whether their coexistence can continue. New video-on-demand (VOD) download services and home entertainment technologies are certain to cause a shift in the industry. VOD services will increase the convenience and availability of movie titles, potentially changing consumer buying habits from retailers to the Internet. Home entertainment technology will evolve the PC into a home theater experience, further increasing interest in digital broadcast content. As each industry competes for the same audience, it is unlikely each can continue to grow without cannibalizing the other.

### A.i. New Models and Technology For Viewing Broadcast Content

New entrant NetFlix ([www.netflix.com](http://www.netflix.com)) rents DVDs to customers with two drastic changes in the traditional business model 1) customers pay monthly (\$19.95) for unlimited rental of titles and 2) customers do not pay late fees; which is an especially significant threat to Blockbuster which earned 16% of its total income in 2000 from late fees<sup>9</sup>. This model is also significant because it moves customers away from retailers and to the Internet for movie shopping.

In addition, video on demand technology options across broadband are creating download options for viewing movies. Services such as start-up Movielink ([www.movielink.com](http://www.movielink.com)) enable customers with broadband access to download movies directly to PCs. The service has offerings of over 500 titles, however, a movie download is only available for 24 hours after it has been viewed and expires after 30 days if has not been accessed. In addition, factors such as slow download capability, and short "expiration" will discourage many consumers from using the service. However, impending changes in technology for home use will impact video on demand download/storage models.

---

<sup>6</sup> The Sacramento Bee, "Comcast Sets Sights on DVR Market", Oct. 9, 2003

<sup>7</sup> High Definition TV definition: [www.searchtechtarget.com](http://www.searchtechtarget.com)

<sup>8</sup> The Sacramento Bee, "Comcast Sets Sights on DVR Market", Oct. 9, 2003

<sup>9</sup> The Washington Post, "New Fees on the Block", August 30, 2003

Popular DVD formats store almost 8 gigabytes of data, new two-sided DVD's approach 10 gigabytes of data. Retailers sell 160 gigabyte storage devices that easily plug into PCs. For example, CompUSA retails Maxtor 160 gigabyte drives for under \$150, enabling consumers to buy over a terabyte of PC storage for under \$1200.<sup>10</sup> Other advancements seem to improve storage technology almost daily. In May, Hitachi announced the development of DVDs with storage capacity for 200 movies.<sup>11</sup> Hitachi expects its technology to be available commercially within three years.

Powerful storage technology will create a vast vacuum for content ownership. While it is unlikely the prices would change rapidly, the ability to easily manage potentially hundreds of videos from a PC, will exponentially increase demand. The evolution of the downloadable music industry has proven that easy-to-use technology to acquire media content over the Internet is immediately appealing to consumers.

Apple CEO Steve Job's has made providing music content a profitable enterprise. Record studios almost at almost a standstill, have watched Apple's iTunes service sell over 10 million songs over the Net in just four months.<sup>12</sup> While recording studios struggle to determine whether downloadable music is their friend or enemy, new music service companies like Apple are proving that once there is an availability of reliable, easy-to-use technology, the Internet is a compelling means to acquiring media content. Apple's success to date has proven that albeit a technology firm, it can build a loyal audience for entertainment distribution. Some predict that soon Apple will have the brand capability to record, market and sell music direct, and inevitably explore movie sales.

It can be expected that consumers will respond similarly when storage technology drastically changes movie ownership considerations. The math makes this a striking consideration. For example, Blockbuster offers users approximately 9,100 titles for rental<sup>13</sup>, Wal-Mart offer 13,000<sup>14</sup> and NetFlix offers 15,000 titles<sup>15</sup>. Assuming a movie is between 6-10 gigabytes, terabyte capability enables a PC to store over 100 movies. As Moore's Law continues to exceed expectations, soon technology will turn a PC into a device that can easily manage a pentabyte (1000 terabytes) of data, enabling a user to store an entire movie rental company's inventory on a single PC. With products such as Hitachi's DVD on the market within three years, pentabyte PCs will happen sooner than later.

---

<sup>10</sup> [www.compUSA.com](http://www.compUSA.com)

<sup>11</sup> Agence France Press, "Hitachi Develops DVD Which Can Store 200 Movies". May 16, 2003

<sup>12</sup> Jakarta Post, "Keeping Up With Demands for Online Entertainment", Sept. 29, 2003

<sup>13</sup> [www.blockbuster.com](http://www.blockbuster.com)

<sup>14</sup> [www.walmart.com](http://www.walmart.com)

<sup>15</sup> [www.netflix.com](http://www.netflix.com)

## A.ii. PC to TV Connectivity

PC to TV connectivity is the nexus for a complete video streaming experience. Watching movies on laptops and PCs is convenient, but it is not a substitute from watching them on large screen TVs or on home theater appliances. Described as a conversion from PC-centric broadband to TV-centric broadband, OEMs and market leaders are rapidly shifting their attention to enabling the TV to become the primary choice to enjoy video streaming.

The demand for PC to TV connectivity has moved a number of solutions into the marketplace. Over-the-counter solutions include cable connections which transfer video feeds from the PC to the TV. For example, electronics stores such as Radio Shack sell RCA® S-Video Signal Converters<sup>16</sup>, a cable that seamlessly enables consumers to view video across a TV from a PC. New devices such as the DV200 PC Sender - PC to TV Wireless Video Sender<sup>17</sup>, a product by AEI Security Communications, allows users to send streaming video directly to their television from the PC with a wireless device. These and dozens of solutions are providing consumers a means for PC/TV connectivity.

Soon, TVs themselves will include broadband connectivity. In March, Sony announced it is developing a plasma TV that will offer a broadband connection to the Internet. The project, codenamed Altair, is expected to be available in Britain next year.<sup>18</sup> A recent report from research firm eMarketing predicted a broadband explosion leading new innovative services that move past the PC. BT Openworld Head of Partnerships comments on the study, "The future is exciting from a product point of view, iTV (Internet/interactive TV) has never been for Web browsing, because it was always built around what a TV is capable of. This (iTV innovation) takes things one step further."

We can expect new technology to rapidly change download speeds as well. Advancements in download capability will eliminate file transfer size as a consideration to building large home broadcast content libraries. Recently, using next generation Internet Protocols (IPv6), computer scientists at California Institute of Technology set new Internet2 download rates, achieving 983/mps for more than an hour. In the experiment, the team transferred data from Geneva to Chicago equivalent to the size of a feature-length DVD every 36 seconds, more than 3,500 times faster than typical broadband connections<sup>19</sup>. As new applications and processes enable consumers to easily manage and transfer large libraries of digital content, it is unquestionable that both VHS and DVD sales and rental models will be vastly different in the near future.

---

<sup>16</sup> [www.radioshack.com](http://www.radioshack.com) \*Note: Product requires S-Video connectors in both PC and TV

<sup>17</sup> [www.easylife.co.uk](http://www.easylife.co.uk)

<sup>18</sup> New Media Age, "Sony Works on Broadband Plasma TV" April 17, 2003

<sup>19</sup> Next Generation Internet Protocol Marks Shattered in Internet2 Land Speed Record Competition, June 26, 2003, PR Newswire.

### A.iii. Market Gravity

Meanwhile, content rights holders would prefer to rent their content, however, insatiable demand is only increasing the amount they are choosing to sell direct to consumers. Today, content owners are selling not just movies, but popular TV shows and syndicated specials<sup>20</sup>. Again, they do this reluctantly. King World Syndicate would prefer that households only view the Little Rascals on TV channels, etc. By controlling demand, syndication companies can better control the value and subsequent price of the product. However, the exponential demand for recorded content will continue to drive its prices downward. Content owners cannot counter this trend; and will only continue to sell more and more content direct to reap a portion of the market's soaring revenues.

Market gravity coupled with new technology will only accelerate a change in the way networks and MSOs sell broadcast content to audiences. At the rate that broadcast content is being sold direct, it is probable that within a few years, there will only be a static difference between the volume of retailed broadcast content consumers own and the amount broadcasted by the networks and MSOs. As Keynesian economics teaches, the supply and demand of any product has an inalienable effect on what it can sell for in the marketplace.

---

<sup>20</sup> Los Angeles Daily News, "TV Shows Old and New Send DVD Sales Soaring", September 1, 2003

## B. Technology and 1<sup>st</sup> Time Content

The future of 1<sup>st</sup> time content is a little more complicated, but nevertheless has the faces a different future due to convergence. Today, most broadcasts involve a combination of RF (radio frequency) and satellite. The economics of broadcasting live feeds has forced producers to use both traditional and digital technology. Nevertheless, live broadcasts are “owned” by staid providers not just because of the technology, but because of negotiated distribution.

For example, an NBC news broadcast is owned by the parent and its exclusive resellers. To see the broadcast, a viewer must subscribe to a designated channel. 1<sup>st</sup> time programming such as the Superbowl and the World Series are exclusively broadcasted by a sole provider, a model to control value to advertisers and resale price. Logically, networks such as CBS are willing to pay large sums for exclusive broadcast rights. Exclusivity means large audiences and substantial profits from advertising sales. The Superbowl’s owners- the NFL, would love to have the advertising dollars for themselves, but they do not have distribution. Specifically, they don’t have a way into the home, such as a TV, cable, or satellite channel. Moreover, it is cost-prohibitive for the NFL to build a network just to sell the Superbowl. However, soon broadband and accompanying technologies will not only present the same distribution vehicle cheaper, but to an exponentially larger audience. This reality will make the 1<sup>st</sup> time broadcast model especially vulnerable to convergence.

Broadband technology has multiple reaches. Examples include cable, satellite, WiFi<sup>21</sup>, and DSL. New advancements such as fiber-to-the-home deployment, WiMax<sup>22</sup> unlicensed spectrum, and broadband over power lines (BPL)<sup>23</sup> promise to deliver broadband to users ubiquitously and economically, regardless of terrain. Because broadband will soon compete with the most pervasive TV networks and MSO’s in reach, it easily achieves consideration for 1<sup>st</sup> time broadcast content consideration.

As this technology develops, content producers such as the NFL, without a major network or MSO, will be able to pipe the Superbowl directly to millions of homes. With a larger subscriber base, advertising market, and more control, live broadcast feeds via the Net becomes a very real alternative to traditional distribution. Again, the potential of this is real, the only question is when.

---

<sup>21</sup> [www.weca.net](http://www.weca.net)

<sup>22</sup> [www.wimaxforum.org](http://www.wimaxforum.org)

<sup>23</sup> Statement by Commissioner Kevin Martin, “Inquiry Regarding Carrier Current Systems, Including Broadband over Power Lines”, [www.fcc.gov](http://www.fcc.gov), April 23, 2003.

## B.i. Broadband – A Choice Delivery Means for Broadcast Content

It is projected that there will be 945 million Internet subscribers worldwide by 2004<sup>24</sup> According to a report issued by the International Telecommunication Union (ITU), the number of worldwide broadband subscribers grew 72 percent in 2002 to approximately 63 million. RHK research recently reported (for the end of 2<sup>nd</sup> quarter 2003) that the number of global broadband subscribers has grown to 75.3 million.<sup>25</sup>

Worldwide the number of broadband subscribers will become a significant percentage of overall TV and MSO audiences. In the U.S., the math is quite compelling. There are approximately 72 million households that subscribe to cable in the U.S.<sup>26</sup> However, there are over 19 million broadband subscribers.<sup>27</sup> By next year using broadband, a broadcast content provider could potentially reach a third of the number of households that subscribe to cable TV.

The significance of this penetration rate is easily calculated. For example, out over 200 regularly watched channels available on cable television, it is not unusual for ESPN to have the most viewers. As an example, Turner Entertainment Research recently reported that during the week of Sept 22-28, 2003, ESPN was the number 1 rated network, reaching almost 2 million households. Second and third was TOON with 1.43 million and TNT with 1.4 million households.<sup>28</sup>

ESPN has two primary sources of revenue, programming sponsorship and cable broadcast contract revenue. However, if ESPN decided to broadcast direct to broadband subscribers, it would only need a penetration rate of 10% to reach an equivalent number of households. Combined with inherent worldwide coverage, it could easily eclipse its current penetration rate. ESPN would need to create a viable profit center for this to occur, nevertheless, an accessible audience size of twenty million households would make the direct broadcast model a scintillating consideration. The question of how and when will broadband be able to deliver quality broadcast content to households is the remaining question.

## B.ii. IPTV Technology

Internet protocol television, IPTV is a concept that captures the world's attention for many reasons. The number one technological application of mass appeal is voice. Broadcast content, i.e. TV, is the undeniable second. Every country in the world has a wide variety of television programming, thus delivery of broadcast content across the Net has the immediate appeal of a world market.

---

<sup>24</sup> [www.cyberatlas.internet.com](http://www.cyberatlas.internet.com), "Population Explosion" September 22, 2003

<sup>25</sup> RHK Research Brief, [www.rhk.com](http://www.rhk.com), "Double Digit Broadband Subscriber Growth Continues in 2Q3", August 28, 2003

<sup>26</sup> MPAA Press Release, "Valenti Announce Dramatic Box Office and Admissions Increases", March 4, 2003

<sup>27</sup> [www.cyberatlas.internet.com](http://www.cyberatlas.internet.com), "Broadband Based on Behavior", May 19, 2003

<sup>28</sup> Cable World, "Ratings", October 6, 2003

The demand for Internet access around the world has sped up the deployment of diverse delivery systems for Internet access. Nations with diverse economic, terrain and population density challenges have diverse telecommunications, television and Internet delivery technologies. Today, in countries such as India, hi-speed Internet moves across large wireless networks, cable, DSL and satellite (which is long-range RF). Respectively, a number of broadband delivery systems in Europe and elsewhere have been developed to deliver broadcast content.

While the discussion of IPTV is more prevalent abroad, its development in various countries make its migration to the U.S. both plausible and imminent. In many countries, pre-existent fiber infrastructure has provided telcos with ready-made systems for broadcast content delivery. However, broadcast content delivery across copper (commonly referred to as VDSL or Video DSL) is also commonplace.

Telcos abroad have utilized technology to enhance DSL capability to deliver content across IP<sup>29</sup>. Technological enhancements control bi-directional communication, management applications, for billing and interactivity, and error correction processes. Danna Bethlehem of TMCNet.com writes, "Telcos and operators have had no choice but to tread the IP road. Deregulation has increased competition in their traditional telephony markets. The threat is not only coming from the cable companies, but also from mobile services, which have reduced the number of land-based phone lines that many households need. Likewise, the growing prevalence of broadband Internet access is making a second dial-up line unnecessary in many homes. Telcos are adopting TV over IP strategies as a pro-active stance, before cable companies start infringing on their traditional revenue channels, and also as a way of justifying DSL offerings. Based on this approach, for some telcos it is not financially viable to offer plain broadband intended for Internet use, without the additional TV over IP service. By streaming TV over their native infrastructures, telcos have a chance to recoup or gain market share and increase revenues by offering a wider range of services."<sup>30</sup>

### B.iii. IPTV Abroad

In Germany, Deutsche Telekom [NYSE:DT] has said that it plans to launch television content services over its DSL network by the end of 2003. It plans to initially to supplement programming on existing TV stations and later offer video-on-demand (nVoD) services.<sup>31</sup> In France, France Telecom has signed a

---

<sup>29</sup> See notes section, "MPEG Video Summary"

<sup>30</sup> TMCNet.com, "Delivering TV Over DSL", September 17, 2003

<sup>31</sup> PBI Media, LLC- Inside Digital TV, "Convergence Index Analysis: Germany", May 14, 2003

partnership agreement with TPS, a satellite TV company owned by French TV networks TF1 and M6, to provide content for its forthcoming TV-over-ADSL service. France Telecom plans to launch its initial TV-over-DSL deployment in Lyon in December 2003, followed by Paris in Spring 2004.<sup>32</sup> ADSL supports the simultaneous use of phone lines, broadband access and the delivery of programming to a set-top box.

In North America, Bell Canada and Microsoft will jointly explore delivery of digital TV programming over Bell Canada's broadband network via **IPTV** technology<sup>33</sup>. Through this initiative, Bell Canada will provide Canadians with innovative, new ways to receive entertainment and information and next-generation media. Moshe Lichtman, corporate vice president, Microsoft TV Division comments, "Bell Canada is well positioned as a world-leading telco and digital TV provider to kick off our new **IPTV** effort to transform the market for advanced video services."

Presently, companies such as Alcatel, Monaco Telecom and Sony are developing delivery systems for broadcast content across broadband. Each will face different challenges as they migrate their technologies to the U.S. market. As more U.S. based companies build these systems for use abroad, their use in the U.S. will only be inevitable. Telcos will have to upgrade their copper networks, while in some cases they will have no problem making the transition. Nevertheless, as the technology becomes better, telcos will inevitably invest in selling broadcast content of one form or the other. Meanwhile, broadband will be delivered to consumers via WiFi, WiMax, satellite, and BPL. Each with the potential to send and receive broadcast content.

The most ironic development in the convergence process will be what MSO's that sell hi-speed Internet service themselves decide to do. On the one hand, they are the leading provider of broadband and will only continue to expand their base of customers with offerings that double broadband speed.<sup>34</sup> It is very likely that the broadcast content models described will only MSO subscriber bases. Nevertheless, it will be interesting to see how they will respond to broadband subscribers that wish to discontinue their TV service, but keep their broadband, only to access broadcast content direct from competing providers.

Meanwhile, as offerings improve technologically, broadband will become more and more competitive with both network and MSO providers. Gerry Kaufhold, an analyst with In-Stat/MDR comments, "Just off the top of my head, we believe that new, on-line technologies, specifically Microsoft Windows Media 9 Series, and MPEG-4<sup>35</sup> with Linux - will cause a gradual migration to occur with all broadcast TV content." IPTV technologies can significantly reduce market entry and operational costs for new broadband television service providers..." said

---

<sup>32</sup> Pressi.com, "France Telecom and TPS Launch Digital TV on Phone Lines," September 9, 2003

<sup>33</sup> Canada NewsWire, "Bell Canada and Microsoft to Trial Internet Protocol TV", October 9, 2003

<sup>34</sup> [www.money.cnn.com](http://www.money.cnn.com), "Comcast to Double Downstream Speeds for High Speed Internet Customers", October 2, 2003.

<sup>35</sup> see notes: "MPEG Video Summary"

Peter King, director of Global Broadband Practice at Strategy Analytics. Strategy Analytics projects that a mere 110,000 homes around the world would be connected to IPTV in 2003, but said the number would grow to more than 20 million by 2008.

In a forward-thinking essay published in 2001, entitled “Will the Tail Wag the Dog”, author/consultant Steve Hawley presents the logic for the impending transition as he contemplates apartment owners or MDUs (multiple dwelling unit owners) competing with cable companies. In his provocative piece, Hawley comments, “If the broadband operator can acquire and offer a competitive set of programming, bundled with the other services one has come to expect from cable---without cable, then why bring in cable?... While the noisy contention between cable and satellite rages on, broadband service providers will inexorably become a greater competitive factor, as many technology providers have already begun to recognize... If we are to believe that nature abhors a vacuum, then we should believe that these new types of TV providers will ultimately succeed in obtaining their programming "from somewhere". And why would an owner or supplier of TV programming or movie content turn its back on a potential incremental source of revenue, from what is in many instances an upscale base of TV consumers, particularly if the owner-operator doesn't want to be served by a cable franchise or satellite operator. Suppliers will inevitably step forward to serve the operator...”<sup>36</sup>

## C. Conclusion

The prospect of convergence is an exciting one. As it occurs all around us, we can definitely expect it to change the way we see both recorded and 1<sup>st</sup> time broadcast content. Technologies rarely extinguish each other. Instead, competition sets up new profit centers, thus eliminating the need for old ones. As convergence impacts broadcast content, we will see an inevitable response in the pricing as networks and MSO's react to new competition.

In some ways, convergence will impact broadcast content almost immediately. In other respects, we may not see any of the changes discussed within 3 years, but, more definitely in five to ten years. Although change will not happen overnight, in preparation, we should engineer business models, public policy and legal landscapes with long-range vision, mindful of these and other impending innovations. If anything, convergence in the broadcast market demonstrates that there is uncertainty in every venue, thus it is premature to pick winners and losers in any of the business categories -- just yet.

Convergence will change dozens of traditional business models. For example, MSO's with Internet telephony offerings will compete in the voice business with telcos; likewise, telcos will compete with MSO's for TV viewing audiences. In the future, it will be no more unusual to buy teleconferencing links from Comcast, than it will be to buy ESPN from Verizon. Ultimately though, convergence will

---

<sup>36</sup> ITV Marketer, “Will the Tail Wag the Dog”, December 2001

only increase the variety of programming and choices for viewing it. In the end, we can only expect to enjoy TV even more.

## D. Additional Implications

1) Convergence will change the terminology of commonplace technologies we have embraced for over 100 years. The term phone, TV radio, TV and radio broadcaster are just a few of the devices and processes that will be irreversibly redefined by convergence. Regulators, courts and policymakers will be forced to reinterpret definitions of what each technology is. It is almost certain that traditional template definitions will not apply.

2) Broadband will soon become a choice delivery vehicle for broadcast content. Regulatory bodies, around the world, particularly in the U.S. will soon need to more closely evaluate media ownership rules, particularly when without significant investment, broadband availability will enable virtually anyone with a website, servers, and a content provider will be able to deliver programming to a global market.

3) Convergence will rapidly introduce new competitors for broadcast content. Networks and MSO's will be forced to change their pricing models to respond to competition from new broadcast content delivery providers. All current debates regarding MSO subscription rates will change dramatically within five years. For example, convergence will directly impact the current debate on cable rates. By the time Congress could best determine how to adjust cable access rates, convergent technologies will make the change in the marketplace automatically. Old pricing models will quickly become irrelevant. Converging technologies will bundle services and content that are independently regulated today. The future pervasiveness of broadband will force new elasticity in all broadcast content and broadcast content provider models.

## E. References

CD storage

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

Computer to TV Converters

[http://www.avermedia.com.tw/cgi-bin/products\\_computertv.asp](http://www.avermedia.com.tw/cgi-bin/products_computertv.asp)

DVD storage

[http://www.mysimon.com/DVD\\_RAM\\_MEDIA\\_9\\_4GB\\_TYPE\\_I\\_TWO\\_SIDED/4505-3214\\_8-6037078.html](http://www.mysimon.com/DVD_RAM_MEDIA_9_4GB_TYPE_I_TWO_SIDED/4505-3214_8-6037078.html)

*“DSL Market, Ahead of Forecasts”*

[http://www.advanced-television.com/special\\_report/DSL.html](http://www.advanced-television.com/special_report/DSL.html)

*“Free TV via Broadband”*

EuropeMedia, March 2, 2003

IPTV Partners and Microsoft

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

*“New HP product to convert VHS home movies to DVD”*

Associated Press, August 11, 2003

*“Sony TV would grab streams from the Net”*

April 4, 2003, [Evan Hansen](#), [Stefanie Olsen](#) and [Richard Shim](#) CNET News.com

*“Sony Will Release Two Digital High Definition Plasma TV Models...”*

Kyodo News Service, Japan Economic Newswire, August 4, 2003

Two Sided DVDs at 9.4 Gigabytes

[http://bizrate.com/.mss\\_\\_cat\\_id--410.prod\\_id--7382785.rf--wgg.html](http://bizrate.com/.mss__cat_id--410.prod_id--7382785.rf--wgg.html)

*“Video over DSL, An Opportunity for Independent Phone Companies”*

[http://www.tellicent.com/pdf/Video\\_over\\_DSL.pdf](http://www.tellicent.com/pdf/Video_over_DSL.pdf)

## F. Notes: MPEG Video Summary

### “GETTING TV OVER PHONE LINES: DSL APPLICATION ARCHITECTURE”

(Source: TMC.Net, “Delivering TV Over DSL”, September 17, 2003)

Streaming TV over DSL lines is possible by using high quality MPEG video. The various MPEG standards allow application developers to create customized trade-offs between playback rate, quality, bandwidth and cost.

MPEG-1, MPEG-2 and MPEG-4 offer different compression rates and schemes, allowing service providers to offer various video streaming services:

- MPEG-1 provides very good quality at playback rates of up to three Mbps;
- MPEG-2 provides a compression solution for applications that are not limited by bandwidths (three to 15 Mbps). Such a broad compression range means that it is not necessary to sacrifice quality to compression rate limitations; and
- MPEG-4 is a set of compression/decompression formats and streaming technologies that address the need for distributing rich interactive media over narrow and broadband networks. Although MPEG-4 covers more or less the same encoding range as MPEG-1 and MPEG-2, its target applications are different. MPEG-4 defines interactivity, scalability and streaming of rich media. Content compressed according to the MPEG-4 standard can be streamed over the broad or narrowband Internet, used in Interactive TV applications or streamed to wireless appliances such as cellular phones and PDAs (Personal Digital Assistants).