

Video Content Services as a Transforming Industry

Claudia Loebbecke

Chair Professor, Department of Media Management and
Director, Media Science Center
University of Cologne
Pohligstr. 1, 50969 Koeln, Germany
Tel +49 221 470 5364
claudia.loebbecke@uni-koeln.de
www.mm.uni-koeln.de, www.mzk.uni-koeln.de

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Ian MacInnes

Center for Business and Government Fellow
Kennedy School of Government
Harvard University
79 JFK Street, Cambridge, MA 02138, USA
Tel +1 617 496 3053
IMacInne@syr.edu

Michael Staudinger

Department of Media Management
University of Cologne
Pohligstr. 1, 50969 Koeln, Germany
Tel +49 221 470 5364
michael.staudinger@uni-koeln.de
www.mm.uni-koeln.de

Abstract

This paper shows how the video content services industry is quickly in transformation as a result of the introduction of new media technologies. It examines two major technological factors -- increased broadband connectivity to the home and increased storage capacities -- and their implications for the different value propositions of players in the industry.

We are interested in the industry realignment with a focus on issues such as 'strategic positioning', 'concentration versus specialization', 'proprietary or open standards applications' and 'equipment devices and their impact on competitiveness', and 'actual rent-(profit-)based power shifts among players and along the overall industry's value chain'. This paper investigates the impact of new video content technologies in the United States, and provides a brief outlook on how and to what degree our US findings can be transferred to selected European markets.

1 Video Content Services at a Glance

Using the value chain as a metaphor, the players in the video content services industry include providers (Hollywood, etc.), aggregators (channels / programs), and distributors (broadcasters, cable operators and satellite service providers.) Additionally, manufacturers of equipment such as set-top boxes serve and influence the industry.

Content providers (e.g., film studios) create some of the primary content for the whole industry. They forward their productions to channels such as CNN, Discovery or ESPN. As content aggregators, the channels add value by procuring, enriching, and prepackaging the delivered content and finally include it to their program offers.

The downstream video content distribution industry consists of three major technology segments: broadcast, cable, and direct satellite. In the US, distributors are television broadcasters (e.g., ABC), cable distributors (e.g., ComCast), satellite companies (e.g., DirectTV), and eventually Internet / information services, including news websites such as *real.com* and *cbc.ca*. Incidentally, terrestrial broadcasters also had regional franchises but faced greater regulation in the areas of content and spectrum obligations. Because these industries used dissimilar technologies and were subject to different types of regulation, they evolved independently from each other. In the US, the cable distribution industry, which provides content to many broadcasters and cable channels via coaxial cable, has traditionally been organized with regional operators as exclusive providers. Satellite providers of video content services entered the market and, given the high cost associated with establishing a satellite network, there are only a few providers in, with DirecTV and EchoStar as key players. The industry has changed gradually since the 1970. Companies in these segments were at first simply distributors who bought content from television, movie studios, and sporting leagues. Over time, they began concentrating, forming alliances, and merging with those producers. Regardless of the media used to deliver content, all of these providers rely on advertising and, for satellite and cable, on monthly subscriptions from users. In contrast to cable and broadcasters, satellite companies have been able to serve an entire continent with a single signal. Entry by satellite providers resulted in stronger competitive pressure for cable distributors.

2 Evolution toward Enhanced Video Content Services

The on-going transformation in the video content services industry is not a recent event. There have always been attempts to provide more sophisticated services leading to on-demand and interactivity technologies. The primary motive behind these initiatives is to generate additional revenue-streams. With respect to technological factors as transformation drivers, we focus on the developments that took place in the distribution segment.

In 1977, Warner Communications tested interactive television with a system called Qube. By pressing up to five buttons on a set-top box, viewers could participate in surveys, vote in town meetings, and vote in the Academy Awards among other things (Constantakis-Valdez 2003). The test was then cancelled because it was too expensive. But some of the initiatives later became quite successful. In an effort to keep the channels fully utilized, the company started a

children's network in late 1977, which two years later became Nickelodeon. The company also tried in 1979 to put on 'Pop Clips', which in 1981 became MTV.

In Montreal, Vidéotron was one of the first companies in North America to have systems capable of handling twoway signals. The interactive system 'Videoway', introduced in 1989, allowed people to select camera angles when watching hockey games, participate in game shows, choose the intensity of a workout when watching an exercise show, and select the type of news. The interactivity in the system was possible because for every interactive channel on the user side there were four channels that transmitted the same show but on different tracks (Maney 1995, p. 140). In 2000, the company merged with Rogers, the largest cable operator in Canada to take advantage of Internet technologies.

Viewer-Controlled Television, a pilot started in 1992 by the large telecom providers TCI, AT&T and U.S. West (Allen et al. 1993). Another effort took place in Connecticut with the system called 'Command Performance' by New England Telephone (Baldwin et al. 1996).

In 1994, Time Warner Cable launched a test of the 'Full Service Network' that included 4,000 customers in Orlando, Florida (Colette 2000). The system was able to provide movies, shopping, games, and sports. The video storage system offered memory for 500 movies. The switch necessary to deliver the content was sophisticated and could handle video calls. The set-top boxes, nonetheless, cost US\$2,000 each (Maney 1995). The trial was offered as a test with no extra monthly charges until 1996 (Davis 1996). In January 1997, Time Warner Cable abandoned the system to concentrate on Web Technologies.

While these efforts were advanced for their time, the technologies necessary to make them commercially successful were still in their early stages. They were not sufficiently developed to allow for the implementation of full interactivity, 'on demand' applications, and marketable pricing. Therefore, cable operators as well as satellite providers started 'Near Video On Demand' (NVOD) services, which simulate VOD services at a fraction of their cost (Ellis 2001). Instead of delivering a movie on-demand, a given film would be started every 30 or even every 15 minutes, devoting in parallel four and eight channels respectively.

More recently, costs for true VOD have declined dramatically due to technological developments. As a consequence, some 40 VOD deployments were implemented in the US in late 2001 (e.g., Grotticelli, Kerschbaumer 2001; Iler 2001; Rizutto, Wirth 2001).

3 Technological Factors as Transformation Drivers

We examine in this section two major technological factors and their implications for the value proposition of video content services. The factors under investigation are:

- innovative storage devices such as DVDs, personal computers, and personal video recorders (PVRs) - including intelligent set-top boxes with cheaper storage and faster processing, and
- increased broadband connectivity to the home - combined with increased processing power for network servers, and Internet-based content services.

These drivers are both aspects of *digitalization*, the convergence of computing technologies with video content.

3.1 Storage Related Technological Developments

While the price of drive-based storage has declined dramatically, the storage capacity has increased considerably. In the 1970s, when the first interactive and on-demand applications were tested, the cost of one megabyte of storage was close to US\$1,000. At such high prices only program providers could have afforded the equipment necessary for the storage of video programs. Today the price for one megabyte of storage is less than one cent. It is now possible for individuals to store a library of programs on a single hard disk in their own homes. This enabled a change in the provision of these services.

The improved storage capacity at a better 'price performance ratio' shapes the market via several technical devices.

Personal computers have invaded households since the late 1970s. At first acquired for doing spread-sheets and word-processing, they were soon cherished for game-consoles as well. They are increasingly used also for entertainment. The screen resolution of monitors has improved from 320x240 pixels to 1600x1200. DVD drives are becoming standard in all machines, many of which can write recordable CDs. Speakers were introduced in the late 1980s. A recent poll conducted by Harris Interactive player (Evangelista 2003, p. E1) indicates that people of 13 years of age and older consider their PCs more important than a CD, stereo, or DVD. TV tuners and recording software have been technically integrated.

Digital Video Disks (DVDs) have been rapidly adopted in recent years, thereby changing viewing patterns for feature length movies. In the first quarter of 2003, the growth in sales of DVD players was 93 (Bates 2003, p. 2). In the past, consumers had the choice of waiting for a network broadcast of a movie, watching it on a pay movie channel, or renting a video at a local store. With DVDs, a growing segment of the population is building collections that they loan to friends or watch several times. DVDs include more content and random access in comparison to videocassettes. DVDs are less prone to deteriorate than cassettes, which typically have a life expectancy of only 10 to 20 years depending compared to 80 and 100 years for DVDs. Movies on DVDs also cost less than what cassettes previously cost. Another impact of DVD has been its complementarity with HDTV¹, whose sales have taken off in the US as people want to view DVD movies on a higher quality screen at an aspect ratio closer to that seen in theaters. The popularity of DVDs may reduce the demand for on-demand movies

1 *High Definition Television (HDTV)* began as an analog signal with more lines and a different aspect ratio than traditional television. Eventually digital signals were seen as an essential element in HDTV. Only recently broadcasters offer a wider variety of their programs in a digital format. Consumers, with the decreasing price of sets that are capable of receiving the signal, purchase these sets making it economically feasible to develop high definition programming. Digital television per se does not generate revenue for video distributors, who - in the US - are required to switch by an FCC mandate. The switch is expensive due to the installation of new equipment to carry the digital signal. The main adoption incentive for networks, cable, and satellite companies is that they could lose audiences if competitors provide programming and they do not.

from cable companies because of the collectibility aspect and the additional content that can be accessed whenever a viewer wants.

Personal Video Recorders (PVRs), also called Digital Video Recorders (DVRs), allow people to record 15 to 200 hours of video that can be accessed randomly. The software embedded in the device uses a menu system that permits the user to program the specialized computer so as to record shows using criteria such as 'genre', 'title of program', and 'actor' (for a more detailed technical description, see for instance Rizzuto, Wirth 2001). Thus, PVRs help users choose and organize the programs that they like to watch at the times they want to watch them.² While a live program is being recorded, viewers can pause, rewind and fast forward it. The fast forward capability on some models can do 30-second jumps, thus making it easy to avoid advertising. PVRs also act as personalized agents that automatically find programs of interest. The machines can record a household's preferences and suggest programs that could be of interest to them based on their previous selections. Users do not need to know the time or day when the program is broadcast; they may even be able to connect their PVRs over the Internet and share programs and other types of contents within and between homes.

In their beginning, PVRs had limited commercial success.³ This was mainly due to high prices and the difficulty of communicating product features and functionalities. More recent trials conducted in selected markets by ComCast, Cox Communications and Time Warner Cable have been encouraging for the operators so far (Applebaum 2003). However, according to Leichtman Research Group (2003), only one percent of cable and satellite subscribers in the US have a PVR and only additional five percent claim to be familiar with the product and its features. The percentage of cable and satellite subscribers showing a strong interest to find out about PVRs is reported to have remained stable at 17% from the first quarter of 2002 to the first quarter of 2003.

3.2 *Broadband Connectivity to the Home*

Telecommunications, cable, and satellite companies are taking advantage of their infrastructure to offer access to the Internet through broadband networks (Loebbecke, Rehn 2003). These are fast connections that have generally used an upgraded version of infrastructure that was already available in homes. Together with fast computer processing capabilities and inexpensive storage, this trend is making video distribution over the Internet possible. It introduces new products such as 'Always on Internet Access' and thus competition for television-based video programming. Several video content providers could offer programs for download or live streaming. Such Internet-based television programs could easily reach viewers in other countries.

2 The *analog VCR* was initially marketed to do exactly this, but the lack of random access and the level of information required from the user made few willing to invest.

3 The first real success story - even if not in economic terms - of PVRs was TiVo, the product introduced by TiVo Inc. with its co-founder M. Ramsay in January 1999 at a trade fair in Las Vegas. For a technical description of TiVo see for example Allen (2003).

This, however, raises some intellectual rights issues which have not been settled yet. Hollywood movie studios, for example, will want to separate the licenses they sell for traditional video distribution from potential new licenses for Internet distribution. As well, the number of substitutes for traditional video programming is increasing as individuals can distribute home videos and companies can offer product demonstrations on demand. Firms and the industry have not yet been able to find business models that would allow them to take advantage of this technology without jeopardizing their content assets to piracy.

4 Technology Impacts on Strategies of Content Aggregators and Distributors

With increasing time-shifting options for the audience, video content providers will need to change the way they do cross promotions and program line-ups / lead-ins. In *cross promotions* video content aggregators advertise in advance a program that will show at a later time. *Lead-ins* describe that video distributors begin the next show immediately after the previous show, not showing the program credits until after the first scene. This is done because a large number of people leave channels during the commercials that are shown between programs (Gomery 2000, 210). Without live audiences, this method of audience retention will no longer work.

Furthermore, the time at which a program runs during the day will not be as important as the program itself. The importance of 'prime time' or 'live shows' is likely to diminish. Similarly, programs that rely on viewers' calls will need to adjust because many people will not longer be watching at the time the program is being shown. Of course, people will prefer to watch certain programs such as sporting events live, because knowing the result prior to watching a game reduces its entertainment value.

Because of the increased deployment of new technologies, viewers will be less exposed to commercials. Consequently, prices for advertising are expected to fall due to lower viewership figures. With the potential demise of prime-time scheduling and less outstanding positions for live events, programs may become more specialized and the audience more fragmented. Also, as PVR users surf less through the channels (C-Cubed 2002), their behavior limits the likelihood of stumbling over programming or advertising they did not directly target in the first place. Finally, the commercial skipping feature of ReplayTV (ReplayTV 2003) resulted in great concern by programmers. Advertisers in conjunction with program developers will have to find alternative means to promote products and services such as greater promotion of products within the programs themselves. They will try to increasingly place their message in the program's content, not in separate commercials (e.g. Zeisser 2002).

On the other hand, subscription-based television is high in the US which gives stations and then their respective customers additional information with respect to the preferences of their subscribers. Once an organization has basic information about its viewers it is also able to determine their programming preferences with more accuracy. The increased deployment of the new technologies therefore allows advertisers greater granularity and precision for more targeted advertisements.

At the same time, the metrics for advertisers and video content distributors may change: According to TiVo's subscriber data regarding viewer pattern at the 2002 Super Bowl, other than the winning field goal, the Britney Spears Pepsi commercial was replayed more often than any other part of the game. TiVo also starts publishing the most popular programs for their subscribers. Such audience data provide an alternative to the traditional Nielsen ratings.

Some of the aforementioned technologies will impact viewer behavior and thus ultimately also the industry value chain and structure. Especially the incorporation of PVR features into set-top boxes is likely to have a strong impact on video content service provision. While digitalization and broadband connectivity have enabled distribution across traditional geographical and political barriers, PVRs reduce the need for temporal coordination between programmers and viewers.

5 Derived Technology Impacts on Industry Structure and Value Chain Constellations

A first transformation that has already taken ground is the substitutability of each of the three distribution technologies, broadcast, cable, and satellite for video content service delivery. As cable companies began to consolidate, broadcasters began to lose the competitive advantage of reaching national audiences. This trend has been accelerated by the fact that a substantial majority of US households subscribe to either cable or satellite. People do not generally select the programs they watch based on the source. Their choices are dictated by the preferences for certain types of programs.

Secondly, concentration is rising among cable operators and also among their set-top box providers. These fewer, but stronger cable operators are the primary customers for set-top boxes such as PVRs. They will not want features incorporated in the boxes that may reduce overall profits, even if they add value for end users. For instance, widespread use of PVRs capable of skipping TV advertising would lead to reduced revenues for cable channels, thus indirectly affecting the revenue models of cable distributors promoting PVRs. Cable operators' desire to promote PVR features will depend on their ability to find a viable business model to tackle competition from other providers such as the satellite players and / or to more than offset revenue losses in other initiatives such as video-on-demand from proprietary servers. We currently observe a push for proprietary standards among set top box providers (and thus cable operators), but expect increasing use of open technologies for a variety of standardization areas.

Thirdly, PVRs may reduce already comparatively low 'on-demand' sales. Once people have access to the programming, they are expected to use their personal devices to watch programs at their preferred time. The convenience factor is already provided by the PVR at no additional expense. Hence, the main factor in the decision to purchase a program on demand will depend on the quality and the one time availability rather than convenience. Assessments regarding demand and pricing of PVR-and / or VOD-based programs are in progress. Among others, ESPN; Discovery and the Cartoon Network have been testing. However, beyond questions regarding the general acceptance of such features, it has already become obvious

that PVR and VOD offerings will have to stand up for direct competition. The more PVRs, the less VOD and vice versa.

Fourthly, the digitalization of all sorts of content has facilitated the process of Internet-based distribution. As a source of entertainment, the Internet indirectly competes with television-based video programming. Nevertheless, it challenges the legal issues of copyright protection and license granting. So far, the furor over DVDs created a similar outcome over the legality of swapping content as Napster did. The Digital Millennium Copyright Act (DMCA) stopped a significant amount of files exchanges, but does not specifically address PVRs and the legal implications of their technical features.

Obviously, along all four lines of thought, the revenue models have to be adjusted. Also the revenue split among (a) content distributors such as broadcasters, cable operators, and digital satellite providers, (b) program providers (channels), (c) Hollywood studios and (d) advertisers needs to be realigned and recalculated as a consequence of new technologies impacting the video content services market place.

6 Outlook

Observing the way the technologies for video content services are evolving has shed light on the specific drivers that could lead to competitive advantage. Increasing use of new technologies such as PVRs and Internet based distribution seems to put the current business model of cable channels, a mix between subscription fees and advertising income, at jeopardy. Obviously, the incorporation of new features depends on the value that these can provide to industry, not end users. Our analysis so far suggests an additional power shift from channels to original content providers (e.g., Hollywood studios) on the one side of the value chain and content distributors on the other. The likelihood and the likely timing of a potential market power shift from cable to satellite remain uncertain and are part of our continuing investigation.

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