DIGITAL VIDEO RECORDER-DRIVEN IMPACTS ON THE VIDEO CONTENT SERVICES INDUSTRY[1]

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Abstract

Being part of a larger research program, this paper focuses on the impacts of so-called 'Digital Video Recorders' (DVRs) on the video content services industry. First, it gives a succinct definition of the video content services industry using the value chain as a metaphor. After laying a brief theoretical foundation on technological change and adoption, it considers the technological factors 'increased broadband connectivity to the home' and 'increased storage capacities' as change drivers in the video content services industry. The paper then highlights DVRs in detail (features, history, evolution, and viewer behavior) and investigates implications of a DVR roll-out for the different value propositions of players in the industry. It concludes with a brief outlook for the industry in the light of new technological developments.

Key Words: Video content services, Digital Video Recorder (DVR), industry transformation, value propositions, business models

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1 THE VIDEO CONTENT SERVICES INDUSTRY AT A GLANCE

Using the value chain as a metaphor, the players in the video content services industry include content providers (Hollywood studios, etc.), channels (aggregators / program providers), and distributors such as terrestrial broadcasters, cable operators and satellite service providers (see Figure 1). Additionally, manufacturers of equipment such as set-top-boxes (e.g. Digital Video Recorders (DVRs)) serve and influence the industry.

Content providers create some of the primary content for the whole industry. They forward their productions to channels (e.g. Fox or RTL Television). As content aggregators, channels add value by procuring, enriching, and packaging delivered content to finally include it to their program offers.

As a sub-industry, the downstream video content distribution industry consists of three major technology segments: terrestrial broadcasting, cable, and direct satellite. Distributors are (terrestrial) TV broadcasters such as 'ABC' or 'RTL Television', cable distributors as for example 'Comcast', 'Telewest', or 'iesy', satellite companies such as 'DirectTV', 'Westlake Communications', 'Strato', and eventually Internet / information services, including news websites such as 'Golem' and 'NewsNow'.

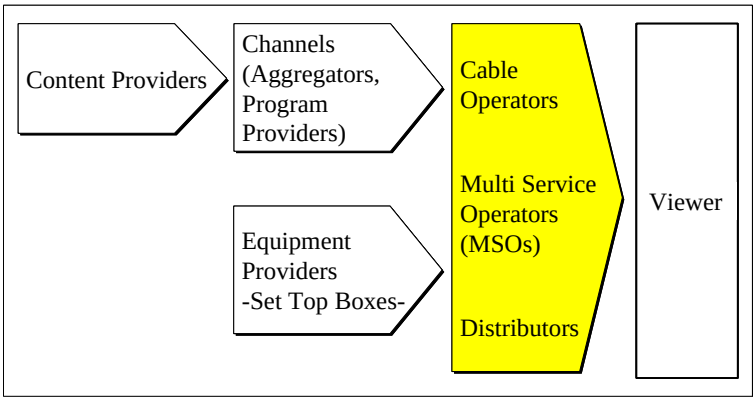

Figure 1: Value chain in the video content services industry

In the following, after briefly outlining our theoretical foundation, we investigate selected technological factors causing changes in the video content services industry and then elaborate further on DVRs.

2 THEORETICAL FOUNDATION AND APPROACH

Schumpeter (1942) portrays the process of technological change consisting of the three phases 'invention', 'innovation', and 'diffusion'. The latter describes adoption and market penetration (see also Stoneman 1995).

With various foci, innovative change paired with predicting and forecasting the diffusion of new products is analytical core of many studies (e.g. Griliches 1957; Mansfield 1968; Rosenberg 1972; see also Geroski 2000). More specifically, industry life-cycle theory (e.g. Abernathy et al. 1978; Tushman et al. 1986) tries to explain the origin and development of new industries (for a critical perspective, see Klepper et al. 2000).

Also following Schumpeter's ideas of evolutionary thinking, the dynamic analysis of economic change at the organization and the industry level is core, particularly in contexts where innovative performance is a key element in the competitive struggle. This problem is simultaneously about the

returns to innovation, the sustainability of competition, the role of entrepreneurial start-ups, the distribution of firm size, and the determinants of market structure (see also Nelson et al. 2002).

The technology and management literature particularly highlights conflicts between incumbents and entrants. According to Tushman and Anderson (1986), new technologies only menace incumbents when they are 'competence-destroying' and do not build up on their acquired skills. Incumbents are only threatened if they focus too narrowly on establishing uses of a basic technology and leave entrants the chance to capture niche markets by extending the technology (Christensen et al. 1995). The risk for incumbents increases when innovative changes affect the 'architecture' of a system as opposed to its 'components' (Henderson and Clark 1990).

In our work, while investigating the 'diffusion' phase of new technologies in the video content services industry, we focus on the qualitative impact that such new technologies are likely to have on the industry structure and on the value creation models of the different players involved. Following the basics of evolutionary theories of technological change and industry transformation, we analyze the interaction between multiple technological trajectories (Dosi 1982) that are specific to a broadly defined technological sector (Nelson et al. 1982).

More specifically, we investigate DVRs (1) as an example of technology diffusion (e.g. Caselli et al. 2001, more generally Rogers 1995) with a focus on competitive positions and industry structure (e.g. Benjamin et al. 1995; Porter 2001) and (2) from an individual / organizational perspective (e.g. Technology Adoption Model - TAM; e.g. Davis 1989) in the domain of management and information systems. However, we do not ask how many DVRs will be in use in year X. Instead, we would like to understand what a decent number of DVRs would mean for the industry. In such a context, Katz et al. (1986) introduced the importance of network externalities in the process of technological change; Cabe (1991) stresses 'learning-by-using' as driving force.

In particular, having consolidated the secondary and primary data for the US, the UK and Germany in our earlier work (e.g. Loebbecke et al. 2003a and 2003b) and taking into account some technological factors causing change in the video content services industry and their implications for the players' value propositions, we investigate how the diffusion of DVRs may drive the industry transformation.

3 TECHNOLOGICAL FACTORS CAUSING CHANGE IN THE VIDEO CONTENT SERVICES INDUSTRY

In this work we mainly investigate the following two factors:

- Increased broadband connectivity to the home - combined with increased processing power for network servers, and Internet-based content services, and
- Innovative storage devices such as PCs, DVDs, and DVRs, i.e., intelligent set-top-boxes with cheaper storage and faster processing.

These drivers are both aspects of digitization, and the accompanying convergence of computing technologies with video content.

3.1 Broadband Connectivity to the Home

The FCC (1996) has defined 'broadband' as the capability of supporting, in both the provider-to-consumer (downstream) and the consumer-to-provider (upstream) direction, a speed in excess of 200 kilobits per second (kbps) in the last mile. Companies have generally offered an upgraded version of the infrastructure that was already available in homes. Telecommunication, cable, and satellite companies are taking advantage of their infrastructures to offer Internet access through broadband networks (e.g. Loebbecke et al. 2003a).

Together with fast computer processing capabilities and inexpensive storage, this 'broadband to the homes'-trend makes video distribution over the Internet technically possible. It introduces 'always on' Internet access and thus potential competition for television-based video programming and delivery.

Video content providers could provide programs for download or live streaming. By downloading and subsequent file-sharing, individuals gain access to home videos and companies can offer product demonstrations on demand. In the case of live streaming, we speak about 'Internet-based TV'. By 'Internet-based TV', we understand any IP-based transmission of audio-visual broadcasting content using audio or video streaming which is directed at the general public (e.g. Loebbecke et al. 2002). While the technical side has been basically solved, Internet-based TV raises some intellectual rights issues and subsequent economic challenges which have not been settled yet. Hollywood movie studios, for example, will want to continue to separate the licenses they sell for traditional TV-based distribution or for video distribution from potential new licenses for Internet-based distribution (for a more detailed discussion on the market entry potential of Internet-based TV, see Loebbecke et al. 2002).

3.2 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 afford 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' has shaped the market via several technical devices. We will briefly look at PCs, DVDs, and Digital Video recorders (DVRs).

PCs 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. DVD drives are becoming standard in all machines, many of which can write recordable CDs/DVDs. Speakers were introduced in the late 1980s.

Digital Video Disks (DVDs) have been rapidly adopted in recent years, thereby changing viewing patterns for feature length movies. 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 provide for more content than videocassettes and offer random access. With a life expectancy of 80 to 1,000 years, they are less prone to deteriorate than video tapes. Movies on DVDs also are cheaper than tapes. Further, DVDs are complementary to HDTV[2].

DVRs, also called 'Personal Video Recorders' (PVRs), are specialized computers that allow people to record 15 to 200 hours of video that can be accessed randomly (for further details, see next section).

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2 *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 started to offer a wider variety of their programs in 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. 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.

4 DIGITAL VIDEO RECORDERS: INNOVATION UNDER INVESTIGATION

4.1 Major DVR Features

The software embedded in DVRs uses a menu system that permits users to program the devices 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 et al. 2002). Thus, DVRs act as personalized agents that automatically find programs of interest. The machines can record a household's preferences and suggest programs based on their previous selections. Users do not need to know the airtime; they may even be able to connect their DVRs over the Internet and share programs and other types of contents within and between homes. DVRs help users choose and organize the programs that they like to watch at the times they want to watch them.[3]

While a live program is being recorded, viewers can pause, rewind and fast forward it. The fast forward capability on some device models can do 30-second jumps, thus making it easy to avoid advertising. Automatic suppression of undesired content enables viewers of digital broadcasts to establish filtering mechanisms that block or suppress items in the broadcast stream. Suppression of commercials may take the simple form of automatic switching to alternate desired content for the duration of the commercial break. A more sophisticated approach toward commercial suppression would utilize automatic buffering, editing, and playback of the program material so as to permit uninterrupted near-real-time viewing. The only nuisance of this scheme to the viewer is a program start delay time which equals the length of the suppressed material.

4.2 DVRs and Enhanced Video Content Services in Retrospect

In this section, we present a brief history of the DVR industry and outline the evolution toward enhanced video content services.

4.2.1 History of the DVR Industry

The history of the DVR industry (see also Runyon 2003) is mainly a US history. The DVR industry began in earnest in the fall of 1998 when TiVo[4] began testing its product locally in New Jersey and San Francisco (Healey 1998). Initially, this product was viewed as a replacement for the family VCR. At nearly the same time TiVo was engaging the market in full stride, Replay TV came on the scene with its own version of DVR. While technically similar to TiVo's offering, Replay TV focused on providing a set-top DVR that was a one-time purchase for the customer.

In September 1999, TiVo undertook an IPO raising US$ 88 million. Replay Networks was unable to follow this example and found itself cash poor by the beginning of 2000 (Davis 2000) and pulled out of the consumer market before being sold to SONICblue Inc. in November 2000. After losing patent infringement suits against TiVo and others, SONICblue chose to license its technology to set-top manufacturers and other in-home providers of media content. Microsoft entered the DVR market in March 2001 by launching 'Ultimate'. Teaming with DirecTV, Ultimate packaged its DVR as an additional service for DirecTV customers and established a major selling point for those without DirecTV. Ultimate's service was available solely with DirecTV.

By the end of 2002, TiVo was still leading the industry with around 300,000 users in the USA and UK (Davies 2002), a number still far short to break even. Crucial partnerships for TiVo were its

3 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.

4 For a technical description of TiVo see, for example, Allen (2003).

manufacturing contract with Sony and its broadband deal with AT&T. By working with broadcasters, TiVo was able to avoid copyright infringements and focus on business strategy.

4.2.2 Evolution towards Enhanced Video Content Services

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 and vote in town meetings or the Academy Awards (Constantakis-Valdez 2003). The test was later cancelled because of being 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. Similarly, the company in 1979 started 'Pop Clips' which became MTV in 1981.

In Montreal, Vidéotron was one of the first companies in North America to have systems capable of handling two-way signals. The interactive system 'Videoway', introduced in 1989, allowed people to select camera angles, 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). In 2000, the company merged with Rogers, the largest cable operator in Canada.

Another effort occurred 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 cost US$ 2,000 each (Maney 1995). The trial was offered as a test with no extra monthly charges until 1996. In January 1997, Time Warner Cable abandoned the system to concentrate on web technologies.

In 1999, distributors started 'Near Video-On-Demand' (NVOD) services, which simulate 'Video-On-Demand' (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 15 minutes, devoting in parallel four and eight channels respectively. In late 2001, some 40 VOD deployments were implemented in the US; cost for true VOD have declined dramatically due to technological developments (e.g. Grotticelli et al. 2001; Iler 2001; Rizutto et al. 2002).

4.3 DVR-Driven Viewer Behavior

Instead of selecting a single program from 100+ channels, DVR users may select a small set of programs to record from 15,000+ each week (Buczak et al. 2002). Recent experiments show that users with DVRs in their homes quickly shifted from watching live TV to watching recorded TV programs. Shifting editorial and scheduling control from channels to consumers (see also Rao 2001) has led to new forms of consumer viewing behavior (see Figure 3).

DVR-Driven Forms of Viewer Behavior	
Buffering	Regularly moving favorite shows to a more favorable time slot
Bookmarking	Avoiding constraints of the schedule due to the ability to bookmark or 'series link' a particular program
Grazing	Scanning a complete day or evening's viewing via the on-screen program guide and recording a selection for later viewing
Stacking	Collecting a number of episodes for a big viewing session or 'appointment to view'
Archiving	Dropping content from the DVR onto a storage device - mainly to give copies to other people
Compressing	Recording an event and using the flexibility in fast forwarding to create a 'highlights' version (watching a 90 minute game in 20 minutes - primarily a sports related concept)
Extending	Watching a live program / game through the DVR, re-winding and re-playing the key events repeatedly, and catching up with real time, for instance at the half way break (corollary of 'compressing').
Pausing	Zapping in and out of recorded content of live TV
Ad Sampling	Halting fast forward process to watch ads one enjoys

Figure 3: DVR Driven Viewer Behavior (After: Decipher 2002)

4.4 Actual DVR Usage

DVRs had limited commercial success when they were introduced on the market in the spring of 1999. However, more recent trials conducted in selected US markets by 'ComCast', 'Cox Communications' and 'Time Warner Cable' have been encouraging for the operators (Applebaum 2003). Nevertheless, according to Leichtman Research (2003), only 1% of cable and satellite subscribers in the US have a DVR and only additional 5% claim to be familiar with the product, even if a stable number of 17% shows a strong interest in finding out about DVRs.

In the UK, 'Sky' (satellite) has driven the take up of DVR services with its 'XTV'-launch in Q4 2001, also triggering competition from the now defunct 'ITV Digital' (formerly 'ONdigital' - terrestrial) and, a little later, the cable providers 'NTL' and 'Telewest'. In Germany, the commercial spread of DVRs is still negligible (as of March 2004).

Obviously, for major market success, DVR prices have to come down to a level that consumers can handle. As of early 2004, DVR manufacturers sell units to the public at a loss being subsidized by service providers. This business model can last only as long as the cash does. One will see whether economies of scale can be realized in production so that prices can come down before the money pot is empty.

5 INSIGHTS REGARDING DVR-DRIVEN IMPACTS

5.1 DVR Impacts on Content Aggregators' and Distributors' Strategies

With increasing time-shifting options for the audience, video content providers will need to change the way they do cross-promotions[5] and program line-ups / lead-ins[6]. Furthermore, the airtime will be less important than the program itself. The importance of 'prime time' or 'live shows' is likely to diminish.

5 In cross-promotions video content aggregators advertise in advance a program that will show at a later time.

6 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 (Gomery 2000). Without live audiences, this method of audience retention will no longer work.

Similarly, programs that rely on viewers' calls will need to adjust because many people will not longer be watching at the airtime. Of course, people will prefer to watch certain programs (e.g. sporting events) live, as watching them later reduces entertainment value.

As DVRs force a shift away from linear broadcast TV, they will drive a change in the relationship between advertiser, broadcaster and viewer. On the other hand, with DVRs, 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. As DVR 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 requires advertisers in conjunction with program developers to find alternative means to promote products and services such as greater promotion of products within the programs themselves (e.g. Zeisser 2002).

On the other hand, increased deployment of DVRs also leads to better information about viewers and allows advertisers greater granularity for more targeted advertisements. Stations and then their respective customers receive additional information with respect to subscriber preferences allowing them to determine subscribers' programming preferences with more accuracy (while at the same time raising some concerns about intrusions of viewer privacy).

At the same time, the metrics for advertisers and video content distributors may change: According to TiVo's subscriber data (TiVo 2002) regarding viewing patterns at the 2002 Super Bowl in the US, other than the winning field goal, the Britney Spears Pepsi commercial was replayed more often than any other part of the game. Such audience data provide an alternative to the traditional Nielsen ratings.

DVRs also allow for media content manipulation capabilities and thus may open a whole new field of required strategy adjustments. Media content manipulation capabilities begin with the simple function of copying (or transcoding) across formats and end with the transformative editing and modification of an item to support the creation of new content. Customers may alter the digital item that they have obtained from the media provider. Such alterations may take the form of a representational change that leaves the logical content intact, or it may be a content transformation that leaves the original item almost unrecognizable.

Commoditization of media manipulation facilities by PC operating system vendors will follow the availability of these tools as freeware and commercial products. Microsoft, for example, has a history of annexing popular application functions into its operating system. The Windows Media player has the capability to display several PC video formats. It may evolve into a 'media manager' utility with rudimentary editing capabilities, as growing processing power supports this function and demand for it increases (KPMG Digital Media Institute 2000).

Overall, the commercial model underlying the traditional video content services industry and the content models it spawns, need reviewing in the light of potential DVR roll-out. That review should be based on a solid understanding of the kind of changes that DVRs and other new technologies herald. Possible corridors for new revenue models include 'custom programming and recording services', 'mini-subscriptions to selected programming', 'tiered pricing for variable commercial content', 'premiums for embedded links in media content', 'merchandise sale revenue splits tied to advertising', 'media shareware', 'micro-commerce in rights to underutilized content', 'private sponsorship of productions for recognition status', and 'variable pricing tied to product demand and format quality' (e.g. Hargadon et al. 2001; Rauch 2003; Swann 2003; Woolley 2003).

5.2 Derived DVR Impacts on Industry Structure and Value Chain Constellations

The new technologies will impact viewer behavior and thus ultimately the industry value chain and structure. Especially the incorporation of DVR features into set-top-boxes is likely to have a strong impact on video content service provision. While digitization and broadband connectivity have

enabled distribution across traditional geographical and political barriers, DVRs reduce the need for temporal coordination between programmers and viewers.

In the US, concentration is rising among cable operators (e.g. Loebbecke et al. 2003b). These fewer, but stronger cable operators as well as the satellite players are the primary customers for set-top-boxes such as DVRs.[7]

Cable and satellite providers' desire to promote DVR features will depend on their ability to find a viable business model in the light of decreasing advertising revenues. At the same time they are almost forced to offer DVRs to prevent an uncontrollable market roll-out through independent suppliers. They will aim to offset revenue losses in other initiatives such as VOD from proprietary servers.[8]

Further, DVRs may reduce 'on-demand' sales. Once people have access, they are expected to use their personal devices to watch programs at their preferred time. The convenience factor is provided by the DVR at no additional expense. Hence, the main factor in the decision to purchase a program 'on-demand' will depend on the quality and the on-time availability rather than convenience.

Assessments regarding demand and pricing of DVR-based or VOD-based programs are in progress. Among others, 'ESPN', 'Discovery' and the 'Cartoon Network' have been testing. It has already become obvious that DVR and VOD offerings will have to stand up for direct competition. However, DVRs, unlike VOD, do not in any way replace broadcast in the broader sense. They cannot function without broadcast content and are therefore reliant on the channels.

DVDs are another competing technology for DVRs. DVD players have gained wide acceptance with the average consumer. Recordable DVDs (DVD-Rs) play CDs, something that exists in almost every US-American household. While DVD-Rs do not have the capability to interrupt live TV and skip commercials automatically, they integrate nicely into the home PC.

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 1998) in the US stopped a significant amount of file exchanges, but does not address DVRs and the legal implications of their features.

With DVRs media businesses are also likely to become more responsive to individual customer preferences because of the competitive necessity of heeding the digital customer. Collecting precise viewer activity information becomes feasible with significant roll-out. The movement from approximation to precision in measuring and serving customers could proceed inexorably.

Further, the digitization of content has technically facilitated the diffusion of 'Internet-based TV' (see section '3.1'). Such online broadcasting eliminates some barriers to entry by lowering the costs of distribution. Following the theory of contestable markets (Baumol 1982; Baumol et al. 1982), these lower entry barriers raise the attractiveness of the market and offer new entrants the chance to become a threat to traditional broadcasters. Nevertheless, as mentioned above, Internet-based TV challenges the legal issues of copyright protection and license granting (see Loebbecke et al. 2004), as it would require a worldwide license which comprises prohibitively high costs and builds a strong entry barrier.

Along these lines of thought the revenue split among (a) Hollywood studios, (b) channels, (c) distributors, and (d) advertisers needs to be realigned. One may expect clearing houses, consortia, and other cooperative industry structures to further develop and function as efficient intermediaries in the exchange of digital media products and services. The evolution of standardized media business metadata and interoperable business processes could promote this development. Shared infrastructure

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7 Others argue that DVRs will barely negatively impact the current video distribution revenue model. Following their arguments, instead it causes changes in revenue streams: The main, lasting effect on advertisers could be the impetus to provide more attractive, interactive ads to viewers that will be less likely skipped past.

8 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.

facilities may develop rights and royalty accounting services, digital material interchange management, digital product distribution, or eventually customer activity databases.

6 SUMMARY AND OUTLOOK

Increasing use of DVRs seems to put the current business model of cable and satellite providers, a mix between subscription fees and advertising income, at jeopardy. Obviously, the incorporation of new technical features heavily depends on the value that these can provide to industry, not to end users. Our analysis so far has suggested a power shift from channels to either content providers on the one side or content distributors on the other side of the value chain. While it is clear that DVRs need broadcast channels to work, their very nature challenges the commercial model that channels are based on. If channels cannot control their audience and deliver eyeballs to adverts, they will have to re-appraise their revenue models.

The longer term impact and business potential of DVRs will be highly dependent on the roll-out of such devices. The continuing increase in PC processing power and storage capacity make it reasonable to expect that, within five years, many PCs and set-top-boxes will also carry DVR features.

Beyond the technological development, some changes in the landscape of content providers and aggregators are to be discussed. According to the KPMG Digital Media Institute (2000) the cultural baggage of old-media organizations will be their greatest handicap in serving the digital customer. The institute claims that the transitions from secrecy to openness, from content control to content sharing, and from mass marketing to precision targeting go against the cultural grain of many established media organizations. While such a claim follows modern listings of buzzwords, we wonder why then do all kinds of media associations as well as political and legal bodies desperately aim for new Intellectual Property Right legislation and implementation? At least those initiatives make us believe that some of the old paradigms are to be transferred to the new technological landscape. Will business models really have to change to the technology applied? We doubt, at least, that the business will overwhelmingly move to different institutions.

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