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Convergent Hollywood, DVD, and the Transformation of the Home Entertainment Industries

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Convergent Hollywood, DVD, and the Transformation of the Home Entertainment Industries

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Dedication

For my parents, Robert and Shelly Sebok, and my grandparents, Steve and Leona Sebok.

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Convergent Hollywood, DVD, and the Transformation of the Home Entertainment Industries

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In 1997, DVD was introduced to the American public, beginning the fastest diffusion of any consumer electronics product in history. In this dissertation, I show how DVD, via favorable conditions in industry, technology, culture, economics, and the regulatory environment, replaced existing home video and computing technologies while transforming home entertainment. I analyze how DVD was successfully developed and commercialized by member firms in the filmed entertainment, consumer electronics, and computing industries from 1994-2002. I demonstrate how a new industry developed around DVD through unprecedented cooperation between these three industries.

This study uses trade publications, mainstream press reports, industry data, advertisements, depositions to congress, and published interviews with industry members to analyze a process that has been understudied by scholars. Through the use of these resources, I explore how demand for the technology developed within existing contexts and how myriad forces aligned to enable the emergence of a new disc technology.

Furthermore, I demonstrate how DVD reshaped these contexts while transforming the nature and business of filmed content distribution. DVD initiated a new era for digital content distribution. This era was marked by the convergence of three industries, new levels of access to filmed entertainment, mobilized viewing opportunities, the conflation of the computer and the television set, and heightened efforts to protect content through a variety of legal, regulatory, and technological strategies.

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Chapter One: Introduction to DVD

Throughout the year 2000, a series of major media events took place that signaled a sea change in entertainment content production, consumption, and distribution. For the first time in history, the home video market surpassed $20 billion in sales and rentals, more than doubling the domestic theatrical gross for feature films.[1] From January through December, consumers purchased and rented more movies for home consumption than ever before in the twenty-plus year history of home video technologies. Sales records for individual titles, especially blockbuster-scale hits, were established and broken repeatedly throughout the summer and fall. *Gladiator* (R. Scott, 2000) set a record for sales and rentals in home video, generating more than $123 million in revenues in the six weeks between its November release and the end of the year.[2] Theatrical business was booming, both at home and abroad. Big-budget, effects-driven blockbusters dominated the marketplace. Hollywood was growing and prospering at a pace not seen since the 1940s. Driving this success was the profitability of ancillary markets, particularly new revenue streams from home video.

The primary force behind these changes was the success of a new video disc technology, DVD, and its impact was evident not only in the movie industry.[3] While sales of movies on the new format jumped a staggering 269% over the previous year,

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[1] Video Software Dealers Association Report: "Consumers Spent More Than Ever on Home Video in 2000," January 29, 2001

[2] "Tarzan puts Grinch in vidlock Fueled by DVD, video sails while B.O. pales" By Scott Hettrick, *Variety,* January, 2001.

totaling $4.03 billion by year's end, DVD was also the first home video technology designed for use on a variety of platforms.[4] On March 9th, Bill Gates announced the forthcoming release of the first Microsoft video game console, the Xbox, which utilized DVD technology.[5] By October, Sony's DVD-based gaming system, the PlayStation 2, was available in the United States. Millions of personal computers were shipped to retailers equipped with media drives capable of playing DVD-ROM and DVD-Video discs. The major movie studios responded by realigning and renaming home video divisions under the more general moniker "home entertainment."[6] Media analysts reported on these events with varying degrees of astonishment and dismay. There was general consensus that something important had taken place; explaining how and why these events took place was another story. Hyperbolic reports of the end of an era of theatrical dominance proliferated in the mainstream press. DVD was perceived as both a threat to the status quo and the harbinger of a new era of digital media production, distribution, and exhibition.

Taken together, the events surrounding the rapid diffusion of DVD into the domestic marketplace in the year 2000 were interpreted as the end result of cross-industrial partnerships in technological development and savvy marketing campaigns by the major film studios and consumer electronics firms. As milestones were passed and

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[3] *Gladiator* also joined *X-Men* (Singer, 2000) as the first major blockbuster films to earn more in their first week of home video release than in their first week of theatrical distribution.
[4] VSDA Report: "Consumers Spent More Than Ever on Home Video in 2000," January 29, 2001.
[5] http://www.activewin.com/faq/x-box.shtml#Microsoft%20%22X-Box%22%20Timeline
[6] "APAR's WORKING WEEKEND: Video Is Dead, Long Live Home Entertainment," by Bruce Apar, Director of content & business development, Advanstar Entertainment, November 3, 2000.

the massive impact of DVD became ever more apparent, Hollywood studio executives spoke of how DVD was designed to meet consumer demand for high quality digital content, delivering a home viewing experience closer to the theatrical experience than ever before. DVD was described as a tool of empowerment for consumers, enabling users new degrees of control and access to content. DVD technology was represented by the press as a revolutionary technology, capable of changing the nature and quality of movie watching forever.

The rapid diffusion of DVD in the year 2000 was seen as a watershed moment for two key reasons. First, it was seen as an indication of a major structural transformation in the home video business itself. Since 1987, revenues generated from home video rentals had routinely surpassed domestic theatrical grosses. However, due to copyright law, movie studios could not demand returns from the rental of each tape from retailers like Blockbuster. The studios sought an alternative to the home video rental model that would return a larger percentage of profits. Beginning as early as 1986, the studios experimented with pricing tapes for sale to consumers. By the mid-1990s, the sales model had been established as a viable secondary market. This model was then applied to DVD as the primary mechanism for distribution, permanently altering the home video business. Under this new business model, DVDs would be sold, not rented, to consumers. The home video market prior to the introduction of DVD was enormous but was experiencing little new growth. The market had become flat, antiquated, and out-of-step with the dynamic changes in digital media delivery via the internet. DVD offered

the major studios an opportunity to resuscitate a market that had stagnated in the 1990s while simultaneously re-branding themselves in the digital age.

The second reason the rapid diffusion of DVD in 2000 was so significant had to do with convergence. Simply stated, DVD was a dynamic, interactive technology that could bridge the gaps between the personal computer and the television set. And while it altered the home video business, it also liberated movies from home consumption. Because DVD delivered digital movies on a variety of technological platforms, movies were suddenly freed of their domestic constraints and made mobile and portable. DVD offered more than simply a movie for playback on a television. DVD, via its utilization of optical disc technology, also expanded the nature and quality of content available to consumers. Supplemental features offered the consumer access to the production process through "behind the scenes" documentaries, deleted scenes, and director and/or cast audio commentary tracks. Interactive DVD-ROM features would direct consumers to websites where games could be played to supplement the experience of the movie, or similar titles could be ordered from studio websites.

The rise of DVD in the year 2000 was indeed a sign of a dramatic transformation of the media content industries, as DVD became the most successful consumer electronics product of all time. However, it was a monumental event for more reasons than those identified by most media analysts either at the time or since. How do we account for the remarkable, unprecedented growth of DVD? Did DVD revolutionize the media industries, or was it the end result of an evolutionary pattern developing over a number of years? DVD's success cannot solely be attributed to an industrial strategy to

alter the existing home video business model while creating convergence between computing and televisual technologies. The unprecedented success of DVD marked the synchronicity and convergence of favorable contexts in technology, industry, culture, and the regulatory environment. Over a period of years, and in some cases decades, these distinct yet interacting spheres aligned in such a way to guarantee DVD's successful diffusion. Only by virtue of the efficient exploitation of these contexts by industry could the DVD become the cultural and industrial force it is today. Therefore, DVD must be viewed as both evolutionary and revolutionary in nature. DVD technology developed along an evolutionary continuum, drawing upon existing technologies and established industrial structures. Demand for the technology, both within industry and in society, also occurred as a result of existing experiences, needs, and demands for new technologies. DVD's revolutionary status hinges on the synchronous convergence of these evolutionary moments.

This study, which examines the unique alignment of industrial, cultural, economic, technological, and governmental forces contributing to the unprecedented success of DVD, is framed by two major events related to DVD: the commercialization of DVD-Video in the United States during 1997 and the maturation of the DVD industry in 2002, marked by the thirty millionth player shipped and the one billionth DVD shipped to retailers.[7] In order to explain the rapidity of DVD diffusion, this study examines how favorable contexts developed over several years prior to the formation and maturation of

[7] "DVD Timeline," by Thomas K. Arnold, Special for USA TODAY, October 17, 2002; accessed via: http://www.usatoday.com/life/2002-10-17-dvd-timeline_x.htm

the DVD industry. Furthermore, this study illustrates how shifts during these preceding years in the media industries relating to globalization, conglomeration, deregulation, and digitization influenced the process of DVD diffusion. In covering this period, I show that to study the emergence of DVD as a technology is to study the transformation of the media industry in a time of change and uncertainty. The rate of change is reflected in the myriad shifts that have occurred in the DVD industry after the end-point of this study. Over the course of only three years from 2002 to 2005, complete television series have been released on DVD, competing high-definition disc technologies have been commercialized, and new global markets have opened for DVD distribution.

The form and nature of filmed content have also changed dramatically during this time span. Hollywood movies and television programs are now re-mastered in digital form, shipped via disc and over the internet with supporting documentary materials, games, interactive functions, and assorted promotional materials. While only a small number of movies were released for sale on VHS, huge portions of studio libraries were re-mastered for DVD release.[8] These movies are increasingly distributed in their original aspect ratio in high quality digital formats. Consumers have become adept at navigating through graphic menus, accessing, pausing, jumping to scenes, and replaying action instantly. During this period, digital video consumption has changed from being a specialized, niche-oriented experience to an all-access twenty-four hour a day media

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[8] According to the MPAA, some 68,000 titles were available by 2006.

mass cultural phenomenon defined by YouTube, Google, MySpace, and movies and complete television series available on DVD.

Change has also been effected upon the regulatory environment, where digital rights management technologies have been officially sanctioned by legislation, shifts in copyright law, and court rulings. DVD proved to be the first technology to test new digital copyright laws designed to protect digital content. Hollywood media companies have shifted as well; once focused primarily on content production for consumption in either theaters or on television screens, content providers now think in terms of platforms, mobility, global markets, and digital content production and distribution. What was once an industry focused exclusively on *production* and distribution of content has become an industry virtually obsessed with *protection* of content in an increasing number of media outlets. A brief survey of the home video industry affords perspective on the significance of these changes.

A BRIEF HISTORY OF THE HOME VIDEO INDUSTRY

The development of the home video industry can be discussed in relation to periods of industrial practice and shifts in structure. According to Frederic Wasser and Eugene Marlow, the home video industry can be defined according to four phases of development before DVD: from 1975-1980 the home-video industry consisted primarily of blank tape and hardware sales for use in home video recording and viewing pornographic pre-recorded content; from 1977-1981 video distribution companies were established for the dissemination of pre-recorded Hollywood content; from 1981-1986 independent video distributors and Hollywood majors dominated the marketplace; from

1986-1993 increased concentration of video distributors and retailers turned video into big business, with the major studios and the conglomerates who owned them gaining control over the marketplace. Significantly, the last phase as described by Wasser ends where DVD technology begins.

Increasing concentration and "tightly integrated" media conglomerates, described in Wasser's final VHS period, sought to take full advantage of increasing revenue streams from the video market and began to realize that advancements in optical disc technology would allow for a viable replacement home video technology. Battling the independents and retailers for control over film and television profits and increased concentration of ownership would lead to the development of the DVD and a boom period for playback-only devices. The introduction of DVD technology, within this context, should therefore be viewed as a process altering the existing industrial structure and practice while simultaneously creating a replacement industry.

Thus two additional stages are needed to adequately describe the history of the home video industry. The first, occurring from 1994-2002, is marked by the introduction and rapid diffusion of DVD, and the maturation of the DVD industry. This period was further defined by the simultaneous release of blockbuster titles on tape for rent and sell-through to consumers, DVDs of classics and blockbuster films available for purchase, and the growth of mass retailers Wal-Mart and Best Buy selling DVDs. This period is the subject of this study. The second phase, running from 2002-2007, is defined by new revenue sharing deals between studios and rental retailers, making DVDs available for rent in virtually all international markets, the phasing-out of VHS technology, online

distribution of films for rent (led by NetFlix), television series distribution on DVD, and competing high definition DVD technologies entering the marketplace.

The maturation of the home entertainment industries, first with VHS and then with DVD, was crucially related to the support of content providers, primarily the Hollywood studios, and the government. When the Betamax was introduced in 1975, it entered into an existing industrial and regulatory context much different from those present with DVD. The Betamax machine afforded viewers control over television schedules and freedom from the dictates of network executives. The reaction of the film and television industries was less than enthusiastic. Almost immediately, legislative action was taken against Sony for violation of copyright law. Universal and Disney filed suit in 1976 to stop the recording and playback of film and television content from network and cable television. While the case would ultimately go to the Supreme Court, it would fail to stop the diffusion of Sony hardware into the American marketplace. This case is illustrative of larger concerns resulting from this new ancillary market. While the advertisements for Betamax heralded the empowerment of consumers, the networks and film studios feared loss of control. Once a tape has been sold to consumers, how many copies will they make? How many friends will they share it with? How would the studios maintain their rightful share of profits in this new market? For the purposes of this discussion, it is sufficient to say that the content owners would begrudgingly work alongside video distributors and establish business strategies to maintain control over content.

The majors wanted to sell their content at premium prices to individuals or establish a mechanism to recoup a percentage of each rental. At first, the majors were concerned primarily with consumers taping content off of live television, potentially damaging the profits received from the networks through advertisers. However, by 1980, a growing number of "underground" retailers had begun setting up shops designed for the sale and rental of pornographic videos. Through the late 1970s and early 1980s, pornographic video sales accounted for over half of all video sales in the United States. While this content was popular and profitable, its lasting impact was the establishment of retail and rental stores for the sale and rental of videotapes. These stores would soon establish their right to rental through the "first sale doctrine," guaranteeing them all the profits from rentals after first paying for content.

From 1977-1981, all of the major film studios (or parent companies) entered into the video distribution business. Recognizing the increased consumer demand for pre-recorded content and the potential for profit and control, Disney, MCA/Universal, Paramount, and Warner Bros. formed video distribution companies. Fox, Columbia, UA, MGM, and Orion either partnered with an independent distributor or contracted to have an independent handle their distribution. Quickly a business structure was established. The content owner would sell titles to a central distributor (the independent video companies in most cases), the distributor would sell the titles in bulk copies to a wholesaler who would then sell individual copies to retailers. Retailers would then either sell highly priced copies to customers or, more commonly, rent titles for a predetermined length of time. These retailers, mostly "mom and pop" operations often charged a

membership fee to customers on top of the rental fee in the hopes of avoiding legal action for copyright infringement. They need not have worried; constant badgering of congress and the courts by the studios failed to exempt the content owners from the first sale doctrine. For several years the studios sought a means to control this industry, either through legislative action, exclusive leasing deals with distributors and retailers, or contractual prohibition of sales and rentals. Ultimately, the development of two-tiered pricing would be effective (enough) in securing profit margins for the time being.

From 1981-1986, the home video industry found its footing. Enormous profits filled the coffers of independent video distributors. By 1986, video rental stores in America surpassed the number of theatrical screens. Two-tiered pricing, defined by higher prices for new titles than older releases (an $80 mark was set by Paramount for new releases), did not restrict or stagnate the market. In fact, video distributors were desperate for more titles, any titles. Consumer demand far exceeded supply. Anything on the shelves would disappear as soon as it went on display. Video distributors, now a major economic and industrial force, were aggressive in acquiring titles from content owners. Bidding wars were commonplace. The distributors sought another means to their profitable end: pre-buying and production.[9]

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[9] Of note here is Vestron, an independent video distributor formerly held by Time-Life. Vestron became independent after the dissolution of Time-Life Films, acquiring the rights to all titles produced by the parent. Soon thereafter, Vestron would become a major player in the production of feature films. Producing *Dirty Dancing* for theatrical release, Vestron became the first video distributor to have a theatrical hit. In addition to pre-buying and forays into production, Vestron and the independents cultivated the retailers, spent generously on advertising, explored production of marginal genres, music videos, and how-to tapes, and focused efforts on both adult and children's titles.

As the market matured, video turned away from independence and diversity and toward the big blockbuster strategy of New Hollywood through increased acceptance and promotion of two-tiered pricing. Increasing revenue streams did not cut into other ancillary returns, and production spiked for a period. However, the most significant aspect of the mature video market is its reliance on big-budget, mainstream Hollywood product. Retailers, wholesalers, and distributors saw increased returns on blockbuster films in both sales and rentals, and recognized the importance of theatrical success to video business. Additionally, many independent distributors had overreached in film production and pre-buying, hoping that the market would sustain initial periods of growth. Many independents were consolidated into the majors' distribution arms or folded outright.[10] Subsequently, consolidation of the retail business, led by the rapid expansion of Blockbuster Entertainment in the mid-1980s, led to closer affinities between video and merchandizing and advertising, franchising of stores, and the establishment of a royalties structure.[11] Blockbuster bought up mom and pop operations and formed a nationwide retail chain. Integrating all aspects of the business save distribution, Blockbuster was soon attractive to Viacom, who was attempting to consummate a deal for Paramount Studios, for the purposes of tightly integrating their entertainment industry interests.

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[10] Establishing a payment structure for royalties and copyright, the content owners had increasing control over the video business. Royalties were paid to copyright holders from video distributors (20 percent of adjusted gross receipts), and to unions (SAG gets 4.5-6 percent of distributors' gross) on top of the sale price. The distributor charged a distribution fee and marked up the price for the rental market (again, the content provider and distributor were increasingly the same company). The wholesaler minimizes risk by soliciting presales from retailers before ordering titles. The retailer then can sell or rent titles.

Blockbuster Entertainment was bought by Viacom in 1993. Soon thereafter, the majors would move back into the development of video disc technology. Because the video independents were now owned and operated (by and large) by the content providers, the only step left in securing complete control of video profits was the elimination (or reduction) of the rental market in favor of sell-through. Ultimately, the content providers came to control the home video industry and pushed the hardware manufacturers, both domestic and foreign, to exploit developments in laser technology to manufacture a viable video disc. These consumer electronics companies had their own motivations for developing video disc technologies. They desired a replacement technology for home video that would generate new revenues. Because the majority of the market owned a VCR, new sales were stagnating. A new console market would generate new profits while allowing them to exploit patents in a similar fashion to those held in the CD manufacturing and distribution. The lessons of the VHS era proved valuable to the studios, their parent companies, and the consumer electronics manufacturers. A new home video technology would allow the content providers to dictate the structure of an industry separate from the wants and desires of large video rental retailers. A single technological standard would encourage adoption of DVD consoles and drives while avoiding a format battle.

Learning from the industrial and technological shifts within the home video sector, content providers sought a new technology based in playback that would preclude duplication or trading amongst consumers. A content scramble system (CSS) was

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[11] *Top Gun* is of note here as a sell through title that included a Pepsi commercial before the film

developed that would ensure just that. Furthermore, content providers knew that they must aggressively lobby legislature to protect digital content from piracy. The tiered pricing system established during the VHS era was adapted to the DVD market, with new release titles priced higher than library titles. Furthermore, content owners established a tiered regional releasing strategy upon the introduction of DVDs. The world would be split into regions, with hardware specifically designed to only play discs coded for the corresponding region. Through this system, titles would be staggered in tiers based on region. Theoretically, piracy could be contained within regions without eating into global profits.

Additionally, the studios sought a replacement technology that would encourage consumers to re-invest in movies, replicating their existing home video libraries, or building new ones, with newly purchased, high quality, digital titles. As early as 1986, Paramount was experimenting with sell-through of blockbuster titles, selling more than 2.5 million copies of *Top Gun*. In the 1980s and 1990s, Disney capitalized on market demand for ownership of family-oriented titles and the desire for repeat viewing of animated classics like *Snow White* (Disney, 1937), releasing tapes for sale to the consumer. In so doing, they demonstrated the viability of a home video sales model that was adopted by the other studios in the early 1990s. Sell-through of titles equaled rentals by the mid-1990s and accounted for the majority of increases in home video revenues

during that decade prior to the introduction of DVD.[12] *The Lion King* (Disney, 1995) sold more than 30 million copies by 1996, generating over 500 million dollars, more than twice its domestic theatrical box office. During 1996 alone, the year prior to the release of DVD and the shift to the sell-through model, sales of films on tape grew 7% from the previous year to 10.4 billion dollars. Culturally, media consumers had, as of the early 1990s, fully shifted from audio tape to the CD and seemed primed for a similar shift to random-access digital video content technology.

HOLLYWOOD, HOME ENTERTAINMENT, AND THE DVD

As early as 1986, under the direction of Warren Lieberfarb at Warner Bros., DVD technology began its gestation and development period. After a series of starts and stops, failed technologies, and lukewarm support from the rest of Hollywood, developments in laser and manufacturing technologies led to two viable DVD technologies. The turning point for DVD came in 1995, when at the behest of the major U.S. movie studios, a group of computer companies led by IBM brokered a deal between competing camps of consumer electronics manufacturers engaged in DVD development.[13] The movie studios had what they wanted: a unified digital video disc technology that was "play-back only."[14]

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[12] Gomery, Douglas. "The Hollywood Film Industry: Theatrical Exhibition, Pay TV, and Home Video," Who Owns the Media? Competition and Concentration in the Mass Media Industry. 2000. Benjamin M. Compaine, Douglas Gomery. Lawrence Erlbaum Associates: Mahwah, New Jersey. Pp. 418.
[13] Ibid.
[14] Unlike VHS, DVD-Video and DVD-ROM could not record off of live television.

Concurrent with the research and development efforts relating to DVD, movie studios, consumer electronics companies, and computer companies were engaged in fundamentally different businesses. The degree to which there was interaction between industries was dictated by mergers and acquisitions (e.g. Sony purchasing Columbia Tri-Star and Matsushita purchasing MCA-Universal), by "synergizing" holdings, or by computing firms supplying technologies for content production. Home video technology was supplied by consumer electronic companies to consumers and to content providers. The movie studios would then convert their products from film to analog video tape for distribution. These separate industries would come together for the first time to commercialize DVD. The prospect of a multi-platform optical disc technology led all interested parties into a tenuous partnership that resulted in the formation of an industrial body designed to control and develop the technology in all markets.

The key, driving force that brought DVD to market was the cooperation and pooling of resources by the largest firms in the computing, filmed entertainment, and consumer electronics industries. These three industries came together to form the core of the DVD Consortium in 1995 (renamed the DVD Forum in May, 1997). The Consortium was a collective administrative organization from which to launch DVD into all global markets in 1997 and 1998. From its inception in 1995 through the release of DVD in 1997, to the maturation of the industry in 2002, the DVD Forum provided a crucial collaborative venue in which these traditional industrial rivals jointly shaped a new industry and utterly controlled the DVD marketplace. During this brief period, the Forum established control over the technology through technological and legal

mechanisms, exploited cultural desires for home viewing and portable media consumption, redefined the relationship between studios and home video retailers, and introduced new standards for the production, distribution, and marketing of films and television programs. More than simply an administrative body, the DVD Forum was a new strategy for collectively controlling content through technology. Recognizing the increasingly digital media environment, the DVD Forum placed a heightened emphasis on lobbying in Washington while developing technical copyright protection measures, theft-deterrent packaging, and a strong legal team to combat piracy in global markets. Through these tactics, the DVD Forum ushered in a new era for digital technology marked by unprecedented integration of three once-distinct industries and by the increased economic value of home entertainment products to each constituent industry.

The major film studios continued to produce big-budget "blockbusters" for release in theaters across the world. However, DVD offered such enormous returns to the studios that theatrical exhibition became more and more a "loss leader" for the eventual profit returns in home video and other ancillary markets. DVD could make films that disappointed at the box-office profitable eventually, and small budget or direct to video features could return enormous profits to distributors and production companies alike. DVD offered content providers an opportunity to re-orient both their long-standing relationships with rental retailers and the ways in which they were branded and conceptualized in the public imagination. Rather than relying solely on blockbusters to return profits and keep the branded identity of the studio in the public consciousness, the studios turned to their vaults to accomplish these tasks. DVD afforded all copyright

holders the potential to re-package their films (and, by 2002 television series as well) for audiences. Thus, DVD vastly enhanced the value of a studio's brand; for instance, MGM could re-package pristine digital versions of the *James Bond* series at relatively little cost and profit handsomely (and they did). Additionally, DVD became the means by which the major studios could expand into "branded entertainment" in a variety of additional markets, including merchandising, video games, and cross-promotions both in the U.S. and around the world. In the process, DVD returned profits to not only the studios, but their counterparts in consumer electronics and computing industries.

DVD also changed how Hollywood operated by reinforcing the importance of digital technologies to the business of moviemaking. DVD was not the first digital technology to be incorporated by the studios. Prior to DVD, the studios utilized digital technologies throughout the production chain, from shooting on digital cameras and editing in digital suites, to the growing reliance on computer-generated digital effects. However, whereas digital technologies had been utilized on the production side of the business for a number of years, DVD was the first digital technology deployed in the distribution of content. Prior to DVD, Hollywood movies and television shows were converted to analog tape for distribution in secondary markets. DVD ushered in an era of digital content delivery via a variety of digital technologies, including high-speed internet, digital cable, and High Definition disc.

Collecting movies took off like never before in the history of home video. Indeed, a culture of personal ownership of media developed around DVD that was initiated by the Hollywood studios' desire to offer an alternative to the existing cultural

and industrial home video rental model. DVD offered the studios an avenue to stimulate a mass home viewing culture based on repeat viewing, permanence, ownership, and status. Barbara Klinger has identified DVD enthusiasts as "royalty" in her analysis of a number of home viewing cultures.[15] She posits that connoisseurship and mastery over digital technology by "techie" film collectors led to an evaluative film culture surrounding DVD. With the mass diffusion of DVD, these early adopters account for only a small portion of a broader DVD culture. DVD has, since 2000, moved into the mainstream; the masses are purchasing DVDs in huge numbers for their family home theater libraries. DVDs, much more so than their video and laserdisc predecessors, were designed and marketed to be owned, cherished, displayed, and archived for future use by the general public. Creating this cultural phenomenon was at least partly based on technological and industrial conditions; the ease of use and quality of the image, coupled with the affordability of hardware and software, made the casual home-film viewer comfortable with the switch to digital disc technology.

DVD influenced the media landscape by virtue of its widespread adoption and compatibility across platforms. As I demonstrate over the next several chapters, DVD and members of the DVD Forum from the three constituent industries were at the forefront of myriad changes across a variety of contexts. For example, by developing a series of digital rights management technologies designed to limit piracy of digitally encoded discs, the members of DVD Forum initiated debate about digital copyright law

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[15] Klinger's book illustrates the centrality of home viewing to the histories, discourses, technologies, cultures and business of cinema in her book: *Beyond the Multiplex: Cinema, New Technologies, and the*

and fair use in the digital age. By developing an administrative body for controlling the technology that included members from three different industries, the DVD industry first circumvented and then adapted to antitrust concerns through direct interaction with the Department of Justice. Throughout this study, I show how these three industries developed, commercialized, and controlled DVD technology while simultaneously altering the content businesses and the larger regulatory, cultural, and industrial landscapes. A key consequence of these partnerships was that DVD provided a model for digital industrial formation and technological introduction. In this new era, both "old" media industries (i.e. the film studios) and "new" media industries (i.e. computer companies) partnered to establish a universal technological standard. In so doing, these industries combined resources to assure the successful introduction of DVD as a technology meeting the demands of both the public and the constituent industrial players. As I demonstrate in the next section, scholars are only beginning to discuss the impacts DVD has had on the media industries, media culture, and the regulatory environment.

SURVEY OF LITERATURE

As influential as DVD has been to the bottom-line profitability of the entertainment, computing, and consumer electronics industries, remarkably little has been written about the technology, the processes through which it was commercialized, and its various impacts on the contemporary media world. Jim Taylor's *DVD Demystified* marks the first and only substantive effort, at this point, to chronicle the various mechanical workings of the technology, including the processes of technological and industrial

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Home (Berkeley: University of California Press, 2006).

development.[16] However, Taylor limits his focus to the technology itself, offering descriptive accounts of the various "pros" and "cons" of DVD over the alternatives in the marketplace, rather than investigating its dynamic influence on a variety of contexts. What little academic inquiries there have been into DVD have focused on the cultural impacts of the technology on social groups and the negotiation of their identities relative to changing home viewing cultures.[17] If the process of DVD development, diffusion, and commercialization are mentioned in these analyses, it is usually an afterthought, or simply a "given condition."

DVD is often overlooked in contemporary media industry analyses. Most studies covering 1990s Hollywood focus on the home video industry as an important development to the economic well-being of the studios and their parent conglomerates throughout the 1980s and 1990s while suggesting that uncertainty lays ahead with DVD.[18] Since DVD entered into an existing home video marketplace and home viewing culture relatively recently, scholars seem hesitant to assess its various impacts and significances in any great detail. Studying a technological-cultural phenomenon without the benefit of historical perspective is a daunting task. Additionally, the process of DVD development, diffusion, control, commercialization, and popularization are exceptional in

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[16] For example, Jim Taylor's work has been most noteworthy in this regard, see *DVD Demystified* (New York: McGraw-Hill,1998), *DVD Demystified Second Edition* (New York: McGraw-Hill, 2001), and *Everything You Ever Wanted to Know About DVD* (New York: McGraw-Hill, 2004).

[17] The first book to discuss the cultural impacts of DVD by Aaron Barlow, *The DVD Revolution: Movies, Culture, and Technology* (Westport, Connecticut: Praeger, 2005) suggests that DVD is at the heart of a global participatory culture.

[18] For example, see Douglas Gomery, "The Hollywood Film Industry: Theatrical Exhibition, Pay TV, and Home Video," *Who Owns the Media?*, eds. Benjamin M. Compaine and Douglas Gomery (New Jersey: Lawrence Erlbaum Associates, Inc.), 411-426.

the degree of involvement across industry lines, and can not be easily assessed by studying one particular component, company, or individual. Because DVD is not a media-specific technology (i.e. bound to a single media industry) scholars undertaking analysis of any aspect of DVD must first decide if they are studying the technology as a new media technology, a home video technology, a gaming technology, as a delivery mechanism for a cultural experience, or some combination thereof.

Scholars studying cinematic technologies seem equally perplexed with regard to DVD. While there have been no significant scholarly studies to date on the DVD phenomenon, how media technologies have been studied in the past suggests directions for this study. Media scholars have routinely relied on classification systems to make sense of cinematic technologies in keeping with traditional ideas of what technologies consist of: mechanical devices produced and consumed by and for human experiential pleasure. By classifying moving image technologies according to their mechanical underpinnings, historians could connect the processes of representation (camera), reproduction (printing), and exhibition (projection). In so doing, cinema and later television and related technologies, including home video, became quantifiable objects of study, their unique social and cultural import explained through a process of extrapolation from the precise nature of core technologies. Studying the processes involved in the "birth" of DVD reveal that this approach fails to account for the complicated and fluid nature of technological innovation. Because a variety of technological, cultural, industrial, and economic forces influenced the development of DVD, it is necessary to account for these factors through a nuanced, synthetic approach.

Traditional accounts of technological history tend to isolate machines within one sphere of influence, whether social, political, cultural, industrial, legal, or economic contexts. Attempting to redress and deconstruct this tendency, media scholars have sought to identify the interplay of forces that might have influence on the form and function of home video devices. Shifting from technological determinism to a range of determinants in attempting to ascertain what shapes technological change, scholars have engaged with multifarious methodologies. To wit: economic imperatives contextualize the development of cinematic and home video technologies within a broader discussion of mature (or maturing) capitalist industry (Gomery and Allen 1985; Marlow and Secunda 1991; Albarran 1996; Picard 1989). Political and ideological determinants privilege the role of power and agency in locating the development of home video machines (Wasser 2001). Cultural studies inquiries focus on the uses and interfaces of home video machines impacting our sense of self in relation to gender, class, and race (Gray 1992; Levy 1989). Sociological and cultural analyses further explore how spectators use home video technologies in forming or maintaining social groups and norms as well as the cultural position of home video technology relative to ways and processes of viewing (Barlow 2005; Carrol 2005; Cubbison 2005; Johnson 2005; Kendrick 2005; Wasko 1994). Industrial determinants posit the significant role of changes in business strategies intrinsic to the mode of production, arguing that home video technology fulfills an industrial role, carefully managed to augment the existing paradigm (Wyatt 1994; Gomery 1989; Prince 2000). By employing these approaches

scholars seek to shift the definition of home video technology, eliciting a broader, more nuanced view of this technology as systems of social demands and uses (Moran 2002).

Home video scholarship, within the larger field of media studies, has deployed one or more of these methodological approaches to discuss the technology's significance to perceived changes in industry, culture, economics, and global distribution of Hollywood content. Technocratic studies, commonly associated with these "before and after" type polemics, take several forms. Occupying spaces along a continuum between "hard" and "soft" extremes, Post-Enlightenment technology studies convey a vivid sense of the efficacy of technology as a driving force of history. Focusing largely on the impact of the home video and DVD technology before investigating its genesis point, these narratives make for entertaining historical storytelling: the material artifact (the VCR, the VHS/Betamax, or the DVD) is invented and has immediate causal efficacy in imparting change in society, culture, economics, etc (Barlow 2005). As is the case with traditional histories of home video technology, the very materiality of the artifact and its widespread popularity gives weight to this assertion, one in which the machine becomes an active role player in the process of historical revolution. However, technological determinism is nuanced between those polarized extremes of hard and soft. In the former, technology is assigned agency and leads us towards inescapable necessity (Marlow and Secunda 1991). The latter perspective locates video technology in the various and complex social, economic, political, and cultural matrices of existence, highlighting the role of human actions in shaping historical moments (Moran 2002).

However, the development and diffusion of digital cinematic technologies has significantly altered this pattern. Faced with new non-linear technologies, and more specifically digital media technology, media scholars were challenged to develop new ways of addressing technology-user interaction. Because these technologies privilege graphic interfaces and complex navigation through branched menus, scholars engaged new media theory, systems analysis, interface theory, hybridity, and media specificity to understand a new dynamic between audience and text. Once the technology itself moves outside a linear continuum, in the case of cinematic technology (analog or celluloid) towards a more fluid, random access digital technology such as DVD, scholars are faced with a daunting task: contextualize a hybridized media format in terms other than traditional aesthetic, industrial, "bounded," approaches of the past. Scholars have responded by integrating new media theory into existing paradigms, contextualizing digital media in traditional categories of production, distribution, and exhibition. Additionally, new and digital cinematic technologies are most often situated in industrial, political, or reception contexts (versus aesthetic or social contexts). Digital media scholarship is forging new ground in theoretical domains, reshaping our understanding of media texts and media specificity. However, the dominant trend within film and media studies is to move away from the "mechanical underpinnings" of digital technologies in favor of a definitive industrial bias. In this approach, digital technology is viewed in predominantly economic or industrial terms; either digital technology exists within a larger move towards late capitalism categorized by profit margins and multinational conglomeration, or as a symptom of industrial imperatives to create "filmed

entertainment" franchises capable of crossing traditional media boundaries (Wasko 1994; Prince 2000).

From evolutionary histories, "Great Man" histories of conquest and invention, etymological histories detailing linear chains of events leading directly to causal inevitabilities, to industrial, economic, social, cultural, aesthetic, discursive investigations of technology in context, scholars attempt to fill the record with perspectives on the relevance of technology in a particular historical moment or moments. It is my task, undertaking a similar consideration of technology, to create a synthesized methodological approach that can begin to account for the relevance of DVD technology to contexts including industry, culture, regulatory and political environments, economics, and the like. However, it is important to recognize that there exists no history of this technology to revise, no problematic text to revisit, only one to write through the lens of a contemporary scholar seeking the best and most ways to contextualize and theorize digital media technology.

Given the limited amount of information analyzing the development of DVD technology, and the dearth of scholastic inquiry into the topic, I have relied heavily on trade publications, popular press articles, depositions to Congress, Security and Exchange Commission filings, and published interviews for information. There are multiple main sources of data: secondary sources including trade publications *Variety*, *Video Business News*, and *The Hollywood Reporter*, economic data supplied by the Video Software Dealers Association (VSDA), mass media publications including *USA Today, The New York Times* and major newspapers from around the United States, and websites,

interviews with DVD producers and designers, corporate documents including memoranda, corporate correspondence and other general data, and published interviews with industry personnel who played a role in establishing technological specifications and industrial structures in the mid-1990s. I also rely on a variety of DVD news websites. Secondary sources are culled from a variety of online and print sources dating back to 1994, including "DVD Exclusive" (Variety Supplement), "DVD Report," "Electronic News," "Screen Digest," "PR Newswire," "DVD Angle," and "The Digital Bits" website. Much of the information garnered from these secondary sources has provided insight into the official position espoused by industry member companies through their PR firms, and will be compared to interview responses on the same subjects. I have relied on a variety of technical publications to familiarize myself with jargon related to the technology; I have made every effort to avoid lapsing into this jargon. Primary corporate documents are analyzed in conjunction with interviews of corporate executives in order to compare and contrast official documentation to interview responses. Because these secondary sources often lack perspective, depth, or objectivity, the information and analysis from these sources are cross-checked with multiple sources for validity whenever possible. Additionally, as mentioned above, this study is not attempting to be an exhaustive study of the DVD in all contexts. This analysis is limited in scope, focusing primarily on DVD in the United States.

In this study I employ a synthesis of technology studies' focus on the artifact combined with analysis of a variety of "determinants" shaping the technology and its process of diffusion into society. In so doing, this study examines technological, socio-

cultural, political, and industrial enabling conditions in order to begin to explain the successful introduction and commercialization of DVD technology. The study begins with a history of home video and optical disc technology and then employs multiple approaches: discourse analysis, diffusion of innovations theory, cultural studies, economic industrial analysis, and political economic approaches. In so doing I detail the complex forces at play in DVDs development and introduction. I have tried to create a synthetic approach that is fluid and exploratory. Wherever possible, suggestions have been made for directions for further research.

THEORETICAL FRAMEWORK

As a means of further framing my analysis, I have turned to four bodies of scholarly literature: media industry studies, political economy of the media industries, diffusion of innovations, and social-shaping of technology. In referring to these four areas of research, this study can be contextualized within larger scholarly traditions.

Media Industry Studies

Critical studies of cinematic technologies have examined technology in a variety of contexts, including its relationship to industrial modes of production. Media industry studies, though rarely focusing exclusively on cinematic technology, have grappled with the relationships between production operations, marketing strategies, media economics, management systems, and labor. On the whole, however, the role of technology within industrial analysis remains focused on the industrial context within which technology is exploited. By detailing the division of labor within industrial sectors, scholars and

industry insiders utilize evidence pertaining to the industrial structure in particular historical periods, relating shifts in the structure to changes in the production process and the products themselves.

Studies of industrial modes of production and the dynamics of managerial decision making processes are complemented by a growing body of literature focusing explicitly on media economics. Douglas Gomery provides a basic model for examining media economics, suggesting that, "a set of firms creating a similar product or service constitutes an industry (Gomery 1989)." These industrial organizations act in systematized and highly regular ways to ensure efficient allocation of resources and the distribution of goods and services into the economy. The systemic and differentiated labor structure, which often includes technology producers and designers, documentarians, editors, graphic designers, etc., serve these aims for the DVD industry. Analysts employing this approach attempt to define the basic structure, conduct, and performance of the industry under study. Questions addressed include: Who are the firms constituting an industry? How big are they? How do firms set prices? How do they distribute their products? Are goods distributed "fairly"? What is the role of government in the performance of the industry? These questions provide a starting point for examining a given industry but fail to address the developmental conditions or the activities of key firms in *establishing* an industrial structure. Contemporary media scholars recognize this shortcoming and thus are beginning to account for the formation of industries and the incorporation of new technologies into existing industrial structures. Additionally, scholars are employing a synthetic approach to technology and economic

analysis, analyzing the economic impetus behind particular contemporary production styles (Wyatt 1994).

Neo-classical economics, focusing on the structures through which production executives meet the wants and needs of audiences through the allocation of resources, analyzes the role of producers and consumers and attempts to predict the success or failure of films or genres in particular markets (Picard 1989; Albarron 1996; Alexander et al. 1993). Through micro-analysis these researchers illustrate how industries prosper within particular economies. These studies are largely descriptive, detailing the complex financial and legal arrangements surrounding production, distribution, and exhibition.

The question of how to conceptualize the role of technology within media industry studies has been of little concern to scholars within the field. Studies of entertainment industries routinely focus on mergers and acquisitions, economic imperatives, and the role of management in the production of cultural texts. Beginning in the 1980s, scholars undertook several studies of the studio era. These studies detailed through archival evidence the division of labor and the need for standardization on the supply side of the economic chain (Staiger 1985). Through analysis of the inner workings of studio decision-making processes, scholars were able to account for the development of group styles while detailing the production histories of individual films (Schatz 1988).

Schatz, Staiger, and others redressed theoretical gaps within the field of cinematic research. By contextualizing the relationships between labor and management, these scholars can be aligned with revisionist technological historians. However, the roles

played by technology and the shifting stakes of contemporary media economics in an era of ancillary markets and digitization suggests new questions about the primacy of technology and technological industries. Analyses of division of labor within new media industries should consider not only owners and executives, primary creative personnel, and creative managers, but also technical craft workers, including designers who execute and conceptualize the possible applications of digital technologies (Hesmondhalgh 2002). In the DVD industry, these workers design interfaces, menus, branching designs, and compression algorithms. Creative craft workers produce, direct, shoot, and edit documentary features that detail the making of the primary product (film or television series); they produce commentary tracks by actors, directors, or historians to accompany the film; and they work in close concert with the creative personnel on the film or television series to acquire deleted scenes, alternate endings and the like.

The relationships between technology and economics in the digital age are not limited to production, content acquisition, and design. In order to fully account for the technology's role in the economic equation, we must begin to conceptualize technological manufacturing, design, replication, duplication, etc., not only according to its position vis a vis institutional structures and support mechanisms, but as wholly defined, differentiated and integrated industries. Understanding the activities of member firms explains, to some degree, the successful integration of DVD into the existing media marketplace. Examination of the collective activities of member firms begins to explain the dynamic processes of industrial formation. Gomery claims, "For a particular industry, conditions of supply and demand give rise to a certain number of corporations

which, in turn, define its basic economic structure." As we will see, consumer demand for DVD and the rush to supply it were central to the rapid evolution of industrial structures. DVD offered superior quality compared to its home video and computer drive antecedents, combining quality, reliability and speed of data transmission. Firms acted to ensure that the new technology would meet or exceed consumer and technical expectations in the early stages of product launch. Laserdisc-style ancillary materials with multiple format options (aspect ratios ranging from pan and scan to anamorphic widescreen, subtitles, and language options), commentary tracks from scholars as well as producers and directors, and "making of" documentaries defined DVD-Video as a markedly different technology than VHS. Therefore, firms acted to ensure that consumers recognized this product as different from and superior to existing home video and computer technologies.

While media industry studies apply economic analyses in order to explain the relationships between production, distribution, and exhibition systems and market performance, these systems are often over-determined relative to other frameworks. Little attention is given to mutually-influencing conditions in law and the political environment, focusing instead on economic behavior as the principal framework for analysis. Conversely, political economy studies approach economic doctrines as beliefs and actions to be explained relative to existing conditions in government.[19] Political

[19] See for instance, David Baker, "The political economy of fascism: Myth or reality, or myth and reality?" *New Political Economy*, Volume 11, Issue 2 June 2006, pp. 227-250.

economic studies challenge orthodox economics by drawing on a variety of disciplines to explain the interplay between industry, political institutions, and capitalism.

Political Economy

A political economy approach to the film and media industries is concerned with economics, ownership, power and relations of power within industry and society. This approach details the structures of power and the strategies of control employed by conglomerates forming a media oligopoly. Specifically, political economy approaches investigate social change and history, social totality, moral grounding, and praxis. Its concern with social change and history is centered on understanding and contextualizing the impacts of capitalism, including its dynamic relationship to the state apparatus. In this way, political economy approaches continue theoretical and critical traditions of Marxist economics, highlighting the processes through which control and power are operationalized in the maintenance and organization of society (Mosco 1996). Social totality, according to Mosco from Murdock and Golding (1991), explores the interplay between commodities, institutions, social relations, and hegemony, focusing on a totalizing approach that broadly defines relationships between elements. Moral philosophy, in this theoretical paradigm, is a primary area of research. Detailing the potential discord between public desire and corporate economic imperatives, along with moral issues arising from the structures of power, political economy details the failings and successes of capitalistic industry in serving the goals of contemporary society.

Finally, praxis is roughly defined as activism; the political economy approach suggests solutions for the inequalities uncovered during research.

The political economy of media industries, including film and DVD, defines and analyzes cultural artifacts as commodities within a capitalist economic system in a manner similar to media industry studies (Mosco and Wasko 1988). However, political economy approaches broaden the field of influence, suggesting that these artifacts perform within economic systems according to influences in the regulatory environment. Like industrial organization analysis, political economy of DVD will address questions of industrial structure and performance, albeit within wider social, legal, and regulatory contexts. The economic structure of the DVD industry will therefore be understood in terms of political and socio-cultural structures of power. Taking an evaluative position relative to inequalities in the distribution of wealth and power within these realms, political economy of DVD suggests how access and fair use are constricted. Understanding the processes by which DVDs are produced and distributed, as well as the processes involved in industrial formation will afford perspective on the relationship between multi-media conglomerates and the state. Furthermore, approaching the DVD industry through political economy will highlight the significance of institutional structures and the collective behaviors of industry members to restrict access to content on the discs. This control was augmented by strategies deployed by the DVD Forum members from the three constituent industries to present barriers to entry for new firms and technologies.

The DVD industry successfully manipulated and adapted existent industrial and manufacturing infrastructures, market forces of supply and demand, and a favorable regulatory environment. Because the infrastructure already existed in terms of hardware and software manufacturing, retail/rental outlets, and home video marketing and distribution, DVD posed relatively little risk to firms wishing to develop and distribute the new technology. However, firms employed three key strategies that were imperative to the exploitation of resources, the creation of consumer demand, and the successful diffusion of DVD technology: (1) hardware and software companies agreed to work cooperatively in product development; (2) firms agreed to form collective organizations to ensure the mutual interest of all members in the marketplace; (3) development firms did not release technology until quality standards were agreed upon industry-wide.

DVD industrial organization developed firms operating as a cooperative collective to produce similar goods and services. These firms were divided into categories: disc manufacturers, hardware manufacturers, content providers/producers, retailers, and distributors, all under the umbrella of the DVD Forum whose guidance impacted industry wide standards in each category while presenting a unified front to an agreeable legislature. Businesses desired to take full advantage of the power collective cooperation offered to reduce initial capital outlay in manufacturing and product development. The collective would "share" innovations while guaranteeing market positions based on a leveled playing field. In this regard, developers could avoid costly research and development budgets. Secondly, cooperative collectives ensured market control. A member of a production, research, or leadership consortium need not worry

about being left behind in the event of new technological advances. As a forum or consortium member, the corporation could virtually guarantee their standing in relation to firms seeking entry into the marketplace. This institutional structure implies not only collusion, but deliberate attempts to gain protection and assistance from the state in the early period of industrial development.

Diffusion of Innovations

Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations. Everett Rogers, Diffusion of Innovations 1995

The DVD console became the fastest-selling consumer electronics product ever, having reached sales of more than 56 million players within five years. Between product launch in the third quarter of 1997 and the end of 1999, 128.6 million DVDs were shipped to retailers. By 2003, DVD players were in more than half of all U.S. homes.[20] In the first year on the market, DVDs shipped to retailers increased five-fold. How did the DVD diffuse so quickly into the market? Was the DVD perceived as having those qualities mentioned above by Rogers on a scale heretofore unimagined in the history of technology? How did the DVD target adopters and guarantee massive diffusion into the mainstream marketplace faster than any other electronics device? What were the enabling conditions surrounding DVD product launch and diffusion? Diffusion of

innovations theory is useful in explaining why DVD became such a phenomenal success so quickly, its status as a disruptive innovation, and the strategies employed by the "change agents" in introducing the DVD. [21]

Diffusion research analyzes the adaptation of innovation. Explaining the processes of social change stimulated by new ideas, practices, or objects, scholars in myriad fields examine how members of social systems integrate newly introduced products, services, and concepts over time through communication systems. Beginning as early as the early 1900s with Gabriel Tarde in France, continuing through the 1920s, and exploding in the 1960s with the work of Neal Gross and Bryce Ryan, diffusion research developed in fields ranging from education, sociology, anthropology, geography, economics and communications. Through diffusion theory, scholars are able to examine the degree to which the person or agent introducing innovation into a social system considers the target population, the relative advantage of the innovation, the compatibility of the innovation to existing values, the innovation's complexity, the trialability (or degree of experimentation with the innovation on a limited basis), observability (or the visibility of the results of use to others), and the stages of adoption.

Communication, uncertainty, and social change are important components of diffusion theory. Studying the adoption rate of a new innovation, scholars look to the processes through which adopters create and share information in understanding the

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[20] http://www.dvdinformation.com/News/press/010903.htm

[21] In the case of the DVD, the "change agents" include content providers, consumer electronics manufacturers, disc manufacturing houses, computer firms, and content distributors. These agents would band together to form "The DVD Forum," discussed herein.

innovation. Furthermore, diffusion scholars conceptualize uncertainty as the perception of alternatives by the audience and the possibility of a lack of predictability in explaining diffusion adoption rates. Perhaps the most important of the diffusion constructs is social change; researchers seek to explain how innovations alter the structure and/or function of social systems. Additionally, diffusion research defines adopter categories based on speed of engagement with the innovation and social standing and/or personality traits. (Rogers 1995)

Innovations can be thought of as occurring on a continuum between two extremes. Innovations are thought to reside on a scale from evolutionary to revolutionary (Christensen 1997; Hill and Jones 1998; Tidd et al 1997; Trott 1998; Veryzer 1998) and are categorized as either improving the performance of existing products, services, or business models, or as revolutionary breakthroughs that serve as the basis for the establishment of new industries and the generation of enormous wealth. Disruptive innovations are conceptualized as the opposite of evolutionary innovations; the highly discontinuous nature of the product or service relative to the existing paradigm transforms the demands and needs of a mainstream market and disrupts the former industrial members. In the case of the DVD, transforming the demands and needs of the home video and computer markets meant changing expectations for quality, accessibility, storage, and the practices of viewing audio/visual content in the home and elsewhere while stimulating social and cultural change.

The fact that the film industry has periodically engaged in the process of revolutionary innovation speaks to the long-term viability and profitability of the

industry. After an initial period of hesitancy and even active resistance to technological innovation, the studios adopted new technologies into the production, distribution, and exhibition chains. The degree to which any new technology disrupted the established business model corresponded to the level of resistance from Hollywood. The coming of sound, color, widescreen, the drive-in, television, and home video, to name but a few, initiated some disruption to the existent industries and audiences and were met with a reluctant response. DVD is an exception to this rule because of the primary role played by Hollywood in establishing the form and function of the technology.

Some of these innovations, such as the coming of sound and the DVD, can be defined as "competence-destroying" discontinuities, because they entailed significant product substitutes and new business models (Christensen 1997). Furthermore, the introduction of sound and the DVD required new skills, abilities, and knowledge both in production, distribution, and reception and initiated new industrial companies into the marketplace. Conversely, the introduction of color and widescreen can be described as "competence-enhancing" discontinuities, since these innovations represented improvements over prior products and built on existing know-how both in technology and reception (Hamel 2000). Furthermore, disruptive innovations can be divided into "product discontinuities" and "process discontinuities," suggesting that the artifact and/or the mode of production can be altered by the innovation.

In order for disruptive innovations to create change in industrial, economic, social and cultural spheres, the innovation must not only meet the unfulfilled needs of a niche market, it must also change the perception of the mainstream market. The DVD did not

simply meet the needs of video and home electronics enthusiasts, but it changed what mainstream audiences thought about home viewing in terms of aesthetics, interfacing, archiving, and the boundaries of the text. As with many innovations, the disruptive innovation is initially appreciated only by niche market consumers; however, the rate at which the DVD moved from niche to mainstream consumption is unparalleled and is the subject of the forthcoming chapter on DVD industrial performance.

Social Shaping of Technology

Social Shaping of Technology (SST) approaches attempt to comprehend the complexity of the socio-economic processes involved in technological innovation. The social shaping perspective develops in the social and natural sciences in the UK and Europe as an interdisciplinary critique of technological determinist approaches, reflecting a shift in recent (1980s and 1990s) social and economic research on technology. This field of research broadens inquiry beyond the technological artifact, incorporating the detailed processes of innovation (MacKenzie & Wajcman 1985, Bijker & Law 1992). Social Shaping theory both agrees and conflicts with elements of other theories that tie sociology and technology together such as Social Construction of Technology, which argues that human action shapes technology, from designers to choices made by consumers, but technology does not shape human action. Social shaping theory explores a range of factors - organizational, political, economic and cultural - which pattern the design and implementation of technology. SST explores the material consequences of different technical choices, suggesting that alternatives exist to technological determinist perspectives. SST strives to redress problematic post-Enlightenment traditions that

examined technology out of context, thereby bringing technology into the realms of social explanation and analysis while expanding critical inquiry beyond detailing its social impacts. Furthermore, SST challenges presumptions and assertions that technological change is both inevitable (demonstrating economic and/or technical "rationality") as well as being the sole agent of social change. Conversely, SST studies show that technology is perhaps best understood as being structured by conditions of both its creation and its reception/consumption, and is therefore a social product. As will be shown with DVD, at every stage in both the innovation and development of new technologies a variety of technical options were available. The process through which the artifact became "finalized" for distribution to the market cannot be reduced to simple technical considerations, but is assessed in terms of a wide range of social, economic, cultural and political factors.

Thus SST challenges linear models of innovation that suggest technologies are developed to satisfy particular industrial and/or social needs and then are easily, rationally marketed. The concept that there are alternative possible choices in the design of artifacts and technological systems will be demonstrated through the example of the DVD. Different technological routes were available, choices that potentially would have led to different outcomes in terms of the form of technology. The DVD's form and function along with the practices of social groups interacting with the technology may have been radically different had standards for product specifications been different. Significantly, the choices made by members of the DVD Forum could have resulted in differing implications for society and for particular social groups. SST thus attempts to

integrate traditional approaches, concerned with assessing the "social impacts" of technology, to examine what shapes the technology which is having these impacts, and the way in which these impacts are achieved (MacKenzie and Wajcman 1985). In this way SST broadens the policy agenda to suggest that there are dynamic processes at work in the development and innovation of technologies generally and media technologies specifically. In contrast to the certainties held out by images of social and technological progress, technological change was revealed by a growing body of SST research as a highly uncertain and unpredictable process.

STRUCTURE OF THE STUDY

The four theoretical frameworks discussed above are important because they provide a basis for understanding the variety of approaches available to scholars, as well as the difficulty in discussing technological innovation, commercialization, and diffusion in simple terms. In addition, these approaches offer a means by which this study can frame description of the development of DVD technology and demonstrate why this particular technology was impacting and was impacted by contexts ranging from culture to industry and the regulatory environment. These theoretical approaches provide a starting point from which this study begins to unpack DVD development and diffusion into these contexts.

This study begins by examining the technological and industrial conditions into which DVD was developed and introduced. Chapter two describes the technological basis for DVD, based in CD, laserdisc, and optical media storage. Additionally, this chapter examines the technological development of home video technologies in an effort

to compare and contrast the development of DVD by the consumer electronics, filmed entertainment, and computer industries. Chapter two concludes by suggesting that the cooperation of these three industries was a crucial step in developing an industry-wide standard for DVD. Chapter three then details the processes through which these three industries came together over several decades. Each industry is examined independently to identify the forces that led to their involvement in the DVD Forum. This chapter discusses how and why the three vested industries cooperated to create an "ancillary industry" around DVD, and traces the consequences of these efforts in terms of the conduct and performance of industry members as the technology rapidly diffused into the domestic marketplace. In addition, this chapter provides a much-needed analysis of 1990s Hollywood that accounts for the influence of digital technologies, the cooperation between firms in technological development, and cross-industrial alliances with computer industry firms. The chapter also discusses a variety of strategies to legitimize control and access to power within the industry and potential impacts on the form, function, and utility of DVD technology as it is developed within this context.

The conclusion of chapter three shifts focus away from the individual industrial structures and practices and toward an investigation of the DVD Forum, which is the subject of chapter four. After examining the collective influence, structure, and practices of the DVD Forum in chapter four, I examine the cultural contexts into which the Forum introduced DVD in chapter five. This chapter focuses on the creation of meaning and the cultural context(s) of home video and digital media consumption, examining how DVD was introduced to the public through trade, popular, and advertising texts. These sources

provide a framework for understanding how a variety of discourses combined with consumer behaviors and experiences with the technology, defining the early relationships between industry and the public related to the technology. I argue that DVD was made meaningful through successive stages of discourse that began with trade descriptions of the technology and the format war that existed in the early stages of product development. These discourses played an important role in "priming" the early adopter community for the technology and set the agenda for meaning-making prior to product launch. This chapter also examines how early advertising for the technology structured meaning in particular ways by associating DVD with home video and theatrical viewing cultures.

Chapter six returns to issues of control and power by focusing on the regulatory context surrounding DVD. Strategies employed by the DVD industry to regulate use of the technology are identified. I show how DVD entered into a changing landscape of intellectual property law, digital copyright law, fair use, deregulation, conglomeration and international protocols for managing the distribution of digital content. This chapter then illustrates how the members of the DVD Forum established legal precedent for digital copyright law by prosecuting a number of "hackers" in state, federal, and international courts. In addition, this chapter demonstrates the various strategies employed by the members of the DVD Forum to restrict access to the technology and prescribe the kinds of uses available to consumers. DVD was a key component in initiating debate around the Digital Millennium Copyright Act, fair use in the digital age, and the legality of digital rights management technologies. This chapter then turns its

focus to analyze the strategies employed by the entertainment industries in establishing a global distribution system that staggered the release of DVDs to specific markets in order to maintain theatrical profits and to minimize piracy around the world.

The chapters take a thematic approach, organized around specific contexts rather than following a strict chronological history. Over the course of each chapter, I describe how demand for DVD developed within each context and how the technology influenced existing conditions in distinct ways. Every chapter includes analysis of the particular context prior to the introduction of DVD and concludes by suggesting the how the technology was impacted by those conditions and how the technology affected contexts in far reaching ways. By organizing my study in this fashion, each chapter contributes to a larger argument concerning the synchronous alignment of favorable conditions that facilitated the successful diffusion of the technology.

As this overview indicates, in many ways DVD was at the center of dynamic changes in a variety of contexts during the 1990s. DVD successfully diffused into the marketplace because of the unique combination of these changes and the various desires of industry and the public to commercialize and adopt a new home video/computer storage device. DVD was made possible by technological developments in optical media storage stemming from the CD and laserdisc. However, its technological basis is only part of the dynamic interplay of forces contributing to its success in the domestic marketplace. What made DVD possible included favorable contexts in culture, industry, and the regulatory environment, along with the technological context. These influences, taken individually, would not fully explain how DVD became the most successful

technology in history. By addressing each context in turn, this study builds a nuanced picture of the processes involved in technological diffusion. My attempt to trace the integration and interplay of these various forces distinguishes this work from previous examinations of the rapid ascent of DVD as a technology, a distribution/delivery system, and ultimately as an industry.

Chapter Two: The Development of Home Video Technologies

The development of home video technologies has occurred as a result of the confluence of advances in technology, corporate vision, and marketplace demand. Technological advancements in the 1950s in magnetic tape recording led to the commercialization of machines capable of recording and playing-back filmed content on tape. Japanese consumer electronics leaders Sony and Matsushita developed competing consumer technologies that were mass-marketed in the 1970s as devices for recording live television for later viewing. After challenging the legality of Sony's Betamax in federal court, Hollywood adapted to the perceived threat by tapping into the cultural desire for feature films on television, shifting the principal purpose of the device from recording television to playing back pre-recorded feature films. Thousands of films, from new releases to classics, were transferred to tape and made available for rent throughout the world. American and foreign audiences, accustomed to viewing Hollywood and foreign films on broadcast television, eventually embraced home video technology. By 1987, twelve years after the introduction of Sony's Betamax, revenues returned to the studios from tape rentals surpassed box-office grosses for the first time. Home video devices were in nearly every American home; home viewing of films on tape was ubiquitous.

Despite this phenomenal growth however, video tape technologies and the home video industry actually developed at a much slower rate than the DVD. Because competing videotape technologies confused potential consumers, and given Hollywood's

initial reluctance to support either Betamax or VHS formats, successful mass diffusion was scarcely a foregone conclusion. Without a standardized format recognized as such by the content providers and potential consumers, the path to widespread adoption was tumultuous. Matsushita and Sony struggled for market share throughout the 1970s and early 1980s, promoting the benefits of their respective products while Hollywood looked on. In the end, shifts in consumer demand, industrial behavior, and technological advancements in Matsushita's VHS technology eventually ended the format battle by 1985. Matsushita's VHS became the industry standard by virtue of these shifts combined with its lower retail price and the widespread perception that it could record more live television than the Betamax. However profitable home video tape technologies proved to be for Hollywood, the studios still sought a technology for home video that would preclude illegal copying and sharing of content. They repeatedly urged domestic technology companies to develop a device for play-back of content only. Laserdisc, Selectavision, and other disc-based technologies emerged throughout the late 1970s and early 1980s, but remained niche products for cinema enthusiasts and collectors due to cost, lack of titles, and functional problems with the discs. These disc technologies, and their more successful tape-based counterparts, are important precedents for DVD. Their development and diffusion, and the home video industry they spawned, were crucial antecedents to DVD. Examining the processes of their invention, innovation, and diffusion well indicates how indebted DVD technology was to earlier advances in home video tape, laserdisc, and compact disc technologies. This analysis also reveals how

DVD develops according to industrial desires for a play-back only home video device for the masses.

HOME VIDEO TECHNOLOGIES BEFORE DVD

Home video technology did not simply appear in some rudimentary technological form in 1956, the year that magnetic tape was innovated, and go through a linear series of improvements before becoming a consumer-sector phenomenon in the late 1970s. The development of home video technology is a long and complex one, with players on either side of the Atlantic and Pacific (with vastly different aims) struggling to invent, innovate, and distribute home video technology to worldwide consumers. Asian consumer electronics manufacturers developed and commercialized home video technology to empower consumers to record and share media taped from television. American content providers desired a product without such capability; home video technology would ideally serve as a play-back only technology for delivering pre-recorded content. The divide between corporate goals for video technology and consumer uses and gratifications would eventually lead to the development of playback-only home video technology.

Prior to the mid-1950s, the magnetic recording industry was under the direct purview of the American radio industry. Magnetic recording experiments and devices, of both audio and visual data, can be traced back as far as the industrial modernization era of the late nineteenth and early twentieth centuries. However, struggling inventors and prototypes does not an industry make. Magnetic recording did not become a viable technology until after the Second World War. Early developments in magnetic recording

by Valdemar Poulsen in Denmark towards the end of the nineteenth century and subsequent inventions by Dr. Fritz Pfleumer in 1920s Germany differ from the innovations by Leonard F. Fuller in the United States. The early inventors envisioned differing applications for the technology and established a continuing theme in technological and industrial development in regards to home video that would persist through the development of DVD technology: American content providers desired a machine that would protect their valuable assets on the open market; European and Japanese manufacturers developed a technology based on recording and sharing of content.

Soon after the war, the flailing American magnetic recording industry received a boost from the fall of Germany, as engineers and their technological innovations were discovered by allied troops. By 1946, the differing technologies had merged into a unified prototype. In June of 1947, the Magnetophon was demonstrated for Bing Crosby, who was seeking a means to prerecord his radio programs. Crosby would soon join forces with the Ampex Corporation, leaving NBC radio for ABC. By 1948, ABC began large-scale use of 3M Magnetic tape and Ampex model 200s to record radio shows. Ampex and RCA had begun experimenting with video technology shortly after the end of the War. Ampex won the race to a prototype and in 1951 the electronic division of Bing Crosby Enterprises (in affiliation with Ampex) demonstrated the first video recorder in black and white. However, it was not until 1956, when Ampex introduced the Ampex VR-1000 that video technology became commercially viable. This marks, according to

Wasser and Eugene Marlow, the beginning of the modern video era. For the next fourteen years, almost all videotape recorder design was based on Ampex's system.

Videotape and video recording technology would soon spread to the Asian continent. By 1959, Toshiba improved on Ampex's design, introducing helical scanning that improved signal strength and resolution. Soon after, the three major Japanese technology companies, Sony, Matsushita, and JVC, entered into the fray and cooperated by setting standard specifications for the development of their own machines. Initiating a cooperative business plan for the development of video technology that was defined by collective research and sharing of technological advancements, the partnership proved beneficial to all members for a brief period. Each member company worked towards technology based on the Ampex design in the hopes of cornering the growing Asian markets. However, the introduction of the proprietary Sony U-Matic in 1966 and its popularity in business and educational markets would position Sony as the market leader in this new business. Spurned by the successes of Sony in these burgeoning markets (Sony's U-Matic brought color to the video image), Matsushita and JVC would openly compete with Sony in the next decade.[22] Sony, unfettered by the challenges of Matsushita and JVC, shrunk the ¾ inch U-Matic tape to ½ inch and introduced the Betamax in 1975. Marketed as a tool of empowerment for the consumer, enabling recording and playback of live television ("time-shifting"), Sony advertised videotape and the Betamax recorder as an extension of the television industry. Matsushita and JVC

subsequently introduced the VHS player in 1976. While both technologies offered recording and playback capabilities, VHS tapes could record longer (four hours to Betamax's two). However, the format war, according to Wasser, was not decided on the basis of internal technological differences. Rather, the battle between Sony and Matsushita was won on the basis of "network externalities" or forces unrelated to the technology proper. These included the consumer perception that VHS tapes could record longer than Sony's (even after Sony caught up with the Matsushita standard), significant price differences between the competing machines, effective marketing campaigns, a shift in viewing patterns relating to watching Hollywood movies on tape, and pre-recorded content availability. By 1978, VHS had overtaken Betamax in marketplace saturation. By 1979, viewing pre-recorded tapes through the VCR became the dominant practice by consumers across the world (more on this below).

In America, consumer electronics companies and content providers--namely the Hollywood studios and the television networks-- forged a different path to the consumer market during the 1970s. Convinced that home video viewing should be an extension of the film industry, where pre-recorded content could be controlled in distribution by the studios, steps were taken to develop video disc technology for playback only. American firms were concerned over control of content, copyright protection, and piracy and attempted to integrate videotape technology into existing industrial practices. The goal of American companies remained in developing a technology for the home market centered

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[22] According to former IBM executive Dan Sullivan, this jealousy would split the Asian industry along national boundaries. Japanese firms, led by Sony, would wage war in the press and through competing

around playback-only devices. As a suitable industrial product, videotape was capable of increasing profits through syndication and reruns of film and television series. Videotapes could be shipped to local affiliates, shown, and returned at relatively little cost. For home use, consumers taping live television potentially would cut into theatrical and traditional television ancillary markets. Forging ahead with the development of numerous disc technologies, including the Discovision, Selectavision, and eventually the Laserdisc, manufacturers were slow to market and plagued by production costs, a lack of titles for playback, few retail stores willing to participate, a refusal to supply pornographic content, and competition from the now entrenched videotape market. However, as late as 1976, Hollywood executives were still optimistic that the videodisc would triumph over the videotape.

According to Frederic Wasser, the development of VCR technology can be roughly sketched into four historical phases. The first is initiated by the introduction of the Ampex video playback machine in 1956. Ampex was introduced as an industrial machine, too expensive for practical consumer applications. The second phase begins in 1969 with the introduction of the ¾ inch U-Matic from Sony, sold as a business and educational tool for the recording and playback of video and audio recorded on Sony cameras. The third begins with the introduction of Sony's Betamax, characterized by the format war between Sony and Matsushita (who introduces the VHS player/recorder in 1976), and the first consumer technologies. The fourth phase begins in 1979 with technological improvements to existing technology and marked by the shift in audience

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product development against Taiwanese firms for the next three decades. (personal interview)

behavior from recording live television to playing back pre-recorded tapes. These phases overlap, of course, as technological advancements initiate competitor response and demarcate the shift from industrial to consumer technology. This technological approach is part of Wasser's synthetic, political economic approach to the subject, and reveals the tensions that shape video and magnetic recording technology and the structure of the home video industry. Wasser's periodization demonstrates the process of industrial maturation as well as shifting uses and gratifications by consumers. The fact that consumers eventually preferred to play-back pre-recorded content rather than record and share content off of television aligns with the desires of Hollywood for a playback-only home video technology.

Wasser's fourth and definitive phase, beginning in 1979 and marking the emergence of home video as a motion picture market, accounts for the eventual rise of rental retailers Blockbuster, Movie Gallery, and Hollywood Video and the significance of the home video industry to production, distribution, and exhibition. A viable home video market also increased the value of the content providers, continuing to turn around the financial fortunes of major studios, who had struggled to turn profits under diversified corporate umbrellas during the 1960s. Increasing revenues for both studios and retailers helped propel the frequency of mergers and acquisitions within the media industries. New revenue streams made the studios attractive to media conglomerates seeking to diversify their holdings. Valuable studios libraries could be mined for titles to release, while new releases were virtually guaranteed to turn a profit once in the home video market. Once this market was established, very little technological improvements were

made to the video tape standard established by Matsushita's VHS technology. Incremental improvements throughout the late 1980s and early 1990s, including high fidelity tape and machines capable of delivering stereo and surround sound, were integrated into the existing technology.

Several studios, principally Disney, circumvented the rental retailers in the mid-1980s by marketing and selling tapes directly to consumers. It is in no small part due to the profits generated from sell-through of blockbuster hits and family titles that content providers revived their collective desire for a new playback-only device. Selling directly to the consumer at prices ranging from $15.99-$29.99 (per title) returned enormous profits to the studios. Disney's success with animated classics and family titles, including *The Fox and the Hound* (Disney 1981), *The Little Mermaid* (Disney 1989), *Aladdin* (Disney 1992), and *The Lion King* (Disney 1994), throughout the 1980s and 1990s, along with the small but profitable market for laserdisc sales, suggested that consumers were willing to purchase, collect, archive, and repeat-view films in the home. Despite the profitability of the sale of tapes directly to consumers, the studios did not immediately embrace this model en masse; titles released directly for sale to consumers were mostly limited to blockbuster hits and family titles. The vast majority of Americans still preferred to rent tapes and the studios dared not risk their golden video goose by abruptly shifting the distribution model.

Disney employed videotape technology to build a lucrative sales model for home video. Their efforts to establish this market align with the collective desires of their competitors in filmed entertainment. All of the major studios conceptualized video

technology as a delivery mechanism for pre-recorded content. The development of videotape technology can also be understood in light of continental technological and cultural divides, first between Europe and the United States, then between Japan and Europe, and then the United States and Asia, a gradual progression from industrial technology to consumer technology, differing intended uses of the machines (playback vs. recording), and a struggle for control over the marketplace and content. Along these dividing lines, American content providers and consumer electronics firms sought playback-only devices while Asian and European firms based their technology in recording and "time shifting." In the process, the home videotape industry would move from an extension of the television industry to an extension of the film industry.

THE DEVELOPMENT OF DVD TECHNOLOGY

Unpacking the circumstances surrounding the production and development of DVD is not a simple matter. Because DVD is a multiple-media technology (i.e. both a technology for the computer and a "stand alone" hardware console device connecting to the television set), different industrial motivations and technological developments were at play in the shift from existing technologies to digital video technology platforms. Computer manufacturers sought a replacement technology for the unsuitable and unpopular CD-ROM. Consumer electronics manufacturers recognized the potential of a new disc technology to do for movies what CD had done for music: create a new market that would boost sales of consoles. Additionally, these firms sought to exploit the established patent pooling structure employed with the CD in an effort to retain the majority of royalties from hardware sales. Content providers understood that a new home

video technology, with copyright protections in place, might offer a new market to exploit existing film libraries in a more profitable way than had been established with the home video rental business model.

According to Aaron Barlow, media commentator and historian, a prime motivator for the development of DVD technology and investment in the potential replacement for VHS was recognition by media conglomerates that developments in television technology (High Definition, video on-demand, digital cable) would make obvious the inferior picture quality delivered by VHS technology.[23] Barlow's argument privileges the influence of media conglomerates over consumer electronics manufacturers and computer firms because his story focuses on film and home video culture and the role of the media conglomerates in shaping that culture. While high definition television technology was available in the late 1990s, and was indeed ill fitted to video tape technology, the move to develop DVD was also crucially linked to the existing home video business model, patent pooling and licensing, a long history of videodisc technology and developments in digital audio and digital video compression, and a perceived shift in consumer consumption patterns, viewership, and film culture generally.

VIDEO DISC TECHNOLOGIES

The technological basis for the DVD was established as early as 1928 by John Logie Baird. Baird developed a wax disc capable of storing images for playback via a stylus similar to a record player. Utilizing data storage technology developed in 1801 by

[23] Barlow, Aaron. 2005. The DVD Revolution: Movies, Culture, and Technology. London: Praeger Publishing, pp. 16.

Joseph- Marie Jacquard, and furthered by Charles Babbage and Herman Hollerith, Baird's disc employed the concept of punched holes and punched tape for data transmission. The difference between surface and hole, or pits and lands, served as the foundation for high-speed optical data storage and would be utilized by the first electronic computers, census machines, and eventually the CD and DVD. The foundation for modern optical storage technology was set. However, Baird's technology failed due to technical glitches and its inability to galvanize industry players. Fifty years later, Philips and Pioneer introduced videodisc technology that improved upon Baird's concept, replacing wax discs with polymer discs while employing a laser to read analog data off the grooved surfaces in the disc. The "laserdisc" offered key functional differences to its VHS/Beta competitors. Capable of high quality data storage and playback, the laserdisc produced vastly superior picture quality, random access functionality, and printed material storage. However, because the disc could not hold more than one hour of analog video per side, it was incapable of uninterrupted feature length film playback. As early as 1976, MCA began developing its own videodisc technology. They joined the laserdisc market by releasing the DiscoVision brand in 1979, offering the new technology to consumers for the first time.[24] Like all home video technologies, competing formats came to market before a winner was declared. RCA introduced its own videodisc technology in 1981, called capacitance electronic disc (CED), utilizing a diamond stylus that came in direct contact with the disc to read information. Due to technical flaws and a lack of industrial support, the technology was

[24] Taylor, Jim. DVD Demystified. Second ed. 2001. New York: McGraw Hill. Pp. 33.

abandoned in 1984. JVC and Matsushita developed their own technology, the video high density or video home disc (VHD), using a floating stylus that read information from a smooth disc. Again, due to a lack of industry-wide support of titles and a tepid response from consumers, the technology ultimately failed. The Philips/Pioneer technology would attain market dominance, largely due to its widespread application in Asian markets as a karaoke technology, but remained a niche success in the West, catering largely to videophiles and the educational marketplace.

One of several reasons for laserdisc's lukewarm reception and diffusion was its size and functionality. The laserdisc was roughly the same size as a record album, and behaved in much the same way, with an "A" side and a "B" side. Consumers would have to eject the disc, turn it over, and begin playing the second half of content embedded on the disc. The affiliation of the laserdisc with an "old" media technology meant that consumers would potentially associate the technology with low quality analog media. Another principal problem facing the laserdisc was the compression of video and audio data. The laserdisc was not able to store video and audio digitally and convert it efficiently to a standard analog television signal for display.[25] Instead, the disc relied on analog data storage and transmission for video and limited digital audio specifications. However, the laserdisc proves to be significant to the story of the DVD for multiple reasons. First, the laserdisc established the technological viability of the video disc. Its ability to playback (only) high quality video through optical data storage encouraged the

[25] Jim Taylor's chapter "The World Before DVD" in DVD Demystified details the data storage requirements for such a conversion.

eventual hybridization of its technology with digital formats like the CD. Both laserdiscs and DVDs are made from two bonded substrates; DVD technology would improve on bonding techniques utilized by laserdisc manufacturers, avoiding technical problems common to the laserdisc. Second, the laserdisc established that there existed a market segment who would invest in high quality videos on disc, even if they were unable to record on the format. Third, the relative success of the laserdisc in ancillary and tertiary markets like karaoke bars and educational sectors suggested that video disc technology could be profitable in a variety of arenas. Fourth, the laserdisc spurred the creation of a number of production companies specializing in supplemental content to package with Hollywood movies.[26] These companies would be crucial early supporters of DVD, adapting their production models, styles, and resources for use with the new technology. Finally, the technology employed with the laserdisc, as well as analog video and digital audio, existed without region codes or advanced copy protection schemes. Even without these safeguards in place, Hollywood supported the laserdisc format for home video distribution, releasing in excess of 35,000 titles worldwide. Before the internet and global connectivity, sophisticated protection and encryption technologies were not viewed as mandatory for home video technologies; simple Macrovision technologies that discouraged the average consumer from copying would suffice. The support of Hollywood also demonstrates the desire of the content providers (the film studios and their parent companies) to exploit new playback-only technologies AND the need to

[26] Companies such as Criterion Co. would be successful boutique houses during the days of laserdisc before successfully exploiting the potentials of DVD.

eventually replace the laserdisc with a more safeguarded technology in the computing age. The shift to digital audio, the promise of digital television, along with the development and introduction of compact disc (CD) and DVD technology, would prove that the laserdisc was not able to compete in a new, all digital marketplace.

CD TECHNOLOGY

When the CD was introduced by Sony and Philips in 1982, the laserdisc was still in its infancy. The compact disc, as a delivery mechanism for digital music, would generate enormous revenues for the music and recording industries. In the process, it would prove a crucial antecedent to DVD, both technologically and culturally. Recognizing the potential of pulse-code modulation (PCM) technology for applications in the consumer market that were demonstrated in 1974 by Denon Records for digital recording, Sony and Philips developed the digital-based CD as a replacement to the then dominant audio cassette.[27] The CD was developed to exploit digital sampling through PCM technology, converting electronic signals into numbers represented as binary digits. CDs and DVDs, like all optical storage technologies, store data in the form of microscopic pits that represent these binary digits. On a CD, the minimum pit length and track pitch (the distance between pits) restrict the amount of data that can be encoded on the disc. Infrared lasers then read the data from the pits and convert the digital sequences. The CD has a layer of reflective aluminum behind the pitted layer of polycarbonate substrate that reflects the laser back to a photo detector. Data is stored on

[27] PCM technology is the basis of all digital audio recording, storage, and playback and is the foundation of the DVD's audio capabilities.

a single layer of substrate on a single side of the disc and spirals outward from the center. As an evolutionary technology, the DVD would build upon these technical specifications through advancements in laser technology, encoding technology, and substrate materials.

The technical specifications for the CD were based on its functionality as a digital platform for music. The shift to digital music was, in part, spurred by the technological benefits afforded through the application of PCM technology: digital sound promised high quality frequency response, exceptional dynamic range, and no generational loss in copying.[28] A number of advantages over existing audio tape and LP technologies, including longer playing time, smaller size, instant access to data, and increased durability propelled CD past LP in worldwide sales by 1988. With the early success of the CD, manufacturers and product developers began pushing the limits of the technology in the hopes of including high quality digital video with digital audio on the CD.[29] Given its limited storage capacity, (see figure 2.1 below) engineers faced an uphill battle to achieve multi-media functionality with the CD; the disc simply could not hold enough information to adequately store and playback feature-length video content. Compression technology proved crucial to overcoming the size demands of high quality digital video and would be a first step in the eventual development of the DVD. Compression technologies employ complicated algorithms that convert media from original formats into smaller versions encoded on the disc to be decoded by the player. By 1988, after several proprietary compression systems had been developed and proved unsuitable as

[28] See Taylor, pp. 23.

industry standards, the Moving Picture Experts Group (MPEG) committee was created to address the problem. Founded by Leonardo Chairiglione and Hiroshi Yasuda, the MPEG group's expressed mission was to standardize video and audio for CDs.[30] By 1992, the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) recognized the labors of the MPEG group and adopted the standard that came to be known as MPEG-1. The standard offered a formula for compressing and decompressing (on the hardware end) audio and video to fit the data rate of the CD format. The viability and acceptance of MPEG-1 proved to be the foundation for a variety of CD-video technologies. However, these technologies were unreliable and would eventually encourage the development of a new technological standard for video on disc. Additionally, the MPEG-1 standard made possible video and audio for personal computers, the internet, digital video camcorders, Direct Broadcast Satellite television, and the MP3 audio format. Simply put, the MPEG-1 standard made the technological, cultural, economic, and industrial shifts of the "dot-com" era possible.

Even before the MPEG-1 standard achieved widespread acceptance in the manufacturing sector, attempts were underway to hybridize the two existing disc technologies (CD and laserdisc). CD-Video (CDV) was developed in 1986 to incorporate the video performance of the laserdisc with the digital audio specifications of

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[29] See Taylor (2001) pp. 39-45 for a thorough discussion of the different CD applications developed by consumer electronics companies.

[30] Halfhill, Tom R. "CDs for the gigabyte era. (Digital Video Discs will offer 25 times the capacities of CD-ROMs)." *Byte* 21.n10 (Oct 1996): 139(4). *InfoTrac OneFile*. Thomson Gale. University of Texas at Austin. 6 Dec. 2006. <http://find.galegroup.com.ezproxy.lib.utexas.edu/itx/infomark.do?&contentSet=IAC-

the CD. The CDV contained 5 to 6 minutes of audio tracks and 20 minutes of analog video. Due to its inability to play back larger segments of video, the technology ultimately failed to catch on. However, the experiment proved to be a bellwether for things to come. Sony and Philips, after successfully introducing the CD-ROM drive to the computer industry (a hardware device that would read data and interact with operating systems on hard drives), expanded the CD universe with the Compact Disc Interactive (CD-i) in 1986. The new format was designed to interact with the OS-9 operating system and was envisioned as "the standard for interactive home entertainment."[31] The technology languished for the first few years and was thought to be obsolete even before it debuted. Its significance to DVD, however, is noteworthy. The CD-i was the first CD technology to successfully demonstrate MPEG-1 video and achieved limited support from Hollywood, with 50 movies released on the CD-i Digital Video format between 1991 and 1993.[32] However, the technology proved to be unreliable, supporting companies dropped out of product development, and Philips was left with a billion dollar tab for development costs. By 1993, JVC, Sony, and Philips jointly developed a new standard called Video CD (VCD) that would employ MPEG-1 compression to store 74 minutes of video and audio. The new standard was designed to play through a CD-ROM on a home computer or through a console developed and distributed by Philips. By 1996, the VCD was selling millions of units in countries like

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Documents&type=retrieve&tabID=T003&prodId=ITOF&docId=A18786569&source=gale&srcprod=ITOF&userGroupName=txshracd2598&version=1.0>.

[31] Taylor, Jim (2001). Pp. 41.

[32] Ibid. pp. 43.

China where the VHS had not achieved dominance, but failed to achieve significant market shares in Western nations.

In 1993, ten years after the introduction of CDs and CD- ROMs, the first prototypes for high density CDs were demonstrated. After a period of twenty-odd years of targeted marketing and niche consumption of video disc technology, technological developments in laser technology enabled the production of a video disc the size of the existing CD. Early attempts at creating the video disc simply pushed the capabilities of the existing CD technology, reducing the size of the pits on the disc to double amount of potential embedded information. Nimbus developed a CD with double the storage capacity of existing discs, capable of connecting to an MPEG video decoder.[33] Nimbus, in partnership with Sony and Philips, had joined forces during the development and diffusion of CD technology in an effort to stave off anti-trust legislation by sharing the patent pool. However, Nimbus and Philips quickly realized that CD technology tended to falter when pushed too far, and decided to develop a separate disc technology.[34] The potential viability of this technology was tied to developments in the MPEG compression and decoding technology. The MPEG committee had been working to improve the standards it had set with MPEG-1, and by 1994 had introduced MPEG-2, a variation on its existing system that could handle high quality data at much higher speeds than its predecessor.

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[33] DVD Demystified, second edition, by Jim Taylor.

[34] Philips refused to release its CD patents for video CD technologies, further instigating the shift to a new digital disc separate from the existing technology.

Meanwhile, Toshiba and Time Warner began developing their own next generation video disc. As development was underway in early 1994, Hollywood weighed in, calling for a single worldwide standard for the new generation of digital video on optical media. Seven entertainment and content providers formed the "Hollywood Digital Video Disc Advisory Group," asking developers to meet their collective demands. Members of the group included Sony, Disney, MCA/Universal, MGM/UA, Paramount, Viacom, and Warner Bros. Their inventory of desirable features included room for a full-length feature film, about 135 minutes, on one side of a single disc; picture quality superior to laserdisc; compatibility with high quality audio systems; ability to accommodate three to five languages per disc; copy protection; multiple aspect ratios for widescreen support; and multiple versions of a program on one disc, with parental lockout. All interested parties recognized the technological need for a higher capacity disc. CD-ROMs average a total capacity of 553 Megabytes per disc. In order to meet the demands of the studios, whose support of the technology was crucial to its successful commercialization, the disc capacity needed to be expanded by a factor of seven. Improved manufacturing techniques for bonding multiple layers of substrate combined with refinements made in disc-mastering technologies and shorter-wavelength lasers provided the technological material to squeeze the pits on the disc, resulting in more data capacity. These smaller pits combined with tighter rings, or tracks of information, requiring a more refined red laser to read the material. Employing the same red-laser diodes used in retail for reading bar codes produced the desired effect (see figure 2.1 below for a comparison of CD and DVD laser specifications). The combination of

technical advancements in disc encoding and laser technology resulted in a disc with the capacity to hold 4.7 GigaBytes (GB) of data, more than enough to satisfy the demands of the Hollywood Advisory Group.

Figure 2.1: Comparing CD-ROM and DVD-ROM

	CD-ROM	DVD-ROM
Disc diameter	120mm (4.7 inches)	same
Disc thickness	1.2 mm (0.6 mm X 2)	same
Track pitch	1.6 microns	about one half of CD (0.74 micron)
Minimum pit length	0.834 micron	about one half of CD (0.4 micron)
Laser wavelength	infrared	red-laser diode
Data layers	One	One or two
Data sides	One	One or two
Data capacity (per layer)(2)	682 MB	about 6.9 times the CD (4.7 GB)
Data capacity (per side)(2)	682 MB	4.7 to 8.5 GB
Total data capacity(2)	682 MB	about 25 times the CD (17 GB)

Source: Halfhill, Tom R. "CDs for the gigabyte era. (Digital Video Discs will offer 25 times the capacities of CD-ROMs)" *Byte* 21.n10 (Oct 1996): 139(4). *InfoTrac OneFile*.

As mentioned, the physical size of the CD-ROM and DVD-ROM were identical. This was a crucial design element allowed CDs to play and perform in DVD drives. The major differences between the two standards were in the track pitch, pit length, and laser type and wavelength. Track pitch refers to the distance between data marks and the orientation of the data on the disc; smaller distances between data markers allowed the DVD-ROM to store more data. Pit length differences also improve the storage capacity

of DVD-ROM; pits are the indentations on the surface of the disc. Smaller pits allowed more of them to be embedded onto the disc, resulting in larger storage capacity. Additionally, multiple layers of pits/data could be laid on top of each other, doubling the potential storage capacity of the technology.

STANDARDIZING DVD

On December 16, 1994, the structure of the fledgling DVD industry was divided into two camps as Sony and Philips announced their own standard, Multimedia CD (MMCD). By January 1995, hardware and software manufacturers were working together to challenge Sony/Philips. Sony, Philips, and 3M MultiMedia CD were working on single and dual layer optical discs and hardware capable of converting MPEG-2 compressed video with eight channels of surround sound, capacity for multiple languages and subtitles, and compatibility with CD, CD-ROM and photo-CD formats. The dual layer model was said to be capable of carrying 270 minutes of video, in addition to sound, language, and subtitle options.[35] The second camp was comprised of MCA, Time Warner, Toshiba, MGM/UA, Matsushita, JVC, Thomson, and Mitsubishi. The group, known as the SD (super density) Alliance, offered four products: single-sided five and nine-gigabyte discs and double-sided ten and eighteen-gigabyte models.[36] While the two formats differed in architectural structure, they both offered relatively inexpensive manufacturing options. The estimated cost of mass production was estimated to be 113%

[35] 7.4 gigabytes is enough memory to store 270 minutes of video, in addition to the sound, language, and subtitle options.

of the cost of manufacturing CDs.[37] Compared to the existing home video technology, VHS, DVD manufacturing costs were significantly less, adding to the potential profit margins in the sell-through market (DVDs cost disc manufacturers roughly 80 cents to produce each disc compared to $2.20 per VHS). Additionally, the optical discs could be produced with minimal modifications to existing CD manufacturing technology.

The installed manufacturing infrastructure and the potential ease of efficient and inexpensive manufacturing would be undercut if competing, incompatible formats went to market. The two camps seemed poised to engage in a format war similar to the aforementioned Beta/VHS battle of the early 1980s. However, at the end of April 1995, five computer companies, Apple, Compaq, HP, IBM, and Microsoft, weighed in to urge the technology developers to come to an agreement on a single format for both computers and home video entertainment.[38] Based on the techno-industrial history of the CD and the CD-ROM, technology developers knew that without the support of the computer industry any technology they developed for digital discs would fail in the marketplace. Still, the two camps, SD and MMCD, refused to cooperate, citing "liberalism and democracy" and the desire to offer options to interested consumers.[39] On August 14, 1995, the technical working group from the computer industry recommended adoption of

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[36] The single sided, single layer, five-gigabyte disc is capable of storing a 135-minute film with Dolby AC-3 audio, three languages, four subtitled languages, multiple aspect ratios, parental lockout, and backward capability with CDs.

[37] "DVD camps remain split at REPLItech" by Paul Verna, Billboard, 7/1/1995.

[38] Additional recommendations included a common file system for computers and video entertainment, backward compatibility with existing CDs and CD-ROMs, forward compatibility with future writable and readable discs, costs similar to the CD media, no mandatory caddy or cartridge, and data reliability equal to or better than CD-ROM.

[39] Taylor, Jim. (2001) DVD Demystified, p. 49.

the Universal Disc Format (UDF), supported by the SD alliance. The UDF format would ensure a universal interface and file structure that guaranteed the DVD-ROM would be able to interact with all computer operating systems. This is a crucial point; without a standard infrastructure in place, DVD technology could not expect widespread support from the computer industry or default installment of DVD-ROM drives on home computers. Sony and Philips quickly demurred, saving face through a compromised format agreed upon by all members.

After eight months of haggling between interested parties, the collectives agreed on December 12, 1995, on a unified standard for hardware and software that would cover the DVD-ROM format and video standards, taking into account the recommendations made by the computer and movie industries.[40] In an unprecedented cooperative agreement, ten companies-- Hitachi, Matsushita, Mitsubishi, Philips, Pioneer, Sony, Thomson, Time Warner, Toshiba and Victor Company of Japan, Ltd. -- joined into a consortium whose principal aim was "exchanging and disseminating ideas and information about the DVD format and its technical capabilities, improvements and innovations."[41] These ten firms forged ahead with the hopes of delivering hardware and software into retail outlets as fast as possible.[42] Because compromise was needed to establish the standard, the resulting technical specifications reflect elements from each camp. The MMCD group favored a single-sided/dual-layer disc, while the SD group preferred a double sided disc. Toshiba and Time Warner insisted on a double-sided

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[40] "DVD standard raises new issues" by Eileen Fitzpatrick, Billboard, 9/30/1995.
[41] www.dvdforum.org/about-mission.htm

option, so the standard was established that all discs would have two 0.6 mm substrates. The final specification would have two layers bonded together, even though only one layer contains data.

Sony and Philips, heading the now defunct MMCD group, complained that manufacturing costs for bonding would be prohibitive; Toshiba and Time Warner, drawing on lessons learned from laserdisc technology, countered that the technology had developed to a point of mass production feasibility. The final format settled on for DVD-Video was a two-sided five-inch optical disc capable of holding a total of 18.8 gigabytes, or the equivalent of two two-hour features per side. Ultimately, the standards were met and agreed upon by all parties in 1994, only to have multiple formats developed within the guidelines of the standard (see figure 2.2 below). By employing a standard for DVD-Video, the consortium guaranteed that Hollywood would not have reservations about competing formats and thus would support the technology by releasing large quantities of titles. Furthermore, the involvement of content providers Time Warner, MGM/UA, and MCA in the technological development and standardization process virtually guaranteed that Hollywood's support would be forthcoming.

Support from content providers proved more difficult to garner than expected due to concerns over copyright protection. Clouding matters further was the competing interests of the varying industries. DVD-Video was designed for the playback of pre-recorded content on stand-alone consoles and on home computers; it was imperative that the technology be protected from potential pirates wishing to profit from copied versions

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[42] Everything You Ever Wanted to Know about DVD, Jim Taylor, p. 179.

of Hollywood content. The computer industry, however, desired a format based in interactivity that would allow consumers to burn and re-burn content onto discs for data storage. In a joint conference held in October of 1995, the Interactive Multimedia Association (IMA) and the Laser Disc Association (LDA), drawing on years of experience in manufacturing and marketing CD and laserdisc technologies, concluded that the new technology needed "functional interactivity" in order to galvanize interest in the international marketplace.[43] Superior audio and video quality was thought to be insufficient for the new standard. The group's recommendations were based on a minimum level of interactivity that would include internet connectivity, random access functionality, and the capability for functional menu buttons that would lead to different content areas for both DVD-Video and DVD-ROM. The level of interactivity supported by the formats would ultimately be tied to the flexibility of the technological standard. Because the agreed upon format could be developed and tweaked to suit the needs of potential consumers, the companies involved in the process could work together to develop compatible secondary technologies if they so desired. While the DVD-Video standard would be "read-only," or "playback only," and would temporarily quell copyright concerns from content providers, the computer industry desired flexible "writable" and "rewritable" discs for data storage. The solution would be DVD-R and DVD-RAM, two writable disc formats that would interface with DVD-ROM drives but that would not function as recordable technologies on consoles connected to televisions.

[43] Taylor, Jim. (2001). Pp. 50.

However, the prospect of computer drives capable of copying movies onto computers was cause for concern for Hollywood.

Figure 2.2: DVD Physical Formats

DVD format	Capacity (120-mm disc)	Capacity (80-mm disc)
DVD-ROM: one side, one layer	4.7 GB	1.4 GB
DVD-ROM: one side, two layers	8.5 GB	2.6 GB
DVD-ROM: two sides, one layer	9.4 GB	2.9 GB
DVD-ROM: two sides, two layers	17 GB	5.3 GB
DVD-R: one side, one layer	3.9 GB	1.2 GB
DVD-R: two sides, one layer	7.8 GB	2.4 GB
DVD-RAM: one side, one layer	2.6 GB	0.7 GB
DVD-RAM: two sides, one layer	5.2 GB	1.5 GB

Within a month of the December 1995 announcement of a unified technology standard, companies began announcing plans for hardware release. Philips claimed that their player would be available by late 1996; Thomson targeted summer 1996; most other companies aimed for a fall release date. Hollywood was still not satisfied. Without a copyright plan in place, through legislation or technology, or both, support from the studios would not be forthcoming. For three months, the major Hollywood production companies and distributors, through the Motion Picture Association of America (MPAA), cajoled the consortium to develop and implement copyright technology. Recognizing that the Macrovision protection technology employed by VHS was insufficient for digital content protection, the MPAA sought a new technological answer. On March 29, 1996, the MPAA and the Consumer Electronics Manufacturers Association (CEMA) announced their intention to seek legislation that would protect their intellectual property.

Hoping to include their proposal in the Digital Recording Act of 1996 (discussed in detail in chapter five), the two industries recommended that Congress enact legislation that would dictate hardware and software systems to prevent copying of movies onto computers. However, the recommendation came without the support of the computer industry, whose Information Technology Industry Council (ITI) balked at the mandatory standards. The Council announced it would have a counterproposal for an April 29 meeting. That meeting came and went without an agreement or a copyright technology in place. A June 3 meeting between the newly formed Copyright Protection Technical Working Group (an inclusive collection of members from all three branches of the Consortium) and the rest of the Consortium resulted in a moratorium on Copyright legislation proposals. By June 25, the ten founding members of the Consortium agreed to integrate copy protection circuits into their players, including a regional management system that would divide the world into segments, allowing for tiered global distribution of content. It wasn't until October 29, 1996, however, that the final copy protection mechanism was in place, clearing the way for product launch.

Developed by Matsushita and Toshiba, the Copy Scramble System (CSS) promised to protect digital content by matching encryption codes on discs to decoding systems in players. One of the first instances of Digital Rights Management technologies (DRM; covered in chapter five), the CSS system allayed the fears of Hollywood by matching digital protection technologies between discs and players. Thought to be unbreakable, CSS combined with analog protection systems like Macrovision to protect content from "casual copying." The system basically works like cable channel

scrambling technology. Through the encryption process, data is moved around, jumbled without degrading the signal. The decryption technology shifts the data back into place, restructuring the fragments into a unified whole. If an encoded disc is duplicated, the copy would not contain the encryptions; if the copied disc or data were then played on a console, the reader would not recognize the data and the disc would be unplayable. Because the system was developed with 400 keys available, it was thought to be sufficiently flexible to guarantee its long-term viability as an anti-piracy technology.

With the final technical standard in place, discs and players could be produced for the mass market. The technological foundation was set. By drawing upon developments in CD manufacturing, including laser technologies, data compression technology, and laserdisc manufacturing, including bonding techniques for manufacturing layered discs, the development of DVD technology went from concept to market. By pooling resources, consumer electronics firms divided the costs incurred for product development. Initially divided into competing factions that reflected long-standing animosities between Japanese, American, and Taiwanese companies, an agreement was brokered by the increasingly powerful computer industry. In an unprecedented cooperative gesture, ten of the leading global technology firms joined together to share resources and develop a unified standard. Once the technology was in place, these firms conceded that the support of content providers was necessary for a successful product launch. Again, working together to develop a totally new digital encryption technology, Matsushita and Toshiba delivered the solution that cleared the final technical obstacle to mass marketability. The process was protracted and

complicated; because the new technology involved both the development of discs, copyright technology, and players, and was inclusive of interests in the computer industry, the consumer electronics industry, and the motion picture industry, cooperation and competition defined product development. The desire to control patents for the new technology encouraged the involvement of every major technology provider in the world. However, the potential for windfall profits from patents were not the only motivating factor in the development of DVD technology.

The foregoing discussion has focused, by and large, on the processes of technological innovation in establishing business and economic structures in the home video market. While this technological approach sheds light on the historical changes and continuities leading to the development of a new technology, it remains only one of many possible methodologies available to explore the subject. The full story of the home video market and the unprecedented successful diffusion of DVD needs to account for additional forces impacting technological development and diffusion. Before returning to the activities and structure of the DVD Forum that led to an industry-wide DVD standard, examination of each core industry reveals the unique processes encouraging their convergence. With this in mind, I now turn to the broader industrial contexts surrounding the development and commercialization of home video technologies. The next chapter accounts for the economic and structural organization of the consumer electronics, computing, and film industries in an effort to further explicate the motivations behind the cooperative practices that led DVD to the marketplace.

Chapter Three: Producing DVD: Industrial Contexts

So far we have examined how DVD was developed and introduced, propelled by existing home video and digital disc technologies. DVD was conceptualized as both a technology and a commodity by corporations in the consumer electronics, computer, and film/home video industries. DVD's industrial significance, however, extends well beyond its antecedents in home video and computing technologies. DVD grew out of existing industrial conditions in the filmed entertainment, consumer electronics, and computing industries. Each of these industries, over the course of the home video era prior to DVD, integrated new business strategies to expand into global markets. New technologies were innovated through research and design collectives. The promise of DVD as a new revenue stream brought together these three once-distinct industries who agreed to structure and conduct themselves in particular ways, resulting in a new kind of industry defined by unprecedented convergence and cooperation.

Rather than developing within an individual corporation and being subject to the distinctive practices and ways of operating within that corporate culture of production, DVD development and commercialization contributed to the formation of an industrial culture of production. Each of these industries altered existing practices to participate in the process of DVD standardization. Individual members adapted to the newly formed industry, integrating cooperative processes of production with their individual corporate cultures. The conditions under which this "industry-think" and "industry-practice" became widespread reflect the collective values, beliefs, and patterns of working of

member organizations and the industry at large.[44] Each of the constituent industries drew upon their disparate experiences in technology development and integration during the home video era prior to DVD to adapt to the newly formed industrial culture.

The unprecedented cooperation between traditional rivals in the consumer electronics industry, as well as the involvement of computer and film industry corporations in creating an industrial culture did not develop in a vacuum. In fact, the processes of production that would eventually be categorized as "cooperative" and "efficient" by participating corporations and industrial associations developed within the existing industrial contexts for the three industries. The formation of an industrial culture of production was directly tied to the respective motivating factors that led to the involvement of these corporations. Conditions in each industry contributed to the decision to become involved in DVD development. Beyond the key motivation for new revenue streams, each industry had its own rationale for changing and/or supplementing the existing industrial conditions in the mid to late 1990s. Moreover, each industry drew upon long histories of technological innovation and adoption to rationalize DVD's potential.

In a continuing effort to elucidate the various contexts into which DVD was introduced, this chapter argues that favorable conditions within industrial sectors contributed to the successful diffusion of DVD technology. It is the combination of favorable conditions in a variety of contexts, including technological, cultural, industrial,

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[44] Du Gay, Paul, and Stuart Hall, et al. 1997. *Doing Cultural Studies: The Story of the Sony Walkman.* London: The Open University, Sage Publications, Pp. 43.

regulatory, and economic that result in DVD becoming the most successful consumer electronics product in history. DVD technology stimulated cross industrial cooperation and led to the development of an industrial culture that set clear standards for conduct by member firms. A new industry formed around DVD, existing alongside the pre-existing core businesses of industry constituents. Member firms continued to be actively engaged in their "home" industries while participating in the newly formed DVD ancillary industry. The participatory nature of this new industry developed from existing, intra-industrial cooperative traditions within each segment during the home video era. The nature and degree of cross-industrial participation and cooperation pertaining to DVD distinguishes DVD industrial culture from the hermetic cooperative culture of each industry.

Before analyzing the formation of a DVD industrial culture of production and the structuring of a newly formed ancillary industry, it is necessary to explore and examine these conditions in each related industry prior to DVD to explain the processes leading to participation in the DVD industry. This chapter is therefore divided into four sections. The first section focuses on the consumer electronics (CE) industry during the home video era prior to DVD development and diffusion. The consumer electronics industry in the period leading to the commercialization of DVD was marked by geographic and political industrial divides, globalization, and home video technologies. Deeply rooted conflict, suspicion, and animosity between Japanese, Korean, Taiwanese, American, and European corporations defined the industry throughout the 1970s, 1980s, and 1990s. Economic downturns and poor industrial performance offset the successes of new

technologies, resulting in periods of market stagnation and heightened competition. Price slashing and tightened profit margins encouraged shared development of research and development costs. Analysis of the structure, conduct, and performance of the industry will demonstrate that a favorable environment and enthusiasm for new hardware markets existed prior to product development and launch. The second section explores industrial conditions in Hollywood in the 1980s and 1990s, identifying the industrial structure, conduct, and performance prior to DVD. This analysis will examine trends in the industry, including the prevailing attitudes towards new technologies generally and digital technologies specifically. The increasing prominence (if not dominance) of home video to the profitability of media conglomerates will demonstrate the potential significance of DVD to the existing industry. The third section shifts to explore the computing industries prior to DVD development and diffusion. Like section one, analysis focuses on the structure, conduct, and performance and key trends, including prevailing industrial attitudes towards new digital technologies. We will see how economic downturns and industrial shifts in the late 1980s and early 1990s combined with unstable conditions in U.S. computer manufacturing sectors, resulting in a favorable environment for a new optical storage technology.

The final section of this chapter charts the formation of the DVD ancillary industry, which brought together members from three historically divided industries into an integrated operation involving audio-visual digital content delivery in hardware and software manufacturing and distribution. Drawing upon both their unique corporate cultures and the burgeoning industrial culture of production, these firms behaved

according to both corporate/individual and industrial/collective desires. Throughout this chapter analysis will demonstrate how a variety of conditions, attitudes, and behaviors related to new technology development and commercialization paved the way for DVD development and diffusion.

THE CONSUMER ELECTRONICS INDUSTRY IN THE HOME VIDEO ERA

Throughout the 1970s and 1980s, Japanese corporations acquired smaller American manufacturers and invested large sums of capital in U.S. manufacturing plants. Revenues generated from home video technologies were reinvested into infrastructure and global expansion. The enormous success of the VCR and the continuing profitability of televisions and radios assured continuing profitability throughout the 1970s, 1980s, and 1990s. Radio and television sets dominated the global market for consumer electronics through the late 1970s, when home video technologies stimulated a wave of globalization that would be the undoing of the American manufacturing sector. Throughout the 1970s and 1980s, Japanese consumer electronics manufacturers expanded their product lines, adding to their diversification in manufacturing and commercialization. These firms grew exponentially through research and development initiatives supported by government.

The 1980s consumer electronics industry was defined by explosive growth in new products, improvements of existing products, and a shift in the leading market sectors. Digitization, mobilization, and miniaturization were key aspects of new product development and introduction in the decade. New leisure time technologies like the VCR, the Sony Walkman, and video game consoles expanded the functionality and

interactivity of the technological base of the industry, television and radio, through new ancillary technologies based in "plug and play" compatible hardware. Video games, digital music technologies, and home video re-oriented the industry by creating new revenue streams and shifting the locus of power away from American firms to Japanese electronics giants. Globalization became a key industrial strategy throughout the 1980s and 1990s, as Japanese and American corporations exploited labor pools in the Pacific region and continued to develop subsidiaries in global markets.

New consumer electronics products in the early 1990s set the stage for DVD by successfully incorporating digital technologies into ever-increasingly convergent forms. In fact, the consumer electronics industry was increasingly tied to the computer industry through audio and visual digital technologies designed to interface with the personal computer. Explosive growth in the telecommunications and audio/visual markets expanded the industry; cellular phones, digital televisions, and digital satellite technologies expanded the global influence of Japanese and Asia-Pacific manufacturers. Following a market lull in the early part of the 1990s related to the aforementioned U.S. economic recession, new consumer electronics technologies were successfully commercialized by Japanese firms. These changes were due in large part to a structural shift in the industry related to failed managerial strategies at the Radio Corporation of America (RCA) and the global market position obtained by Sony, Matsushita, and Philips stemming from the commercialization of the compact disc and home video. By the 1990s, only one American corporation, Zenith, had a significant market share. Japanese firms came to dominate the 1990s global market through a combination of managerial

strategies to exploit growing markets, the growth of domestic markets guaranteed by protectionist policies, and through tightly integrating their holdings in manufacturing technologies. Conversely, the remaining American and European consumer electronics corporations remained focused on a singular product, rather than diversified products, and were unable to compete in global markets.

Figure 3.1: U. S. Exports and Imports of Major Consumer Electronics Products, 1965-1990 ($1,000)

	Home Radios		Color Television		Videotape Recorders	
	Exports	Imports	Exports	Imports	Exports	Imports
1965	5,274	125,103				
1970	4,007	305,227	17,755	141,858	16,651	8,779
1975	4,877	374,561	50,012	220,751	44,735	34,931
1980	20,718	486,304	276,983	311,785	76,087	498,333
1985	13,986	609,763	85,806	1,113,770	68,798	4,165,103
1990	35,217	506,777	423,108	1,659,132	N/A	4,223,254

Source: *Inventing the Electronic Century,* appendix 3.1 (from U.S. Bureau of the Census, and Electronic Industry Association)

The American consumer electronics industry, once a global leader in television and radio manufacturing and distribution, was unable to commercialize new products in the 1980s and 1990s. Japanese firms cooperated to innovate new technologies for the consumer market, pooling resources to develop manufacturing and distribution infrastructures. Because the American industry had long been dominated by a single firm, RCA, it lacked the ability to partner with domestic firms in research and

development. Without the creative and logistical resources of the Japanese, RCA failed to compete in the rapidly expanding global consumer electronics market.

The American Consumer Electronics Industry: The Rise and Fall of RCA

Prior to the home video age, RCA (Radio Corporation of America) dominated the global markets for consumer electronics. RCA had partnered with the German company Telefunken to commercialize radio in the United States in the 1920s. RCA went it alone in commercializing black and white television in the 1930s and color television in the 1950s. Unlike CBS, which was formed as an independent programming enterprise, NBC came into existence as the subsidiary of an electronics manufacturer, RCA, which saw programming as a form of marketing, an enticement to purchase radio and television receivers for the home. The power and influence of a national network aided RCA as it lobbied to see its technology adopted as the industry standard. RCA controlled patents for radio and television technologies, licensing their technologies to manufacturers around the world. Essentially, RCA functioned as a patent monopoly throughout the 1920s and 1930s, restricting entry into the manufacturing sector of potential competitors in the domestic radio market. As a result, RCA dominated the U.S. market for consumer electronics; by licensing patents for radio production to General Electric and Westinghouse, RCA could not develop integrated development plans to take new products from concept to market (Chandler 2001, p. 48). RCA did expand its production and research bases with television technology in the 1940s, but because they separated their research facilities from their operating division, they were unable to fully integrate divisions for commercializing new technologies. After the war, two Japanese companies,

Matsushita and Sony, along with the Dutch company Philips had moved into global markets with their own electronics products based on RCA patents. Philips had obtained a 40% stake in Matsushita in exchange for sharing technical knowledge in design and manufacturing. RCA attempted to keep up with their foreign competitors by developing a new strategy for growth.

RCA's decline and eventual demise was a direct result of two key managerial decisions related to this search: conglomeration and investment in computing technologies (Sobel 1986). During the war, RCA had expanded production of electrical components for governmental contracts, teaming with GE and Bendix to build radar and communications facilities. The resulting profits provided the stimulus for expansion into unrelated (to the core business) manufacturing. After the war, with governmental contracts ebbing, David Sarnoff and his son Robert shifted research and development funding away from consumer electronics towards electronic data processing in the hopes of entering the burgeoning computer market. Their hope was to sink large sums into research and development to compete with the aforementioned IBM 360 System. In so doing, RCA unwittingly ceded control of the consumer electronics industry to their Japanese and, to a lesser extent, European competitors. Additionally, turning RCA into a diversified conglomerate became an effort to find funding sources for the development of computer technologies. Two waves of acquisitions were intended to diversify holdings in order to withstand market fluctuations and offset research funding. The first began in 1966 with the acquisition of Random House, followed shortly thereafter by Arnold Palmer Enterprises, Hertz rental car company, and the Alaska Communications Systems.

The second took hold in 1970 with the acquisition of F.M. Stamper Co. (Banquet Foods), Cushman & Wakefield (New York real estate), Coronet Industries (carpets) and finally Oriel Foods and Morris James Jones, Ltd. in 1974. These acquisitions had increased the company debt from $266.4 million in 1966 to over $973 million by 1970 (Chandler 2001, p. 42). Less than a decade later, RCA had consolidated debt of over 2.6 billion dollars. The computer venture had proved to be a costly failure. Unable to compete with IBM on the international market, RCA lost more than $200 million in the $1.4 billion venture before selling off the computer division to Sperry Rand's UNIVAC division for $250 million in 1971. More importantly, RCA had neglected its consumer electronics division, the core of its profit generators, at a time when its international competitors were investing in their research and development and core technologies.

The rest of the domestic consumer electronics industry was forced to reconcile the effects of conglomeration in a different manner. Because of RCA's historical dominance and control over patents, their domestic counterparts, led by Sylvania and Philco, were specialists, developing and commercializing a particular product. With the corporate zeitgeist firmly engaged with conglomeration strategies, these smaller companies were quickly bought and integrated into conglomerate business structures throughout the 1970s. Philco and Sylvania were victims of neglect through acquisitions by diversifiers. Philco was the nation's second largest producer of radios and television sets, and had a profitable business in producing supercomputers and peripherals for the scientific and governmental markets prior to its acquisition by the Ford Motor Company in 1961. After the acquisition, Ford limited funding for consumer electronics development and split the

company's activities by selling off manufacturing plants, the brand name, and the sales and distribution organization. Sylvania, the nation's second largest producer of electronics components was acquired by General Telephone (eventually GTE), in 1958. GTE reduced research and development funding and shifted focus away from consumer electronics, before selling Sylvania to Philips in 1981. In the process of becoming a conglomeration or becoming a subsidiary of a conglomeration, American consumer electronics firms lost institutional focus and funding. Broad scale institutional support dried up, with the parent company only interested in the profitability of existing products rather than the development of new ones. In 1987 RCA, which had been a subsidiary of General Electric since its founding in 1919, sold its consumer electronics division to the French conglomerate Thomson Multimedia and effectively destroyed the remaining American consumer electronics industry.

The Japanese Consumer Electronics Industry

During the 1960s and 1970s, as RCA struggled in the computing business, the three largest international consumer electronics corporations, Sony, Matsushita, and Philips, along with Sanyo and Sharp, were concentrating on core consumer electronics development and commercialization. Matsushita, since its beginnings in the 1920s, had focused closely on electronics. Sony developed its internal technical capabilities, commercializing new products and enhancing old ones through miniaturization and digitalization. Philips, the only major European competitor in the international marketplace had relied, like Sony, on RCA licenses to develop television technologies and sustained its focus on the core businesses of electronics products for consumers.

However, because Philips was the sole power in that region, it was limited in its opportunities to pursue collaborative research and product development. Eventually, it partnered with Matsushita and, beginning in the mid-1970s, with Sony to develop and commercialize new products. The Japanese firms created what Chandler (2001) calls a "supporting nexus" of suppliers of materials and services—that is, a group of secondary companies that had become major industry players themselves by the 1980s. These included Pioneer Electronic, TDK Electronics, Kyocera, and computer manufacturers like Hitachi, Mitsubishi Electric, and Nippon Electric Company (NEC), all of which had research and/or manufacturing plants in Japan. This group, as was mentioned in the previous section, engaged in cooperative endeavors to share technologies and research findings. The supporting network could also assist in the supply of constituent parts for entirely new technologies, or components for the improvement of existing technologies. Again, the strength of the Japanese domestic market in the 1980s for consumer electronics contributed to the success of the nexus. Because tariffs were in place and the computer industry had developed a strong supportive base of domestic consumers, there was little competition and a virtually guaranteed market for new electronics. For instance, the video game industry, which emerged in the 1970s in America with Atari, was soon dominated by Nintendo, Sega, and Sony during the 1980s. These Japanese firms exploited the pool of resources and strong domestic marketplace to dominate an industry sector.

The 1990s consumer electronics industry was dominated by Japanese manufacturing corporations. Their market share throughout the decade was determined,

to a large degree, by their organizational structure and managerial philosophies. Generally, these firms operated according to one of two strategies: either they developed internal technical operations to innovate, design, and commercialize new technologies, or they partnered with specialized corporations to divide the production, distribution, and marketing of new technologies between firms. These two strategies were most clearly demonstrated through the introduction of home video technology in the 1970s and 1980s. That involved competition between Sony, whose managerial strategy was to create and innovate new technologies internally, and Matsushita/JVC which employed an Original Equipment Manufacturer (OEM) strategy that relied on a network, or "nexus," of participating firms to increase economies of scale in marketing and production. The difference between developing proprietary technologies and "open" technologies that incorporated the collective resources of multiple firms would significantly impact the structure and performance of the industry in the 1990s, leading to the development and diffusion of DVD. The former strategy, employed by not only Sony but also RCA and Philips, represented an effort to maintain control over new technology and the lion's share of profits. The latter strategy, as demonstrated by IBM's success in the computer market with "plug compatible" platforms, and by Microsoft's and Intel's licensing of technologies to manufacturers, was based on maintaining dominance in the marketplace through volume, and exploiting economies of scale to reduce prices.

An excellent example of these different strategies was the VCR market in the 1970s, when four competing formats were developed and introduced: Sony's Betamax, Matsushita/JVC's VHS, Philips's V-2000 tape system, and RCA's VideoDisc. Of the

four, only Matsushita's VHS technology developed through a collective organization of manufacturing and distribution partners. RCA's proprietary strategy was based on the hope of re-establishing market share through new technologies. RCA was competing with Philips, which was in the process of developing their own video disc format, and hoped to introduce the system to the public before the tape-based systems could establish dominant market share. However, RCA's technology was not ready for market in 1976, after Betamax and VHS had introduced their competing tape-based technologies. Edward Griffiths, then CEO of RCA, devised a compromise that entailed negotiation with Matsushita for licensing tape-based technology to distribute under RCA's brand (Chandler 2001, p. 60). Because RCA had not developed their own tape technology, instead sinking millions into the disc technology, they were forced into a distributor role if they hoped to profit from the initial market surge in the VCR business. By supporting Matsushita's VHS, RCA played a large role in deciding the format battle between the two Japanese giants. By competing with Philips, who was employing a similar proprietary strategy for development of disc technology, RCA was attempting to re-establish its corporate identity while creating a barrier to entry in its domestic market for Japanese firms. Philips's strategy for the video disc was similar; by cornering the European video market, they hoped to re-establish their corporate identity as a technological innovator while restricting the growth of their Japanese counterparts. Philips, however, still held 35 percent equity in Matsushita and was profiting from the booming international success of the VHS. Due to delays in the development process with Philips's disc and without a global distribution network for their V-2000 technology, they abandoned the

development of the disc and the V-2000 in 1983, licensing Matsushita technology for distribution under their corporate brands. A year later, RCA shut down its videodisc project, losing more than $500 million after selling only 550,000 units (Graham 1986).

The consumer electronics industry's reliance on collective organization and strategic alliances to exploit new technologies in competitive market situations was well evidenced in the successful diffusion of VHS. Six Japanese companies and one Japanese-owned American company produced, distributed, and marketed the VHS: Matsushita, JVC, Sharp, Tokyo Sanyo, Hitachi, Mitsubishi Electric, and Quasar. Sony's foray into home video through its Betamax technology demonstrated that without supportive networks between manufacturers, distributors, and marketers, successful commercialization of new technologies in a highly competitive market was difficult. Sony did eventually employ this strategy in the early 1980s, enlisting Sanyo (a sister company to Tokyo Sanyo), Toshiba, and NEC to volume produce the Betamax, with Zenith, Sears, Pioneer, Aiwa, Fisher, Rank, General, and Knekerman licensed to sell the technology. By this time, however, Matsushita had established a supportive infrastructure that resulted in nearly twice the number of models licensed by Sony at far reduced prices (Cusumano, Mylonadis, and Rosenbloom 1992). The early success of its VHS technology enabled Matsushita to invest in manufacturing infrastructure, increasing automation and reducing the number of parts required. As a result, Matsushita reduced the cost of manufacturing and the cost of the technology for consumers, winning large contracts to supply distributors with VHS through the OEM arrangements.

The implications and full effects of Matsushita's VHS strategy were enormous. First, Matsushita set the standard for videocassettes in all global markets through their transnational partnerships. Second, Matsushita's dominance produced barriers to entry in the market, reducing the possibility of a new competing product. Third, the strategy encouraged Japanese computer makers (like Hitachi, Mitsubishi Electric, and Toshiba) to expand their burgeoning investments in manufacturing and distributing consumer electronics. Fourth, the OEM strategy solidified the Japanese domination of American and European consumer electronics markets. Fifth, the cooperative strategy set the stage for further industrial growth strategies in the 1980s and 1990s, while demonstrating the need for collective development and unification in commercializing the next-generation home video technology.

Lessons Learned: Innovating DVD

These lessons learned during the VHS/Betamax product commercialization influenced the industrial conduct and performance throughout the 1980s and into the 1990s prior to the introduction of DVD. Matsushita expanded its production of communications and consumer electronics products throughout this period, while steadily expanding their global development, distribution, and marketing efforts. Rather than developing new technologies internally, they exploited existing technologies, improving them for a variety of markets. Just as Matsushita had relied on Sony's technical innovation of the U-Matic (as discussed in chapter one) to develop its VHS system, the company later exploited existing technologies to move into the production and distribution of pagers, cordless telephones, fax machines, copiers, and computer products.

Meanwhile, Sony continued to innovate and develop its core technical capabilities. Their relative failure in the home video market was offset by the success of the Betamax in industrial markets and the overwhelming successes of 1979's Sony Walkman and 1982's CD player. As a number of commentators have pointed out, Sony's unique ability to innovate and commercialize new electronics products stems from a corporate culture that combines American and Japanese industrial cultures while integrating changes into flexible business models (Nathan 2001; Luh 2003; Asakura 2000; Kunkel 1999; Hays 1999; and Morita, Reingold, and Shimomura 1988). Sony learned from its early mistakes with Betamax, incorporating international partners for the commercialization of new products from the late 1980s through the 1990s.

The CD's technological development, as discussed in chapter two, combined with laserdisc technology and developments in lasers and substrate manufacturing to make DVD technology possible. Additionally, Sony's competition with Matsushita in the home video market produced industrial knowledge that was then integrated into the commercialization strategy employed with the CD. Sony established licensing and manufacturing agreements with a number of Japanese partners, and built CD manufacturing plants in the United States and Austria to ensure dominance in those crucial markets. Rather than employing the OEM strategy, Sony established a patent pooling structure that allowed tighter technical control over their product (Chandler 2001, p. 65). Additionally, Sony partnered with Philips, with whom it had partnered in its Betamax campaign, to develop and market its CD technology. In the wake of Matsushita's success in the home video market, Sony and Philips were both seeking

alternative investments in the consumer electronics industry. As a result, the tandem worked cooperatively to develop CD technology, quickly expanding the core business to include manufacturing CD-ROM hardware for the computer industry. The success of the CD provided enormous profits for Sony and Philips. Philips invested these revenues into the development of the aforementioned CD-i as a counterpart to CD-ROM technology, designed to deliver video through consoles attached to television sets. The failure of this technology in the early 1990s, which cost Phillips more than $1 billion, was a direct result of a lack of broad-scale support from corporations in developing supplemental technologies. The effect of this misstep was Philips's complete dependence on partnerships with Japanese corporations for future commercialization of new technologies. Sony's strategy was to expand their innovation and development operations by moving into the computer industry. In 1985, Sony purchased Apple's hard disk drive operations and began an unsuccessful initial venture into personal computing.[45] Additionally, Sony invested revenues from the CD into the entertainment business. After successfully partnering with CBS records in 1988, Sony channeled their CD profits into the aforementioned acquisition of Columbia Pictures in 1989.

Matsushita followed suit in 1990 by also acquiring a feature film production company to synergize their hardware manufacturing with software. While this strategy resulted in varying degrees of success for the two Japanese companies, it served an important function in the development of future corporate growth strategies. Matsushita,

[45] Sony would pull out of the computer business in 1991 after failing to successfully challenge the dominant PC makers, only to return with more success in 1997 through a line of laptop computers.

through its attempts to profit from the purchase of MCA, learned that their strategy for growth should remain centered around exploiting the supporting network of regional consumer electronics and other closely related electronics technologies. By focusing resources on the improvement, distribution, and marketing of technologies, Matsushita could be assured of continuing growth. Sony doggedly maintained its entertainment interests after Matsushita had left the sector, enjoying consistent profits from its music business but not becoming consistently profitable in the filmed entertainment sector until after they acquired MGM in 2004. Sony continued to innovate and commercialize new consumer electronics products, including the highly successful PlayStation videogame console in 1993. By 1998, the PlayStation led this industry sector, with more than 50 million units sold. Thus despite Sony's failure in the home video battle, the company's subsequent pursuit of new consumer electronics technologies and software/content production, as well as the ability to channel revenues from hardware successes into new ventures, allowed it to maintain a dynamic and fluid corporate business philosophy.

The industrial context in the consumer electronics sectors during the 1990s set the stage for the introduction and diffusion of DVD. American consumer electronics companies had all but disappeared by the dawn of the decade, with Japanese conglomerates dominating the global market. Through supportive networks and collective organizations, these firms collaborated on product development, distribution, and marketing. Globalization and digitalization were key industrial themes throughout the decade. The format battle over home video solidified the dominance of the two leading consumer electronics firms, Sony and Matsushita. Sony, because of its failure in

the home video market invested in developing and commercializing the CD with their European partner, Philips. This investment proved to be the first step in the product development process for DVD; Sony sought a new technology to replace the VHS that would challenge the hegemony of their rival Matsushita. Throughout the 1990s, the consumer electronics industry became more closely aligned with the computer industry, as consumer electronics companies like Sony moved into the computer industry while computer companies, like Toshiba, moved into consumer electronics manufacturing, distribution, and marketing. This conflation proved to be a key enabling condition for the development of DVD. The consumer electronics and computer manufacturers cooperated to develop an interactive technology that would serve dual purposes in delivering content via the television and the computer. Only through partnerships and pooling of resources (and patents) could the development and commercialization of DVD be realized.

THE FILMED ENTERTAINMENT INDUSTRY IN THE HOME VIDEO ERA

The filmed entertainment industry in the home video era was defined by increasing globalization, conglomeration, diversification, and digitization. The studios responsible for feature film production were, by the end of the 1990s, centerpieces of global media conglomerates. Increased synergy between divisions within the conglomerate structure maximized profits and expenditures while minimizing risk. Changes in regulatory law, technology, business models, distribution strategies, and increased pressures to produce blockbuster hits were met with remarkable adaptability. Faced with dynamic changes in the marketplace, in politics, and in culture, the film

industry at large continued its production of feature films, including those for television and direct-to-video, at a rate close to that of Hollywood's Golden Age.[46] The feature film remained the centerpiece of a global profit chain. While production budgets continued to increase, profitability was also up due to increased revenues from markets other than theatrical. Global markets expanded, as both theatrical and home video revenues grew in international markets throughout the 1980s. Big budget blockbusters dominated the industry during the home video era, beginning with *Jaws* (Spielberg 1975) and continuing throughout the 1980s and 1990s. Deregulation in media ownership laws initiated under the Reagan administration paved the way for mergers and acquisitions and newly integrated media conglomerates.

Figure 3.2: 1990s Domestic Box Office

Year	Total Gross*	Change	Tickets Sold*	Change	# of Pics	Total Screens	Ticket Price	Ave Cost**
2000	$7.661	+2.9%	1.4208	-3.0%	478	37,396	$5.39	$54.8
1999	$7.448	+7.2%	1.4652	-1.0%	461	36,185	$5.08	$51.5
1998	$6.949	+9.2%	1.4807	+6.7%	509	34,186	$4.69	$52.7
1997	$6.365	+7.7%	1.3877	+3.7%	510	31,640	$4.59	$53.4
1996	$5.911	+7.6%	1.3386	+6.0%	471	29,690	$4.42	$39.8
1995	$5.493	+1.8%	1.2626	-2.3%	411	27,805	$4.35	$36.4
1994	$5.396	+4.7%	1.2917	+3.8%	453	26,586	$4.18	$34.3
1993	$5.154	+5.8%	1.244	+6.0%	462	25,737	$4.14	$29.9
1992	$4.871	+1.4%	1.173	+2.8%	480	25,105	$4.15	$28.9
1991	$4.803	-4.4%	1.140	-4.0%	458	24,570	$4.21	$26.1
1990	$5.021	-0.2%	1.188	-5.9%	410	23,689	$4.23	$26.8

* in billions
** in millions

Source: www.boxofficemojo.com

[46] Including features produced for distribution directly to the home video and cable markets; between 450-

Domestic theatrical attendance also continued its ascent following a brief downturn at the dawn of the 1990s. The total number of screens grew dramatically due to expansion in global markets and overbuilding multiple screen "mega-plexes" in the United States. Domestically, screens rose from just over twenty three and a half thousand in 1990 to more than thirty seven thousand by the end of the decade.[47] The total number of admissions rose from 1.188 billion to 1.42 billion by 2000. As a result, domestic box office revenues jumped from $4.8 billion in 1991 to a record $9.52 billion by 2002. Increasing production costs, including rising above the line salaries, expenditures on digital and computer generated imaging (CGI), and marketing campaigns were offset by rising ticket prices and the long-term profitability guaranteed by distribution on television and home video. Home video revenues assured profitability for theatrically-released feature films; increasingly, theatrical releases served as a "loss leader," for eventual profits in the the home video and television markets. Throughout the decade, the film industry was remarkably healthy and profitable (see figures 3.1 and 3.2).

Industry Structure: Conglomerate Hollywood

In the course of the 1990s, the film industry came to be structured as a tightly controlled and operated oligopoly, as several horizontally and vertically integrated conglomerates controlled the bulk of profits from feature film distribution in all markets. A wave of mergers and acquisitions began in 1984 with the acquisition of Fox Studios by Rupert Murdoch's Newscorp. The trend continued throughout the home video era, with

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500 films were produced a year throughout the decade.

[47] Nielson EDI

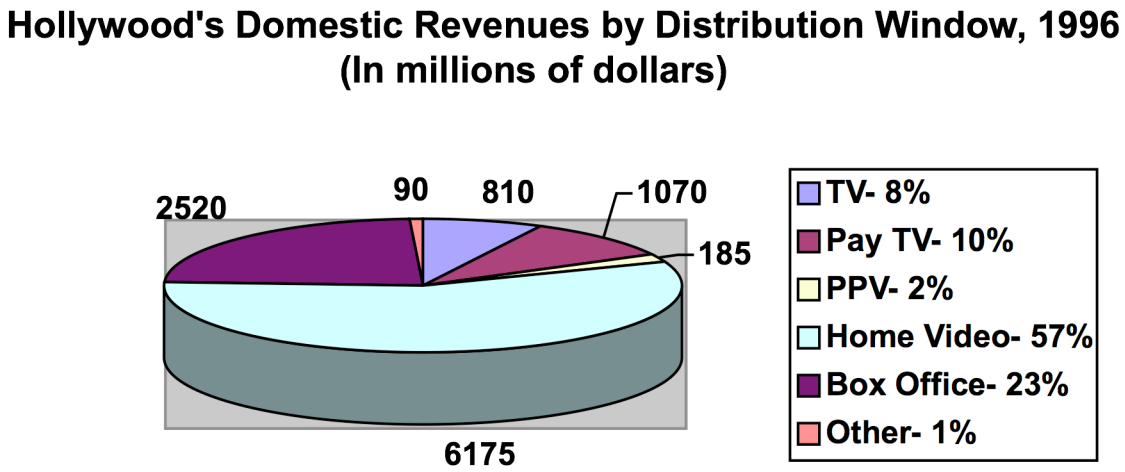
Time Inc.'s acquisition of Warner Communications in 1989 (including Warner Bros. studio), Sony Corp.'s purchase of Columbia Tri-Star in 1989, Matsushita's buyout of MCA/Universal in 1990, Pathe's acquisition of MGM/UA also in 1990, Disney's 1993 purchase of independent film producer/distributor Miramax, and Viacom's acquisition of Paramount and Blockbuster (in separate deals) in 1994. The mid-1990s was marked by more shifts in the industry, with three significant mergers and acquisitions in 1995: Seagram bought MCA/Universal from Matsushita; Disney purchased Cap Cities/ABC; and Time Warner acquired Turner Broadcasting. The millennium featured more mergers involving major studios: in 1999 Viacom bought CBS; 2000 saw two major moves, with AOL merging with Time Warner and Vivendi buying Seagram; in 2003 GE acquired Universal, creating NBC Universal; 2004 marked the purchase of MGM by Sony; and in 2005 Viacom bought DreamWorks.

Each of these major acquisitions or mergers underscores the fact that the film studios in the home video era had become core businesses for multimedia conglomerates. The ability to produce and distribute feature films enabled synergistic exploitation of media holdings in television, music, theme parks, hardware manufacturing, home video, magazines, and other media. Each of the media conglomerates utilized the film studios to brand their corporation through big budget blockbuster films while maximizing profits and controlling the distribution, representation, and exhibition of feature films in all ancillary markets. The acquisition of television networks, both cable and broadcast, demonstrates this consolidation of power and the struggle for control over all profit chains related to "filmed entertainment." Throughout the 1990s, control over visual

media production and distribution shifted from the studios to their conglomerate parent companies. These global media empires developed a ravenous appetite for profitable media companies, with each of the eventual "Big Six" acquiring or creating television and home video divisions at some point in the 90s.

By the beginning of the millennial decade, the wave of mergers and acquisitions had repositioned the major studios as centerpieces of global media companies, with feature films driving profits throughout the corporate chain. This acquisition and creation strategy also demonstrates an effective response to competition. When companies other than the studios and their conglomerates were profiting in independent film production, distribution, and home video, the conglomerates acquired them or started their own companies to eliminate competition and control all potential profits from their products. Each acquisition, then, offered a means to capitalize on "downstream" profits from the core business of filmed entertainment production and distribution. The consolidation of media interests meant that a single conglomerate could control profits from audio/visual media in all distribution windows, from theatrical, home video, pay-per-view, cable television, and network television. Exploiting changes in U.S. regulatory law, media giants became global entertainment cartels with interests in virtually all mainstream media businesses.

Figure 3.3: Hollywood Revenues



Source: Goldman Sachs Movie Industry Update—1996

Blockbuster Mentalities

While the wave of mergers may suggest instability and volatility in the film business, the reality is that the industry remained remarkably stable and productive throughout the shifts in ownership. The number of films produced continued to grow throughout the decade, as did profits stemming from ancillary distribution outlets such as network, cable, and video-on-demand television, and home video. Theatrical film production was separated in three tiers from three different kinds of producers (Schatz 2006). Blockbusters dominated the industry and accounted for the overwhelming majority of profits.[48] These films featured budgets exceeding $100 million, big stars, digital effects (more on this below) and elaborate advertising and marketing campaigns

and merchandising tie-ins. The second tier included specialty fare produced and distributed by the conglomerates' newly formed or purchased independent subsidiary companies (e.g. Fox Searchlight, Warner Independent Pictures, Sony Pictures Classics, or Disney's Miramax). Budgets were roughly 40% of the average blockbuster with advertising campaigns averaging one third of the cost to market. Independent subsidiaries accounted for the occasional breakout hit in the 90s, and with the marketing support of their parent companies, were able to reach large audiences if they performed well in initial limited release. The third tier was comprised of low-budget specialty, art, and genre films produced by wholly independent production-distribution companies for carefully targeted markets. These films accounted for a large portion of the overall production output during the 1980s and 1990s, surpassing the number of studio releases routinely throughout this period.[49] However, these films account for only a small fraction of the revenues generated by the conglomerates' filmed entertainment divisions. While production of feature films was up throughout the 1990s, and the industry split between the conglomerate producers and the independents, it was clear that the feature film had become the eye of a storm of profits that stimulated concentration of ownership and conglomeration.

This is not to suggest that conglomeration was solely linked to the lure of the blockbuster. Each of the mergers identified above represented a strategic effort to expand the existing structure of the conglomerate to include holdings in a media division other

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[48] 2005 MPA report, pg. 12.
[49] Ibid.

than those already under the corporate umbrella. As we've seen, the impetus behind the acquisitions of Columbia Tri-Star and MCA-Universal by Sony and Matsushita, respectively, marked an effort to synergize hardware with software content. However, these deals also represent institutional strategies outside of the film industry's purview including economic stagnation within the hardware industry. Furthermore, the acquisition of MCA-Universal by Matsushita, Sony's longstanding rival, should be viewed in light of the animosity-laden relationship between the two corporations. Surely Matsushita was not only attempting to follow Sony's lead in developing hardware/software synergies, but was actively and openly competing to keep up with Sony's aggressive global expansion. Similarly, when News Corp. bought 20th Century Fox in 1984 and purchased a number of television outlets nationwide to start the Fox television network, thus establishing a model for 90s conglomeration in the media industries, others were soon to follow. Hence 1994's acquisition of Paramount and Blockbuster by Viacom, a conglomerate with considerable holdings in amusement parks, publishing, cable and international television, represents not only the desire to maximize profits from a division capable of creating blockbusters but a "gap filling" in the conglomerate portfolio. With holdings in virtually every other media available, the film studio was most desirable as a means to an end. That end would seem to be effective control over price discrimination in the distribution of content in all channels, synergy, and economies of scale between divisions. Another example of this "gap filling" tendency would be Disney's buyout of Cap Cities/ABC in 1995. Disney's acquisition of Cap Cities/ABC completed their cross-ownership efforts that already included

Hollywood Pictures, Walt Disney Pictures, Touchstone Pictures, Buena Vista Pictures Distribution, Buena Vista Home Video, The Disney Channel, the Disney theme parks around the world, sports franchises in baseball and hockey, retail stores, Broadway plays, a publishing group, and two music companies. The purchase of a major network was not the only incentive; ESPN Networks was also a part of the deal. ESPN was (and remains) by far the most profitable cable channel in the industry and has affiliated businesses in restaurants, radio, and retail.

Digital Technologies

Digitization has yet to be fully examined as a transformative mechanism for 1990s Hollywood. Digital technology played an important role in the successive waves of mergers and acquisitions that reshaped the industry throughout the 1990s. As seen in chapter two, for instance, Sony experimented with digital disc technologies, pushing the limits of the CD in the hopes of cornering the digital home video market. A new digital platform for delivery of content, which Sony now owned via its acquisition of Columbia-TriStar, would be most profitable if hardware and software could be cross-promoted. Speaking shortly after another major content acquisition (Sony's buyout of MGM in 2004), Howard Stringer, CEO of Sony of America, states: "History will continue to prove that technology innovations, large-capacity data-storage mediums, and higher-speed distribution networks will only boost the value of Sony's digital-content libraries. Whether we distribute our content via CD, DVD, cable, and satellite today, or repurpose it for high-definition displays or wireless distribution tomorrow, our networks, distribution, and devices enable us to financially mine our high-quality libraries for many

years to come."[50] Between 1990 and 1995, the New Hollywood of the 1970s and 80s transformed into "Conglomerate Hollywood," as tightly integrated media giants bought up the content providers/studios in an effort to synergize their various media holdings (Schatz 2006). By the end of the decade "The Big Six" had effectively consolidated their power through strategic acquisitions and perhaps more importantly, by integrating new technologies into their existing business models. Participation in the development and commercialization of DVD through active partnerships with consumer electronics and computing companies redefined Hollywood once again. "Conglomerate Hollywood" became "Convergent Hollywood," as filmed content moved onto computers and became increasingly mobile through digital delivery technologies.

Digitization became a prominent buzz word in Hollywood in the 1990s. Over the course of the decade, digital filmmaking entered the mainstream, digital effects were commonplace within big-budget blockbusters, non-linear digital post-production for audio and visual became the norm, the number of digital projectors was rising dramatically, and at decade's end, home video began its digital transformation with the shift to DVD. As much as any other phenomenon in the 1990s, including the wave of mergers and acquisitions that restructured the industry into tightly integrated media conglomerates, digitization was the lynchpin to profitability and global dominance. Throughout the 1990s, digital effects figured prominently in the string of blockbusters that dominated domestic and international theatrical box office revenues. Beginning in

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[50] Grover, Ronald. "MGM Puts a Content Crown on Sony," *BusinessWeek Online*, September 15, 2004. http://www.businessweek.com/bwdaily/dnflash/sep2004/nf20040915_5425_db011.htm

1991 with *Terminator 2* (James Cameron, TriStar 1991) and concluding with the release of *Star Wars Episode I: The Phantom Menace* (George Lucas, Fox 1999) in May of 1999, *every* year's top grossing domestic film featured digital effects.[51] This fact is further amplified if we examine the role of digital technologies in these films. CGI was not simply a background effect that punctuated a dramatic moment; it became the source of spectacle and the foundation of blockbuster narrative construction. Would audiences have flocked to theaters in the 1990s without the digital effects that made possible the dinosaurs of *Jurassic Park* (Spielberg, Universal 1993), the photo realism accomplished through the all-digital *Toy Story* (Lasseter, Buena Vista 1995), the alien destruction of *Independence Day* (Emmerich, Fox 1996), the spectacular recreation of the sinking of the *Titanic* (Cameron, Paramount 1997) or the invasion of Normandy in *Saving Private Ryan* (Spielberg, DreamWorks 1998)? Without CGI, these films would be hard to imagine.

Digital technology became pervasive in 1990s Hollywood. Digital audio, beginning with Warren Beatty's *Dick Tracy* (Buena Vista 1990), was adopted and employed by hundreds of films throughout the decade. Dolby Stereo Digital (now simply called Dolby Digital) was first featured on the 1992 film *Batman Returns* (Warner Bros. 1992). Introduced to the home theater market as Dolby AC-3 with the 1995 laserdisc release of *Clear and Present Danger* (Paramount Pictures 1994), the format did not become widespread in the consumer market, partly because of extra hardware that was necessary to make use of it, until it was adopted as part of the DVD specification. A series of improvements led to widespread adoption of DTS (Digital Theater Sound)

[51] www.boxofficemojo.com

technology, including *Jurassic Park*, *Independence Day*, *Apollo 13* (1995), and *Twister* (1996). As early as 1992, the first demonstrations of digital cinema proved the viability of the format for image capture as an alternative to celluloid.[52] The Hollywood establishment was slow to recognize that digital sound, image capture, and post-production technologies could enhance the production process while delivering high quality, high fidelity outputs. In keeping with their attitude towards new technologies, the studios slowly integrated digital technology into the production chain in the 1990s. Because digitization in production and post-production offered efficiency and potential and did not present any threat to the existing mode of production, there was less hesitancy from studios to adapt than in the past. Unlike the cases of sound and television technologies, where uncertainties surrounded adaptation and adoption, digitization was not an imminent threat to the profitability of Hollywood. Like widescreen and color technology, digitization in production and post-production should be viewed as an effort to alter filmed entertainment to differentiate product in the marketplace and to compete with other media.

However, digitization in home video technology and distribution meant something altogether different. Because digitization in distribution technologies presented consumers (and potential pirates) with pristine digital versions of content, there was considerable concern for copyright protection. Content owners were understandably reluctant to adopt technologies that might threaten their hegemony and oligopoly. Digital

[52] http://www.tech-notes.tv/Dig-Cine/Digitalcinema.html

distribution technologies, including DVD, required technology that encrypted the material, protecting it from illegal copying and distribution.

Studio executives were not the only proponents for digital technologies in effects, editing, and sound. The Academy quickly lauded the application of the latest digital tools. *Apollo 13*, for instance, was the first picture featuring DTS sound to win the "Best Sound" Academy Award; *The English Patient* (1996) became the first feature with a digitally edited soundtrack to win an Academy Award. More important than awards was the increasingly powerful position of special effects producers and directors throughout the 1990s. George Lucas pushed digital technology further than most of his contemporaries, creating all digital characters in his *Star Wars* prequel, founding Skywalker Sound (a digital sound company), developing digital effects through his Industrial Light & Magic and LucasFilm shingles, and shooting and exhibiting *Star Wars: Episode I* with all-digital technology. By the turn of the century, Lucas' estimated net worth topped $3 billion.[53] Digitalization was not limited to big budget spectaculars, with Lars Von Trier employing digital video cameras for use in his anti-Hollywood "Dogme 95" projects. Furthermore, established directors began employing high quality digital video for image capture, experimenting with the technology to alter traditional narrative construction, including the likes of Spike Lee (*Bamboozled* 2000), Mike Figgis (*Timecode* 2000), and Barbet Schroeder (*Our Lady of the Assassins* 2000). The digital "evolution" spilled over into the advertising and marketing sectors. With the rapid diffusion of computers into homes across the country with access to the digital internet,

online advertising and marketing campaigns became increasingly prevalent. *The Blair Witch Project* (Sanchez and Myrick, Artisan 1999) proved that "viral" internet marketing campaigns could translate into huge box office success. Shot on 16mm and digital video, the film became the most profitable film of all time, grossing $248 million on a budget of $35,000 (plus nearly $20 million in marketing expenses).[54]

The introduction of digital technology into the production, post-production, distribution, and exhibition businesses fundamentally altered the ways in which feature films were made and experienced. Digital technology allowed filmmakers to create, via the computer, more fantastical worlds than was ever possible before. Sound recording and editing became much more precise and nuanced. Editors were able to access scenes and create effects in seconds and minutes, rather than the weeks and months it took in the past. Audiences embraced big budget spectaculars that employed CGI to best effect. With digital technology, the line(s) between fantasy and reality became increasingly blurred, as audiences struggled to identify digital effects as such. However, digital technology did not stimulate significant alternatives to the proven story formulas produced by Hollywood for nearly a hundred years. These genres remained intact; digital technology was integrated into pre-existing narrative structures to heighten affect and produce spectacle. Rather than initiating a whole-scale narrative revolution, digitalization resulted in an incremental and evolutionary shift in narrative, enhancing the firmly established "blockbuster mentality" that had been driving the industry since *Jaws*

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[53] www.imdb.com
[54] www.filmsite.org/90sintro.html

broke box office records in the mid-1970s. Blockbusters within action and fantasy genres utilized CGI to increase the amount of spectacle and action already prevalent in those forms prior to digital technology. Digital technologies did shift the profitability, scale, and volume of these genres. With the aforementioned popularity of *T2*, studios rapidly adopted CGI into their potential blockbusters and produced more successful action and fantasy films during the 1990s than ever before. Even colossal big budget effects failures could not stem the move to digital technology and digital effects; films with enormous effects budgets and disappointing domestic theatrical returns, like *Speed 2: Cruise Control* (DeBont, Fox 1997) and *Waterworld* (Costner, Universal 1995), were profitable even before going to ancillary markets due to profitability in foreign theatrical (Gomery 2000).[55]

Consider 1997 by way of example: of the top twenty grossing films during the calendar year, fourteen can be categorized into the action or fantasy genres. Each of the fourteen employ digital effects, with eleven grossing more than $100 million in domestic theatrical returns alone (see figure 3.4).

[55] Foreign theatrical vs. domestic data for each film can be found on www.boxofficemojo.com.

Figure 3.4: Top Grossing Films, Domestic Markets, released in 1997

Rank	Movie Title	Studio	Total Gross	Genre
1	Titanic	Paramount	$600,788,188	Historical Romance/Action
2	Men in Black	Sony	$250,690,539	Science Fiction/Action
3	The Lost World: Jurassic Park	Universal	$229,086,679	Action/Adventure
4	Liar Liar	Universal	$181,410,615	Comedy
5	Air Force One	Sony	$172,956,409	Action/Adventure
6	As Good as It Gets	Sony	$148,478,011	Comedy
7	Good Will Hunting	Miramax	$138,433,435	Drama
8	Star Wars (Special Ed.)	Fox	$138,257,865	Fantasy/Action Adventure
9	My Best Friend's Wedding	Sony	$127,120,029	Romantic Comedy
10	Tomorrow Never Dies	MGM	$125,304,276	Action/Adventure
11	Face/Off	Paramount	$112,276,146	Action/Adventure
12	Batman and Robin	WB	$107,325,195	Comic Book/Action/Adventure
13	George of the Jungle	Buena Vista	$105,263,257	Children's Fantasy
14	Scream 2	Dimension	$101,363,301	Comedy/Horror
15	Con Air	Buena Vista	$101,117,573	Action/Adventure
16	Contact	WB	$100,920,329	Fantasy
17	Hercules	Buena Vista	$99,112,101	Children's Action
18	Flubber	Buena Vista	$92,977,226	Children's Comedy/Fantasy
19	Conspiracy Theory	WB	$75,982,834	Action/Adventure
20	I Know What You Did Last Summer	Sony	$72,586,134	Horror

Source: www.boxofficemojo.com

What effect digitalization did have on the narrative output of the major studios should be seen as incremental and evolutionary rather than revolutionary. Digital effects meant more spectacle, less dialogue, and oversimplified plot construction. The structure remained the same; narratives were constructed around empathetic protagonists fighting against clearly defined enemies with clear conflicts and well defined goals driving the story forward, as they had been for decades. Around simple universal conflicts digital effects heightened the obstacles, made possible impossible enemies, and made

spectacularly explosive climaxes (and sometimes resolutions) the norm. The result was more internationally marketable fare. Universal themes and universal conflicts convey well, as is evidenced from Hollywood's long standing international domination. Digital effects increased spectacle and propelled international theatrical and home video revenues, as theatergoers and home video patrons eagerly paid for the latest digital creation. Over the course of the 1990s, international box office, driven in large part by the digital effects-driven action/fantasy blockbuster, would routinely surpass domestic theatrical grosses (Balio 1998). Higher returns were offset somewhat by higher production and advertising costs, as teams of digital artists labored to concoct the spectacle required for marketability. Between 1990 and 2000, the average per film negative cost jumped by over 50%, in no small part due to the excessive budgets of blockbusters and their digital effects budgets. The rise in digital effects thusly resulted in higher per film production budgets and more action and fantasy film output, not new genres or new storytelling techniques (see figures 3.3 and 3.4).

Hollywood and Home Video

Digitalization would have its most obvious impact in the home video market. As a replacement technology for the VHS, DVD would alter the existing business model and return greater profits to the conglomerates than ever before. The film industry during the home video era, as we've seen, was being re-structured by conglomeration, globalization, and digitalization. Throughout the 1970s, 80s, and 90s, the rising profitability of ancillary markets also contributed to shifts in the industrial structure. The home video market, prior to the introduction of DVD, was booming. As we saw in chapter two, VHS

sell-through became much more prevalent during the latter half of the 1980s and into the 1990s, as content providers developed more efficient home video technologies and began buying out home video retailers. In the early 1990s, having grown over the course of the 1980s into a multibillion dollar enterprise dominated by national chains like Blockbuster Video, as well as regional chains like Hollywood Entertainment, Movie Gallery, and Video Update, the home video industry was a rental business, relying on content from the film industry. Industry leader Blockbuster had expanded from 17 stores in 1986 to more than 1,000 stores by 1990, buying out its rivals and "franchising" its brand much like fast food retailers (Gomery 2000). Relying on economies of scale and blockbuster theatrical hits, Blockbuster took in more than $400 million in annual revenues at the start of the decade. While these large retailers obtained a national profile through expensive advertising campaigns, the industry remained fragmented throughout the 1990s. The top 50 rental chains accounted for only 49% of the overall revenues in the 1990s; small chains and individual stores accounted for the rest.

The 1990s VHS industry saw explosive growth in the sell-through market, as studios attempted to bypass the First Sale Doctrine by pricing blockbusters and children's films for direct sell-through to consumers. Revenues from VHS purchases rose from $3.6 billion in 1990 to more than $10 billion by 1996 before falling off due to the introduction of DVDs priced for direct sale. By the late 1990s, more new VHS releases were being priced for sell-through, jumping from 44 such titles in 1997 to 63 in 1998.[56] However, this sales strategy did not seem to inhibit the rental market, which remained

relatively flat, and profitable, throughout the decade. Revenues from rental jumped from around $10 billion at the start of the decade to $11 billion by 1992 and remained there throughout the decade (see figure 3.4). Combined with the sell-through market, the VHS home video market accounted for an average of $15 to $18 billion dollars in revenue in the 1990s. Theatrical revenues, also rising throughout this period, crested at around $9 billion dollars at the end of the decade. However, because a revenue sharing model was not in place with rental retailers, the studios were unable to fully capitalize on the $11 billion dollar rental market. This revenue stream easily exceeds domestic theatrical grosses, and positions the video market prior to DVD as the largest single potential revenue source for the media conglomerates. By shifting from a rental to a sell-through model for the new home video technology, not only could the majority of profits be returned to the studio-distributors, but their profit margins would also increase as the price per unit reduced with disc technology. Recognizing the imminent shift in distribution strategy in home video, rental retailers quickly agreed to share rental revenues, returning around 40% after 1998 (versus 0% in the prior era) (Gomery 2000).

With rising production and advertising costs, theatrical exhibition increasingly became a loss leader in the home video era. Theatrical runs established subsequent markets for films, including home video, and television broadcasts. Due to the rental orientation of the home video industry, broadcast, cable, and satellite television represented a lucrative after market. In fact, the overwhelming majority of profits in the 1990s filmed entertainment business came from presentation of Hollywood content on

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[56] VSDA, "An Annual Report on the Home Video Market 1999," pg. 5.

television. Including non-theatrical filmed content and theatrical films on home video, pay-per-view, cable television, and network television in domestic and foreign markets, profits from films on television dominated worldwide theatrical by a staggering margin. Estimates have the difference somewhere in the neighborhood of 85% of total profits coming from films presented on television. Exploiting the feature film in all windows became the defining business strategy of the 1990s media industries; the potential revenues offered from filmed entertainment along a chain of integrated media holdings was a central motivating factor in conglomeration throughout the decade.

Figure 3.5: The 1990s VHS/Home Video Industry

Year	Total VHS Rentals*	Total VHS Rental Spending*	Avg. Tapes Rented Per HH	Total VHS Purchases*	Total VHS Purchase Spending**
1990	4,132.50	$10, 331	3.02	231	$3,629
1991	4,090.90	$10,227	2.84	290.7	$4,317
1992	4,481.20	$11,203	2.88	386.8	$5,543
1993	4,473.60	$11,184	2.92	462.5	$6,591
1994	4,593.90	$11,485	2.92	580.1	$8,423
1995	4,194.80	$10,948	2.84	682.9	$9,738
1996	4,226.10	$11,453	2.84	735.1	$10,409
1997	4,086.50	$11,238	2.8	657.1	$9,278
1998	3,979.50	$11,023	2.72	676.3	$9,658
1999	3,741.20	$11,111	2.61	592.8	$8,145
2000	3,720.20	$11,621	2.65	576.4	$7,620

*millions of units
**millions of dollars

Source: www.alexassoc.com

The film industry in the home video era is best understood within the contexts of digitalization, globalization, and conglomeration. These three trends suggest large-scale

shifts in the business of making movies. However, what they more accurately demonstrate is the concentration of ownership, control, and power, the dynamism and flexibility of media business models and the willingness to incorporate new means and methods of creating content for sale to audiences. Throughout the decade of the 1990s, the major studios maintained between 85 and 94 percent of the domestic box office market share.[57] What this statistic suggests is that even when facing changes in ownership, threats from new technology, increasing pressures to produce hits, and the increasing economic significance of ancillary markets, the top six studios continued to dominate the industry through feature filmmaking. The fact that these shifts and pressures occurred during a period of sustained economic growth reflects the efficiency in the mode of production, the strength of leadership within the film production business, and ongoing stability with labor relations. Maintaining the centrality of the film studio and its product in the corporate pecking order represented an effort to exploit the potential synergies between the blockbuster and other media interests (including cross promotion, merchandizing, licensing, and home video sales). The increased concentration and cooperation between members of the oligopoly also contributed to an atmosphere conducive for industry wide acceptance and participation in new technologies. With complete control over the filmed entertainment landscape, including content for any new technology, the conglomerates were well positioned to deal with any new home video technology.

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[57] Standard and Poor's Industry Survey, "Movies & Home Entertainment," May 20, 1999, pp. 1-2, from www.netadvantage.standardpoor.com

THE COMPUTER INDUSTRY IN THE HOME VIDEO ERA

As in the film and consumer electronics industries, a favorable environment existed in the computer industry that spurred the eventual diffusion of DVD. In fact, the computer industries in the Americas, Europe, and Asia were in an industrial position of need relative to a new optical storage technology. Existing technologies failed to meet the changing needs and developments of content manufacturers and the public. Due to a series of strategic missteps by industry leader IBM, opportunities for industrial and technological development were opened to Japanese firms throughout the 1970s and 1980s. IBM's outsourcing of technological component development and rush to market personal computers decreased its market share and ability to innovate new products. When IBM weighed in during 1995 to solve the format battle over DVD, it did so to compensate for its failure to internally develop drive technologies. Thus the story of the computing industry during the home video era is marked by IBM's rise and fall as the market leader and also by the Japanese response to IBM's travails. Cooperation that would prove to be a crucial strategy in DVD commercialization began as a strategy employed by Japanese computing firms in response to IBM's global dominance. These computing firms emerged from the consumer electronics industry and were able to innovate and commercialize new technologies by virtue of their cooperation with other Japanese firms. As they did so, they set the stage for cross-industrial cooperation that made possible the universal standard specification for DVD.

The computing industry at the time of DVD commercialization was structured around seven specific sub-industries related to hardware equipment and software sectors

that had developed over the course of the 1960s, 1970s, and 1980s.[58] Four computer equipment sub-industries included electronic computers, computer storage devices, computer terminals, and computer peripheral equipment (Miles 1993). The computer software sub-industry consisted of computer programming services, prepackaged software, and computer integrated systems design. Electronic computers included PCs, laptops, and any digital computer of any size. The computer storage industry was based around equipment like magnetic and optical storage drives (like the eventual DVD-ROM), and tape storage devices. Split between the United States and Japan, the industry was defined by trade barriers, cooperation between national governments, academics, and domestic corporations in research initiatives, and economies on the rebound following periods of stagnation. The computer industry during the home video era was structured in this particular manner due to a series of innovations, market developments, regulatory decisions, and industrial shifts occurring from the foundation of the industry in the 1950s through the end of the 1980s. Over the course of that relatively short historical period, one corporation influenced the international computer industry more than any other: IBM.

Creating Computers: IBM

IBM established the industry in the 1950s by demonstrating the viability of electronics technology integrated with existing punch-card tabulators (Chandler 2001). After successfully introducing the 650 mainframe computer and attaining an 80 percent

[58] Appendix 3.1 lists the leading firms and their market share in the 1990s in these seven core industrial sectors.

share of the world computer market in the 1960s, IBM channeled profits into development and research of the System 360 line of compatible mainframe computers for industrial use. This led to a threefold impact on the industry. First, the introduction of the System 360 and its successor the System 370 spurred the creation of a supporting network of "plug-compatible" components and software produced by both existing businesses and entrepreneurial start-ups. Second, the migration of the System 360 to Japan with designer Gene Amdahl in September 1970 resulted in the growth of the Japanese domestic computer market and, due to failures by European firms to develop their own plug-compatible products and Japan's ability to supply the European market with mainframe computers, the international competitiveness of Japan's computer sector. And finally, the success of the 360 led to a dominant market position for IBM in mainstream commercial computing, opening market opportunities in supercomputing and minicomputing (Chandler 2001).

The growth of the Japanese computer industry, led by Fujitsu, Toshiba, Hitachi, NEC, and Mitsubishi Electric, was a national cooperative effort to challenge the global dominance of IBM. After World War II, the Japanese computer industry, at the behest of the Ministry of International Trade and Industry (MITI), formed the Japan Electronic Computer Company (JECC) to fund the development and manufacturing of computer products. The JECC was designed to fund research and development within the industry, guaranteeing a market by purchasing the end products and leasing the computers to clients within Japan. Five of the seven members of the group developed partnerships with U.S. based IBM competitors in the hopes of developing the technical knowledge

required to compete on the global stage (Chandler 2001). The JECC was followed by the unsuccessful FONTAC initiative, the Ogata Project, the influential "New Series Project," and the VLSI circuit project, each efforts to develop competitive technology after IBM had introduced a new computer mainframe or peripheral technology to the international market.[59] Each initiative divided development responsibilities between member organizations, with one corporation developing large scale mainframes, another firm handling medium sized and peripheral products, and another handling small computers for machine control and operation. However, it was not until Gene Amdahl defected from IBM to Fujitsu, bringing along his design skills and technical know-how, that the Japanese computer industry became a viable international market force. Arriving in 1971, Amdahl's firm quickly produced competitive mainframes that enabled Japanese firms, working cooperatively, to dominate the European market for large computer systems, to compete successfully in the international mainframe marketplace, and to virtually destroy the U.S. memory chip industry.[60]

The Rise of the Pacific: the Japanese Computer Industry

Through the 1970s, the Japanese computer industry dominated the European and Asian markets. Based largely on patents obtained from U.S. technology developers, the big five Japanese computer makers were the leaders in mainframe production and posed serious threats to American semiconductor developers. By 1984 the Japanese market

[59] The FONTAC Project was an attempt to compete with the IBM 1700 series; the Ogata with the 360 series; and the New Series Project for the 370 series.

share in the semiconductor (memory chip) international market had risen to 92% (Chandler 2001, p. 131). This dominance forced the closing of plants in Silicon Valley for semiconductor manufacturers Advanced Micro Devices (AMD), Intel, and National Semiconductor. The challenge from the Japanese firms in the semiconductor business coincided with the invention and development of microprocessors at the research and development centers for Intel and Texas Instruments. Because American firms reinvested revenues from memory technologies into microprocessor technologies, they were able to reduce the manufacturing costs for, and the power of, the "computers on a chip" that would make the personal computer possible in the 1980s. The research and development initiatives of the Silicon Valley firms and the subsequent shift in business practices by IBM ensured that the market dominance of the Japanese firms would not last. The microprocessor shifted the industrial focus from mainframe computing and the peripheral software, devices, and services for managing large industrial computers to a world of small computers used by individuals in the office on small networks and by the general public in the home. Because IBM had so dominated the domestic market in computing prior to the microprocessor, the number of software and peripheral equipment producers was high. The costs of the equipment needed to produce a computer, given the commercial success of the microprocessor, made it possible for amateur enthusiasts to develop home-made personal computers. Famously, it was the amateur enthusiast-developed and marketed Altair 8800, employing an Intel 8080 chip, which inspired Bill

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[60] For a thorough account of the development of the five core Japanese computer companies from their formation through the 1990s, see Alfred D. Chandler Jr.'s (2001) Inventing the Electronic Century, chapter

Gates and Paul Allen to develop the BASIC programming language that would lead to the founding of Microsoft in 1978.

The decision by the managers of IBM to mass produce the PC for sale to the general public in the late 1970s and early 1980s ensured their continuing dominance in the domestic computing market. Rushing into production after the early successes of Apple, Commodore, and Tandy, IBM shifted from proprietary hardware and software packages to open source, scalable, interactive systems based on Intel chips and Microsoft operating systems. Because IBM benefited from economies of scale and applied the resources of mass production and mass marketing, it set the standard for personal computing in the 1980s. Intel and Microsoft became dominant market forces, and shifted the innovation focus from hardware and semiconductors to microprocessors and software. Barriers to entry dropped. The software industry virtually exploded with gross infusions of capital. By the end of the 1980s, software was the industry's fastest growing sector. The decision to go non-proprietary with PC technology led to innumerable IBM clones employing the same hardware and software combinations under the nomenclature of a variety of international companies. Thousands of software start-ups struggled for market position and profitability. By the end of the 1980s, the industry had matured. IBM, Hewlett-Packard, and Compaq dominated the PC market, with Apple maintaining a smaller market share with its proprietary system. After the decline of the U.S. economy in the early 1990s, the market boomed once more in the mid to late 1990s.

6, "National Competitors."

Entering the 1990s, the computer sector was in the midst of its longest sustained economic downturn in its history. The domestic industry endured four consecutive years of employment loss from 1988 through 1992. Prior to the "dot com" boom of the late 1990s, computer companies around the world restructured their operations in continuing efforts to cut costs and improve efficiency. Hit hard by the economic recession, U.S. computer equipment firms laid off 191,729 workers worldwide between 1988 and early 1992.[61] Globalization began to affect the industry, as cheap off shore labor replaced domestic factories, and plant closing became the norm nationwide. Automation in the manufacturing sector was up, leading to increased efficiency and a reduction of jobs. By the early 1990s, employee reductions had spread from the factories to include researchers, engineers, managers, and marketing executives. Research and development expenditures were down and eating up a significant percentage of total revenues, though still at a staggering $14 billion. However bleak a picture this may present, the global market for computer/information equipment and services had more than doubled between 1984 and 1991. During the same period, the Japanese market share tripled, to 27%. The European market share stood consistent at right around 10%, and relied mostly on Japanese technology and services that were then branded under European corporate nomenclatures. The $290 billion industry was still dominated by American computer companies, whose 62% market share at the dawn of the 90s was growing increasingly tenuous. The Japanese consumer market grew from a relative non-factor in the global market to the second largest in the world over the course of the 1980s. Japanese firms,

[61] 1993 U.S. Department of Commerce annual report. Copyright 2004 Gale Group.

due to governmental trade restrictions on foreign firms, cornered their domestic market and formed strategic alliances at the behest of government and academia. The result was a consistent trade deficit for the U.S. industry throughout the late 1980s and early 1990s. U.S. exports averaged around $26 billion compared to an average $31 billion in imports.

Internet products and services contributed to a significant boom period during the middle 1990s, following "bust" periods for the entire industry in the 1970s and 1980s. The instability of the market belies its overall performance and profitability. Split between U.S., Asia, and Europe, the IT/computer industries are amongst the largest and most profitable in the world. For example, Information Technology (IT) products and services, the core of the computer industry, accounted for nearly 30% of the growth in the U.S. gross domestic product (GDP) between 1994 and 2000.[62] Over the same period of time, IT became the nation's largest exporting industry, accounting for 29% of all U.S. exports. According to the World Information Technology Services Alliance (WITSA), domestic spending on IT products and services jumped by almost 70% from 1992 to 2001. By the turn of the century, the computer industry was generating domestic revenues of over $800 billion, and had the largest per capita spending of any nation in the world.[63]

The Dot Com Boom

At the dawn of the 1990s, while the market for PCs and supporting equipment sagged, the promise of the next new market loomed on the horizon. After workstations

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[62] "The North America IT and High Technology Sectors: A Company and Industry Analysis," Charlotte NC: Mergent, Inc., 2003.

and PCs had infiltrated the business and home markets, network systems developed to connect employees in an organization or researchers in different parts of the country. The Department of Defense's Advanced Research Project Agency (ARPA) demonstrated that computers could communicate through the telephone system using minicomputers and mainframes in the early 1970s. By the end of the decade over a hundred institutions across the country were connected to the system. Throughout the 80s, thousands more connected and corporate and public networks appeared in the United States and around the world. Based on the success of LAN (land area network) technology, as demonstrated through both governmental and closed intra-organizational communications systems, entrepreneurs started developing ways to connect these groups into a unified network. The development of the router by Cisco Systems in 1980 solved that problem; the disparate networks would be connected together through hardware supplied by the company. The foundation was set for the development of a publicly accessible internet. However, the problem of organizing, accessing, and interfacing with information and data on these networks proved to be a major obstacle to widespread adoption. Tim Berners-Lee developed the solution by originating a system that labeled, addressed, and formatted information on the system. The development of the World Wide Web was furthered by the invention of the Mosaic browser that exploited the hypertext on the internet with a graphic user interface. The browser developed through a research initiative undertaken by researchers at the University of Illinois-Urbana and spun off the commercial technologies that would become Netscape and Internet Explorer.

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[63] Ibid.

By 1994, the internet was privatized and companies began offering services for connection and electronic mail service. At the dawn of the decade some 300 thousand users were on the internet, by the end of the decade more than 93 million had connected. This "dot com" boom impacted the culture, economy, industry, and politics in countless ways. Perhaps most significantly for the purposes of this discussion, the rapid ascent of home computing and the rise of the internet and its supporting software and hardware packages led to the demand for technologies associated with content delivery. These technologies included CD-ROM peripherals, compression technologies (including MPEG), and software systems able to convert online content through an audio/visual interface.

The rise of the internet in the 1990s was facilitated by the supply of hardware and software from the computer industry. The computer industry, although historically dominated by IBM, has a long history of technological innovations and demonstrated success in commercializing new products and services.[64] While the rapid ascent of the internet vastly improved market conditions after the downturn in the early 1990s, it also shifted power dramatically from hardware manufacturing to service providers and the aforementioned microprocessor and software manufacturers. The resulting growth in the personal computer hardware and software markets did not dramatically increase the number of platforms just the number of firms involved in all stages of their production, distribution, and service. Because IBM rushed to market with an open architecture

[64] Bresnahan, Timothy F. and Shane Greenstein. "Technological Competition and the Structure of the Computer Industry," The Journal of Industrial Economics, Vol. XLVII, March 1999.

personal computer that relied on suppliers to deliver constituent parts, the industry became de-centralized. Instead of one firm controlling the technological hardware, any number of firms could market interchangeable components designed to operate through the "wintel" platform.[65] These providers implemented as strategy of cross and backward compatibility between platforms. This led to increased competition from a "divided technical leadership."[66] Because there was increased competition between firms in the technology development and commercialization efforts, the speed and frequency of technological innovations increased. Furthermore, the inter-operability and backwards compatibility for new personal computing technologies contributed to the persistence of the "open architecture" platform initially sponsored by IBM.[67] Consumers could be assured that the firms supplying content or hardware could rise and fall without their products becoming useless.

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[65] "wintel" refers to the combination of a Microsoft Windows operating system with an Intel microprocessor chip.
[66] Bresnahan and Greenstein, p. 3.
[67] Ibid, p. 14.

Figure 3.6: Global IT/Computer Spending, 2002

Region	Telecom	Software	IT Services	IT Hardware	Corporate/Internal
Total Spending in US millions	$1,037,877	$196,237	$425,660	$376,119	$345,500
W. Europe	38.1%	9.4%	18.6%	15.4%	18.5%
N. America	33.2%	11.8%	24.5%	16.8%	13.7%
Asia-Pacific	60.7%	3.9%	7.5%	20.4%	7.5%
Japan	55.2%	3.4%	12.8%	12.1%	16.6%

Source: WITSA, 2002

The lessons learned by the computer industry during this period of industrial shifts and new market formations would eventually influence the formation and structuring of the DVD ancillary market. IBM would play a central role in the development of unified technological standards and the cessation of hostilities between rival companies. IBM's willingness to incorporate lessons learned from its 1980s and 1990s experiences in the personal computing market into their activities related to DVD and DVD-ROM are noteworthy. Knowing that the success of the majority of new computing technologies was based on compatibility across systems and backward compatibility, IBM stressed these features in the final specifications for DVD-ROM and DVD-Video. Because IBM was not structured as a diversified electronics manufacturer, like some its Japanese competitors, it was unable to develop DVD technology on its own.

Desiring a replacement technology for the CD-ROM, IBM relied on its longstanding relationships with peripherals and hardware vendors to negotiate a settlement between Hollywood and the consumer electronics companies. Calling for an "open source" product that would work between hardware devices from competing companies would guarantee widespread adoption and revivify the desktop and laptop markets. DVD technology would replace the existing CD-ROM technology while functioning as an incentive for consumers to replace existing technologies.

The computer industry in the home video era was undergoing dynamic changes and explosive growth. Over the course of the 1990s, the dominant market sector became the personal computer and its supporting technologies and software. The once dominant markets of supercomputing, mainframes, and superconductors remained profitably controlled by single firms. The rise of the PC shifted the industrial structure and increased competition in technology development. Research alliances continued on a broad scale in Japan and began to become more commonplace in the United States. GE, AT&T, Honeywell, and IBM formed the Optoelectronic Technology Consortium in 1992 in a cross-industrial effort to study high speed data transmission devices, and to keep up with the research initiatives and products coming from the Japanese firms. Governmental funding supplemented corporate expenditures and long-term strategies for the industry were established. New technologies and the demand for interfaces capable of translating online data for consumers were driving the industry.

INDUSTRIAL CULTURES AND CONCLUSIONS

This chapter has identified the industrial contexts into which DVD was introduced. We have seen how globalization, digitalization, and conglomeration has impacted the industrial structures, conduct, and performance of three distinct industries. The filmed entertainment industry during the home video era was analyzed relative to these forces for change; the widespread adoption of digital technologies in production and post production combined with increasingly profitable global markets in theatrical and home video distribution and tightly integrated conglomeration to lead to a favorable environment for a new digital home video technology. Additionally, the film industry's exploitation of home video markets and their attempts to control the profits within that sector were identified as contributing factors that led to the support for new digital content delivery technology. The film entertainment industry became structured as a tightly controlled media oligopoly over the course of the 1990s. The core business of these conglomerates continued to be the production and distribution of filmed entertainment, including feature films and television series for all markets; it is clear that maintaining control over this content meant having a direct say in any new technology that would deliver the content to consumers. The members of the oligopoly consistently employed similar production and distribution strategies for their feature films throughout the decade, with each member producing larger budget films with digital effects and initiating or acquiring independent subsidiaries and home video divisions. This collective behavior can be defined as an industrial culture; each of the member firms behaved in similar ways and engaged similar strategies for growth. While developments in the

industry were often initiated by a single member, as with the case with Disney's sell-through of video titles, the remaining firms quickly caught on and behaved in similar fashion. Competition between firms ensured production of similar products and engagement with similar growth strategies. Additionally, cooperation between firms continued to be the de-facto industrial strategy in promoting products and establishing strict barriers to entry by presenting competitors with a unified industrial front. Acting collectively, the major studios maintained business models that had been established years before; their parent conglomerates continued to produce feature films through a division of labor that privileged the director and producer, continued to release films through a tiered distribution strategy, and continued their support of trade organizations such as the MPAA. Additionally, cooperative behavior continued to demonstrate the existence of an industrial culture through co-production and co-distribution agreements (as was the case with *Titanic*). The filmed entertainment industry in the home video era was healthy, with profits rising throughout the decade. The significance of this industrial context for DVD is clear; because the industry recognized the profitability of ancillary markets and desired greater control over the core profit center for their products, they were eager to modify the home video business model through introduction of a new digital platform.

Cooperation and collective industrial behaviors were also prevalent in the computer industry. In an industry historically dominated by IBM, collective measures were necessary for Japanese firms seeking entry into the global marketplace. Through governmental support, including tariffs on computer industry imports in the Japanese

market, firms were able to establish technical and organizational capabilities that would benefit them in global conflicts with IBM. Because new market segments were created with the introduction of personal computers and the internet, and IBM's control over the industry was greatly reduced by their rush to market the PC, Japanese firms obtained a larger share of the global market in the 1990s. IBM struggled to maintain its global dominance because it lacked the diversified portfolio of their Japanese competitors. This fact would force IBM to cooperate with competitors and would relegate them to a negotiator position in the struggle for a unified DVD format. While the filmed entertainment business remained a tightly controlled oligopoly of six firms, the computer industry became increasingly decentralized throughout the period leading up to the development and diffusion of DVD. In fact, IBM's hegemony over the computer industry was in jeopardy because of their own domestic dominance. Because there were few domestic competitors to IBM and no supporting network of manufacturers, IBM could not benefit from cooperative behaviors and governmental support. By the time IBM had partnered with AT&T in a research consortium, their Japanese counterparts had wrested control of hardware manufacturing from them and Microsoft and Intel were global giants.

Domination by Japanese electronics conglomerates in the home video era over the CE industry came via innovation and commercialization of new technologies, cooperation with each other to share research, development, and marketing costs, and consistent focus on a core set of electronics manufacturing businesses. The industrial atmosphere in the 1990s consumer electronics business thus can be described through the

combined effects of globalization, conglomeration, digitalization, cooperation, and innovation. The fact that the computer, filmed entertainment, and consumer electronics industries evolved independently belies their growing interdependence and convergence in the 1990s. Even before the development and diffusion of DVD, these three industries had increasing propensities for cooperation and cross-fertilization. In the 1990s, more computer companies invested in developing, manufacturing, distributing, and marketing consumer electronics devices such as televisions and CD players. Meanwhile, more consumer electronics companies were moving into the computer industry, with Sony leading the charge with the development of PCs for domestic use. Additionally, consumer electronics companies were moving into the filmed entertainment business, investing millions to own and operate content production businesses to supply their growing stable of hardware devices.

Since the introduction of the television in the 1940s, the film industry was forced to reconcile the effect of consumer electronics devices as delivery mechanisms for their content. Through a series of industrial and regulatory shifts, media conglomerates acquired both the content providers and television networks in an effort to maintain profit streams from all distribution windows. With the coming of the VHS player, and the growing revenues generated from pre-recorded content, the studios sought another strategy to control the dissemination of content and the resulting profit windfalls. Only through acquisition of home video retailers (such as Viacom's purchase of Blockbuster entertainment in 1994) or through the introduction of a new business model related to a

new video technology, DVD, could the content providers wrest control away from video rental retailers and hardware manufacturers.

The DVD ancillary industry was formed through cooperative involvement between members of the three industries described herein. While the members of the ancillary industry are the same corporations that came to dominate their respective industries prior to DVD, their behavior is noteworthy for the degree of cooperation demonstrated in the first several years of product development and launch. The individual corporate cultures that defined the ways in which these corporations interacted and developed business strategies in their respective industries combined into a collective industrial culture. In each of the cases presented in this chapter, member organizations acted together to establish operating procedures, to create unified collectives to interact with regulators, and to maintain barriers to entry. These cooperative cultures then combined into an entirely new industrial culture of production around the DVD. The degree of cooperation expanded exponentially. Cooperative agreements based on OEMs or licensing dovetailed into membership in the collective organization of The DVD Forum, where each member would share technology and policy decisions were made through collective decision making. We will examine the structure and behavior of this organization in chapter four, identifying how barriers to entry were created, how power was established and maintained, and how a political economic institution was formed through the combined influence of these giant conglomerates. The DVD Forum established an industrial culture of production that guaranteed an efficient exploitation of the market economy while granting access to power only to those member organizations

willing to devote resources to the collective good. In a paradigmatic way, the DVD Forum will represent the combination of cooperative industrial cultures for the fullest exploitation of the market. We've seen in this chapter that the industries involved in the production, distribution, marketing, and commercialization of DVD had developed the cooperative foundations and collective practices that would come to be fully realized and exploited through The DVD Forum. The increasing convergence of these industries, in retrospect, makes their participation in the formation of an ancillary industrial culture seem all but inevitable. However, as has been demonstrated, these conditions developed through complex shifts in national and international markets stemming from managerial decisions and organizational capabilities.

Chapter Four: The Political Economy of DVD

Thus far, we've seen how favorable technological and industrial conditions in the home video era made possible the introduction of a new digital audio/visual technology. Chapter two examined the technological precursors to DVD, identifying the evolution of existing technologies that impacted the eventual design and functionality of DVD. Drawing on lessons learned from the commercialization and design of CD and Laserdisc technologies, DVD designers exploited advancements in technology to meet the collective demands of hardware and software providers and the public. The third chapter explored the industrial contexts surrounding DVD development and commercialization, identifying the respective structures, conducts, and performances of the filmed entertainment, computer, and consumer electronics industries during the home video era prior to the introduction of DVD. Each of these industries developed new industrial practices to cope with changes stemming from increasing globalization, digitization, and conglomeration.

In the 1980s and 1990s, revenues generated from the distribution of feature films on video and sales of video machines shifted the core profit centers of both the filmed entertainment and consumer electronics industries. New revenue streams encouraged reinvestment in manufacturing and technological development in the consumer electronics industry. Similarly, Hollywood invested in the continued production of filmed entertainment, as production, advertising, and special effects budgets for potential blockbuster hits increased exponentially during the video era. Conglomeration and

diversification occurred simultaneously, as the major film studios were purchased by multinational media conglomerates who then integrated their media holdings while diversifying into home video businesses.[68] Globalization impacted both industries, as Japanese hardware manufacturers, along with other international corporations, became members of the Hollywood oligopoly through acquisitions of major studios.[69] Two consumer electronics firms with studio holdings in the early 1990s, Sony and Matsushita, employed differing strategies to dominate technological markets. Throughout the period leading to the commercialization of DVD, home video revenues stimulated more direct interaction between content providers and hardware manufacturers, as each sought greater control over all revenues and related businesses along the production, distribution, and exhibition chains.

Globalization and new technologies also impacted the relations of power while increasing revenues in the computer industry. Through protectionist strategies supported by government, Japanese firms partnered in technology development initiatives to challenge the hegemony of IBM in international markets prior to the introduction of the personal computer in the 1980s. Diversification and cooperation in the Japanese industry led to greater hybridization between the consumer electronics and computer industry and consortia of supporting companies that assisted in commercializing new technologies. The diffusion and adoption of the personal computer and the eventual rise of the internet

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[68] Each of the studios had, by the time of DVD's introduction, started their own home video subsidiary and/or purchased a video rental retailer.

[69] Foreign ownership during the 1990s peaked with four of the original eight studios owned by non-U.S. corporations.

stimulated growth in the computer markets and increased demand for peripheral technologies capable of storing and playing back large audio/visual media files. Growth in these markets combined with Japanese corporations' diversification to create the demand and development infrastructures to make the commercialization and rapid diffusion of DVD possible.

While each industry adapted in different ways to shifts in industrial structure stimulated by changes in ownership, new technologies, and newly globalized markets, all recognized the value of cooperative partnerships, consortia development, and shared research and development initiatives by the dawn of the 1990s. The recent successes of the personal computer, the CD, and home video demonstrated the potential promise of a new versatile disc technology that could deliver movies, games, and other visual media via television, gaming consoles, and computers. Working together, member firms could develop a unified technological specification that would guarantee broad-scale support from all three industries.

The successful development of DVD was contingent upon the behaviors and industrial strategies of these three core industries in a newly formed cooperative collective. Historically, the filmed entertainment, consumer electronics, and computer industries developed competitive and cooperative relationships between firms in continuing struggles for market dominance. Cross-industry partnerships related to DVD commercialization resulted in unprecedented cooperative and communal behavior from member firms related to DVD-Video. What this unprecedented collaboration of American, European, and Japanese firms accomplished was a governing body that could

control all elements of product development, distribution, and marketing. They could work together to thwart challenges from potential competitors or governmental anti-trust litigation. In so doing, these firms also created a new industrial culture based on collective decision making, cooperative product development, and a hierarchical division of power that guaranteed their respective place within the newly formed pecking order.

This chapter examines the development of organizational control and the relations of power within the emergent DVD industry. While the macro-level technological, cultural, and industrial contexts helped create a favorable atmosphere for the introduction of DVD, the micro-industrial developments involving individual firms determined DVD's technological development and adoption. In the process, member firms of the new industry employed strategies designed to establish barriers to entry, maintain control over licensing and patent revenues, and thwart threats from competitive technologies. The formation and structuring of the DVD Forum guaranteed control through cooperation, standardization, and delegation of duties and responsibilities to individual companies. Additionally, the organizational structure of the DVD Forum assured that a hierarchy of power could be maintained for key firms from each constituent industry. The ten founding members of the Forum, including members from the consumer electronics, filmed entertainment, and computer industries, worked together to restrict the form and function of the technology while assuring quality and technical standards. Drawing upon lessons learned from each industry in technological innovation and commercialization, member corporations in the DVD industry employed strategies that would establish hierarchies of control and mechanisms to maintain that control

indefinitely. These strategies included creating a rigid power structure within the DVD Forum, limiting competition, establishing patent pooling and licensing bodies, and partnering with manufacturing consortia to assure quality standards.

The structure of this chapter is threefold: section one offers analysis of the formation of the DVD Consortium and DVD Forum; section two explores the behaviors of members to demonstrate collective practice and the development of an industrial culture of production; section three examines the performance of industry members to highlight the success of the industrial strategies outlined in section one and the behaviors detailed in section two. The third section demonstrates the rate of diffusion for DVD into the marketplace, suggesting the relative influence of the strategies and behaviors of industry members. The first section draws upon data obtained from the DVD Forum, including its founding charter and mission statements, the structure of the organization as defined by its official releases to the press, its responsibilities and activities, as well as identifying its member organizations and their roles within the Forum. The second section delves into the activities of the Forum, drawing official press releases from industry members and the DVD Forum website to explicate how cooperation over DVD-Video turned to conflict over recordable DVD formats.[70] Drawing on data from the MPAA, the Video Software Dealers Association (VSDA), and boxofficemojo.com, the third section illustrates how quickly DVD became a viable commodity in the marketplace. Additionally, these data will demonstrate how the strategies for control,

[70] www.dvdforum.org

including licensing and control over patents, relates to market share and market performance.

STRUCTURING CONTROL: THE DVD FORUM

DVD was conceptualized by technology developers and content providers as an extension of existing digital audio (CD) and home video (VHS and laserdisc) technologies. As such, the technology was developed within a framework of associative technological functions and manufacturing capabilities. The DVD industry successfully manipulated and adapted existent industrial and manufacturing infrastructures, market forces of supply and demand, and a favorable regulatory environment to commercialize the new technology. Because the infrastructure already existed, in terms of hardware and software manufacturing, retail/rental outlets, and home video marketing and distribution, DVD posed relatively little risk to firms wishing to develop and distribute the new technology. However, firms employed three key strategies that were imperative to the efficient exploitation of resources, the creation of consumer demand, and the successful diffusion of DVD technology: (1) hardware and software companies agreed to work cooperatively in product development; (2) firms agreed to form collective organizations to ensure the mutual interest of all members in the marketplace; (3) development firms did not release technology until quality standards were agreed upon industry wide. All three of these strategies were predicated on the willingness of consumer electronics manufacturers to work together in a heretofore unprecedented manner.

The formation of a DVD ancillary industry required the participation of corporations engaged in a primary business that is different from, but related to, the

production, distribution, and commercialization of a new product or service relating to optical disc technology. In the case of DVD, the 1990s filmed entertainment, computer, and consumer electronics industries organized their corporate and industrial models around the feature film, the personal computer, and the television/radio/VCR respectively. The fact that the leading corporations in these three industries recognized the suitability of DVD as a new product was directly related to the perceived enhancement afforded by the technology as it related to their existing products and services. For the filmed entertainment industry, the content providers sought a new delivery mechanism for feature films that could alter the existing business model in home entertainment. For the computer industry, DVD offered an opportunity to enhance the functionality of the personal computer, improving the audio/visual and data storage capabilities necessary for the increasingly online environment. For the consumer electronics industry, DVD consoles promised a new revenue stream that could enhance or replace the core business of television and VCR manufacturing and distribution. The successful development and commercialization of a new optical disc technology for home entertainment meant that existing products (movies, games, and later television series) and services (home viewing, computing, gaming) could be packaged, delivered, purchased, and experienced in ways different from existing home video and computer products.

Participation in the DVD industry by these major firms gave rise to corporate divisions whose primary businesses were distinct from their traditional business practices and existing technologies. With DVD, these firms would focus on compression services,

packaging, supplemental content production, graphic and menu design, and the like. These new DVD divisions performed functions within the newly formed industry that served the needs of the founding parent corporations. DVD ancillary industries were established, then, through the behaviors of corporations entrenched in existing, mature, video and computer industries along with newly formed businesses serving the needs of the core companies. For the filmed entertainment companies, the continued production of feature film content, particularly blockbusters, meant that there would be ample supply of software for the new technology.

DVD was designed to deliver feature film content for playback on both television sets and computer monitors. A new home video technology that could also deliver content (and storage) for computers could potentially combine the revenues of existing home video and CD-ROM software markets while replacing VHS and computer drive hardware markets. For each of the three industries involved in DVD commercialization, the potential revenues generated from filmed content distributed on DVD encouraged members to alter existing relationships between technology providers and content suppliers as well as business models relating to home entertainment. The potential profits generated in sales of discs, consoles, and computers, led major corporations in each constituent industry to behave amicably and to alter existing practices relating to new technologies. These new behaviors differ in degree, if not substance, from the activities established during the home video era prior to DVD; content providers would continue relationships with home video retailers, but would circumvent major video rental chains in favor of sell-through retailers like Best Buy and Wal-Mart. Consumer electronics

manufacturers would continue to cooperate in product development, but would agree to technological standards for the entire industry to ensure Hollywood's participation.

Prior to the founding of the DVD Forum, DVD technological development was undertaken by competing consumer electronics firms in the early 1990s. In 1993, ten years after the introduction of CDs and CD- ROMs, the first prototypes for a compact disc capable of delivering video were demonstrated.[71] However, the developers of this technology, Nimbus and Philips, quickly realized that CD technology was unreliable as a video disc technology, and decided to develop a separate disc in 1993. As development was underway, Hollywood weighed in during 1994, calling for a single worldwide standard for the new generation of digital video on optical media. Seven entertainment and content providers formed the "Hollywood Digital Video Disc Advisory Group," asking developers to meet their collective demands.[72] As early as 1994, it was apparent to consumer electronics developers that in order for any new disc technology to succeed in the marketplace, the support of Hollywood through supply of content would be necessary. DVD technology was designed to do many things on many different platforms, but for it to reach the public en mass, it would first and foremost be a delivery mechanism for Hollywood films.

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[71] Nimbus developed a CD with double the storage capacity of existing discs, capable of connecting to an MPEG video decoder.

[72] Members of the group included Sony, Disney, MCA/Universal, MGM/UA, Paramount, Viacom, and Warner Bros. Their request included room for a full-length feature film, about 135 minutes, on one side of a single disc, picture quality superior to laserdisc, compatibility with high quality audio systems, ability to accommodate three to five languages per disc, copy protection, multiple aspect ratios for widescreen support, and multiple versions of a program on one disc, with parental lockout.

On December 16, 1994, the structure of the industry was divided into two camps as Sony and Philips announced their new standard, Multimedia CD (MMCD). By 1995, hardware and software manufacturers were working together to challenge Sony/Philips.[73] These challengers formed a second camp, comprised of MCA, Time Warner, MGM/UA, Matsushita, JVC, Thomson, and Mitsubishi. Known as the SD (super density) Alliance, the collective offered four different disc products of varying storage capacity.[74] While the two formats differed in architectural structure, they both offered relatively inexpensive manufacturing options.[75] Additionally, the optical discs could be produced with minimal modifications to existing CD manufacturing technology. Crucially, each camp's technology met Hollywood's demands for functionality and quality. The two camps seemed poised to engage in a format war similar to the aforementioned Beta/VHS debacle of the late 1970s and early 1980s. However, at the end of April 1995, five computer companies, Apple, Compaq, HP, IBM, and Microsoft, formed a technical working group and met with each faction, urging them to compromise. The two camps refused to cooperate citing "liberalism and democracy" and the desire to offer options to interested consumers.[76] On August 14, 1995, the work group recommended adoption of the Universal Disc Format (UDF), supported by the computer industry and the SD

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[73] Sony, Philips, and 3M MultiMedia CD were working on single and dual layer optical discs and hardware capable of converting MPEG-2 compressed video with eight channels of surround sound, capacity for multiple languages and subtitles, and compatibility with CD, CD-ROM and photo-CD formats.

[74] These included single-sided five and nine-gigabyte discs and double-sided ten and eighteen-gigabyte models. The single sided, single layer, five-gigabyte disc is capable of storing a 135-minute film with Dolby AC-3 audio, three languages, four subtitled languages, multiple aspect ratios, parental lockout, and backward capability with CDs.

[75] The estimated cost of mass production was estimated to be 113% of the cost of manufacturing CDs, "DVD camps remain split at REPLItech" by Paul Verna, Billboard, 7/1/1995.

alliance. Sony and Philips quickly demurred, saving face through a compromised format agreed upon by all members.

The formation of the DVD Consortium, later renamed the DVD Forum (more on this below), drew upon Japanese and American research consortia examples but differed in its structure, function, and behavior. The founding members of the DVD Consortium were Hitachi, Matsushita, Mitsubishi, Pioneer, Philips, Sony, Thomson, Time Warner, Toshiba, and Victor Company of Japan (JVC). These corporations did not join forces to challenge the market dominance of a single firm, as was the case with Japanese computer manufacturers challenging IBM. Instead, these companies agreed, as their mission statement asserted, to "exchange and disseminate ideas and information about the DVD Format and its technical capabilities, improvements and innovations…and to promote broad acceptance of DVD products on a worldwide basis, across entertainment, consumer electronics, and IT industries."[77] In the process, these firms established control over the technology and the industry through pooling of resources and establishing barriers to entry.

After a group of computer companies, led by IBM, insisted that the competing SD and MMCD factions agree on a single standard, a combined format was announced in September 1995. IBM and the rest of the American computing industry recognized the potential of DVD technology as a replacement for CD-ROM. However, these firms lacked the infrastructure to participate in technological development. Only the Japanese

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[76] Taylor, DVD Demystified (2001), p. 49.
[77] "DVD Forum's Mission," from the official DVD Forum website, www.dvdforum.org.

computer makers who had diversified into consumer electronics manufacturing and development (and vice versa) could innovate new technologies. The American firms, including IBM, were relegated to an advisory role, albeit one that carried significant weight given their respective market shares in the booming personal computing industry. The overwhelming influence of the Japanese firms within the newly formed consortium can not be understated. Besides drawing on Japanese research consortia as a model for the DVD group, and notwithstanding the fact that seven of the founding ten members of the organization were Japanese-based consumer electronics manufacturers, the relationships between firms developed over the previous twenty-plus years assured that technological resources would be shared and progress would be forthcoming.

Strategy of Control: Establishing a Power Structure

The DVD Consortium was initially structured as a closed association of hardware manufacturers, software firms, and content providers from the three core industries based in Japan, Europe and the United States. After threats of litigation from the United States Justice Department on antitrust grounds, the Consortium changed its name to the DVD Forum and created a voluntary, open membership standard in May 1997. However, a strict hierarchy was established to maintain control. Any corporation attempting to establish itself in the newly forming industry was confronted with a veritable cartel that dominated and controlled all aspects of the technology and the industry. Any new market entry was required to deal with the Forum for licenses, including format and logos, technical specifications, and access to distribution networks. Because the Consortium (hereafter "the Forum," or "the DVD Forum") stratified membership and tightly

controlled all aspects of decision making for the entire industry, it quickly became obvious that membership in the organization was imperative to establishing a market presence and/or a voice in the collective process of decision making. Membership, while open to any firm engaged in the DVD business, was organized around two classes: principal and associate. Principal membership was restricted to firms "deemed to be making a significant contribution to the development, promotion, or improvement of the DVD formats and who pay the required membership fees."[78] Of course, the ten founding companies were responsible for evaluating any potential members, and could deny membership as it pleased. Given the vague wording of the charter, it is clear that decisions could be based on any number of factors, including the relative significance of any contribution a prospective member was offering. Principal members were eligible to participate in the "format-making" activities and were provided access to the research and technical developments made by other principal members.[79] Principal members signed a non-disclosure agreement that protected both the confidentiality of technical information disclosed during meetings and the member companies from any potentially illegal trust-making claims. Associate membership was open to any firm interested in joining the group and willing to pay the yearly membership fees.[80] Associate members were afforded access to working group activity reports, but could not participate in decision-making processes.

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[78] Quoted from Article 5 section 2 paragraph (a) of the DVD Forum Charter: http://www.dvdforum.org/about-chater.htm
[79] Ibid.

The structure of the DVD Forum can be described as a cooperative oligopoly of hardware manufacturers, software designers and manufacturers, content providers, distribution companies, wholesalers, and retailers (with the latter two categories often overlapping). Perhaps more so than any other industry in history, the companies involved in the commercialization and development of DVD worked together and shared resources. In so doing, they established a structure for control over the technology that was virtually impenetrable. The Forum's structure illustrates this explicitly; the forum was composed of a Steering Committee, a Technical Coordination Group, Working Groups, the DVD Format Promotion Conferences, and a variety of "non-profit trade associations" that licensed technology for members of the Forum.[81] The Forum was directed by a "Chair Company" and three "Vice-Chair" companies that were elected from the Steering Committee members by a majority vote every two years.[82] The three Vice-Chair positions were required to include one member from the consumer electronics industry, one from the computer/IT industry, and one from the "content industry."[83] In this manner, control over the industry was guaranteed to remain under the auspices of the leading firms in each of the three industries; because ascension to Chair was restricted to members of the Steering Committee and membership on that committee was controlled by its members, only the original members or their designees could hope to attain the seat

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[80] The annual fee for principal members is 1 million Yen (about $9500 U.S dollars); the annual fee for associate members is 300,000 Yen ($2,850) www.dvdforum.org/about-faq.htm
[81] Quoted from Article 6 section 1 of the DVD Forum Charter.
[82] Article 6 section 2 of the DVD Forum Charter.
[83] Ibid.

of penultimate power.[84] The Steering Committee served as the executive body of the Forum and for the first two crucial years of the Forum's existence (from 1997-1999), with the ten founding companies completely controlling access to the decision-making group.[85] Curtailing access to power was guaranteed through the structure and organization of the Forum, and only the founding companies could grant access to the decision making body. By establishing a strict hierarchy of power, the leading firms were assured that their contributions to the technology, or their demands for the technology relative to software functionality, would be included in the final technological specifications. Crucially, this division of power guaranteed that the unified specification for DVD-Video and DVD-ROM would reach the marketplace, assuring the continued participation of Hollywood and the computing industry.

The Steering Committee maintained control over the industry through control of the Forum. Members required that all decisions relating to the structure, policy, or operation of the Forum be approved by the Steering Committee. Additionally, the Steering Committee controlled all of the groups within the Forum, including the relative efficacy and implementation of recommendations of the various Working Groups.[86]

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[84] General Meetings were held yearly upon the call of the Steering Committee and included all members of the Forum. Only Principal Members could vote during the meetings. The content of the meetings was dictated by the Steering Committee, who reviewed the previous year's activities and set the plan for the forthcoming year.

[85] After that initial period, any company seeking election to the Steering Committee was required, per the Forum charter, to participate in three or more Working Groups or "otherwise have made significant contributions, as determined by the Steering Committee, to the development, improvement, verification, or promotion of the DVD Formats." Article 8, section 2, paragraph three of the DVD Forum Charter.

[86] The Steering Committee controlled the adoption and publication of new DVD formats and revisions to existing formats proposed by the Working Groups, the licensing of DVD Formats and the DVD logo (including terms and conditions of the licensing and appointment of the licensing entity), access to chair positions on the Working Groups, termination of Forum Membership, establishment of any new

Steering Committee members participated in these groups, creating an oversight mechanism that assured that the power elite was well-informed as to the activities of other members.[87] For example, Toshiba, a Steering Committee member, was appointed as the first chair of the Technical Coordination Group.[88] Through this chair position, Toshiba could both control the direction of research and design initiatives within each Working Group and could monitor the activities of members. Through this institutional structure, Steering Committee members assured complete control not only of the technology and its licensing, but over all other industry members as well. By establishing through the Charter their ordained right to dictate the power structure of the industry, and by virtue of their control over the Technical Coordination Group, the original ten companies assured their continuing dominance over all things DVD.

The establishment and control over Working Groups derived from the structure established by the original DVD Consortium. When the industry's trade organization was still closed to the founding ten members, the consortium had divided into eight "working groups."[89] After a technical standard had been established through these

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organization within the Forum (including its operating rules), approval of plans for conferences, amendment of the Charter, approval of any matters submitted by the Technical Coordination Group, establishment of the Promotion and Communication Committee, and any decision to extend, dissolve, or change the structure or organization of the Forum Article 8, section 5, paragraphs (a) through (i) of the DVD Forum Charter.

[87] Additionally, all members of the Steering Committee participated in the Technical Coordination Group, along with the chair-companies (approved by the SC) of the Working Groups.

[88] Technical Coordination Group powers included coordinating the activities of the Working Groups, approval of new DVD formats or revisions proposed by Working Groups, and the formulation and adoption of operating rules for all the Working Groups.

[89] Each working group was open to any of the ten original members and was divided into topic headings: (1) DVD-Video and video recording applications, (2) Physical specifications for DVD-ROM, (3) Film system specifications for discs, (4) DVD Audio applications, (5) Physical specifications for DVD-RAM,

Working Groups, and the Consortium changed to the DVD Forum, the original ten members delegated work to Principal Members through newly opened groups. These Working Groups were responsible for the actual technical development of new DVD formats and recommended policies and opinions to the Steering committee related to copyright protection and regional coding.[90] What this organization of labor illustrates is the desire by the ten founding members to control all current applications of the technology through the Forum in order to establish and maintain a unified standard for DVD-Video and DVD-ROM. Founding members also had the foresight to control all future applications of the technology through these groups, with the ultimate goal being a unified standard that would receive the support of the Hollywood content providers.[91] Through this strategy, the Steering Committee established and maintained control over technological development, dictating which future standards would be realized. The Steering Committee also recognized that DVD would eventually be replaced by High Definition discs employing a next-generation laser technology. By setting up a working

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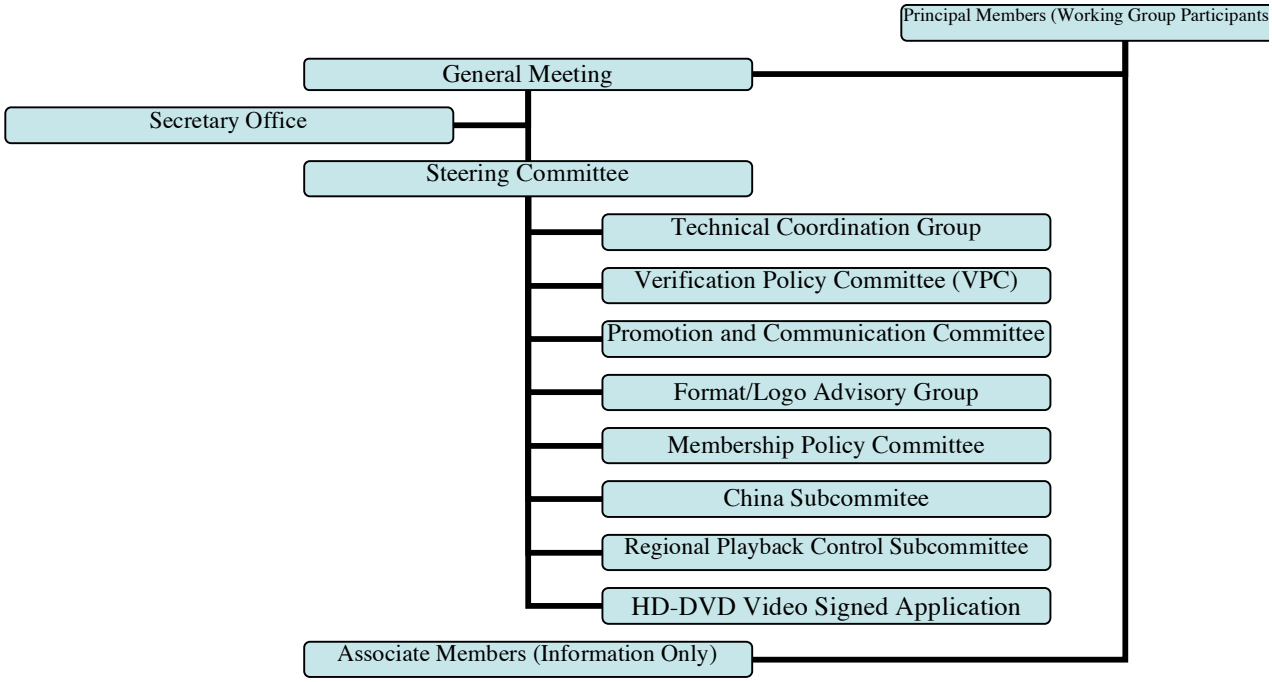
(6) Physical specifications for DVD-R and DVD-RW, (7) Copyright protection, and (8) Professional applications. www.dvdforum.org/about-faq.htm

[90] The initial division of labor (as of 1997) was structured around nine working groups: WG-1 (DVD-Video Applications); WG-2 (Physical Specifications for DVD-ROM); WG-3 (File System Specifications for discs); WG-4 (DVD-Audio Applications); WG-5 (Physical Specifications for DVD-RAM); WG-6 (Physical Specifications for DVD-R); WG-9 (Copyright Protection); WG-10 (Professional Applications); and WG-11 (Blue Laser DVD).

[91] The first three working groups demonstrate the desire to develop industrial control over the DVD console used for playback of pre-recorded content (DVD-Video) and its computer counterparts (DVD-ROM hardware and File System interfaces with computer operating systems), the two principle markets for DVD. Working groups four, five, and six, illustrate the desire to establish technological standards and control over secondary applications, including DVD Audio and recordable DVD technology. Finally working groups nine and eleven represent the efforts of the founding ten companies to establish technical copyright standards (see chapter five) and the next generation of DVD, the Blu-Ray/HD DVD.

group to develop this technology, the Forum hoped to establish control in the same manner used for DVD.

Figure 4.1: DVD Forum Organizational Structure



Source: The DVD Forum (www.dvdforum.org)

Strategy of Control: Limiting Competition

While the Forum was nominally "open" to any company working on commercializing DVD technology, the powers granted to the Steering Committee through the DVD Forum Charter limited the potential power of new members and virtually eliminated the possibility of a successful competing proprietary technology related to DVD. Competing technologies developed outside of the Forum (like Circuit City's Divx) would lack the support of the hundreds of participating companies that had

entered the forum by the late 1990s. Companies attempting to commercialize competing technologies would be forced to expend enormous amounts of capital and resources to compete with the collective. Outside competitors not only had to compete with the technologies introduced by the collective development teams within the Forum, they were also forced to compete with the publicity and public relations resources of member firms. The Forum Charter formally established a mechanism to pool the public relations and communications resources to thwart such challenges.[92] In effect, a committee was designed to guarantee public acceptance of DVD to the exclusion of other formats. By pooling resources and presenting a unified message to the public and press through public Forum events, this committee controlled the "official" meanings and connotations surrounding DVD and was the principal source of industry originated discourse.

The Forum's hierarchal structure guaranteed that any developments in technology coming from the Working Groups required ratification by Steering Committee members before they were implemented by all members. Through this structure, the founding members established oversight that assured they would capitalize on any and all iterations developed by the Working Groups. The Steering Committee also oversaw the work of three subcommittees that would prove crucial to the long-term viability of both the Forum and the industry. Members of the Steering Committee established and controlled the China Subcommittee, the Regional Playback Subcommittee and the HD-DVD-Video

[92] The "Promotion and Communication Committee" was comprised of all the Steering Committee members and those Principal Members approved by the Steering Committee and was responsible for "promoting communication with consumers and organizations outside of the DVD Forum…in order to facilitate common understandings and wide acceptance of the DVD Format in each region." Article 11, sections (1) and (2) of the DVD Forum Charter.

Signed Application Subcommittee. These three subcommittees, whose membership was limited to the ten Steering Committee members, represented the future of industrial profits and control over the technology for the foreseeable future. As their names suggest, the subcommittees were responsible for strategizing ways to penetrate the enormous Chinese market, including negotiating with the Chinese government, establishing mechanisms to deal with piracy in China, establishing regional controls for DVD that would establish a tiered global distribution network, and taking steps toward a next-generation High Definition disc. Besides illustrating the foresight of Steering Committee members, the formation of these subcommittees demonstrates the closed power structure within the forum and the desire of those ten leading companies to limit competition. By limiting competition and maintaining oversight over all the activities of the Forum, Steering Committee members created a trust that opened them to investigations from the U.S. Justice Department. To avoid potentially devastating action from the government, the Forum created carefully worded guidelines for members. The official documentation from the office of the secretary of the DVD Forum reads:

> The purpose of the forum is the dissemination of technical information concerning the DVD format and the use of input from participants to improve and establish the technology for the benefit of consumers and users and encourage broad acceptance of the DVD format. Communication among participants in the forum should be aimed at advancing the goal of enhancing competition. Participants in the forum should not have discussions that call for or result in anticompetitive collective action of any kind. This applies both to formal meetings and informal conversations before, during, and after the event. Your strict adherence to these guidelines is essential.[93]

[93] "Antitrust Guidelines for the Forum Participants," The Secretary Office of the DVD Forum.

While guidelines seem to have kept the Justice Department at bay (see chapter five), it is clear that the structure of the Forum and the powers granted the Steering Committee by the charter result in an industrial structure that limits competition while creating a collective oligopoly.

Strategy of Control: Licensing and Patent Pooling

The Steering Committee also established and controlled the Format/Logo Advisory Group (FLAG) which created an outside corporation called the DVD Format/Logo Licensing Corporation (DVD FLLC) in April 2000. Time Warner originally trademarked the DVD logo, but assigned it to FLAG after repeated challenges to their trademark (see figure 4.2).[94] The company controls the licensing of the DVD format and logo, the production, maintenance, and issuance of the DVD format book, trademark registration and maintenance of DVD logos, verification related activities, and the policing of pirate manufacturers and incorrect usage of DVD logos.[95] The DVD FLLC, and before its formation, the FLAG committee within the forum, established relationships with other trade associations like the ECMA, a European based trade association of companies seeking standardization in the IT and computer industries (and counting among its members the seven Japanese CE firms on the Steering Committee), OSTA (Optical Storage Technology Association), who publishes the UDF file system,

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[94] Toshiba administered the logo and licensing prior to the founding of DVD FLLC. The DVD FLLC, not surprisingly, is owned by Hitachi, Philips, Matsushita, Mitsubishi, Pioneer, Sony, Thomson, Time Warner, Toshiba, and JVC, the original ten members of the Consortium and the principal members of the DVD Forum's Steering Committee.

[95] DVD specification books, required for manufacturers of players or discs, are sold through the DVD FLLC for a $5000 fee. http://www.dvdfllc.co.jp/about/about.html

and DVDA, a non-profit volunteer association supporting the work of the Forum and promoting the broad acceptance of DVD worldwide. Through this network of supporting associations, the DVD Forum delegated responsibilities in an effort to avoid anti-trust investigations. Through this strategy, power and control were maintained by the Steering Committee members, whose interests and involvement reached outside of the activities of the Forum into the trade associations.

Figure 4.2: Original Warner Bros. DVD Logo

Yet another strategy for control employed by the cartel was implementation and maintenance of a patent pooling structure. This strategy, which is similar to the one employed with the CD by Sony, Philips, et al., guaranteed collective control and reduced risk through collaborative enforcement of licensing standards. By November of 1997, Pioneer had joined a patent licensing group initiated by Sony and Philips. In December of 1998, the Department of Justice approved the joint licensing agreement, allowing makers of discs and players to use the technology developed by the three firms in compliance with standard specifications. Joel I. Klein, Assistant Attorney General in charge of the Antitrust Division said through a business review letter that the patent pool would "reduce costs associated with obtaining licenses on the three firms' essential

patents, while raising little possibility of competitive harm."[96] Standard specifications were established by the DVD Forum work group, including rules, conditions, and mechanisms for players to read the discs and convert compressed data into images for screen display. The industry sought to avoid the mistakes of prior technological introductions. By combining strategies utilized in CD and video licensing, the DVD industry established specific pools of patents required for manufacturing technologies related to DVD. For instance, Toshiba, Time Warner, Matsushita, Mitsubishi, Hitachi, and JVC agreed in October of 1997 to license their patents jointly.[97] The majority of these patents were related to previously existing optical media technologies; percentages for the technology were determined based on these existing patents combined with newly secured patents specifically related to DVD (see figure 4.2). By June of 1999, the Department of Justice approved a global licensing program for the second collective.[98] The two collectives were joined by claims from Thomson and Discovision Associates, the latter holding about 1300 optical disc patents.[99] Besides hardware and software patents, the principal firms holding ownership rights over DVD related technology included the Motion Picture Experts Group Licensing Administrator, which created the compression standards used in DVD-Video (MPEG-2), and Time Warner, which originally trademarked the DVD logo.[100] Therefore, any firms attempting to manufacture

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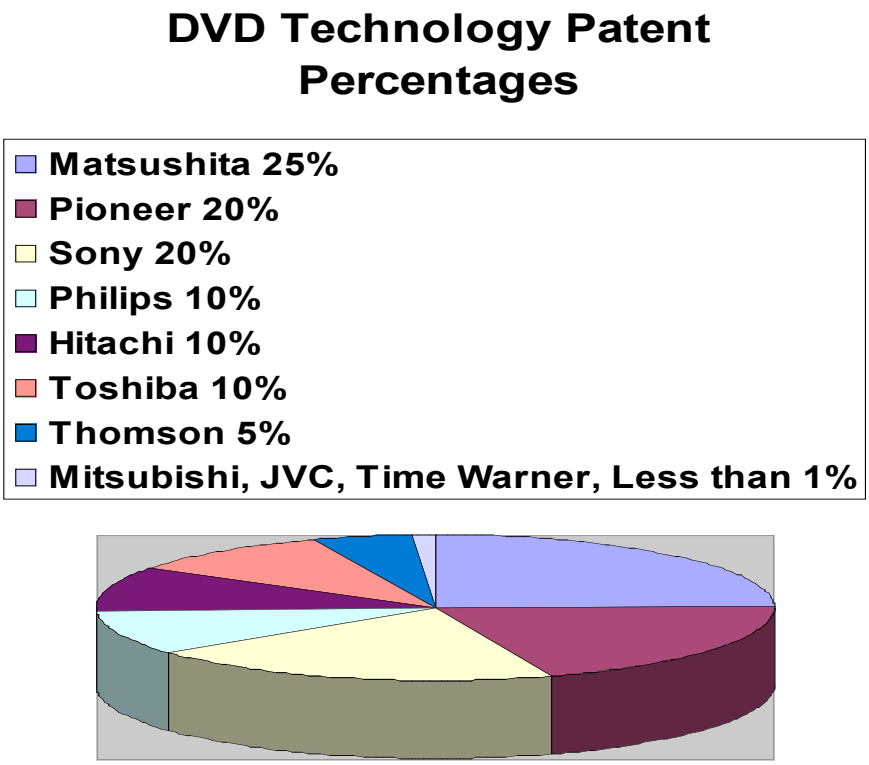
[96] "Justice Department approves joint licensing of patents essential for making DVD-Video and DVD-ROM discs and players." *Regulatory Intelligence Data*: 12/17/1998.
[97] "Second DVD patent licensing group formed," *Screen Digest*: 11/1/1997.
[98] The program mandated hardware and software royalties amounting to 4% of the net selling price for DVD Video players, 4% of the net selling price for DVD-ROM drives, and 7.5 cents per blank disc.
[99] Taylor, 180.
[100] Taylor, 179.

DVD products were forced to license essential technologies from the "3C" pool (held by LG, Philips, Sony, and Pioneer), the "6C" pool (Hitachi, IBM, Matsushita, Mitsubishi, Time Warner, Toshiba, JVC) and from Thomson and Discovision.

Figure 4.3: DVD Patents



Source: DVD Demystified, Jim Taylor (2001)

Copyright protection was also mandated by the Forum and by Hollywood, requiring manufacturers to license that technology from the DVD CCA (Copy Control

Association) and from Macrovision, whose analog anti-recording technologies were required for hardware manufacturers. Player manufacturers would also deal directly with Dolby for access to their Dolby Digital Decoders (or MLP decoders for DVD-audio players) and with the MPEG LA group to acquire patent licenses for compression technologies.[101] All told, the new market entry would pay a total of $81,000 in licensing fees alone, with an additional six-or seven-figure investment required for manufacturing technologies and physical location establishment.[102] After the new company began producing players or discs, $20 in royalties would come off the top of a player retailing for $200.[103] With an installed base of players topping 122 million in the United States alone by 2007, the returns to patent holders and licensing organizations total more than $2.4 billion.

Strategy of Control: Dictating Manufacturing Standards

Control over the technology, its licensing and patents, and the industrial organization overseeing its commercialization guaranteed market dominance for the founding ten companies. IBM, Discovision, Dolby, and the MPEG group obtained

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[101] Any new entries into the hardware manufacturing market would need to acquire the license yearly from DVD CCA for $15000, pay a one time $30000 fee to Macrovision (renewed yearly at $15000) for their license, purchase a specification book for the $5000 fee, pay the $10000 fee for the format and logo licensing, and pay an additional $5000 if they planned to manufacture both DVD-ROM and DVD-Video. http://www.allformp3.com/dvd-faqs/61.htm

[102] The company would return 3.5% per player or drive (minimum of $3.50) and 5 cents per disc to the 3C pool, 4% per player or drive (minimum $4), 4% per DVD Video decoder (minimum $1) and 7.5 cents per disc to the 6C pool and about a dollar per player or drive to Thomson. Manufacturers would also return a maximum of $0.60 per player to Dolby for their digital decoder patents and $2.50 per player and 4 cents per disc to the MPEG group for decoder cards. Many hardware manufacturers seeking cross-compatibility would choose to include Philips licensed Video CD technologies for $25000 and 2.5% per player ($2.50 minimum). An additional 25 cents per player went to Nissim, an organization managing DVD related patents on behalf of the Forum.

[103] http://www.allformp3.com/dvd-faqs/61.htm

market position through their unique patents or licensed peripheral technologies that were incorporated into the infrastructure established by the Forum. The structuring of power and control within the industry was not limited to its administrative body and the organization deciding the technology's form, function, and fate. While the DVD Forum guaranteed control to the largest ten consumer electronics and computer companies, there still existed an open market competition in the manufacturing sector. Disc manufacturers, led by Nimbus CD International, Warner Advanced Media Operations (WAMO), Pioneer, and Panasonic quickly produced bonding machinery to meet the quality specifications of the DVD standard established by the Forum.[104] Working as independent manufacturers, these companies invested heavily in improvements to existing infrastructure and conversion in the hopes of obtaining competitive advantage. By July 1996, Nimbus became the first company in the world capable of manufacturing DVD and DVD-ROM discs, with an initial yearly output of 3.5 million discs. "Being 'DVD ready' this early in the game puts us in an excellent position to serve the market's earliest adopters and ensures our competitive lead in terms of experience in producing the service," said executive vice president of operations for Nimbus, David Trudel in a press release.[105] Nimbus' outlay ($25 million) is illustrative of the manufacturing sector's willingness and ability to invest in DVD. While improving their existing infrastructure, Nimbus also entered into early discussions with MPEG-2 vendors in the hopes of

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[104] "Bonding still a sticky issue for DVD," by Debbie Galante Block, *Tape-Disc Business*: 9/1/1996.
[105] "Nimbus Begins DVD Production," *PR Newswire*: 9/13/1996.

integrating authoring, manufacturing, packaging, and distribution of the final product.[106] WAMO and Nimbus are examples of companies laying the foundations for market dominance through integration of the production chain.

Alliances proliferated between production companies who converted CD authoring and manufacturing infrastructures to suit the new format. The "DVD Production Alliance," a Sonic Solutions-sponsored initiative, was formed in March 1996 to provide "the technology and tools required by production facilities and content developers to create DVD titles."[107] In an attempt to go to market as soon as possible, Sonic offered content providers an integrated system, streamlining the production process and pushing titles into the retail channel. Sonic unveiled the industry's first workgroup-based, integrated DVD production environment, called DVD Creator.[108] This technology allowed for all manufacturing elements necessary for the production of a title, including compression, authoring, and bonding to be done on a single work-station. By September, the system had been enhanced to conform to the Forum specifications, enabling users to create DVD 1.0 discs by fall.[109] The Production Alliance, like patent holders and hardware manufacturers, pooled their resources and completely controlled the manufacturing side of the early developmental market.[110] Several companies were quick to join the alliance: California Video Center, Crest National, Laser Pacific Media Corp.,

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[106] "Nimbus will invest $25 Million in DVD manufacturing capability," *PR Newswire*: 5/17/1996.
[107] "Sonic Solutions Creates Industry's First DVD Pre-Mastering System; Industry's Top Content Providers Join 'DVD Production Alliance' to Create DVD titles," *Business Wire*: 3/20/1996.
[108]The system was unveiled at the National Association of Broadcasters' convention in Las Vegas in April with the support of Toshiba Corp., Warner Advanced Media Operations, and Daikin Industries.
[109] "Sonic Debuts Premastering System for DVD 1.0," *Business Wire*: 9/19/1996.

Patapsco Design, Thomson Electronics, and Warner Bros were all on board by year's end. With the additions of Apple, IBM, Foto-Kern, General TV Network, Intel Corp, and Sunset Post, the alliance worked to produce convergent software and hardware editing packages, electronics hardware, and authoring tools for creators of digital entertainment.[111]

The DVD Forum established formal strategies for controlling DVD technology and the fledgling DVD industry. Through the Forum's mission statement, the ten founding members were granted institutional control over all aspects of technological development. This hierarchical division of power delegated responsibilities while assuring that new industry members were not able to innovate outside of the desires of the central power structure. Through licensing and patent pooling strategies, these corporations solidified their position of dominance while maintaining direct control over the technology's applications and assuring their portion of revenues. Through partnerships with manufacturing collectives, these companies were assured that the product entering the marketplace would meet their collective demands under conditions they controlled.

INDUSTRIAL BEHAVIOR AND INDUSTRIAL CULTURES OF PRODUCTION

The DVD Forum was designed by its founding members to guarantee power and control through the structure of the organization, and the distinctive practices engaged by the Forum members in the production and distribution of the DVD solidified that control.

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[110] No other company offered video encoding, audio preparation and encoding, and authoring in a single, integrated environment.

These practices further ensured that control and power would be limited to a particular set of firms. The behaviors of industry members create and reflect specific values, beliefs, and patterns of working within the industry (Du Gay, Hall, et al 1997, p. 43). These values, in turn, become an integral part of the industrial way of life, informing inter-organizational decisions and activities. For instance, members of the Forum devised unified strategies to litigate against content pirates, develop industry-wide format standards, and enact protectionist barriers to thwart threats from rival formats like Divx. These behaviors inform the perceptions of member corporations within the industry about how "things are done." Outside observers also understand the Forum through these activities, according the industry with particular identities that are distinct from the identities associated with individual firms. Throughout this section practices will be identified that make it hard to categorize the DVD industry as a typical industry based on the commercialization of a singular technological product; the DVD industry became, through the collective behaviors of its constituent members, a cooperative cartel that worked to most efficiently exploit the assets and resources of the various companies engaged in the processes of commercializing the various formats, software, and hardware associated with DVD technology. These behaviors were, in turn, represented by the industry in particular ways and became an integral part of the Forum's attempt to create and maintain a distinctive industrial culture.

This industrial culture was established via actions taken by the Forum over the first five years of its existence (from 1997-2002), most notably their efforts to establish

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[111] "Apple, IBM join Sonic Solutions," by Paul Verna, Billboard: 9/28/1996.

technological standards, discourage rival formats, enforce licensing conditions, discourage conflicts, incorporate new members, maintain current members, and establish barriers to entry for rival firms with competing technologies. That culture developed in order to assure the success of DVD-Video and DVD-ROM, and the crucial software support supplied by Hollywood and the computing industry. This section accounts for the relative successes of the varying DVD formats. Without the influence of these two industries, formats other than DVD-Video and DVD-ROM failed to obtain widespread market dominance. The cooperative culture that was established surrounding DVD-Video and DVD-ROM was increasingly tenuous and unstable with recordable and audio DVD formats. The DVD Forum struggled to exercise its power and maintain unified technological standards as new iterations of the technology appeared in 1997 and 1998. Contrary to the case of DVD-Video, supplemental formats did not quickly supplant their technological predecessors, precisely because the hegemony established through the DVD Forum was challenged by firms splitting from the collective to release proprietary technologies. A number of key firms, including Sony and Philips, were engaged in an effort to challenge the Forum's authority and control. The Forum ultimately maintained its authority in the most crucial of industrial sectors: DVD-Video intended for playback of pre-recorded content. The cooperative culture established in the early days of the Forum pertaining to DVD-Video and DVD-ROM quickly shifted without the influence of Hollywood to a contentious industrial culture defined by a growing divide between Sony and Philips on one side and Matsushita and Pioneer on the other.

Dissention in the Ranks: Threats to the Forum's Collective Culture

The DVD Forum ensured continuing control over the DVD industry through their collective practices pertaining to format specifications and licensing. As early as 1997, the ten founding members of the Forum established their collective authority by announcing standards and practices for licensing logos, the standard DVD-Video format, as well as supplemental formats for recording onto DVD.[112] These announcements mark the first steps in the Forum's continuing effort to encourage industry members to agree to standards, thus avoiding consumer confusion and technological incompatibility between formats. On April 13, 1997, the Forum announced uniform standards for re-writable (DVD-RAM) and write-once (DVD-R) digital discs.[113] Not more than a week after the press release appeared, the trade press implied that the announcement was causing some derision within the ranks of the Forum.[114] Sony, after nearly a year of negotiating within the group to ensure adoption of its own rewritable and write-once format, was not happy the group decided to go forward with a standard not compatible with Sony's offer. Hitachi and Matsushita led the charge to standardize the format, reigniting passionate competition and distaste between Sony and Matsushita. Hitachi and Matsushita announced in late April that they would be first to market with PC drives based on DVD-RAM technology.[115] This struggle to establish a standard for re-writable discs marks the

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[112] The ten founding companies included: Hitachi, Matsushita, Mitsubishi, Philips, Sony, Thomson, Time Warner, and JVC.
[113] "DVD Forum Announces DVD-RAM and DVD-R Formats," *Business Wire*, April 13, 1997.
[114] "Tensions Seen in DVD Market, But Impact Small on Product," by Kenneth McCallum and Makiko Fukui, *Dow Jones International News*, April 17, 1997.
[115] "Matsushita Develops PD-Compatible DVD-RAM," *Jiji Press English News Service*, April 23, 1997; Hitachi Announces Worlds First DVD-RAM Drive; Samples of Recordable DVD Drive to Ship in June" *Business Wire*, April 23, 1997.

first internal conflict within the Forum represented to the public since the DVD-Video format specification had been announced. What was at stake in this conflict is clear: whether the equanimity between Matsushita and Sony that had resulted in the first ever global inter-industrial technological standard would survive.

Control over DVD-RAM and DVD-R technology was thought to be the next generation of huge windfall profits; the technology was designed to replace recordable media (VHS and CD-R) and would be sold as blank media ready for copying data or video content off of computers or television sets. Being first to market with these technologies, particularly the drive technologies, meant an enormous advantage in the marketplace; if a standard was agreed upon, new consoles, PCs and laptops could be marketed as "time-shifters" or as a more versatile version of the increasingly popular playback-only DVD-Video. Sony, Philips, and Hewlett-Packard split from the Forum and announced on August 12, 1997 that they would commercialize a competing standard for recordable disc technology.[116] The result of this announcement was to effectively open the floodgates to competing formats and consumer confusion. Sony's announcement led, in turn, to NEC's announcement the very next day that they would be developing their own standard.[117] The trade and popular press couched Sony's announcement as a sign of a forthcoming apocalyptic struggle for control. By playing up the divide between Forum members and the struggle for industrial control, the press

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[116] "Sony Pushes Alternative DVD Format," by Todd Zaun, *The Associated Press*, August 13, 1997.
[117] Known as Multimedia Video Format, the standard was designed to be compatible on PCs and consoles and would hold 5.25 GB of storage per side. "NEC To Push Its Own Format For Next-Generation Computer Storage," *Dow Jones Online News*, August 14, 1997.

encouraged the public to conceptualize the activities of industrial members as some sort of melodramatic format battle. Sony was cast as the villain, struggling to regain control of an empire it had lost. Most American publications referred to Sony's refusal to abandon Betamax, even after Matsushita's VHS technology had gained control of consumer market, as an analogy for the ensuing battle. A small sampling of the press, however, sought to understand the announcement in light of Sony's struggle to enter the PC market in 1996, explaining the effort as a way to correct that unsuccessful effort.[118]

Meanwhile, the Forum went ahead with their standards, proposing their standard to the European Computer Manufacturers' Association in an effort to establish global uniformity.[119] Sony's collective also submitted their standard and announced they would not support the Forum's proposal.[120] The Forum responded by attempting to court NEC back into the fold to strengthen their standard; NEC demurred. The Forum then demonstrated the "multibrand compatibility" of DVD-RAM during an event in Tokyo on August 25, 1997, ensuring its viability in the marketplace.[121] In September, Sony's consortia unveiled their DVD-RAM format just as the Forum was preparing concessions on the audio specifications for DVDs employing PAL standards for playback in Europe. The format battle for recordable and re-writable discs was well underway; Hollywood was nowhere to be found. For the content providers, support for DVD and participation within the Forum depended on the technology being read-only. Weighing in on the

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[118] "Sony, 2 others go own way on DVD-RAM format," *NIKKEI English News*, August 15, 1997.
[119] "Consortium Proposes DVD-RAM Format to European Body," *Jiji Press English News Service*, August 18, 1997.
[120] "Sony, Philips Electronics, HP Propose New Format for Storage Discs," *EDP Weekly*, August 18, 1997.

conflict over recordable home video technologies would have implied support for that technology. By January, the Forum had established a verification services system that allowed manufacturers to have their drives and discs confirmed as compliant with the standard, a major step towards mass commercialization of the product.[122]

What the lead-up to the conflicts over DVD-RAM illustrates is the fragile nature of the cooperative culture forged through the DVD Forum. Companies with long-standing animosities agreed to work together, sharing research and eventual profits to guarantee software support from Hollywood and the computer industry. While cooperative partnerships continued to proliferate as companies sought to develop economies of scale in research, development, production and marketing, and industry-wide practices aiming to guarantee the successful commercialization of DVD-Video and DVD-ROM continued with the support of Hollywood, conflicts between groups became more prominent. Each new format developed by the industry held the potential for enormous profit and increased industrial power. To cede that power to the collective meant supporting the established power structure at enormous cost to any company capable of producing proprietary technologies. Sony and Philips were not willing to continue their amicable behaviors established early in the commercialization of DVD. Arriving at a standard for DVD-Video and DVD-ROM was done only begrudgingly. The peace would not last; Sony's enlistment of Philips, meant that they were guaranteed a

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[121] "DVD-RAM Compatibility Shown" *Consumer Multimedia Report*, September 1, 1997.
[122] "DVD-RAM Verification Services Begin," by Martyn Williams, *Newsbytes News Network*, January 2, 1998.

market for their competing technologies in Europe. Hewlett-Packard's involvement ensured entrée into the U.S. computer market.

Perhaps more significantly, however, the growing conflicts within the Forum created a palpable tension within the steering committee meetings that threatened to undo the collective efforts designed to be mutually beneficial to all industry members. For example, at the December 1997 DVD Forum meeting at the Trianon Palace Hotel (the site of the signing of the Treaty of Versailles, significantly enough, which marked the end of World War I), the steering committee voted to adjust the language of the DVD-Video specification to allow for Dolby AC-3 audio formats on PAL DVDs. The adjustment would greatly improve the manufacturing capabilities and compatibility of platforms in Europe and was thought to be necessary for a successful launch of DVD-Video and DVD-ROM on that continent. Sony and Philips were the only two companies on the Forum's steering committee not to approve the measure.[123] Whether this decision illustrates a strategic move by Sony and Philips to attempt to restrict the launch of DVD-Video in Europe for some nefarious reason or simply was a demonstration of their ill will towards the other Forum members stemming from the DVD-RAM format conflicts, the significance of the vote lies elsewhere. Sony and Philips, along with their partners Hewlett-Packard and Ricoh, were engaging in a struggle for control that became symptomatic of the newly contentious industrial culture percolating within the industry.

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[123] "DVD Forum OKs Dolby's AC-3 As Audio Format for PAL DVD," *Multimedia Monitor*, January 1, 1998.

Warring Factions: Computer Companies Join the Forum

Meanwhile, the Forum's working groups continued their efforts to develop industry-wide standards for a variety of supplemental DVD formats. WG-4 DVD Audio, released a draft of technical specifications on January 7, 1998 in an effort to standardize the next-generation audio disc.[124] Sony and Philips did not participate, instead choosing to work towards their own proprietary format. Intel, the first computer company to join the Working Group, openly derided the separatist behaviors of Sony and Philips, contributing to the bifurcation of companies and the growing cultural divide within the Forum.[125] Pioneer and Matsushita unveiled plans for DVD-R/W on February 1, proposing a rewritable disc that would be cross compatible with read-only drives, a function DVD-RAM was unable to perform (see figure 4.4).[126] DVD+RW, developed by Sony, Hewlett Packard, and Philips outside of the auspices of the DVD Forum, was demonstrated in March as an erasable format to compete with DVD-R/W.[127]

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[124] "WG-4 Delivers Draft DVD Audio Specifications to Audio Companies and Associations," *Business Wire*, January 7, 1998.
[125] "Intel Joins DVD Working Group, Snubs Sony and Philips," *Computergram International*, February 26, 1998.
[126] "Pioneer proposes DVD-R/W," by Dana J. Parker, *EMedia Professional*, February 1, 1998.
[127] "DVD+RW Gets First Public Demonstration," by Martyn Williams, *Newsbytes News Network*, March 23, 1998.

Figure 4.4: Writable DVD Overview

DVD-RAM 1.0	DVD-RAM 2.0	DVD-R 1.0	DVD-R 2.0	DVD-RW 1.0	DVD+RW 2.0
First available (US)					
1998	2000	1997	1999	2000	2001
Capacity					
2.6 GB/side	4.7 GB/side	3.95 GB/side	4.7 GB/side	4.7 GB/side	4.7 GB/side
Backers					
Hitachi, Matsushita, Samsung, Toshiba	Pioneer	Pioneer, Ricoh, Sharp, Sony,	Hewlett Packard, Philips, Sony, Yamaha	Thomson, Mitsubishi, Ricoh, Yamaha	

Source: Jim Tayler (2001), DVD Demystified, Second Edition

The Forum's officially supported formats, which did not include DVD+RW, were championed by the collective marketing resources of Forum members, an effort to convey to consumers the superiority of the Forum's formats over Sony's.[128] Sony, taking a cue from their Forum counterparts, formed the DVD+RW Compatibility Alliance with Philips, Hewlett Packard, Ricoh, Mitsubishi, and Yamaha Corp. to pool resources, develop standards, and challenge the hegemony of the Forum. In an effort to resolve the format disputes within the organization, the Forum invited seven new companies to join the steering committee (the seven new members included IBM, Industry Technology Research Institute of Taiwan, Intel, LG Electronics, NEC, Samsung, and Sharp); by opening membership the committee divested the seat of power, bringing disgruntled

technology developers into the power structure to effectively unify the disparate attempts to control writable DVD.[129] In a separate effort to unify the disparate technologies, 29 manufacturers joined together through the Optical Storage Trade Association (OSTA) to "forge a common format for digital video disks [sic] they hope will cut a swath through the labyrinth of competing approaches to rewritable DVD."[130]

The expansion of the steering committee also marked a shift in the Forum's distribution of power across its three constituent industries. The inclusion of IBM and Intel on the steering committee changed the dynamics of the Forum irrevocably; the two leading global computer companies now had direct influence over the form and function of the technology for use on computers. These two companies also played a significant role in the development of the DVD-Audio specifications, working with Matsushita and Toshiba to develop content protection technology, thus finally clearing the path to market for the format by March 1999.[131] Additionally, the inclusion of the Industry Technology Research Institute of Taiwan demonstrates that the long-standing animosity between Japanese and Taiwanese electronics manufacturers could be reconciled. Matsushita, the chief antagonist to the Taiwanese industry, dramatically changed its practices to challenge Sony, vowing to champion DVD in partnership with the ITRIT in the Taiwanese market. The Forum also went so far as to challenge Sony and Philips publicly,

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[128] "Forum: Family of discs to offer added value, simplicity," *TWICE*, March 30, 1998.
[129] "DVD Committee expands to combat disputes," *Screen Digest*, June 1, 1998.
[130] "Group Hopes to Unify Recordable DVD Factions," by Junko Yoshida, Terry Costlow, and George Leopold, *CMP TechWeb*, January 11, 1999.
[131] "IBM: Technology companies and music industry agree on framework for DVD-audio content protection," *M2 PRESSWIRE*, March 5, 1999.

asking them in a press release to "stop referring to their rewritable products as DVD."[132] Finally, to resolve the standards issues over writable DVD formats, the DVD Forum announced in December 2001 hardware specifications designed to ensure compatibility between all Forum-supported formats. "DVD Multi" was intended to alleviate consumer confusion and spur adoption of DVD recordable drives and consoles. However, because the format did not support the DVD+RW and DVD+R formats from the Sony collective, DVD Multi failed to galvanize the public.[133]

Regardless of the success or failure of supplemental formats, the Forum's continuing control and power was assured. If the Forum could not control the technology and its profits through unified standards, they could guarantee that competing technologies would not have free reign over the marketplace. If the Forum could not guarantee that member firms would remain in the collective, working towards the greater good of all members, they could ensure that those members would achieve limited success challenging the hegemony of the collective. The seat of power within the Forum could be manipulated to thwart challenges from expatriate members; new members with enormous resources could be encouraged to support Forum technologies over those of competitors. The activities of the Forum established a way of dealing with threats to power and control that proved to be efficient and profitable. When faced with challenges, the Forum enlisted its member companies in collective practices that supported the Forum. When faced with new technologies that could disturb the order established by the

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[132] "Forum Tells Renegade Members: Customers Will Be Confused by DVD+RW Name," by Doug Olenick, *Computer Retail Week*, April 13, 1998.

collective, the Forum turned up the pressure to enlist new members or to attain additional support from existing ones. If a new technology based in playback of pre-recorded content emerged, the Forum turned up the pressure on its software constituency to include more of its counterparts (ie the other members of the Big Six) and to provide more titles. Acting as a collective organization, with the blessing of the U.S. Department of Justice (as discussed in chapter six), the Forum could restrict competition and set prices for hardware and software through unofficial guidelines. In so doing, the organization developed specific strategies for control; these strategies percolated and manifested into a culture of production that ensured that the technology and the content embedded within its layers would perform in particular ways through a limited set of design elements and user interfaces, agreed upon by all members of the Forum and their employee designers. The struggle for control over supplemental formats, however, did solidify practices and strategies for maintaining power established by the unified collective in the early stages of industrial development.

While the conflicts over writable DVD formats led to expansion of the power elite and challenges to the hegemony of the Forum, power and control were maintained through the practices of the collective relative to DVD-Video and DVD-ROM. The DVD Forum and its constituent members behaved in particular ways to establish and maintain control through licensing strategies, establishing and supporting technological standards, patent enforcement, verification practices, and lobbying and litigation efforts to protect the technology from piracy. By acting as a collective organization to combat threats from

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[133] "What is DVD Multi?" by Ralph LaBarge, *Digital Video Magazine*, November 1, 2002.

rival technologies, including writable formats from Sony's collective, the Forum ensured that the successful introduction of any new DVD platform required the support of the collective.

Outside Challengers: The Case of Divx

This collective power held by the Forum constituents and the viability of their control of the DVD marketplace was most evident in the case of Divx. While Divx was developed and commercialized by Circuit City and Thomson as a supplemental rental platform not intended to directly compete with DVD, the Forum refused to include the specification amongst its supported formats. Through this action, the Forum discouraged the manufacturing of Divx technologies by member firms. This decision was then supported by the activities of key software leaders within the Forum. Warner Home Video, for instance, sent a memo to retailers in December 1998 stating that they would not receive advertising support from Warner if they promoted any Warner products in conjunction with "any alternative or variant optical disc technology, including both video software and hardware (excepting only laserdisc technology)."[134] Threatening the retailer was a strategy supported implicitly by the Forum, as Time Warner was a founding member of the steering committee and the most vocal proponent of DVD over Divx. By enacting protectionist strategies to support the early diffusion of DVD, the Forum restricted competition and guaranteed that any competing technologies would have limited access to the industrial infrastructure created and manipulated by the Forum.

Figure 4.5: Dates the Studios Committed to DVD & DIVX Formats

Major Studio	DVD Date	DIVX Date
Warner (HBO, New Line)	Before players were available	Did not release in format
Columbia	Before players were available	Did not release in format
MGM/UA	Before players were Available	March 1998
Universal	July 1997	September 1997
Disney (Buena Vista)	August 1997	September 1997
Paramount	April 1998	September 1997
20th Century Fox	August 1998	February 1998

(source: Dranove, David and Neil Gandal. "The DVD vs. DIVX Standard War: Empirical Evidence of Network Effects and Preannouncement Effects" *Journal of Economics and Management Strategy*, 2003)

Plans for Divx's launch, meanwhile, employed a similar strategy to that utilized by the Forum with DVD; Divx was set to launch in the San Francisco and Richmond, Va. test markets prior to its nationwide release.[135] With support from Disney, Fox, Dreamworks, Paramount, Universal, and MGM, the technology seemed to have the necessary software support to be a viable entrée into the nascent DVD marketplace. However, these firms only released 25 titles to Divx and players and discs were only made available through Circuit City, Ultimate Electronics and Good Guys stores.[136] Divx's strategy to enlist the support of the studios was to guarantee minimum compensation of $112 million, distributed between the studios between 1999 and 2004. [137] This cash payment was intended to guarantee software support from some of the leading content providers. Several crucial mistakes in this agreement virtually

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[134] "Warner warns retailers away from Divx," by Brett Sporich, *Video Business*, December 7, 1998.
[135] "Divx Delayed Again," by Paul Karon, *Daily Variety*, May 27, 1998.
[136] Ibid.

guaranteed the unsuccessful launch of the technology: 1) cash payments were guaranteed to the studios regardless of the performance of the technology in the marketplace; 2) the pay-outs did not guarantee exclusive support of Divx over DVD; 3) the fact that the technology was proprietary and owned by a major electronics retailer eliminated support from other major retailers; 4) Divx could not enlist the support of Time Warner, whose investment in DVD ensured their exclusive support of that technology; 5) Circuit City could not compete with the collective resources of the DVD Forum in marketing, technical support, and interaction with regulators. Without the support of the Forum or a consortium of major companies supporting the technology, which could have encouraged widespread manufacturing of Divx players that would have been made available through all major retailers, the technology was doomed to fail. Divx did just that. The Divx rental system was created in 1998 in time for the holiday season and was discontinued on June 16, 1999 after consumers failed to embrace the technology.

Software Distribution: Establishing a DVD Model

While Divx failed in its efforts to commercialize a competitive or supplemental DVD technology, DVD-Video and DVD-ROM were primed to enter the marketplace with the full support of all three constituent industries in 1997 and 1998. Within each Working Group, tasks were divided amongst members according to the relative resources and expertise of the company. This division of labor and communal atmosphere permeated the industry, spreading from the Forum into all sub-activities of the industry. In the manufacturing sector, firms pooled resources and established packaging standards

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[137] "Divx training manual," from www.thedigitalbits.com.

at the behest of the Forum. In the software section, the major studios, drawing on their experience in the VHS home video market, partnered to distribute each other's films in international markets. These relationships had been established in the mid-1980s as a way to share costs while capitalizing on strengths of particular studio's distribution networks around the world. In some cases, these partnerships would not last once the DVD revenues started pouring in. For instance, MGM/UA entered into a long-term agreement with Warner Home Video in 1990, granting the rights to distribute both new releases and library titles for a percentage of worldwide home video revenues.[138] This agreement was scheduled to expire in May 2003; in 1999, MGM negotiated an early out that returned their home video rights for $225 million.[139] MGM/UA handled the distribution of their own product in the domestic market from February 2000 onwards, but negotiated a new deal with Fox to distribute titles internationally, maintaining "broad powers to direct and control the handling of [our] home video product."[140] While these deals were increasingly commonplace in the home video market after DVD, collectively the studios maintained control and market share through branded product lines, cohesive large-scale advertising campaigns, and targeted, strategic releasing strategies.

The major studios also devised a collective strategy to increase revenues in shifting to DVD: revenue sharing with the home video retailer. While each studio was responsible for cutting their own deals with rental retailers and dealt directly with major

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[138] "Home Video Distribution," MGM filing with SEC; quoted herein from www.healthdomain.co.ut/film/m_video-distribution.html
[139] Ibid.
[140] Ibid.

retailers for sell-through, they cooperated to establish guidelines for revenue sharing contracts and technologies.[141] Revenue sharing was sold en masse to the rental retail industry as the new business model for home video. Under this new arrangement, retailers lowered the initial cost of acquiring product while sharing the revenue of each new release with the studios, typically for at least the first six months a title was in circulation. The studios could then recoup a percentage of the profits from the retailers, instead of selling titles outright at high prices and not receiving profits as the title was rented repeatedly. Lower priced (read low-performing box-office films or direct-to-video titles) were purchased outright and were not subject to revenue sharing terms. Most early revenue sharing programs employed by the studios guaranteed an increased stake in the exploding home video market through "output programs."[142] Similar to "block booking" employed by the studios prior to the 1948 Paramount Decree, output programs required that rental retailers carry every new release distributed by the studio. Additionally, these programs mandated that a guaranteed amount of revenue be returned to the studio for each release, regardless of its performance in the store. Blockbuster hits would easily return the minimum to the studio, with profits left over for the retailer; lower performing new releases often failed to return the minimum guarantee and resulted in losses for the retailers. When the retailers balked, threatening anti-trust litigation, the studios devised "non-output" agreements that permitted the retailer the option of either taking in large quantities or purchasing a title outright through a distributor for rental.

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[141] See appendix 4.3 for an example of a revenue sharing contract between a major studio and a major rental retailer.

Early in the development of industrial strategies related to DVD, the studios were willing to license titles to niche independent distributors who would package the film with supplemental content as "special edition" discs. Companies like Criterion Co., which had made a name for itself through high-quality transfers and supplements on laserdisc, could exploit this specialty market, packaging titles with high quality, widescreen transfers and a glut of originally-produced supplemental content at premium prices.[143] However, as the studios recognized the profitability of the DVD market, they trended towards maintaining control of their own product and producing supplemental features in-house. This shift away from the independent distributor led to increased control and profits for the majors, while limiting the variety and type of content available on the disc.

The "mainstreaming" of the DVD market has also resulted in multiple iterations and releases from the studios, increasing the profit margins as consumers willingly purchase multiple versions of their favorite movies on disc. Furthermore, the fact that the studios moved away from licensing titles to independent distributors greatly reduced the number of distributors in the marketplace. The studios, by simply maintaining their distribution rights to titles produced under their corporate parents, have effectively taken control of the industry's most lucrative division. The fact that these six studios have gained control over the distribution of DVDs is not surprising; as the DVD industry developed and partnerships between major studios became the norm, they established a

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[142] "Video Update Inc. Annual Report (10-K) Item 1: Business" SEC Filing, 9/11/00.
[143] See appendix 4.4 for a list of DVD Distributors by production company.

collective strategy in all areas pertaining to DVD. One important side effect of the increasingly cooperative studio relationships in the home video market, particularly in its developmental period, was the establishment and control over pricing. Software titles from partnered studios were priced similarly for sell-through based on the developing market, duration in release, and box office performance. Titles that were unqualified hits were priced higher than their underperforming counterparts, regardless of the studio that produced them. By virtue of these cooperative distribution deals, all titles were priced along a continuum from about $19.99 to $29.99.

DVD DIFFUSION

Strategies for control and power in the DVD marketplace were not restricted to hardware and manufacturing sectors, the behaviors of the Forum or its individual members. The market segment that offered the most promise for windfall profits, and the power derived from them, was software and pre-packaged content. Controlling the software market meant performing in the marketplace under the conditions stipulated by the Forum's structure and behavior. As the 1990s computer industry demonstrates, software and content providers like Microsoft displaced hardware manufacturers like IBM as the leading profit earners, resulting in a dramatic shift in the industrial power structure. Software providers influenced the culture developing within the Forum, while establishing a new software sales and rental model. The involvement of the content providers in the DVD marketplace would play an imperative role in the success of DVD. Without supporting content from the Hollywood studios, the format could not achieve widespread market penetration or replace existing home video technologies. While it

was a foregone conclusion that Time Warner/Warner Bros. and Sony/Columbia would release titles on DVD, given their involvement in the development of DVD technology, the other members of Hollywood's oligopoly were initially hesitant to support the digital format.

Regardless of the fact that the DVD Forum worked cooperatively with the studios in establishing a technical standard for playback of pre-recorded content, the content providers recognized that the new technology would need to be copy-protected before widespread support was offered. While five hundred features from Warner and MGM/UA were committed in 1996 and MCA/Universal and Columbia TriStar were vocal supporters of the new format, Disney, 20th Century Fox, and Paramount initially remained quiet. On March 24, 1997, Time Warner released 32 titles to New York, Chicago, Dallas, Los Angeles, San Francisco, Seattle, and Washington D.C. Columbia Tri-Star Home Video withheld product until April 29, citing the difficult production process and the desire to "show off the quality of the new digital medium, not offer a 'marginal' alternative to VHS."[144]

Limiting release to stores in seven initial cities enabled the software/content providers time to produce more titles before the technology hit the mass market. All of the content providers were concerned about copyright, pricing issues, revenue sharing, the threat or promise of Divx, and packaging standards. Three key developments between March and December of 1996 quelled concerns and encouraged some of the studios to move forward: (1) A multi-industry Copyright Protection Working Group

agreed in October of 1996 on copyright technology designed as a picture-based encryption scheme to prevent unauthorized copying of motion pictures and other content from pre-recorded DVD video;[145] (2) Thomson/RCA set hardware pricing guidelines for DVD players at $499 suggested retail list;[146] and (3) Clear-Vu products introduced an alternative DVD jewel-box design meeting VSDA standards while challenging Time-Warner subsidiary Ivy Hill, then sole manufacturer of DVD packaging.[147] By establishing a copyright standard content providers were assured that there would be a technological protection scheme embedded both on the disc and within the player and that their content would be protected from piracy, at least initially. The existence of Divx as an alternative technology with "better" copyright protection restricted full support from the studios. After large cash payments were offered by Divx's progenitor Circuit City to Fox, Paramount, and Dreamworks, those studios agreed to support Divx over "open-source" DVD through 1997 and the first half of 1998.[148] By late 1998, all of the major studios had announced their support of the DVD format, either exclusively, or in combination with their support for Divx. Meanwhile, hardware pricing guidelines assured the studios that the manufacturing sector would supply the market with accessibly-priced consoles that would not restrict early adoption of the format.

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[144] Ibid.
[145] "Groups reach DVD accord; Pioneer, Samsung ready," by Kristen Kenedy, *Computer Retail Week*: 11/4/1996.
[146] "How the disc was spun; vision and compromise lead to one of the most successful consumer products of all time," by Scott Kirsner, *Daily Variety*, April 24, 2007.
[147] VSDA (Video Software Dealers' Association) is an industrial organization that works with the DVD Forum to recommend standards for retailers; "Contention clouds pending DVD intro," by Seth Goldstein, *Billboard*: 3/9/1996.
[148] "Revenge of the 'Early Adopters,'" by Andrew Leonard, *Salon*, April 29, 1998.

Packaging standards allowed DVD products to be seamlessly integrated into existing retail shelves alongside VHS tapes, securing its place in the retail distributorship as a designed-for-sell through product.

DVD-Video Performance

Control and market share in the home video content/software market for DVD was dictated by the studios' release strategy, existing library of titles, market position relative to VHS, and timing entering the market. The first studios to release on DVD had the advantage over their laggard counterparts. On March 24, 1997, Warner Home Video released thirty two titles on DVD in the aforementioned seven test markets. Time Warner devised a release strategy to exploit their library of titles, at that time the largest in the industry, by partnering with MGM/UA, HBO, New Line, and Warner Bros. to release a variety of titles for sell-through at prices ranging from $19.95 to $24.99.[149] On August 26, 1997, Warner Home Video went nationwide, releasing 61 titles.[150] Time Warner had the early competitive advantage by virtue of their wholesale support for the technology, library of titles, and early entry into the market. Warner Home Video, under the leadership of Warren Lieberfarb, had established and maintained the leading market position through exploitation of titles for sell-through and rental on VHS. With DVD, they would employ a similar strategy, releasing both blockbusters, led by their *Batman* franchise, and popular library titles like the *Bond* series (through MGM/UA) and classics

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[149] "DVD Historical Timeline," by Stephen Czar, DVDFILE.com

[150] For a complete list of titles released in 1997 by Warner Home Video, see Appendix 4.1.

like *Bonnie and Clyde* and *Cool Hand Luke*. The success of DVD software sales was predicated on the technology serving as a home video feature film delivery platform. "DVD's performance has been strong, and our numbers prove it. Driven by sales of both new releases and catalog titles, we had total revenues of over $50 million, and we expect 1998 to be even better," said Warren Lieberfarb, president of Warner Home Video.[151] Of the $50 million generated by DVD sales in 1997 catalog revenues totaled $40.6 million, 81% of total DVD revenues, while new releases accounted for only 19%.[152] Warner Home Video sold more than three million DVDs in 1997 to retailers from the stock of 61 titles released. The top five 1997 DVD titles from the Warner family sold as follows:

Figure 4.6: Top selling DVD Titles, Warner Home Video, September-December 1997

Titles	Units	Wholesale Revenues
Batman & Robin	91,521 units	$1,486,301
Twister	86,840 units	$1,410,282
Eraser	79,806 units	$1,296,049
Blade Runner	64,791 units	$1,052,206
The Fugitive	61,093 units	$ 992,150

Source: www.timewarner.com

[151]Warner Home Video Press Release, January 8, 1998, "Warner Home Video DVD Revenues Top $50 Million; Collectible Classics Account for More Than 80 Percent of Warner Home Video DVD Revenues" from www.timewarner.com
[152] Ibid.

While the other studios debated entering the DVD market or the Divx market, Warner Home Video established dominant market position. Independent content providers, led by Simitar Entertainment, rushed to fill the gap.[153] Disney, a leading player in the VHS market through their wholly-owned subsidiary Buena Vista Home Entertainment, refused to release any of its animated classics on DVD until Divx folded in 1999. Instead, Disney released its live-action catalog and new releases on DVD, including *Ransom*, *Phenomenon*, *George of the Jungle*, *Tombstone*, *Homeward Bound: An Incredible Journey*, and *Nightmare Before Christmas*.[154] Disney, along with Paramount, Universal, and Dreamworks agreed to release 100 titles to support the launch of Divx. Figure 4.5 illustrates the rush to market and the desire by the Big Six to dominate the fledgling DVD business. Compare these staggering numbers to the number of theatrical releases and new releases priced for direct-sales on VHS prior to DVD: from 1995-2002, the number of new MPAA films released theatrically remained between 400 and 500 titles; in 1995, there were only 22 theatrically released titles introduced on VHS at sell-through prices; even with this market expanding prior to DVD, only 63 theatrical titles were released for sell-through on VHS in 1998.[155] By 1999, DVD was established as a delivery mechanism for feature films. The major studios divided the

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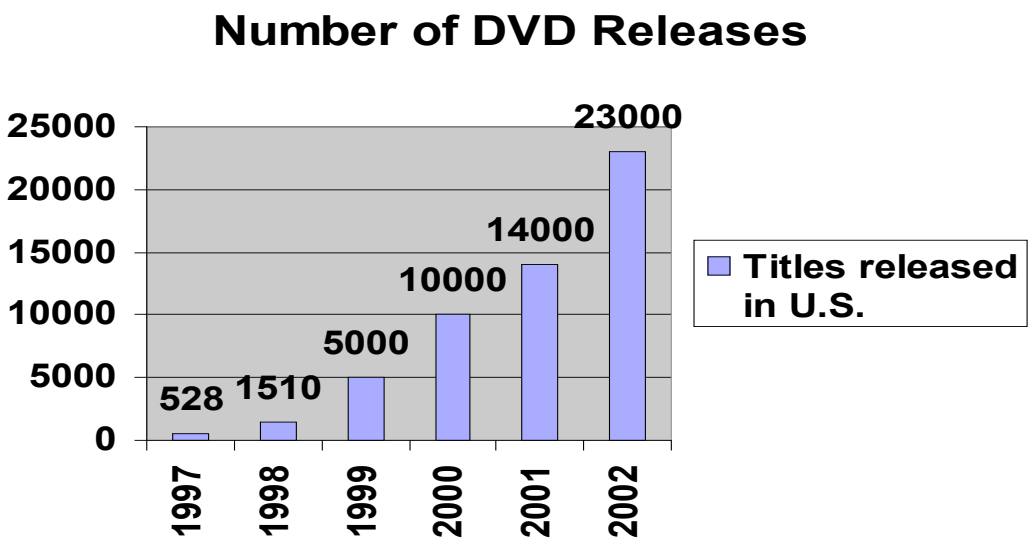
[153] "DVD vs. Divx" by Seth Goldstein, *Billboard,* 1/10/98, vol. 110, issue 2.
[154] Ibid.
[155] VSDA Reports, 1997, 1998, 1999.

market amongst themselves, based on the depth of their existing libraries and the theatrical successes of their new releases and blockbusters.[156]

Figure 4.7: Feature Films Released on DVD-Video in the United States



Source: Jim Taylor, www.dvddemystified.com

[156] By 1999, the leading software suppliers on DVD for feature films (in descending order) had been established: Warner Bros./Warner Home Video was first with around 20% of the rental and sell-through markets; Buena Vista controlled around 16% of those markets; Columbia/Sony claimed around 14% of the rental market and 11% of the sell-through market; Universal had around 10% of the sell through and around 13% of the rental market; Fox reported around 10% of sell-through and around 11% of rental; Paramount claimed around 7% sell-through and about 10% of rental; MGM carried about 6% of each market, with the remaining 8% of the rental market and 17% of the sell-through market controlled by independent specialty companies marketing sports and children's programming. White Paper, "The US Home Entertainment Market" by Marshall Forster, EVP Home Entertainment, Columbia Tristar.

The DVD-Video retail market was controlled by the largest mass market retailers working with the studios and their conglomerate parent companies. Because the studios changed the existing rental model in favor of sell-through with DVD, they alone could dictate which stores were granted access to titles and depth of inventory. New strategies for control and market share emerged, as retailers jockeyed for position, cutting deals with the studios to sell and market DVDs in their stores nationwide. Setting the price of DVD titles according to the studios' guidelines, these retailers were offered a percentage of each disc sale. With titles competitively priced between retailers, marketing efforts for the retailers stressed depth of inventory and supporting technologies.[157] Many sought to offer "one-stop shopping" for DVD players, titles, and televisions, thus increasing sales of peripheral technologies. Because the DVD Forum had established a single technological standard for DVD-Video, both retailers and consumers could be assured that the discs being sold in stores would work on DVD players available one aisle over.

Instead of dealing with rental distributors and wholesalers, the studios formed direct sales relationships with the largest existing online and "four-wall" retailers. Rather than limiting these relationships to specialty retailers selling only VHS or music content, the studios capitalized on the explosive growth of mass-merchant companies selling everything from electronics to clothing and foodstuffs (see figure 4.6). DVD-Video titles offered these retailers an opportunity to branch out into a new and lucrative business with little to no investment to change the existing retail infrastructure. DVD packages were

[157] The average price point for DVDs in 1997 was $24.60; 1998 $25.32; 1999 $25.86; 2000 $22.91; 2001 $20.74 (source: DVD Release Report, 1.16.02)

specifically designed to fit into the existing shelves devoted to VHS display. While DVDs were fitting into the retail infrastructure (pun intended), they were also impacting the layout and design of floor space in large retail outlets. By positioning DVD titles strategically at the back of their stores, retailers hoped to lure consumers into purchasing additional goods on their way to or from the DVD section. Best Buy, the leading retailer of DVDs by 2000, positioned DVD titles at the rear of their enormous stores, strategically positioned next to televisions and DVD consoles. Additionally, Best Buy adapted quickly to DVD's popularity, expanding its DVD section more than half a dozen times between 1997 and 2000 at the expense of VHS shelf space. Best Buy's subsidiary Musicland rapidly converted to DVD and saw more than 40% of their total sales attributed to DVD by 2000.[158]

Figure 4.8: Top 10 DVD Sellers (2001)

Rank	Company	U.S. Outlets	DVD Rev. (M)
1	Wal-Mart	2713	$905.5
2	Best Buy	478	$746.6
3	Musicland	1336	$393.7
4	Costco	280	$388.1
5	Target	1055	$359.0
6	Circuit City	632	$308.0
7	Suncoast	400	$193.7
8	Amazon.com	N/A	$180.6
9	Blockbuster	5374	$160.0
10	Kmart	2114	$137.6

Source: Video Store Magazine, 2001

[158] VSDA (2001), "Annual Report on the Home Entertainment Industry."

Meanwhile, the video rental market remained under the control of the largest rental retailers (see figure 4.8). The ten largest rental chains accounted for $3.9 billion in revenues in 1999 alone, some 47% of total rental spending.[159] By the end of the 1990s, there were between 24,000 and 25,000 video rental specialty stores in the United States, with an increasing number controlled by the two largest rental chains, Blockbuster Video and Hollywood Video.[160] These retailers were in the process of consolidating and altering their business models to cope with DVD and the direct-sales model. Beginning in 1997, Blockbuster Video and Hollywood Video entered into revenue sharing deals directly with the Hollywood studios in an effort to adapt to DVD. The studios, under this arrangement, lease cassettes or discs to the retailer, who pays around $5.00 to cover shipping and then shares a percentage of the revenue from each rental with the studio. The percentage shared varies from title to title, with an average range of 45-60%.[161] The largest retailers negotiated directly with the studios, eliminating the wholesaler entirely; smaller stores could deal with wholesalers who arrange revenue sharing agreements with the studios, keeping 5% of each rental.[162] Under this arrangement the studios reaped more revenue per store from a given title while rental retailers had more copies on hand.

The impact of DVD on the rental business was enormous; the shift to a revenue sharing model completely altered the existing business model and reduced the revenues and power of the top two chains. In so doing, the rental market was opened to new

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[159] VSDA (2000), "Annual Report on the Home Video Industry"
[160] VSDA (2000), "Annual Report on the Home Video Industry"
[161] Ibid, pg. 14.
[162] Ibid.

competitors for the first time since the success of Blockbuster in the 1980s. DVD pushed rental of content online, where retailers like Netflix created a subscription based rental service that mirrored direct-mailing strategies while employing the new revenue sharing model. Customers could browse for titles online and have them sent directly to their stores from a regional distribution hub, returning titles via mail after they were viewed. Through online distribution Netflix restructured the rental industry dramatically; Blockbuster was forced to close thousands of stores and eventually (in 2006) moved into online rentals themselves.

Figure 4.9: Top Ten Video Rental Chains, 2001

Rank	Company	Total Number U.S. Outlets	Total VHS/DVD Rev. (M)
1	Blockbuster Inc.	5,374	$3,550.0
2	Hollywood Entertainment	1,801	$1,201.7
3	Movie Gallery	1,315	$306.2
4	Kroger	2,401	$245.0
5	Albertsons .	2,600	$151.0
6	Family Video	237	$144.0
7	IGA	1,715	$95.1
8	Safeway	1,559	$72.1
9	Giant Eagle	204	$51.9
10	Meijer	152	$39.6

Source: Video Store Magazine (2001) and SEC Reports

DVD-ROM Performance

Control over the DVD-ROM software market largely was dictated by existing market share in the IT software industry and the filmed entertainment industry. Microsoft established a dominant position in the market by virtue of their global dominance in the IT software industry and by being the first major industry member to

release DVD-ROM titles, as early as 1997. The Big Six included DVD-ROM features on their DVD titles to encourage consumers to visit studio websites where other media products could be advertised. Still, enthusiasm for DVD-ROM was palpable. "DVD is already changing the way we think about the personal computer. As the natural successor to CD-ROM, DVD will be in tens of millions of PCs by the turn of the century," said Bryant Frazer, an editor of DVD Report, in a leading DVD newsletter in late 1998. "That means tens of millions of PCs with high-quality full-motion video, digital surround-sound capabilities, and a universe of possibilities on every disc - from educational products like Encarta to electronic commerce to DVD-based Internet environments."[163] However, the DVD-ROM market failed to meet lofty expectations. Software publishers were slow to convert existing CD-ROM titles to DVD-ROM or publish wholly new titles for DVD-ROM. Even with an installed base of 75 million DVD-ROM drives in the United States by 2002 and 140 million worldwide (almost twice the number of DVD-Video players), ROM titles did not materialize.[164] ROM titles were expected to include games, computer software titles, and educational materials incorporating video and interactive functionality. Several reasons for this dearth of titles explain the discrepancy between DVD-Video's success and DVD-ROM's failure: price of drives/computers; the rising popularity of recordable CD-ROM drives; the rising popularity of online distribution for content traditionally distributed via disc; a shortage of components available to computer manufacturers needed to equip machines with the DVD-ROM

[163] Microsoft Press Release, "DVD Delivers Enhanced Content and Relief From Disc-Swapping In Encarta Reference Suite 99 and Encarta Encyclopedia Deluxe 99,"REDMOND, Wash., Nov. 23, 1998.

drive prior to 2001; and complicated and unreliable upgrading technologies to outfit existing computers with DVD-ROM drives.[165]

With the personal computer market thriving in the late 1990s, stimulated by increased competition between Japanese and American manufacturers, prices in the United States were falling to below the $1000 threshold. DVD-ROM drives, more expensive to produce than their CD-ROM counterparts, increased the price of personal computers by at least fifty dollars. In a competitive market where the CD-RW drive offered recording functionality, the DVD-ROM was more expensive and less practical for consumers. According to IDC, CD-RW drives enjoyed global sales of 1.2 million units in 1997 and 4.8m units in 1998.[166] CD-RW served as a bridge between CD-ROM and recordable DVD-ROM drives for many consumers who did not initially embrace the promise of DVD on computers. Even consumers who wanted to purchase computers with DVD-ROM drives were sometimes left wanting; Hitachi converted all of its manufacturing infrastructure to DVD-ROM, but was still unable to quickly produce enough machines to penetrate the marketplace. The software industry hedged its bets, failing to embrace the conversion of the existing base of 46,000 CD-ROM titles. Instead, they continued to produce CD-ROM titles and began distributing content online. "It makes sense to buy a product for the computer on the computer, but it won't happen overnight," Ted Pine, president of InfoTech, Inc., the market research and consulting firm

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[164] www.dvddemystified.com/dvdfaq.html
[165] "Creative Labs and the Chicken and Egg," February 15, 1999. *Inside Multimedia,* issue 186; Phillips Business Information, Inc.
[166] Ibid.

based in Woodstock, VT concluded.[167] "Software publishers are on the whole more rational and trying to plan better. In the early days of CD-ROM, and again in 1995 with the Internet, there was a lot of 'me too' rushing to get out there. As the industry consolidates, publishers are being increasingly sensible," he continued.[168] Consolidation in the software industry not only contributed to the lack of support pertaining to DVD-ROM, it was symptomatic of the industrial desire to challenge the supremacy of Microsoft. Through a series of mergers and acquisitions, a handful of computer-based DVD-ROM content providers emerged. Led by Multimedia 2000, Digital Leisure, Interplay and The Learning Company, the early leaders in the DVD-ROM market produced prepackaged content designed for educational and specialized consumer gaming markets. However these titles were limited to less than one hundred, and did not represent a significant threat to the entrenched CD-ROM industry. To make matters worse, converting existing personal computers required complicated and often expensive technology, including retrofitting existing chips to operate with MPEG-2 decoders. Even with an upgrade, many early DVD-ROM drives would not reliably play DVD-Video movies on computers, thought to be the basis of early adopter enthusiasm.

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[167] "DVD-ROM & the software industry: the new format is experiencing a slow shift from CD-ROM," by Louise Moore Williams, November 1, 1998. *Tape-Disc Business*. Gale Group Inc.
[168] Ibid.

Figure 4.10: Early DVD-ROM Game Titles for PCs

Performance of Selected DVD Game Titles For Ytd 98 (Jan-Oct)

Title	Publisher	Format	YTD98 $	YTD98 Units
Tex Murphy Overseer	Access	DVD Win 95/NT	$1,187,027	27,628
Riven	Learning Co.	DVD Win 95/NT	$140,196	3,167
Journeyman Project 3	Learning Co.	DVD Win 95/NT	$68,015	1,522
Dragon's Lair	Digital Leisure	DVD Win 95/NT	$37,532	1,022
Virtual Pool II	Interplay	DVD Win 95/NT	$11,267	212
Star Trek: Starfleet Academy	Interplay	DVD Win 95/NT	$7,111	139
Totals:			$1,451,148	33,690

Source: PC Data

The DVD-ROM software market did not materialize as a competitive alternative industry to DVD-Video until the turn of the early 2000s. In fact, the number of DVD-ROM titles remained below one hundred throughout the 1990s (compare to the 10,000+ DVD-Video titles available in the U.S. by 2000). As late as 1999, DVD-ROM-only titles represented only 1.2% of the CD-ROM market.[169] The vast majority of the software market for computers equipped with DVD-ROM was controlled by Hollywood content providers equipping their movie discs with DVD-ROM features or IT software companies "bundling" software with hardware. It was not until Sony and Microsoft released their next generation gaming consoles that DVD-ROM software became a viable market. While Nintendo offered its "Gamecube" in October 2001 and Sega introduced its "Dreamcast" in September 1999, neither integrated the DVD-ROM into their gaming

hardware and both failed to attain widespread market success as a result. Sony introduced its "PlayStation 2," bundling a DVD-ROM drive with a 300-MHz Toshiba processor and an Ethernet peripheral and quickly sold more than 10 million devices.[170] By 2002, Sony achieved an installed base of more than 41 million consoles worldwide.[171] Sony developed partnerships with Japanese content providers who produced cross compatible software designed to function on both the console and on suitably equipped PCs. Microsoft's "Xbox," released in the fall of 2001, also paired the DVD-ROM drive with a high-speed processor, not surprisingly Intel's 733-MHz Pentium III. Microsoft countered Sony's software strategy by developing an in-house development program that quickly released the best selling *Halo* game and dominated the market. The two gaming platforms opened a market for DVD-ROM games that would dictate overall segment control and power. These two companies, which by the time of their new product launches were significant players in the DVD Forum, were entering into a videogame industry whose market totaled more than $6.4 billion in revenues in the year 2000.[172] The existing software market for gaming alone was $4.9 billion in 2000, with PC software (mostly CD-ROM-based) accounting for a paltry $1.6 billion.[173] By expanding the market for DVD-ROM through the gaming consoles, Sony and Microsoft opened a significant market for PC gaming on DVD-ROM. While PC gaming thrived through

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[169] "ROM Title Sales Increase; Library Still Small," November 1, 1999. *DVD Report*, Vol. 4, Issue 42; Phillips Business Information, Inc.
[170] "Death Match: Your Guide to the Box Wars," by Mark Frauenfelder, *Wired*, Issue 9.05, May 2001.
[171] http://ep2010.salzburgresearch.at/knowledge_base/gibson_2003a.pdf
[172] Ibid.
[173] VSDA Annual Report on the Home Entertainment Industry, 2001.

"open-source" technologies allowing the playback of any content, it expanded significantly through DVD-ROM only after the proprietary technologies introduced by Microsoft and Sony opened their software accompaniments for use on PCs.

Power and control over DVD was dictated by the structure of the DVD Forum and the existing structures of control in the various content markets. In the software markets, control and power was dictated by title support, release timing, and existing market share. Time Warner/Warner Bros. dominated the early DVD-Video market, in no small part due to their control over libraries of content and their early participation in the Forum. Buena Vista, the distribution arm for Disney, capitalized on its existing VHS market share, targeting children through release of their animated classics in limited release, once they had fully entered the DVD market. Significantly, control over the DVD content market resided, and remains, firmly under the thumb of the Big Six content providers (all of which would eventually join the Forum). These conglomerates dictated which titles would be released and under what conditions; through their increasingly tight affiliation with the hardware manufacturers in the DVD Forum, they could stimulate how the technology would be distributed to the public. Seizing the opportunity to wrest control away from the rental retailers, led by Blockbuster and Hollywood Video, the Big Six established a sell-through priority that established direct relationships with major retailers, effectively circumventing the wholesaler and the rental house. The Big Six, at the peak of their industrial power, controlled access to the flow of content in a heretofore unprecedented manner. Without support from these studios, led by Time Warner/Warner Bros., DVD-Video would have floundered like its DVD-ROM counterpart.

The promise of DVD-ROM offered yet another avenue for increasing the control of the IT software industry's major participants. However, due to the innumerable factors listed above, DVD-ROMs failed to materialize as a major market segment until they were incorporated into video game consoles. The disparity between the IT and filmed entertainment content providers' conversion to the new format is illustrative of the fundamental difference between VHS and CD technology. Hollywood's content providers, after their copyright fears had been temporarily allayed in 1997 (see chapter five), recognized the superiority of the format for delivering high quality versions of their content to enthusiastic audiences. They realized that consumer enthusiasm for the new format could stimulate a new market for content. This content was recognized by consumers as markedly different from VHS content in myriad ways, from its image quality to the interactivity granted by the user interface, and the availability of hundreds and thousands of titles available for purchase. Furthermore, the DVD consumers were quick to realize that the new technology was more reliable than the existing one and would grant them repeated and random access to content without quality loss. Conversely, DVD-ROM technology was only incrementally different from the existing CD-ROM technology.

Consumers and content providers alike were hesitant to replace their existing computer software libraries with the new technology. The vast majority of existing CD-ROM content designed for use on personal computers was not fundamentally based in high quality video playback, due to the technology's technical limitations. To convert existing software to DVD-ROM would be counter-intuitive; in order for DVD-ROM to

attain a significant market share, new content would need to be developed and designed to exploit the functionality of the disc. Enter the video game industry; prior to the release of the PlayStation 2 and the Xbox from Sony and Microsoft respectively, the DVD-ROM market was limited to a few original titles and bundled software packages from Microsoft. The release of these two gaming consoles, essentially personal computers without the keyboard or mouse, created an enormous market for DVD-ROM games virtually overnight. After their release, the personal computer gaming industry took off, with new DVD-ROM games like *The Sims* franchise breaking sales records. By virtue of their early entry and their in-house development team for DVD-ROM software, Microsoft established and maintained control over the industry.

Conclusions

While the DVD-ROM software market failed to achieve the success predicted by industry insiders, the DVD-Video and DVD hardware markets blossomed. Because the DVD-Video market included titles from all of the members of the major studios by the end of 1998, and the hardware market included products from every major international manufacturer, DVD could be found in every major retail outlet in the North American market very early in the process. The activities of the DVD Forum ensured that technological quality standards were maintained and that each product representing the DVD Logo functioned according to industry standards. The Forum also established and maintained profit margins for manufacturers and distributors of discs, players, and content. While players were initially released at prices near $500 (see figure 4.10), rapidly increasing competition and a growing network of suppliers of consoles dropped

the price to a standard four times that of manufacturing costs (each player costing around $25 to manufacture). Disc manufacturers were selling blank discs at small profit margins, literally pennies per disc to content suppliers. The majority of profits were split between player manufacturers and content distributors. According to MGM, profit margins on DVD sales are 50-60%, while the standard VHS profit margin remained between 20-30%. With an average sales price of $20 per DVD, and costs per disc at around $9 to produce, advertise, distribute, etc., about $11 per sale returned to the content distributor.[174]

With early vitriol from online communities combined with limited distribution of hardware and software for Divx, competing technologies were non-existent by the end of 1999. Figures 4.9 and 4.10 illustrate the rapid ascension of DVD; between 1997 and 2002, over 1.3 billion DVD discs were shipped in the North American market alone. What these charts cannot illustrate however, is the processes explained herein that guaranteed such widespread success. Only through the collective control and maintenance of the technology and the clear delineation of an industrial culture of production could such staggering results have been possible.

[174] "DVD Profit Margins Double that of VHS," by Ken Fisher, April 2, 2005, for *Ars Technica*. Accessed via http://arstechnica.com/news.ars/post/20050402-4767.html

Figure 4.11: North American DVD-Video Software Shipments (in millions)

Quarter	1997	1998	1999	2000	2001	2002	2003	2004	2005
1st	N/A	3.3	11.1	29.0	69.2	120.1	231.7	332.2	403.0
2nd	N/A	4.1	13.9	33.2	81.7	152.2	195.5	316.8	369.1
3rd	2.3	5.9	29.0	42.7	75.9	153.3	214.6	340.9	347.9
4th	3.2	11.8	44.0	77.5	137.6	259.4	381.5	528.4	536.7
Yearly Total	5.5	25.1	98.0	182.4	364.4	685.0	1,023.3	1,518.3	1,656.9
Total Since Launch		30.6	128.6	311.0	675.4	1,360.4	2,383.7	3,902.0	5,558.9

Figure 4.12: DVD Hardware Sales to Consumers

CE

Historical: DVD Player

Description: Factory sales of DVD players. Includes sales of DVD audio players.

Units: Thousands of units

Dollars: Millions of dollars

Year	Units	Dollars	Avg. Price	HH%
1997	349	$171	$489.97	0.00%

1998	1,079	$421	$390.18	1.00%
1999	4,072	$1,099	$270.00	5.00%
2000	8,499	$1,713	$201.55	13.00%
2001	12,707	$2,102	$165.00	21.00%
2002	17,090	$2,427	$142.00	35.00%
2003	21,994	$2,698	$123.00	50.00%
2004	19,990	$2,171	$108.60	70.00%

What this chapter has illustrated, therefore, is the structure, conduct, and performance of the DVD industry. The collective efforts of three industries working in concert exploited favorable conditions in technology, culture, and industry to guarantee the support of Hollywood content providers to drive the technology into the marketplace. The major consumer electronics and computer industry firms involved in development of DVD technology recognized that the home video industry was a potential new source of massive revenues. Tapping into that market with a new disc technology meant assuring that all of the major Hollywood content providers would supply feature films. While these corporations created an industrial hierarchy that would guarantee control over the technology to a few major companies, we have also seen how these efforts have resulted in an industrial culture that aligns or conflicts with the individual corporate cultures of the industry's constituent members. This industrial culture is defined by its unprecedented level of cross-industrial membership and cooperation, its efficiency in dividing labor, its structuring of patents and licenses to guarantee its continuing power position, and its

ability to combat threats from competing technologies. This culture is further defined by its international composition; the fact that the largest consumer electronics, computer companies, and software/content providers from three continents joined together to develop standards and to mutually benefit from each others' resources is unprecedented in the history of industry. The fact that each member company was willing to suppress their corporate desire to openly compete for new DVD-Video and DVD-ROM markets through proprietary technologies illustrates the centrality of Hollywood's role in establishing this industrial culture.

The DVD Forum's industrial culture was predicated on pooling resources and establishing a hierarchy of power. Members worked to assure industry-wide technological standards, patent pooling strategies, and licensing organizations. DVD was introduced into a uniquely favorable regulatory environment that assured the practices and structures of the DVD Forum would not be disturbed by antitrust litigation. The cooperative practices and protectionist industrial culture surrounding DVD-Video guaranteed a collective response to threats to the newly established hegemonic order. The next chapter examines how the Forum exploited the favorable legislative environment while establishing mechanisms for controlling access to the technology. Additionally, the following chapter will illustrate the context into which DVD is most prescient in the current technological environment; as the first technology to employ Digital Rights Management Technology, DVD stands as a symbol for heated debate in a policy environment firmly entrenched in consumer rights issues and digital copyright law.

Chapter Five: DVD Culture

Thus far, technological, macro-industrial, and micro-industrial enabling conditions have been examined in order to explain how DVD was innovated, controlled, and distributed to the public. In order to more fully understand the processes of technological diffusion and adaptation, this chapter examines the social construction of DVD. In so doing, this chapter investigates how DVD was thought about and represented in the trade press, popular press, and through advertising representations, and how those representations changed between 1994 and 2002. While the interactions between member firms in the computer, consumer electronics, and filmed entertainment industries influenced technological design and industrial formation, discourses focusing on the promise and transformative power of DVD combined with existing cultural contexts and the activities of industry members to influence the rate of adoption. Additionally, the ways in which consumers integrated these discourses into their understandings and experiences with home video and digital technologies begins to explain the rapid acceptance and adoption of DVD.

The shiny little disc containing our favorite movies, music, and data, is the subject of a plethora of discourses, ranging from technical descriptions of the technology in the trade press, to advertisements hailing the revolutionary nature of the technology, to romantic descriptions of the inventor-heroes thought to be responsible for the birth of DVD in the popular press. Examining the uniquely contingent circumstances surrounding the creation of these discourses reveals a great deal about the ways in which the various stakeholders in DVD, including the trade industry press itself, saw the new

technology and their own investment in its representation. The firms involved in creating and marketing the new technology established a preferred set of meanings to be associated with DVD through advertisements for hardware and software. Reporters contributed to the creation of meaning by writing stories about technological development, industry conflicts, technological performance, and consumer satisfaction. Consumers integrated these discourses into their experiences with DVD to make sense of it and its place within their lives. The degree to which DVD fit into existing behaviors related to media consumption, from viewing feature films on television, to computer storage and gaming, combined with trade and advertising discourses to create a range of possible meanings for the technology.

DVD is a typical technological artifact in that it was born unto a complex and dynamic cultural environment with pre-existing discourses and practices. Culturally, DVD became meaningful as a home entertainment technology through a range of denotative and connotative associations. For example, DVD has come to stand for things that are high-tech, user-friendly, interactive, reliable, mobile, and versatile; it has been associated with home-theaters, Hollywood, the CD, computers, automobiles, data storage, and the "content" world of movies, television, music, and the internet. Each of these descriptive terms was associated with its own range of meanings and practices prior to the introduction of DVD. Through exploration of the processes of inscription that new products or services experience on their way to becoming a part of a collective social knowledge, we can integrate the technological and industrial histories of the preceding chapters. In so doing, this chapter is deeply indebted to the work of Susan Douglas in

Inventing American Broadcasting. Douglas' exploration of the birth of radio reveals dynamic and intersecting enabling conditions in technology, industry, and press discourses and provides a useful model for this research (Douglas 1987). Therefore, this study does not suggest that the discourses in the trade press, popular press, and advertising played a determinate role in DVD diffusion and adoption. Rather, these discourses combine with the activities of consumers, technological and industrial forces discussed in previous chapters, and the regulatory context surrounding DVD.

This chapter examines some of the primary discourses surrounding meaning creation as it relates to the rapid ascent of the DVD. Discussion begins by identifying the cultural context into which DVD was introduced. The first section argues that existing home video and entertainment cultures were uniquely predisposed for a new versatile, hybridized home entertainment technology. With the rising popularity of home video purchases, the continuing practice of renting pre-recorded video tapes, more than a decade of experiences with digital music on the CD, and new internet experiences, cultural conditions were in place for a next-generation home-video disc. This section details the home entertainment culture prior to DVD, describing the practices and characteristics of American consumers related to their leisure-time activities. Analysis concludes by suggesting that home entertainment culture, having recently integrated new technologies into existing practices, drew upon those experiences to make sense of DVD.

Section two suggests that the creation of meaning and consumer demand surrounding the DVD was also inextricably linked to discourses in the popular and technical press. News coverage of product development, format battles, and DVD

performance are analyzed to explore how DVD was introduced to the public and encoded with meaning. These discourses demonstrate how reporters engaged with the existing home entertainment culture and its associated semantic networks of language to make DVD meaningful. By utilizing familiar terminology, early representations of DVD structured the ways in which audiences understood, interacted with, and helped to determine the meanings of the technology. Furthermore, the degree to which these representations suggested the relative advantage of DVD over VHS directly impacted the rate of adoption. Through examination of trade publications and press releases, this section illustrates how technology is "encoded" with particular meanings in the production process and how those meanings tap into the desires of those consumers most likely to be early adopters.[175] By demonstrating how the development of the DVD is represented in distinct ways, we can begin to account for how meanings are negotiated, how demand for the technology was created, and how new technologies are incorporated into existing cultural practices.

Section three shifts to focus on the period surrounding DVD product launch. Examination of print advertisements for DVD hardware and software from 1997 and 1998 reveals the preferred meanings and uses of DVD technology. Hollywood content providers and consumer electronics manufacturers partnered with advertising firms to develop campaigns focused on DVD as a home video technology capable of delivering

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[175] Du Gay, Paul, Stuart Hall, et.al. 1997. *Doing Cultural Studies: The Story of the Sony Walkman*. London: Sage Publications, Pgs 4,5.

theater-quality movies.[176] In so doing, these firms encouraged potential adopters to associate DVD with their prior experiences in home video and theatrical movie-going while tapping into their desires for ownership and access to filmed entertainment. Trade and popular press coverage combined with these advertisements and the performance of the disc to structure the ways in which consumers experienced DVD and the rate at which they purchased players and movies-on-disc. These factors also aligned with the existing home entertainment culture; together these forces begin to account for the unprecedented demand for DVD.

HOME ENTERTAINMENT CULTURES

Entertainment in the home has always been a ubiquitous aspect of American life. Since the invention of mass media, the American domestic space has been awash with technologies conveying news and entertainment programming. From newspapers to radio, television, home video, computers, gaming devices, and DVD, media have been at the center of American domestic life. Hollywood films have been a core source of content for home consumption since the invention of cinema. According to Ben Singer, films first appeared in the home in 1896. Targeted towards families, projectors were designed to play films rented or purchased from regional stores and mail order systems.[177] These early experiments failed to develop into a viable home distribution industry for Hollywood, but they suggest that the early cinematic entrepreneurs recognized the viability of film exhibition in the private space of the home.

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[176] Rather than as a technology for gaming or computer storage and archiving.

Improvements were made to projection technologies with the hopes of creating a mainstream market. Home viewing of films increased with improvements in color film stock, sound projectors, and standardization of 8mm and 16mm film gauges into the 1920s and 1930s, but remained a small niche market comprised mostly of wealthy, elite, cinephiles.[178] Studio titles would be available for rent to this small set of consumers on these formats for the next five decades. Beginning in the late 1930s, Hollywood films could also be found on the radio, adapted for millions of listeners by radio programs like *Lux Radio Theatre*.[179] By the 1950s, Hollywood films, along with foreign imports, began appearing on network and independent television stations. The studios cut lucrative distribution deals with television networks for hundreds of films from their vaults. Hollywood films on television filled programming time and returned new revenues to the studios. In the process, home viewing of Hollywood content became firmly entrenched as a leisure-time activity for American families. In 1975, cable television and home video technologies were introduced to the American public. Over the course of the next decade, more Hollywood films were available for home viewing than ever before. In the process, distinct home entertainment cultures developed around cable television, the VCR, the home theater system, the Internet and DVD.[180]

These cultures developed around technologies that promised new levels of access to content. Barbara Klinger, in *Beyond the Multiplex: Cinema, New Technologies, and*

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[177] "Early Home Cinema and the Edison Home Projecting Kinetoscope," by Ben Singer, *Film History 2* (1988): 37-38.
[178] Klinger, Barbara (2006). *Beyond the Multiplex: Cinema, New Technologies, and the Home*. Berkeley: University of California Press, pg. 7.

the Home, identifies how taste cultures, gender roles, family dynamics, race, class, social identities, history, and notions of authorship and aesthetics are negotiated by groups of individuals experiencing Hollywood content in the home. She finds that groups of early adopters negotiate meanings based on their age, race, gender, and education in relation to experiences with technologies and Hollywood feature films. Specific taste cultures develop within these groups, as experiences with different home entertainment technologies are integrated with discourses on film watching and consumption practices in larger cultural spheres. Klinger identifies groups of individuals that share practices and experiences related to a specific technology, suggesting that these cultures impact larger "viewing modalities" surrounding Hollywood content in the home.[181] Klinger's study provides a valuable starting point in the study of home entertainment cultures relative to Hollywood feature films. Her assertion that explaining Hollywood's powerful social presence must account for home viewing practices and the dynamics of cultural meaning-making in domestic spaces is of particular importance. However, her case studies in enthusiast home viewing cultures fail to account for mainstream home entertainment cultures and the practices of the majority of Americans relative to home entertainment. How audiences developed a core set of practices, meanings, and experiences surrounding home entertainment technologies illustrates how demand for DVD developed throughout the 1980s and 1990s.

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[179] Ibid.
[180] Ibid, p. 14.
[181] Ibid.

Home Video Rental Culture

Between 1975 and 1996, the home video industry developed into a massive industrial, economic, and cultural phenomenon. Demand for Hollywood films on tape grew rapidly after the studios started distributing their films to the home market in the late 1970s. Between 1985 and 1992, the annual growth rate for the video rental business reached double digits each year as a mass home viewing culture grew out of the experiences surrounding renting Hollywood feature films from neighborhood video rental stores.[182] By the early 1990s, the majority of Americans were renting tapes to be viewed on their VHS machines.[183] At the center of this cultural phenomenon was the American family. Family households rented more tapes more often than households without children, and experienced home video in ways that defined home video culture.[184] In the process, families formed a core set of expectations for home entertainment that would influence their widespread adoption of DVD technologies.

Renting tapes for home viewing was an experience defined by value, control, and convenience. Home video consumers could control when and how they experienced content and could be assured that each member of the family could operate the VCR.[185] Much more so than cable television, pay-per-view, and network broadcast of movies, home video offered the American family a degree of control over their viewing

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[182] By 1996, the year before the introduction of DVD, consumers were spending $8.7 billion on video rentals VSDA annual report, 1997, p. 4.

[183] 53% of all adult consumers rented at least one tape in any given month in 1996, according to VSDA and VSM researchers; p. 6 VSDA annual report, 1997.

[184] 9 out of 10 families, according to Video Business are renters of video content, Ibid, p. 5.

[185] At least for playback of pre-recorded tapes; Ann Gray in *Video Playtime*, argues that the VCR is in fact gendered and certain functions, including programming the machine for taping live television was predominantly the purview of males in the household.

experience. This experience began with the renting of the tapes at the retail store. According to consumer research commissioned by the Video Software Dealers Association and conducted by Yankelovich Partners in 1997, women were the primary renters of movies watched by families with children, and could therefore determine how many and what type of tapes were suitable for the family.[186] Research found that home video consumers could be segmented into five categories based on their lifestyles and attitudes towards media, technology, and popular culture: "Voracious Viewers," "Hi-Fi Bachelors," "SUV Suburbanites," "Cultured Ladies," and "Disinterested Gentlemen." "Voracious Viewers" were found to be the most important group of renters; comprising only 21% of all video renters, this group was responsible for 32% of all rentals.[187] The demographic make-up of this group tended to be young (72% were under age 40), urban, female (66%) and was likely to have children in the home (74%).[188] This group was more likely than most other groups to be frequent renters (39% rented once a week or more) and rented more tapes per visit to the store (2.6 tapes per visit). "SUV Suburbanites" were also young (mean age of 36.9 years), female (63%), married (89%) and had children in the house (96%).[189] This group was responsible for 25% of all rentals, and represented an equal percentage of the rental population. Taken together, these two constituencies comprised of mostly young married females with children accounted for 46% of all renters and 57% of all revenues in the rental market.

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[186] VSDA Annual Report, 1998, p. 6.
[187] Ibid, p. 8.
[188] Ibid.
[189] Ibid.

Another crucial demographic in the home video rental market was young, single men, or "Hi-Fi Bachelors," according to Yankelovich Partners. This group, whose average age was 26, comprised only 19% of the total renting population but accounted for 23% of all rentals.[190] They were the most likely group to be frequent renters (40% rented at least one video per week), and tended to frequent more than one video rental store. More often than not for young men, mothers with children, or anyone else, the trip to the video store was a social experience. According to a study conducted by Chilton Research Services in 1996 that surveyed 4,000 rental consumers, nearly two-thirds of all trips included someone else. About half of the time, that other person was a spouse or significant other. Once inside the store, home video rental consumers valued their experience. Chilton's data suggests that video renters averaged a satisfaction level of 8.4 on a ten-point scale.

The nationwide growth of the rental retailer throughout the 1980s and 1990s and continued efforts by rental retailers to maintain "copy-depth," assured that once the renter got to the store, they were likely to find what they wanted.[191] Overwhelmingly, rental consumers valued home video rental for its return on the entertainment dollar. In a study conducted by the Conference Board in 1996, video rentals were ranked the second-best value among their ordinary transactions, just behind buying chicken.[192] According to a 1996 poll conducted by *Video Business Magazine*, consumers valued the availability of

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[190] Ibid.

[191] Women tended to rate their rental experience higher than men in a survey conducted by Video Business Magazine; the mean rating for all consumers applied to their most recent rental experience (in 1996) was 7.5 on a 10 point scale. VSDA Annual Report, p. 6.

titles, as well as the breadth of selection. Among the 26.5% in this survey who expressed dissatisfaction regarding their rental experience, the inability to find the tape they wanted was the leading source of their discontent.

The fact that home video rental culture is so closely aligned with the American family is significant. Besides explaining the performance of family friendly movies in home video markets, home video rental culture suggests that Hollywood films on tape functioned as a binding mechanism that kept the family together. Even among single-person households, home video exerted a socializing influence. Two-thirds of all non-family households watched tapes with another adult.[193] Home video renting also played a key role in the larger culture of leisure surrounding the American family. By the mid-1990s, no other leisure activity was experienced more frequently, and with more of the household present, than watching movies on rented tapes. In any given month in the mid-1990s, nearly half (47.5%) of all U.S. consumers rented a video at least once. Watching rented videos was done more frequently than going to the movie theater or buying a CD, and was more than twice as popular as going online or attending a concert or sporting event. A study of 223 VCR households in the Midwest conducted in 1988 showed that the overwhelming majority of VCR owners reallocated their leisure time after purchasing the technology to spend more time at home watching videos with family

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[192] Ibid, p. 6.
[193] Ibid.

members or friends.[194] The fact that video rental culture was so crucially linked to shared experience, social interaction, and the American family suggests that new home video technologies would function similarly in the domestic cultures of the home.

Home Video Sales Culture

While the majority of people watched Hollywood films on home video via rental retailers like Blockbuster by the early 1990s, a significant evolution occurred as the studios began releasing blockbuster hits for sale to consumers. In only three years, from 1993 to 1996, sales of pre-recorded tapes and practices like collecting and displaying libraries in the home became widespread cultural phenomena. Historically, the home video market has been divided between sell-through and rental since its inception. Renting tapes was the dominant mode of home video consumption by the majority of American consumers throughout the 1980s. However, classics, or "library titles," were released on videotape for sale as early as 1985.[195] Suncoast Video, a division of Minneapolis-based Musicland, opened its first sales-only video store in 1986. The store experienced rapid growth, expanding to 107 stores by 1990, stocking more than 6,000 VHS titles for sale at prices below $29.95. The major film studios recognized the growth of this niche market and began releasing classics in large numbers throughout the late 1980s and early 1990s. In 1990 alone, Paramount released more than 100 classics, including *The Untouchables* (De Palma, 1987) and *Fatal Attraction* (Lyne, 1987) at a

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[194] Lin, Carolyn A. (1988) "Assessing the Impact of the Evolution of Home Video Culture," Paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (71st, Portland, OR, July 2-5, 1988).

sell-through price of $14.95. MGM/UA followed suit that same year, releasing another 100 classics from their vaults. Stores like Suncoast carried hundreds of titles priced below $10, catering to largely cinephiles and collectors.

Prior to the early 1990s, new releases could be sold directly to consumers, albeit at exorbitant prices (upwards of $75 per tape). "When I sold a copy of *Ben-Hur* back then (1977) to a guy for $70 and he kissed the floor, I knew people liked to buy and own films. I once sold $45,000 worth of cassettes in one weekend," Art Robbins, owner of regional (Northwest) chain Movie Masters, told *The Seattle Times* in 1990.[196] Sales of tapes grew steadily throughout the 1980s, from 1 million sell-through transactions in 1980 to 25.7 million in 1985 to 209.5 million in 1990 (see figure 5.1).[197] By 1994, the five-store Movies Unlimited Chain based in Philadelphia boasted more than 35,000 VHS titles available for sale through its mail-order catalog.[198] Reel.com opened for business in 1997, offering more than 80,000 VHS titles for sale to consumers. This booming market stimulated growth in a variety of businesses selling VHS tapes. Mass-merchant chains, including department stores, discount stores, and wholesale clubs quickly dominated the category, claiming more than 50% of all purchases by the early 1990s. As the price per tape dropped and access to titles increased, the practice of buying tapes joined rental as a mainstream leisure-time pursuit.

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[195] MPAA Worldwide Market Research, Adams Media Research (2000). "Sales of Pre-Recorded Videocassettes to US Dealers," p. 28.
[196] "Movie Masters and Suncoast sell but do not rent videotapes," by John Hartl, *The Seattle Times*, 17 June 1990.
[197] Ibid.
[198] "Movie catalog tailor-made for video fiends," by Andy Wickstrom, 15 January 1994, *Austin American-Statesman*.

Figure 5.1: VHS Sales Spending 1985-1995

	Units*	Revenue*
1985	25.69	$773
1986	46.01	$1,012
1987	76.49	$1,415
1988	116.56	$2,098
1989	172.94	$2,940
1990	209.5	$3,352
1991	231.99	$3,619
1992	264.08	$3,961
1993	326.91	$4,708
1994	398.37	$5,497
1995	483.71	$6,288

* millions
Source: Adams Media Research

By 1996, 60% of all U.S. households were purchasing Hollywood movies on video tape. The American family was at the center of this shift in consumer behavior. Households with children were more than twice as likely to purchase two or more tapes per month than households without kids.[199] The average purchasing household owned 41 videos in 1996. In 1996, U.S. consumers spent an additional $7.6 billion to purchase pre-recorded tapes.[200] Home viewing of Hollywood films from a personal collection became a commonplace experience. More than four in ten households reported watching a movie from their own library at least once a week.[201]

A mass home video sales culture grew out of the experiences and practices associated with renting tapes. Dominated by families with children, home video sales culture was defined by the practices of repeat viewing, library building, and socialization.

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[199] VSDA Report, 1997, p. 5.
[200] Ibid.

Purchasing tapes from mass merchant stores, rental retailers, and electronics stores became a widespread phenomenon because of the previous pleasures and meanings experienced by the consumer in home video rental. Rather being wholly distinct from that culture, home video sales culture drew upon the pleasures and practices of renting tapes. Like home video rental cultures, families were most likely to be heavy repeat viewers of a given title, often to satisfy children's notorious appetite for their favorite films. Families who were heavy renters became frequent buyers; households with children that routinely rented more than one title a week owned 81 titles on average by 1996.[202] Households without children were two and a half times as likely to be non-buyers of video tapes. Families associated value with the purchase of tapes, and began a culture of library building.

Most home video sales on tape prior to DVD consisted of family-friendly titles, classics, and blockbuster hits. Library building meant acquiring a catalog of favorites that would please the family and offer repeat pleasures. Owning tapes meant more control over the viewing experience without repeat trips to rental outlets. This collecting culture has long been associated with film buffs, early adopters, and tech-savvy single men who collected classics on laserdisc. Much more so than VHS, the laserdisc consumer remained a niche market throughout the period prior to DVD, as a small number of collectors cherished a unique set of experiences and pleasures from the disc. This small community of mostly young, single, affluent, white males purchased

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[201] Ibid. p. 7.
[202] Ibid., p. 7.

Hollywood classics and foreign films for their library, valuing high quality transfers of films, supplemental content like "making-of documentaries," and multiple language options. They displayed their discs on shelves within the home, negotiating their social identities through their consumption patterns. In so doing, they complimented the mainstream culture of home video tape sales, demonstrating niche market demand for a variety of titles. Together, these two groups created a collecting culture surrounding home video. Both groups created meaningful practices and experiences in the home. While the mainstream consumer used home video collecting to draw the family together, the laserdisc consumer negotiated social status through their collections.

Home video cultures developed over the course of the 1980s and 1990s in relation to experiences, practices, and pleasures surrounding Hollywood content in the home. Home video became a mass cultural phenomenon because Hollywood content appealed to large numbers of the American public. The development of home video cultures combined with theatrical and televisual experiences with Hollywood content to create enormous demand for Hollywood movies. Additionally, the growth of the home video sales culture suggested that Americans were eager to build libraries within the home. DVDs potential in the marketplace hinged on the growing cultural desire for value, control over the viewing experience, and access to content. DVD tapped into these cultural desires and shifts in home video consumption while presenting pristine quality and reliability.

Digital Media Cultures

Creating consumer demand for DVD meant engaging with existing home video cultures and the practices and pleasures of the American family related to media consumption. By the early 1990s, the compact disc had completely replaced tape and record technologies in the music industry. Consumers readily adopted the technology, due to the perceived value of the technology, the functionality of the disc, and its delivery of high quality digital music. A culture of consumption developed around the technology, as pleasures and practices were negotiated. For the vast majority of consumers, the CD engendered an experience with music that was pleasurable, mobile, and reliable. The quality of digital music on disc far surpassed its analog predecessors for the average consumer. The compact disc simply delivered a better sound. This is a crucial aspect of the developing digital media culture; consumers, by virtue of their exposure to digital media technologies prior to DVD, expected high quality, high fidelity experiences with digital media.

The successes of mobile music technologies like Sony's Walkman and the dashboard tape player led to similarly mobile CD technologies. The CD player was not bound to the home stereo like the VHS player was to the television. Because listeners associated the CD with mobility, freedom, and accessibility, they created meaning and pleasure in a variety of social, public, and private spaces. The DVD, which was physically identical to the compact disc, would be associated with the range of practices and consumer expectations that grew out of their experiences with compact disc. Consumers expected a reliable, high quality, mobile experience from digital technologies

like the compact disc. Convincing the public that DVD would do for movies what the compact disc did for music began by introducing the concept of DVD as a corollary to the compact disc. Associating the technology with existing home video and digital music cultures and technologies proved crucial to creating demand for the technology and meeting consumer expectations.

Early DVD Cultures

DVD was introduced to the public in 1997. Early adopters, largely part of the established technophile and laserdisc community, enthusiastically accepted the format and began purchasing discs. Responding to what was thought to be the demands of this community, Hollywood designed these early DVDs to perform in ways similar to the laserdisc. Early Warner Bros. titles included supplemental content, such as "making of documentaries," foreign language subtitles, and director commentaries, that were standard fare on the laserdisc. Additionally, discs included widescreen, "letterboxed," versions of films, rather than full-frame versions that were the standard for VHS. The fact that Warner Bros. and their counterparts from the other major filmed entertainment studios released catalog titles and classics to this community suggests the degree to which they were responding to the established community with its requisite viewing habits and demands for a particular kind of viewing experience.

However, the question remains as to the influence of existing cultures relative to the design and functionality of the new technology. Were early DVD cultures defined through the nature and function of their use with the technology, or with the content embedded therein? Clearly, some degree of give and take between industry and groups

of consumers suggested a range of possible expectations for the technology. As DVD moved into the mainstream, in the short interim between 1997 and 2000, industry responded to consumption patterns and feedback from retailers in designing discs and interfaces. For instance, when Wal-Mart began returning large numbers of letterboxed titles to distribution centers, the studios recognized that a split had occurred in the early DVD market. Enthusiast cultures demanded original aspect ratios and supplemental features. Casual consumers, the vast majority of the mainstream purchasing public, did not desire letterboxing or supplemental features. As a result, the two largest retailers, Blockbuster Video and Wal-Mart, stocked full-frame, basic versions of titles while specialty stores carried letterboxed versions. This dynamic continued throughout the early stages of DVD release; within three years double-sided discs were appearing that carried a full-frame version on one side and a letterboxed version on the other.

Early DVD cultures were therefore generally split into two broad categories of consumers. These broad categories contained smaller groups of individuals who shared common experiences, pleasures, and meanings associated with the technology. These two broad cultures can be defined as "DVD enthusiasts" and "casual DVD consumers." The first, as we've seen, was composed of young, affluent, males who tended to adopt new technologies in the early stages of product release. This group quickly expanded to include cinema and home theater enthusiasts, audiophiles, and laserdisc enthusiasts. On the whole, these individuals formed a vocal community that corresponded with industry via the internet to express their desires for the new technology. While the number of individuals within this group remained low throughout the early stages diffusion, like

their counterparts in existing home video cultures (discussed above), they tended to be heavy buyers and accounted for large percentages of the early market. Additionally, DVD enthusiasts are the only group that was not defined solely by the nature of interaction with the content on the disc. To wit: early DVD enthusiasts quickly took to trying out the technology in all of its myriad functional forms. Whether attempting to crack the encryption codes, transferring materials to computers, or unpacking the compression algorithms, these consumers were active in their activity and interactivity with the technology. This is not to suggest that their interaction and experiences with content were not distinct from more casual viewers; DVD enthusiasts were much more likely to explore within the content on the disc, finding hidden features ("Easter Eggs"), playing with random access functionality, and the like.

More casual DVD consumers, by far the majority of adopters by the year 2000, were much more likely to form experiences and pleasures around the content embedded within the technology. This broad category closely aligns with home video sales cultures (discussed above), utilizing the technology to socialize and to draw the family together. In fact, these adopters communicated their desires for an easy to use disc to the Hollywood majors through their purchasing patterns. By buying full-frame versions of titles, these consumers suggested that their pleasures associated with the new technology derived from Hollywood movies, not from the bells and whistles on DVD. Most consumers within this category wanted the DVD to perform like the VHS. Simply put, when they put a disc into a machine, they expected to be able to press the "play" button on the machine or on the remote and the movie would start. How Hollywood and the rest

of the fledgling DVD industry communicated with these very different groups of adopters is the subject of the next section.

MAKING DVD MEANINGFUL

The first attempts to fix the meaning of DVD through the popular press used familiar language to describe the device, referring to it through analogy to previously existing technologies. Peter M. Nichols, writing for the New York Times in 1994, described the technology thusly: "Some Hollywood executives support the five-inch digital video disk, referred to as DVD. The disk is an advanced form of the video compact disk used in CD-ROM programming, and the studios have formed an advisory group to help guide and promote its development."[203] Here Nichols uses descriptive language to convey what the potential meaning of the new technology will be. He describes the size of the technology, its official acronym, its relationship to Hollywood and the content industry, and its connection to existing technology. However, Nichols' description only means something if the reader is familiar with video compact disk, the CD-ROM technology employed on computers, and the terms digital, video, and disk. Using analogy and metaphor, Nichols is attempting to contextualize the potential technology in terms thought to be familiar to his readers. Everyone presumably understands when Nichols refers to "an advanced form of the video compact disk," just as they would understand if he described the technology as a disk that contained movies for playback on television sets like VHS. But, until the technology had diffused into the

[203] Nichols, Peter M. "Home Video." *New York Times* (1857-Current file); Oct. 28, 1994; ProQuest Historical Newspapers *The New York Times* (1851-2003) pg. D18.

marketplace through a set of core discourses surrounding its design and use, few would likely understand if one simply said, "This is a DVD."

Returning for a moment to the discursive contexts into which DVD was introduced orients the dominant discourses directly employed by the press and advertisers to sell DVD and to make it meaningful to the public. Associative terms utilized by the press, including "video," "digital," and "high-tech," suggest that the eventual meanings for DVD, like its technological basis, were evolutionary in nature. The assertion by Nichols that DVD was "advanced" suggests to the reader that the technology could be associated with a broader discourse surrounding "high-tech" devices. This particular discourse circulating in 1990s culture would have characterized DVD as related to cutting-edge technological developments of the internet and computer age.[204] The DVD would therefore be instantly associated with a long history of meanings pertaining to gadgetry, information technology, leisure technologies, and the full range of connotations relating technological progress to the periods immediately following cultural, economic, industrial, and artistic eras of modernity, urbanization, industrialization, and mass production. DVDs status in this regard also suggests that it may be associated with the post-modern, or perhaps more specifically "post-industrial," as these terms connect the technology to a particular way of life. Based in interactivity, fragmented and individualized experience with content, this representation of DVD reflects recurring themes in post-modernity.

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[204] This section draws upon the work of Hall, DuGay, et al. 1997. *Doing Cultural Studies: The Story of the Sony Walkman*. London: The Open University, Sage Publications.

Furthermore, the fact that the DVD entered into and helped define a shift in technology and culture from "analog" to "digital" is of paramount importance to the processes involved in making DVD meaningful. "Digital" suggests a massive shift in culture and industry, away from a particular understanding of technology and technology-user interface into an age of instant, random access to information and entertainment. Digital implies a new way of storing and using data, a computer-based world of binary digits and malleable content. It also portends a revolution in the quality of content; the DVD enters into an era of digital imaging and digitalization that shifts electrochemical or analog recording into pixels and bits of information to be consumed, digested, and reassembled via computer. Digital suggests a new reproducible text and culture; the underpinnings of digital technology afford the unlimited copying of data without quality degradation. Furthermore, digital represents a tide shift for the content industries, a new era of distribution technologies and the all pervasive fears of piracy and copyright infringement.

The associative context is further complicated by the "versatility" of the technology and its affiliation with a number of culture industries. The fact that Nichols' description invokes Hollywood's role in the design and eventual distribution of the disc suggests that the technology should be understood through the discourses surrounding conglomerate Hollywood in the late 1990s. Association with Hollywood instantly conjures up the century-long dominance in a global market for filmed entertainment, its highly effective global marketing and distribution strategies, its hesitance and eventual exploitation of new technologies, its production cycles of boom and bust including a

preponderance for high-budget, high-concept blockbusters, its influence in cultural norms and styles, its increasing concentration of power through conglomeration, and its significance to home viewing of pre-recorded video and television content. It suggests DVD has associations with the Big Six corporate powers and their managerial styles and division of labor. The DVD's "Hollywood-ness" situates it as a product of a particular kind of industrial organization, associated with an entire history of cultural significance. These associations may reflect historical stereotypes, but they assist in the creation of meaning surrounding DVD that is much different from meanings that might be ascribed to it if it were the proprietary product of a corporation like Sony. Furthermore, Nichols' inference that Hollywood's role in DVD's technological development would be supervisory suggests the involvement of other industries. The inclusion of the reference to CD-ROM immediately signifies both the computer industry and the music industry and all of their respective cultural connotations. The computer industry conjures up a myriad of words and images, uses and meanings ranging from gaming to word processing to operating systems, the internet, and the information age. The "CD" part of the equation suggests that the cultural meanings connected to digital music, including its interactivity, high quality sound, and fidelity, may also be expected from DVD.

Upon its introduction, DVD was used in certain ways that gave it significance and value in late-1990s life. While there is an entire set of meaningful practices surrounding DVD use, including creating libraries of titles that help define individual identity, to creating a prominent display of DVD discs in one's home, to creating home theaters around the purchase of a DVD player, to installing DVD players in automobiles and

playing titles on headrests while "cruising" city streets, the core set, or "preferred" uses of the technology were limited by the infrastructure and safeguards on the disc. We have seen how the DVD was designed from explicit guidelines for intended use patterns; like any technology there is a limited range of experiences one could expect to have given its design features and limitations.

Clearly the intended use of the DVD player and disc differ between its home video application, its computer/ROM application, differences between hardware and software, and its functionality in audio playback. As a next-generation video technology, the range of practices available to the public should be understood relative to VHS and laserdisc practice. By and large, the meaning making practices surrounding DVD-Video stem from the standalone player and disc containing pre-recorded feature-film content. DVD in home video was made meaningful through the practice of watching movies. Many other signifying practices follow, including those listed above and innumerable others, but the primary function of DVD relative to home video culture in the first six years was to deliver movies via a playback-only machine to the public. This technology, unlike its immediate predecessor VHS, could not record content; there would be no "time-shifting" or swapping copies of movies taped off cable on the new platform, by design. Conversely, the range of practices available to the public associated with DVD's application on computers would seem to be much broader. Because the DVD-ROM functioned as both a player for DVD-Video discs and as a mechanism to store and retrieve all kinds of digital data, it was made meaningful through a variety of practices not only within the home, but in the workplace as well. DVD-ROM functioned

according to its prescribed architecture and limitations, but was fluid, "versatile," enough to stimulate uses and practices ranging from online multimedia content viewing and sharing, to multiplayer gaming, to PowerPoint presentations and data backup and storage. The aggregate of all the practices connected to DVD use combine with the overarching cultural context and the stages of dominant patterns of discourse in the press to create cultural meaning.

DVD Discourses

Making DVD meaningful to the public began even before a prototype was ready for demonstration. More so than any other technology preceding it, the DVD was the subject of intense scrutiny by press members from the Far East to tiny local newspapers in the United States years before he official product launch. My research has found that between 1994 and the end of 1999 more than 3000 articles were published around the globe on the subject of DVD. Beginning with somewhat incidental coverage in Japanese technology magazines of the first plans for product demonstrations in 1994, DVD soon became a hot-topic item for any reporter looking for a riveting story on the future of technology, industry, economics, and culture. Besides making good copy, the story of DVD's early development was characterized in a number of ways that would impact the ways in which people came to understand the technology. Press releases, "leaks" to reporters, reports from trade conventions, and interviews focused attention on the contentious process of technology development. Before the marketing machinery of the major studios and their counterparts in the computing and consumer electronics industries weighed in with advertisements, trade magazines set a framework for DVD discourse in

their reporting. These reports referred consistently to DVD as a delivery mechanism for Hollywood movies, couching its developmental process analogously to the Betamax/VHS format battle of the 1970s and 1980s.

This early period aligns with the marketing campaigns employed to sell the public on the DVD. Key themes and patterns were evident in the effort to market DVD hardware and software. Drawing upon shared understandings of CD and video culture, advertisers targeted the young, affluent, male consumer likely to be an early enthusiast-adopter. There are at least four clearly differentiated periods of discourse that dominated the cultural sphere surrounding DVDs introduction. The first phase, beginning in December 1994 and continuing through February 1996, is characterized by trade reporters' fascination with the brewing "format war" between Toshiba/Time Warner et al and Sony/Philips and is marked by the overwhelming influence of technology reporters/reporting. The second period, ranging from February 1996 through December 1997, is characterized by two kinds of publicity and discourse: marketing campaigns engaged by members of the consortium to differentiate DVD hardware and software in the marketplace; and continuing industry coverage of the number of titles and studios supporting the format as it enters the marketplace. This period shifts the discourse significantly from the first and is overwhelmingly enthusiastic and positive.

Phase three, spanning all of 1998 through June of 1999, includes reporting and online activism relating to Divx, a DVD rental technology developed by Circuit City in partnership with ZoomTV and the Hollywood law firm of Ziffren, Brittenham, Branca & Fischer. The first two phases of discourse surrounding the DVD format war's escalation

and eventual resolution impacted how meaning circulated around Divx and the DVD generally. The press surrounding Divx solidified key themes in the rapidly expanding lexicon pertaining to DVD culture and meaning. Consumer groups and the mass media ruthlessly attacked Divx, praising what came to be known as "open source DVD" often only as a means of attack on the tertiary format. This discourse cycle is important for a number of reasons, not the least of which is the role played by consumer groups on the internet. Consumer advocacy was first demonstrated through the internet in response to the introduction of Divx. Dozens of anti-Divx internet websites called for the death of the technology even before its introduction. The degree of discontent and disillusionment was based partly on the loss of control insinuated by the interactive functionality of Divx players and discs.[205] The negative consumer response surrounding Divx would prove to be unprecedented; it was even credited by some members of the press for the complete collapse of support for the technology and its eventual withdrawal from the consumer market.

The fourth period of discourse begins where Divx ends. On June 16, 1999, less than a year after its introduction, Digital Video Express (Divx) shut down operations. After the online community's enthusiastic cheers died down and the press had their field day with the estimated $337 million dollar debacle, attention returned to DVD technology and its economic, legal, and industrial significance. By 1999, DVDs cultural identity was solidified; the mass diffusion of DVD would soon follow. Looking to

[205] The Divx disc controlled viewing patterns by charging for each viewing period (48 hours) of a title and reported back to the Divx motherboard via modem to bill the consumer.

connect the phenomenon to an inspired individual, to narrativize the history of the technology according to a long history of romantic traditions in reporting focused on inventor-heroes, stories began to appear in the press about the "Father of DVD," Warren Lieberfarb (Douglas 1987). Lieberfarb's role as paternal progenitor was uniquely drawn; depicted as a reluctant and misunderstood figurehead-visionary, Lieberfarb was credited with the birth of DVD through the complex discourses then circulating in the media and cultural spheres. His role, unlike that of many of history's fathers of invention, was characterized as benevolent mediator, settler of feuds, soother of squabbles and referee in the ring between mega-heavyweight industrial pugilists. However, looming beneath the surface of this laudatory praise and paternalism was the growing concern over piracy, copyright infringement technologies posted on the internet, and the promise of TV on DVD in the near future.

DVD Discourses: Format Wars

Of the three hundred seventy one (371) articles appearing in the popular and trade press in 1995 that had DVD as their primary subject, two hundred thirty five (235) of them mentioned or featured the words "format war." In an article appearing in a January edition of the *Hollywood Reporter* entitled "'95 looks to be digital milestone," Scott Hettrick writes:

> The pervading message at the Winter Consumer Electronics Show was clear: 1995 will be a year of digital revolution and of the emergence of new technology standards for the entertainment industry. But what was just as evident was the uncertainty of how to configure the new technologies and the growing tensions between the major hardware and software manufacturers as the time grows closer for the release of

> competitive multimedia platforms, many of which will not survive the consumer market share battle.
>
> Sony and Philips executives are adamant that the entertainment industry should adopt a single standard for movies on compact discs. Yet they would not consider the notion of embracing a competing format if the majority of movie studios favored a technology being developed by Toshiba and Time Warner over the Digital Video Disc (DVD) standard announced last month by Sony and Philips.[206]

This sentiment was typical of the press coverage throughout the United States and Asia. Several things are worth mentioning, however: Hettrick's observation that there would be a sea-change through technology for the entertainment industries in the near future is almost unanimously agreed upon by the trade and popular press; the author calls explicit attention to the alliance of Sony and Philips vs. Toshiba and Time Warner and the fact that each are developing technologies, a common observation and one that would acquire increasing significance; the assertion is made that the market would not support multiple competing formats. Several themes arise that would prove to be pervasive throughout this early period of press coverage. Optimism for the future of the entertainment industry is linked, here and elsewhere, to the future of technology and technological innovation. Competing technologies and long standing animosities between hardware and software developers could threaten that optimism, leading to pessimism and an uncertain future. Another theme that is evident here that would prove influential in the press is the portrayal of Sony and Philips as the stalwarts in the competition. This depiction, here only a hesitancy to accommodate Toshiba and Time Warner, would soon snowball into negative press. Sony quickly became the target for

any technology reporter lamenting the possibility of an ugly battle for dominance and a split format in the marketplace. Associating the current format battle over DVD to the VHS/Betamax battle, reporters blamed Sony for their rigidity and unwillingness to work towards a unified standard. Shortly after the article appeared in the *Hollywood Reporter*, the *Financial Times* ran a piece entitled "Sony and Philips on Wrong Side of Divide." The authors report:

> Sony and Philips yesterday appeared to be on the wrong side of the technological divide, as leading electronics manufacturers lined up behind a rival format for the next generation of video recording discs. Matsushita, the world's largest consumer electronics group, has opted for a standard for digital video discs (DVDs) being developed by a group of companies led by Toshiba and Time Warner and including Hitachi, Pioneer and Thomson, the French consumer electronics maker.
>
> Matsushita's move tips the balance away from the rival Sony and Philips DVD format, unveiled a month ago in an effort to establish it as the industry standard. The rivalry has raised the prospect of a war similar to that between the VHS and Betamax video tape standards in the 1980s. At that time Matsushita backed the VHS format, forcing Sony's Betamax to retreat.[207]

Sony and Philips appear to be given short shrift; the authors present the debut of Sony and Philips' DVD technology, appearing before the rival format, as a power grab rather than as demonstration of proof of concept or superior development and design efforts. One key theme that is made explicit here is the analogy between the DVD competition for format standardization and the VHS/Betamax battle. Reactivating the animosities engendered therein, the authors seem keen to pit Sony against Matsushita in

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[206] "'95 looks to be digital milestone" by Scott Hettrick, *The Hollywood Reporter*, Jan. 9, 1995. BPI Communications L.P.

[207] "Sony and Philips on Wrong Side of Divide" by Louise Kehoe, Michiyo Nakamoto and Alice Rawsthorn. *Financial Times*. January 25,1995. Financial Times Limited.

another battle for market dominance. This conflict made for good drama, a key element in good stories that would help sell newspapers.

Even a cursory glance at the coverage during this period reveals an anti-Sony bias. Literally hundreds of articles appear with titles like "Major blow to Sony's hopes for format standard," "Industry support for new digital video disc format spells trouble for Philips/Sony alliance," "Eight back digital video disc standard in opposition to Sony," "Sony stiffens stance in DVD format face-off," "Sony-Philips point out Toshiba-Time Warner DVD problems," and perhaps most forceful, if only by exclusion, "Has Hollywood fallen in love with Time Warner/Toshiba's DVD?"[208] Each article depicts Sony and Philips as the source of conflict. Sony and Philips are presented therein as the "bad guy" in the narrative being constructed in the press. There are many potential explanations for the negative coverage in the press, not the least of which is the possibility that Sony and Philips treated reporters with disdain and suspicion, or that the two companies were acting in a manner consistent with the coverage. Regardless of the motivations behind the trend, technology reporters in the United States and most throughout the western and Asian regions of the world jumped at the opportunity to bring narrative flare to the processes of technology development. Pitting industrial giants against each other in a battle for survival also increased the stakes for their readers and heightened the potential cultural significance of DVD. More importantly, however, the

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[208] "Major blow to Sony's hopes for format standard," *Hollywood Reporter*, January 24, 1995; "Industry support for new digital video disc format spells trouble for Philips/Sony alliance," *Multimedia Week*, January 30, 1995; "Eight back digital video disc standard in opposition to Sony," *Data Storage Report*, February 1, 1995; "Sony stiffens stance in DVD format face-off," *Consumer Electronics*, February 27,

format-war discourse introduced the public to DVD through the lens of VHS/Betamax. Providing a structuring discourse for making meaning of the technology, this discourse provided guidelines and limitations to how the public conceptualized the new technology. The interested public was encouraged to not only associate the DVD with its home-video predecessors, but to imbue it with industrial significance.

Secondary discourse appearing in the press during this period focused on praising DVD demonstrations. Throughout 1995, accounts of DVD's impressive technological capabilities continued to supplement the hyperbolic fascination with format wars and animosity between hardware and software giants. The trade press closely followed each development from the industry, including packaging standards, laser diode developments, adaptation of Dolby's AC-3 Sound system for DVD, the Justice Department's review of DVD patents (more on this forthcoming), and the possibility of a format war over DVD-Audio specifications.

Phase one ebbed after the announcement of format standards in August of 1995. With the two sides coming to an agreement to work together, the drama of a format battle no longer applied. Rather than shifting focus to detail how and why Sony agreed to cooperate with their competitors, trade and popular press accounts focused on the product. This initial period played a crucial role in introducing the public to the concept of DVD. By couching discussion of the technology in hyperbolic terms, the press encouraged their readers to conceptualize DVD in a particular way. By repeatedly

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1995; "Sony-Philips point out Toshiba-Time Warner DVD problems," Video Week, March 13, 1995; "Has Hollywood fallen in love with Time Warner/Toshiba's DVD?" CD-ROM Professional, April 1, 1995.

focusing on the drama of a format war, the press associated DVD with home video, while suggesting that the technology would be influential to the future of media consumption.

DVD Discourses: The Product

Once an agreement had been reached on technical specifications for DVD-Video and DVD-ROM, and the press sorted out the details of the agreement, attention turned to industry forecasts and glowing optimism for the potential impact of the technology. Articles appeared throughout the trade and popular presses with titles like "Digital Gold Rush," "Video Industry puts its money on new DVD format," "A Video System Shakes the Walls," and "The year that optical disc took the industry by storm."[209] Complementing this dominant discourse for 1996 was a return of skepticism about whether DVD would make it in the market, after Hollywood spoke up to voice its concern over copyright protection technologies. Additionally, a number of articles on the brewing competition between industry players to market the DVD to consumers appeared. Mostly appearing in the trade press, commentators shifted focus from the potential of the technology and obstacles delaying product launch to analysis of marketing strategies and partnerships. Specifically, technology reporters suggested that individual companies would scurry to attain the advantage of brand-name recognition, software cross-promotions with hardware devices and economies of scale.[210] For the first

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[209] "Digital Gold Rush," by David Bottoms, *Industry Week*, February 5, 1996; "Video Industry puts its money on new DVD format," by John Hartl, *Seattle Times, Los Angeles Daily News*, January 25, 1996; "A Video System Shakes the Walls," by David J. Elrich, *New York Times*, January 18, 1996; "The year that optical disc took the industry by storm," *Tape-Disc Business*, January 1, 1996.

[210] "Marketing, Partnerships will win the battle for the DVD marketplace," *Interactive Video News*, January 22, 1996.

time, consumers were encouraged to think about the technology as a reality in the marketplace.

By 1997, major newspapers across the country had picked up the story, contributing to the production of cultural meaning. By focusing on the number of titles released by particular studios and their hesitancy and eventual support as they came on-line in late 1997, the press discourse supported the aforementioned affiliation of DVD to the Hollywood studios. In an article appearing in the September 2, 1997 *Miami Herald* entitled "DVD Promises More and Better Entertainment," the authors proffer an optimistic view of the technology while warning potential adopters of the uncertainty surrounding the technology.[211] Pointing to the fact that Disney, Universal, Fox, and Paramount had yet to commit to releasing titles on DVD, the authors initiate a conflicting press discourse that is simultaneously glowing in its continuing reviews of the technology and pessimistic in regards to the possibility of full support from the studios. *The Seattle Times* ran a similar article, detailing the titles then available to consumers, DVD's technological capabilities, and discussing the fact that Disney had yet to support the format (Disney would eventually commit to DVD in December, planning to release only live-action features in the first year).[212] *The Christian Science Monitor* pushed the

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[211] "DVD Promises More and Better Entertainment," by Roy Bassave and Tony Krzczuk, *The Miami Herald*, September 2, 1997.

[212] "Acceptance of DVDs is still up in the air," by John Hartl, *The Seattle Times*, September 10, 1997.

conversation a bit further, speculating that the studios' hesitancy to release titles would slow the rate of adoption.[213]

The second period of discourse ended as DVD entered the marketplace. With early adopters primed for the technology through reports in the press and through exposure to product demonstrations, enthusiasm and skepticism in the press discourse shifted to product differentiation. The second period of discourse proved to be an important mechanism that would encourage early adopters to associate the technology with filmed entertainment and their existing experiences related to home video consumption. Additionally, this period continued to encourage adopters to think about DVD as a revolutionary technology. In so doing, the trade and popular press helped to create a small but enthusiastic group of supporters who would not stand idly by as competitors entered the marketplace.

DVD Discourses: Differentiation

Three groups of early adopters had materialized around DVD: audiophiles, technophiles, and recreation seekers.[214] The technophiles, drawn to the technology and its potential to dominate the home-video industry, were active in a growing online community of DVD supporters. These communities proved vocal and influential in a community-driven anti-Divx campaign that included petitions, boycotts of Circuit City,

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[213] "Picture brightens as digital disks challenge VCR," by Laurent Belsie, *Christian Science Monitor*, 10/7/97, Vol. 89 Issue 219, p12.
[214] Kim, Hun Shik and Seow Ting Lee. 2003. "Exploring the Characteristics of DVD Home Theater System Adopters." *Mass Communication & Society*, Vol. 6, No. 3, Pgs. 267-290.

and passionate correspondence with studios and retailers.[215] However, DVD fan cultures were not the only negative voices related to Divx. The video store industry, studio executives from Warner Bros. and Columbia, and the media also began a smear campaign that would simultaneously herald the superiority of DVD and encourage consumers to avoid the rival format.[216] While Warner and Columbia's lack of enthusiasm for Divx is understandable given their stakes in the hardware and patent pools for DVD (Warner partnering with Toshiba and Columbia being a subsidiary of Sony), the media fury is noteworthy. After several years of meaning making related to DVD and widespread, unilateral support for the technology, the popular and trade presses depicted the newcomer as superfluous and confusing. As a $60 million dollar advertising campaign began to bring consumers into Circuit City stores across the nation and huge cash payouts to studios resulted in titles in the rental format, the online community and the media began using words like "chaos" and "confusion" to describe the DVD industry. Ultimately, the negative press surrounding Divx combined with an intimidation campaign by Warner (they released a memo in December 1998 threatening to withdraw advertising support from retailers if they promoted Warner products in conjunction with Divx) and then the studios' scuttling of a deal between Divx and Blockbuster, resulting in the failure

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[215] A small sample of the Anti-Divx websites includes: **Ryan Mannion's Anti-Divx Site**; **DaBuzz Anti-DIVX page**; **Fight DIVX - fightdivx.com**; **Say No To DIVX and Circuit City**; **Wizemaster's Anti-DIVX Page**; **Jay's DVD and Anti-DIVX page**; **DVD Channel New Anti-DIVX site**; **DVD Now**; **The DVD Factor**; **Sound Freak's Page**; **DVD Connections**; **Doke's No DIVX page**; **DIVX Slogans**; **Death to DIVX**; **Digial Dreams**; **Vader DIVX Buyer Beware**; **DVD vs DIVX Comparison**; **Fightback Against DIVX**; **DIVX: Beyond The Hype**; **5 Ways To Crack DIVX**; **DVD Town Anti-DIVX FAQ**; **DIVX Comments**; **DIVX Petition**; **What does the DIVX account screen look like?**; **ATL.COM supports Anti-DIVX...check them out**; **The DVD List (very informative site)**; **DVD Addicts**

[216] "DVD holds the high ground in battle with Divx," by Bill Kelley III, *The Virginian Pilot*, 1/7/99.

of the technology.[217] However contentious the discourses surrounding Divx, its arrival in the DVD market re-vivified press coverage of DVD while initiating comparisons between the formats in the press. These comparisons, coupled with press coverage of the vitriol coming from early adopters, ultimately secured DVD meaning in late 1990s culture. Through the arrival and failure of Divx, DVD's place as the preeminent next-generation home video/computer technology was solidified.

DVD Discourses: Locating the Birth of DVD

DVD had conquered its challengers and was clearly defined as a technology, as a commodity, and as a cultural phenomenon. The final period of discourse related to DVD culture accounts for the explosive success of DVD following the collapse of Divx. A number of insiders in the DVD universe credited Warren Lieberfarb, the former head of Warner Home Video, as the "father" of the DVD. It was Lieberfarb who, as an executive with little technical experience, first partnered Time Warner/Warner Home Video with Toshiba in 1992 in a cross-industry collaborative effort to design a technological standard. Johnnie Roberts writes that Lieberfarb "didn't invent the technology. More important, he saw its potential to transform the industry. So he cajoled, strong-armed and bargained with industry players around the world to set aside their parochial interests and sign on to a universal standard for the new format."[218] Jack Valenti, head of the MPAA credits Lieberfarb, "Warren is the fellow who had the vision years before anyone

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[217] "Circuit City Pulls Plug on Divx," by Seth Goldstein, *Billboard*, 6/26/99, Vol. 111, Issue 26; "DVD challenger: new Divx format concerns retailers," by Ed Lieber, *HFN*, 9/15/97; "DVD vs. Divx" by Seth Goldstein, *Billboard* 1/10/98, Vol. 110, Issue 2.
[218] "One man's flight of fancy" July 5, 2006, *Newsweek*.

else…he laboriously worked to get the other companies to come on board with titles."[219] Benjamin Feingold, head of Columbia Tri-Star (read Sony) at the time of DVD development recalls, "Warren would often go over the heads of the home entertainment people because he considered DVD to be that important…if he wasn't getting the right answer from someone at Paramount, he'd call [Viacom chairman] Sumner Redstone. If he didn't like what [former Fox president] Bill Mechanic had to say, he'd call Rupert Murdoch or Peter Chernin."[220]

Lieberfarb himself recalled the opposition he faced in the early 1990s: "The most challenging experience I've been through was not convincing the Japanese, Korean, and European electronic companies to develop a successor to the VCR. It was not working with key players in the technology industry, such as IBM, Intel, Microsoft, and Apple. It was working with Hollywood."[221] This last comment is revealing, for it indicates that even if we are to ascribe a certain authority to Lieberfarb's influence in product development, the concept of the DVD and its technological base cannot be solely affiliated with any one individual or any one company.

In fact, DVD was a technology that was dependent upon at least three distinct, yet closely aligned, industries spanning three continents for its technological "birth" and successive periods of discourse in the press and a range of social practices that made the DVD meaningful. It was the confluence of efforts and cooperation between individuals,

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[219] Quoted from: "Warren Lieberfarb: The Man Who Invented an Industry" by Catherine Applefield Olsen, *MediaLine News* February 12, 2003.
[220] Ibid.

corporations and indeed between industries that led to the development of DVD technology. It was the enthusiastic technology reviews, product demonstration reports, format war hyperbole, advertisements, and online community outrage that led to cultural meaning for DVD. What each of the above quotations suggests is the desire in the press to herald the role of one individual in technology development. What this immediately signals is that in studying DVD in this chapter, we have been studying the desires of industry, the press, and groups of individuals in society for new technology, and the processes through which that technology is made meaningful.

By the time the first advertisements appeared in 1997 for DVD hardware, software, computer manufacturers, and retail outlets, the public had been exposed to DVD for more than three years. Through the trade and popular press, they were encouraged to make sense of DVD in particular ways. Initially, discourse favored a technical explication of DVDs capabilities and similarities and differences to its technological predecessors. Shortly thereafter, focus shifted to the brewing "format war," again encouraging potential adopters to make sense of the new technology through VHS/Betamax histories, and the roles played by Sony and Philips and Toshiba and Time Warner. The trade and popular press served as a framing device for the new technology, telling readers how to think about the new technology, not what to think about it.

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[221] Quoted from Wharton Alumni Magazine, University of Pennsylvania, Winter 2006, interview with Kelly J. Andrews.

ADVERTISING DISCOURSES

As early as January 1996, reports started to appear about advertising strategies and expenditures. The St. Louis Post-Dispatch claimed that the aggregate total of all advertising for 1996 would be north of $200 million to introduce DVD by Labor Day.[222] However, due to Hollywood's concerns over copyright protection and royalty issues and the resulting delays in the launch process, it would be another year before the advertising blitz kicked into full gear. The delayed release afforded time to strategize advertising plans for software and hardware manufacturers and suppliers. Warner Home Video planned to use its website to supplement print and television campaigns, teaming with Toshiba to cross promote titles and hardware in a $30 million dollar campaign; Thomson planned to use in-store display units in 300 stores in the seven test markets, featuring 24 titles from Warner Home Video; Panasonic/Matsushita commissioned Grey Advertising for $15 million to produce television and print ads that would champion players and highlight the superior quality of audio and video; Philips planned a comprehensive global branding campaign with DVD as a key component; Sony planned a large-scale hardware campaign featuring in-store demonstrations along with print and television ads featuring DVD as the centerpiece of a Sony home theater system.[223]

Meaning making in the culture industries, and with DVD specifically, is tied to strategies of representation and dominant discourses. Advertisers tied DVD to the VHS

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[222] "Advertisers put best spin on new DVDs." By Michael Sorkin, *St. Louis Post-Dispatch*, January 21, 1996; Pg. 1A.

[223] "High-level meeting on DVD reported," by Thomas C. Veilleux, *HFN*, June 24, 1996. Fairchild Publications; "DVD Update…At last, DVD Movie Players Ship But Licensing Thwarts DVD-ROMS," *Multimedia Entertainment & Technology Report*, February 28, 1997. Information Access Company; "Thomson DVD Goes to Market," by Judy Bloomfield, *HFN*, April 21, 1997. Fairchild Publications.

and the CD, heralding its ability to deliver superior video and audio.[224] By doing so, advertisers engaged with the accumulated meanings stemming from the popular and trade presses to sell the technology. Through a variety of representational strategies advertisers identified target demographics and attempted to engage with idealized self-images and collective unspoken desires. Consider the following two-page advertisement for Samsung's new DVD player, appearing in the February 1997 *Premiere Magazine*:

[224] "The Next Step: Familiarize yourself with DVD-Video" by Mark Waldrep, *Sound and Video Contractor*, May 30, 1998, Intertec Publishing Corporation.

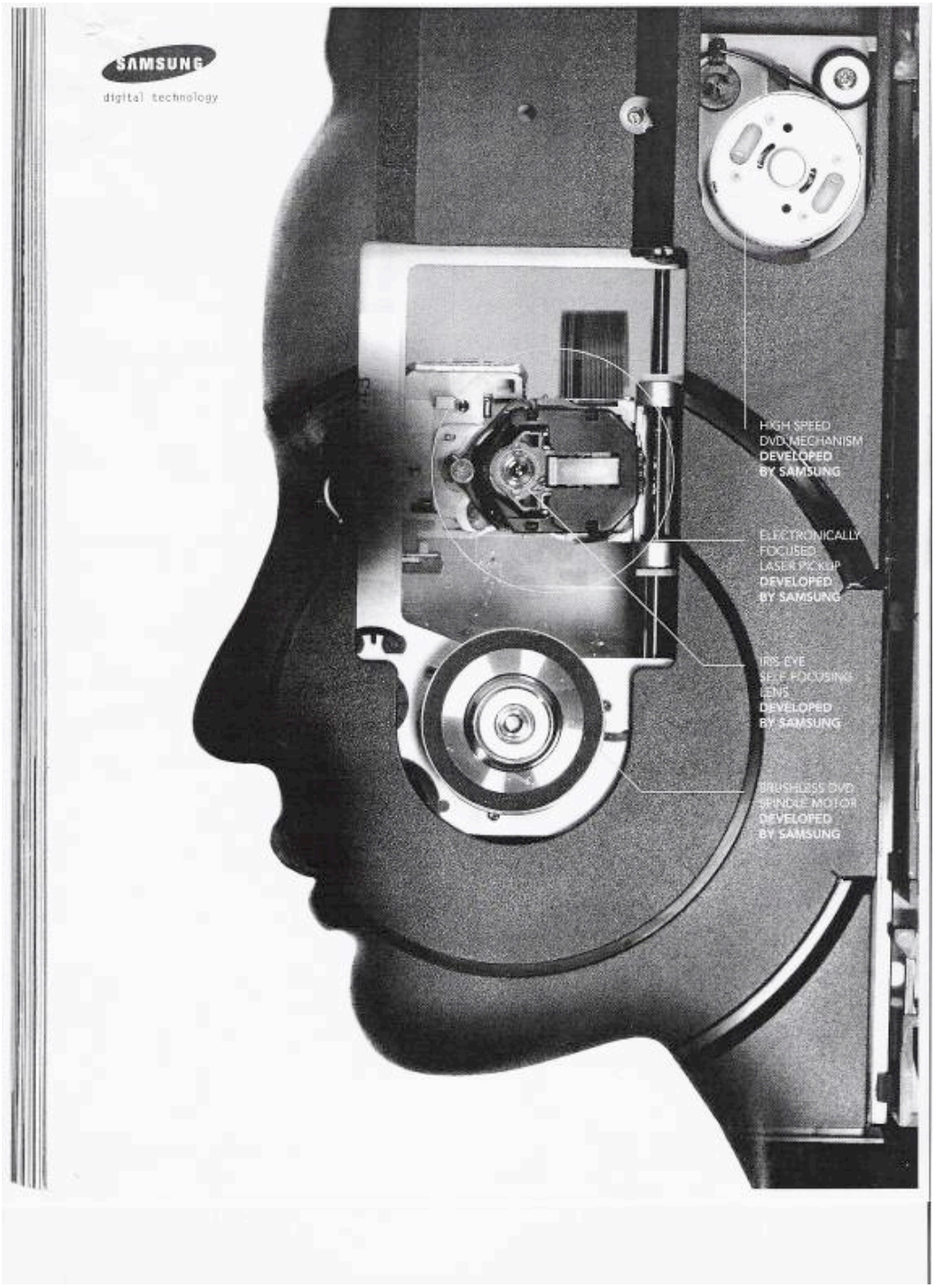


Figure 5.2: Samsung DVD Player Advertisement

SIMPLY REFLECTIVE.
A MIRROR OF IMAGE
AND SOUND. AN ACCURATE
REFLECTION OF THE
IDEAL HOME THEATER
EXPERIENCE TODAY.
A PERFECT VISION OF
SAMSUNG'S COMMITMENT
TO THE TECHNOLOGY
OF TOMORROW.
A PURE REPRESENTATION
OF AUDIO AND VIDEO
EVERY TIME.
SIMPLY INTEGRATED.
SIMPLY DVD.
SIMPLY SAMSUNG.

MULTIPLE LANGUAGES
CONTENT PROVIDERS CAN CODE UP TO EIGHT INDEPENDENT LANGUAGES

COMPATIBILITY
ABILITY TO PLAY DVD, EXISTING MUSIC CDs AND VIDEO CDs

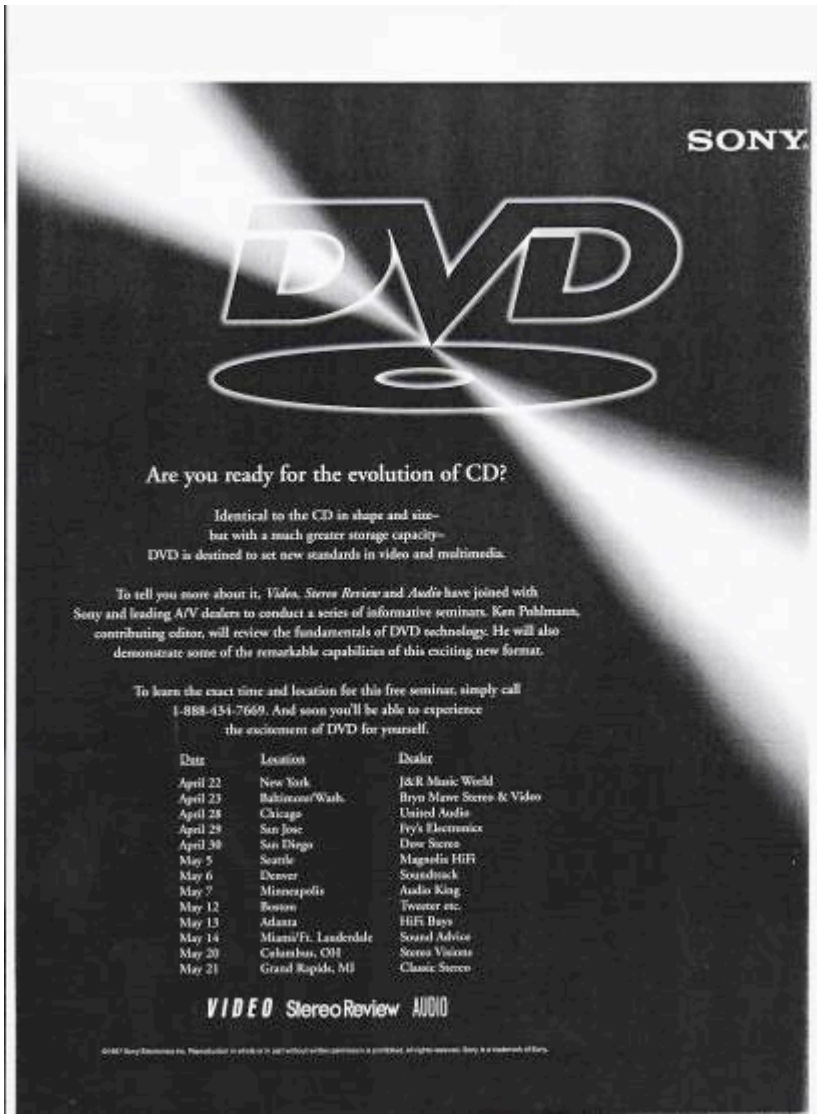
DOLBY DIGITAL® AUDIO
CONTENT PROVIDERS CAN CODE DISCRETE 5.1-CHANNELS FOR SURROUND PLAYBACK THROUGH HOME THEATER SYSTEMS; ALL DISCS EMPLOY DIGITAL AUDIO CHANNELS

MULTIPLE ANGLES
CONTENT PROVIDERS CAN CODE UP TO EIGHT DIFFERENT CAMERA ANGLES OF SCENES

1-800-SO-SIMPLE
WWW.SOSIMPLE.COM

DVD, as I've argued, attains meaning by engaging with previously existing discourses representing a popular idea of something that is "high-tech" and "interactive." This early advertisement emphasizes DVD's technical qualities developed by Samsung (notice the labels directing attention to the various mechanisms inside the head of the model) and its interactive functionality, literally integrating the machinery with human biology. The text on the following page supports this assertion; by representing DVD as "Simply Integrated. Simply DVD. Simply Samsung" the advertisement suggests that DVD should be understood as an idealized and futuristic technology capable of perfecting human perception through DVD technology. Consider too the race and gender of the model; the model appears to be a young white female. However, the difficulty in ascertaining this fact suggests that the identification here is youth, rather than a gendered or racial identity. By targeting young people, Samsung appears to be identifying likely early adopter enthusiasts while pointing to an idealized vision of home viewing technologies.

By way of comparison, consider the following two advertisements from Sony and Philips appearing in the May 1997 *Premiere Magazine* and November 17, 1997 *New Yorker* respectively:



SONY

DVD

Are you ready for the evolution of CD?

Identical to the CD in shape and size–
but with a much greater storage capacity–
DVD is destined to set new standards in video and multimedia.

To tell you more about it, *Video*, *Stereo Review* and *Audio* have joined with Sony and leading A/V dealers to conduct a series of informative seminars. Ken Pohlmann, contributing editor, will review the fundamentals of DVD technology. He will also demonstrate some of the remarkable capabilities of this exciting new format.

To learn the exact time and location for this free seminar, simply call 1-888-434-7669. And soon you'll be able to experience the excitement of DVD for yourself.

Date	Location	Dealer
April 22	New York	J&R Music World
April 23	Baltimore/Wash.	Bryn Mawr Stereo & Video
April 28	Chicago	United Audio
April 29	San Jose	Fry's Electronics
April 30	San Diego	Dow Stereo
May 5	Seattle	Magnolia HiFi
May 6	Denver	Soundtrack
May 7	Minneapolis	Audio King
May 12	Boston	Tweeter etc.
May 13	Atlanta	HiFi Buys
May 14	Miami/Ft. Lauderdale	Sound Advice
May 20	Columbus, OH	Stereo Visions
May 21	Grand Rapids, MI	Classic Stereo

VIDEO Stereo Review AUDIO

Figure 5.3: Sony DVD Advertisement

Figure 5.4: Philips/Magnavox DVD Player Advertisement

The first advertisement stands in stark relief compared to the Samsung advertisement. Sony foregrounds the DVD logo while comparing the product to the CD. In so doing, the suggestion is made that the DVD should be understood in light of the

CD, and all of the associative meanings therein. DVD is "the evolution of CD" and is sold via a simple, elegant design that suggests, through forthcoming product demonstrations, the technology will speak for itself. Conversely, the Philips ad represents DVD as capable of integrating theaters and homes. By graphically portraying this synthesis, Philips is drawing upon the cultural meanings associated with home, domesticity, and suburban lifestyles. Connecting the DVD player with theaters suggests that DVD will bring the quality viewing experience into the home. Like the Sony ad, Philips is drawing upon existing cultural meanings relating to technology by comparing the DVD to laserdisc through the text appearing below the image. Furthermore, Philips' slogan, "Let's make things better," besides being the cornerstone for their aforementioned global branding initiative, further supports the idea that DVD improves upon existing technologies. Neither Sony nor Philips directly represents actual users in these ads; we can infer however that by virtue of their placement in particular magazines (*Premiere* and *The New Yorker*), that the ads are targeting groups of consumers. The Sony ad appears to be targeting movie and technology enthusiasts, historically young educated affluent males, encouraging them to participate in product demonstrations in retail stores. Philips seems to be addressing an older affluent educated audience: homeowners looking to improve their domestic spaces through new technology.

The next three advertisements underline the point that DVD has many meanings and is represented through a variety of industrial strategies and synergies. Compare, for example Panasonic's first ads with an ad for Toshiba and Warner Bros. and Toshiba alone:

Figure 5.5: Panasonic DVD Advertisement

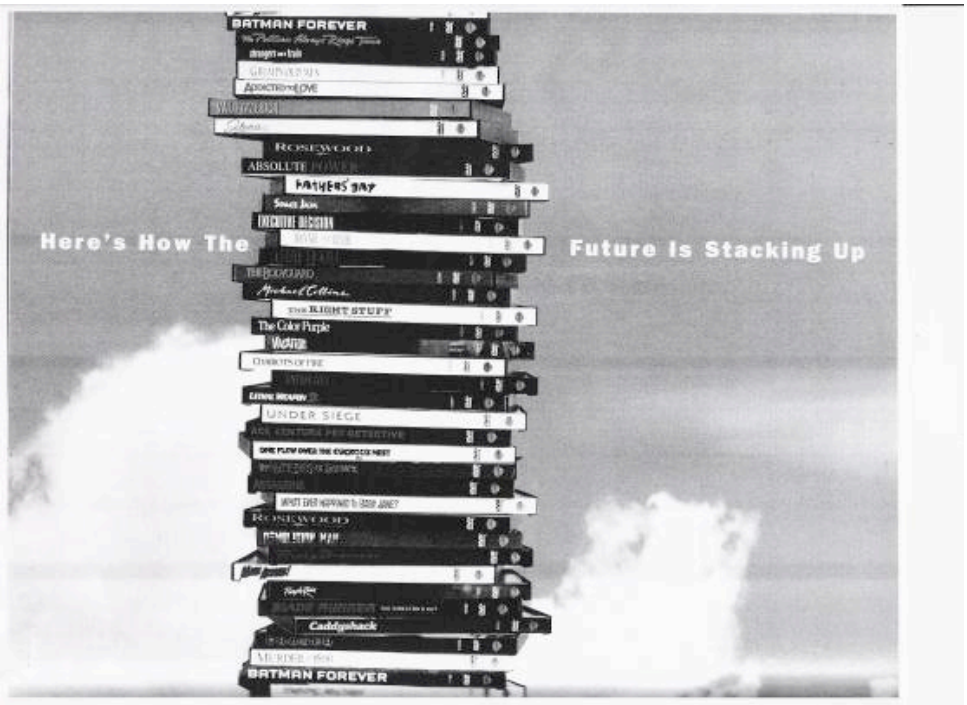


Figure 5.6: Toshiba/Time Warner Partnership Advertisement

Figure 5.7: Toshiba DVD Player Advertisement

The Panasonic ad, appearing in the October 1997 *Premiere Magazine*, makes the same associative connection to CD technology mentioned in regards to the Sony advertisement above. However, Panasonic is much more explicit about the affiliation of DVD to Hollywood. Graphically depicting the dynamism of a cavalry charge (presumably from a Civil War film), the advertisement suggests that DVD is exciting and explosive in its power to deliver Hollywood's content. Furthermore, the appearance of the hand in the lower third of the image cues the reader to both the size of the disc and its metaphorical ability to put the power of theatrical exhibition in the hands of the consumer. This empowerment theme is furthered by the second column of text highlighting the convergent potential of DVD. The inclusion of visual content from Hollywood is shifted in the Toshiba/Warner Bros. advertisement, appearing in the same magazine. Besides being representative of a $30 million joint campaign, the largest ever by a hardware and software partnership, the ad represents the discourse of "optimism" in regards to industrial futures mention above.[225] Presented against a heavenly backdrop of clouds and blue sky and accompanied by the words, "Here's how the future is stacking up," the ad excludes everything but the DVD packages and the hardware device. In so doing, connection between hardware and its software component is made explicit while product differentiation from VHS is made obvious; consumers can expect to enjoy blockbuster hits, and classics not available on VHS, on DVD from Warner Bros. on their Toshiba machines.

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[225] "Toshiba/WHV launch 'hits' ads" by Greg Tarr, November 3, 1997 *TWICE*, UMI Company.

Finally, the Toshiba advertisement appearing in the December 15, 1997 issue of *Newsweek* excludes explicit mention of titles in favor of a stereotypical depiction of youth cultures and attitudes. By representing a young white male in a state of awe at the image being reflected in his spectacles and by employing "hip" language in the ad's copy, Toshiba hopes to tap into the cultural moment. Associating DVD with explosions and dynamism was a common strategy to convey DVD's technical capabilities but the degree of excited-ness in the copy points to an effort to connect DVD to "extreme" youth culture. Targeting this specific demographic would seem to suggest a traditional targeting of demographics most likely to adopt new technology. But as we saw with the Philips and Toshiba/Warner Bros. advertisements, the story is much more complex. The advertising discourse as a whole includes ads strategically placed to target a wide array of potential consumers, from young men and women to home owners in the suburbs. DVD ads employed varying representational strategies to make meaning around DVD, although key themes within the different ads suggest that a coherent discourse was emerging. Recurring time and again, ads for hardware, software, and retail outlets highlight the "newness" of the technology. DVD was represented as the "next" (and better) CD, VHS, and laserdisc. Additionally, advertising discourse being created through early DVD ads structures DVD to mean Hollywood feature films.

We have seen in this chapter how cultural contexts contributed to the creation of consumer demand for DVD while discourses structured the ways in which the technology was understood. DVD entered into pre-existing cultural contexts in home entertainment. The practices of the American family in home video consumption shifted in the early

1990s to include buying and cataloguing tapes. Combined with pleasurable experiences with digital music technology, the cultural context was set for a new digital home entertainment technology. DVD has been constructed through a range of meanings and practices. As a new media technology based on a digital platform, DVD intersects with and acts upon key themes in late 1990s culture. It enters into the popular collective consciousness through representations in the trade press, popular press, through advertisements, and through user-generated activity on the internet. As a cultural artifact, DVD does not mean anything unto itself; DVD is made meaningful through the ways in which it is represented in successive stages of discourse and through the activities of consumers. In analyses of these stages of discourse, we saw how representations of the technology were connected to various groups of people, cultural desires based on interactivity and empowerment, and industrial desires to link the new technology to particular practices of viewing pre-recorded feature films in the home. DVD entered into culture through complex and often conflicting discourse, ultimately becoming a cultural artifact through the combination of uses, practices, and representations in the press.

DVD was introduced into a cultural context in a particular historical/cultural moment. It was made meaningful in context by drawing on pre-existing meanings and discourses. These discourses created a favorable cultural context that contributed to the successful diffusion of DVD. As we've seen, existing conditions in the content industry, consumer electronics industry, and computer industry contributed to DVD's success. Furthermore, chapter six will shift the discussion from the production of culture described herein to the regulatory context surrounding DVD, as well as the efforts

undertaken by industry to regulate how DVD was used and distributed to the public. We'll see how three industries, comprising dozens of leading corporations from three continents, exploited shifts in copyright and antitrust law that ultimately guaranteed the continued involvement of the Hollywood content providers.

Chapter Six: Regulating DVD

The formation of the DVD Forum granted power to a limited set of firms and guaranteed control over DVD technological development and specifications. By virtue of the administrative body's structure, the leading companies in the consumer electronics, computer, and filmed entertainment industries cooperated to exploit favorable conditions in culture and industry--and in the business and economic climate at large--to optimize the prospects of DVD-Video in the marketplace. Through the administrative body, these firms established a hierarchical power structure to control and, in effect, to regulate all potential iterations of the technology, including its production processes and the ways in which it was marketed to the public. Once established, the DVD Forum encouraged its members to behave in concert, cooperating to establish and maintain the quality of the technology and to present barriers to entry for competing technologies or firms. The cooperative nature of the Forum established an industrial culture of production that was then adopted by subsidiary industry sectors relating to DVD-Video and DVD-ROM; manufacturing, replication, packaging, software providers, and distribution companies worked together to pool resources to best exploit the new markets for DVD.

This cooperative culture surrounding DVD-Video was embraced by consumer electronics and computer corporations to ensure the continuing involvement and support of Hollywood. A unified DVD-Video standard and rigid control over all new technological and industrial sectors assured the content providers that a stable market

could be established. Revenue sharing agreements and direct sales relationships offered the studios a route around the First Sale Doctrine and offered additional incentive to support the new home video format. The support of the studios was integral in establishing DVD-Video as the dominant DVD platform. Hollywood desired a playback-only disc, and would not support either group attempting to establish a recordable DVD standard. Encouraging compromise over recordable DVD would have been contrary to their longstanding desire to maintain control over content; if recordable DVD had surpassed DVD-Video in the market, DVD may have become a device primarily used for time-shifting and copying films from other discs and off of television. Keeping DVD-Video ahead of more flexible recordable formats meant releasing large numbers of titles on disc, and assuring that prices of playback-only consoles remained below any new recordable devices; once the public conceptualized the technology as one principally designed for playback of feature films, it would not readily switch to a technology with differing requirements for usability.

Maintaining control over feature films on DVD was of paramount concern for the Hollywood content providers. DVD offered both an opportunity and a cause for trepidation; a new home video technology meant that additional revenues could be extracted from the most profitable ancillary market, but digital piracy threatened to undercut these potential profits. Before the studios would fully support DVD, new measures were required to regulate consumer access to, and use of, pre-recorded content. DVD posed serious challenges to firms making the shift to digital content delivery. Due to the fact that DVD afforded consumers the possibility of making easy, inexpensive,

high-quality duplications that they could then distribute via the internet globally, protecting content required new technologies and new business strategies. In a media environment that was undergoing a paradigm shift in user-content interaction, with consumers exploiting a variety of technologies in consumer electronics, computing, satellites and global networks to repurpose and share content, controlling content meant regulating the activities of consumers and their level of access to content through new technologies, regulations, and enforcement strategies. The members of the DVD Forum recognized that neither technology nor legal measures alone would provide viable and secure ways of protecting their valuable assets. Protecting content required the cooperation and compromise of all industry members. These firms worked to develop mechanisms to protect content within devices designed for DVD playback, between devices like consoles and computers, and over networks like the internet.[226] Reaching a cost-effective solution required the collective resources and political capital of the entire industry and support from legislators in Washington.

Securing content on DVD was an imperative first step in attaining the support of the content providers and successfully launching the technology. In order to achieve this task, the members of the DVD industry, through the DVD Forum and the DVD Copy Control Agency (DVD CCA), employed a three-pronged approach. The first step involved the development of "technical protection measures" (TPMs) that would be made available to manufacturers of discs, consoles, and all other hardware capable of playing

[226] "Copy Protection Measures: The Intersection of Technology, Law and Commercial Licenses," by Dean S. Marks and Bruce H. Turnbull; Workshop on Implementation Issues of the WIPO Copyright Treaty

DVDs. Often referred to as Digital Rights Management technologies (DRMs), these technological safeguards were conceptualized as a means to protect content technologically through encryption systems, keys and codes between players and discs, and recognition software that limited the playback of discs without officially sanctioned technologies. The second strategy was to enlist lobbyists working on behalf of the industry, through the MPAA, DVD CCA, and DVD Forum, to urge legislators to create and ratify laws that supported protection technologies and prohibited the circumvention of technical protection measure technologies. The third strategy was to create licenses that would be enforced through industrial bodies (the DVD CCA and others), guaranteeing oversight and control to participating industrial members. These three strategies were intended to complement the control mechanisms employed by industry members discussed in chapter four. By controlling patents, manufacturing and verification standards, distribution networks, licensing bodies, and copy protection technologies and legislation legitimizing those technologies, the industry was assured unprecedented control. The development of TPMs and DRMs, along with legislation and licensing bodies controlling their implementation and enforcement occurred within a broader legislative, regulatory, and technological context. This era, beginning with the Reagan administration's deregulation policies, is defined by tacit governmental support of the oligopolistic activities and organizational structures of the media industries.

This chapter begins with an examination of the legislative and regulatory context leading up to the passage (and validation through the courts) of the Digital Millennium

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(WCT) and the WIPO Performances and Phonograms Treaty (WPPT), Geneva, December 6, 1999.

Copyright Act (DMCA). This bill was instrumental in sanctioning the use of digital anti-copying technologies, prohibiting publication of circumvention codes, and assuring Hollywood that their movies on DVD would be protected from piracy. The regulatory context surrounding the home video and entertainment industries prior to DVD's introduction also set important precedents in Fair Use and copyright infringement and enforcement that would influence Hollywood's support of DVD. The relationships between the entertainment industries and regulatory bodies pertaining to intellectual and digital copyright issues, media ownership, patent law, and fair use resulted in an increasingly pro-industry regulatory atmosphere. All of these developments coalesced during the mid and late 1990s and combined with favorable contexts in industry, technology, economics, and culture to contribute to DVD's diffusion. After tracking the development and passing of the DMCA in relation to these broader regulatory contexts this section explains and examines section 1201, which included the most controversial and pertinent language related to "anti-circumvention" provisions, directly impacting the commercialization of DVD and broader issues of Fair Use and First Amendment rights.

Section two examines the various technical protection measures employed by the industry to protect content from piracy and illegal use, technologies employed to control the global distribution of content, and the structure and function of licensing agencies controlling protection technologies. Various technologies were employed to ensure that software would be protected from illegal copying with the intent of "keeping honest people honest." This section examines the development and implementation of a variety of digital and analog technologies designed to prevent unauthorized access by consumers

to DVD content. Technical protection measures proved to be an effective method of securing control over the technology, even after the code was cracked and published online by a Norwegian teenager in 1999. Licensing agencies were equally efficient as regulatory tools within the industry. These bodies served as enforcement mechanisms, forcing all manufacturers to include the requisite protection technologies on drives, consoles, and discs. By interacting with lobbying organizations like the MPAA (whose members were also members of the DVD CCA) to influence legislation, litigate copyright infringement cases, and protect the interests of industry members, the licensing agencies played an influential role in the process of DVD commercialization.

Section three examines the enforcement of copyright protections through litigation related to the "cracking" of DVD's protection measures undertaken by the DVD CCA and the MPAA against individuals in 1999. After exploring the circumstances and rulings in these cases, this section will speculate on their relative significance to the commercialization of DVD. This discussion will primarily examine how the DMCA was enlisted by the DVD Forum through the DVD CCA to discourage widespread diffusion of circumvention software, while ensuring the content providers that content would be protected through a variety of strategies, including prosecuting individuals thought to be in violation of the DMCA. All of the strategies employed to regulate DVD, both within the industry and in relation to user access, illustrate new strategies employed by industry to protect digital content. DVD plays a central role in establishing precedent in federal and international copyright law, and is illustrative of a new era of cooperation between industry and government in enforcement and restrictions on fair use.

DVD REGULATORY CONTEXT

The regulatory context surrounding the introduction of DVD intersects with larger historical, industrial, political, and governmental forces pertaining to media ownership, copyright, fair use, and antitrust. The film industry and the communications industries at large have a long history of dealings with governmental agencies seeking to regulate their structure or product.

Regulation and the Entertainment Industries

Beginning with the Sherman Antitrust Act of 1890, governmental regulations sought to increase competition in industry by limiting ownership of similar corporations that may be acting as a monopoly. The regulation, the oldest antitrust law on the books in the United States, is enforced by the Antitrust Division of the United States Department of Justice, who shares civil enforcement duties with the Federal Trade Commission. The law is rarely enforced through criminal adjudication; civil proceedings under a "rule of reason" standard, which examines the economic benefits and harm of allegedly anti-competitive conduct to determine the potential impact on the public, are more commonplace. However, the United States Supreme Court has deemed three types of conduct so lacking in economic justification as to be *per se* illegal. The *per se* violations include price fixing, bid rigging, and market allocation schemes, and are offenses warranting criminal prosecution through the Department of Justice.

Concerns over the legality of trusts and *per se* violations of antitrust law within the U.S. coincide with the birth of the motion picture industry. Edison's Motion Picture Patents Company, the earliest patent pool in the industry, restricted use of film machinery, raw film stock, and distribution technologies to companies within the collective or those willing to pay licensing fees to the trust. Edison's trust was infamously enforced by henchmen and bruisers who would intimidate film companies working independently in the New York area. The atmosphere was so restrictive and dangerous that several leading film producers and distributors headed west to California, founding Hollywood and establishing the modern movie business. Supreme Court decisions in 1912, 1915, and 1917 negated patents on raw stock and all other MPPC patents under the Sherman Antitrust Act. Moving to Hollywood to elude Edison's cartel freed the industry to develop technologies, enact cooperative business practices, and develop vertically integrated global business structures. Thus, a new trust was developed in Hollywood in the form of the Hollywood studio system. In 1938, the United States Department of Justice sued the movie studios, claiming they collectively were in violation of antitrust regulations. The case would eventually reach the Supreme Court of the United States, under the name *United States v. Paramount Pictures, Inc.*, 334 US 131 (1948). The decision, now commonly referred to as "The Paramount Decree" ordered the divestiture of theater chains, eliminating vertical integration in the movie industry and quelling collusive activities such as "blind bidding" and "block booking."

In the ensuing years prior to the introduction of DVD, particularly during the Reagan administration in the 1980s, the Hollywood studios exploited deregulation to re-

consolidate their power and control over filmed entertainment. The fact that the studios re-integrated their holdings through conglomeration enabled a limited set of firms to dictate how and when new technologies would be incorporated into the production, distribution, and exhibition businesses. Crucially, the lobbying efforts of the MPAA throughout this period, under the direction of Jack Valenti, established relationships with legislators and regulators at the FCC that would benefit industry in their efforts to control new technologies. Through these relationships, lobbyists for the MPAA influenced copyright law reform, deregulation of the media industries, and antitrust law that would legitimate the industrial structure and practices of the DVD industry.

Copyright Law

The relationship between the motion picture industry and the U.S. government is not limited to antitrust law. The industry has a long history of influence in Washington, resisting regulation, obtaining favorable trade status, and influencing copyright legislation through one of the most powerful lobbies in the United States, the MPAA. Because the industry produced creative products that were distributed publicly, United States copyright laws, and their enforcement, were of paramount concern. Since the Statute of Anne almost three hundred years ago, U.S. law has been revised to broaden the scope of copyright, to change the term of copyright protection, and to address new technologies.[227] Throughout the twentieth century and into the twenty-first, the U.S. has enacted copyright reform in a thinly veiled pro-industry effort to secure indefinite corporate rights to content. The first major revision of U.S. copyright law occurred in

1909. The bill broadened the scope of categories protected to include all works of authorship, and extended the term of protection to twenty-eight years with a possible renewal of twenty-eight. Congress addressed the difficulty of balancing the public interest with proprietor's rights, illustrating the ongoing debate over monopolies in the free market and public access through fair use:

> The main object to be desired in expanding copyright protection accorded to music has been to give the composer an adequate return for the value of his composition, and it has been a serious and difficult task to combine the protection of the composer with the protection of the public… (H.R. Rep. No. 2222, 60th Cong., 2nd Sess., p. 7 [1909]).

Copyright law directly impacts Hollywood's control over content. Through the law, content producers are legally ordained the right to limit use of their product and to retain rights to their films for set periods of time. These periods grew increasingly longer through several amendments and supplemental copyright laws passed by Congress. By 1976, legislative, technological, and political forces were aligning to shift the relationship between the content producers and government once again. Technological developments and their impact on what might be copyrighted, how works might be copied, and what constituted an infringement needed to be addressed. Cable, satellites, and home video shifted the nature of content distribution and required new protection measures. In 1976, Gerald Ford attempted to crack down on industrial espionage and illegal copying of content in all industries. In advance of the United States' decision to become a signatory on the Berne Convention of 1886, which provided international standards for copyright of creative works, Congress passed a significant copyright revision. The 1976 act

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[227] The "Statute of Anne" was the first copyright law, passed by British Parliament in 1709.

preempted all previous copyright law and extended the term of protection to life of the author plus 50 years (works for hire were protected for 75 years). The act covered "the scope and subject matter of works covered, exclusive rights, copyright term, copyright notice and copyright registration, copyright infringement, fair use and defenses and remedies to infringement."[228] The act stipulated that the enforcement of copyright infringement was both a governmental and an individual or corporate matter. The copyright holder was to be responsible for civil litigation that would redress monetary damages by the infringement; the federal government under the auspices of the Intellectual Property Division of the Department of Justice would prosecute offenders criminally. Contained within this revision was language codifying the fair use and first sale doctrines, two crucial pieces of copyright law directly impacting the motion picture and consumer electronics industries. These two sections of the act clarified the rights of home video hardware producers and set the business model for video rental. Under this act, consumers could not be prosecuted for recording content off of television; pre-recorded content was free to be rented to home video consumers without recompense to the studios after an initial payment by the retailer.

Deregulation and Antitrust Law

The Hart-Scott-Rodino Antitrust Improvements Act of 1976 (Public Law 94-435, the HSR Act) was passed by Congress and signed into law by Gerald Ford. The substantive part of this legislation consisted of a set of amendments to current antitrust

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[228] Association of Research Libraries, Copyright & IP Policies Web Site, <http://www.arl.org/pp/ppcopyright/>; and Public Policies E-News Copyright Updates,

laws, principally the Clayton Antitrust Act of 1914. Essentially, the act stipulated that before mergers or acquisitions can close, both parties must file a "Notification and Report Form" with the Federal Trade Commission and the Antitrust Division of the Department of Justice. In so doing, the companies were obliged to notify government of their intentions so potential antitrust litigation could be avoided, paying a substantial filing fee based on the size and nature of the merger. The effective result of this legislation was to loosen antitrust guidelines prior to a wave of de-regulation during the Reagan administration. The combination of the Hart-Scott-Rodino Act and the Copyright Act of 1976 paved the way for a wave of mergers and acquisitions in the entertainment industries.

The HSR Act was the first formal act of Congress that began a radical shift in policy that was also reflected in the behaviors of the Federal Communications Commission. Prior to the passage of the HSR Act, the FCC consistently upheld and modified laws pertaining to cross-ownership in the media industries, prohibiting media consolidation in the television, radio, and cable industries. After the passage of the Act in 1976, followed closely by the arrival of Chairman Mark Fowler in 1981 under the Reagan administration, the FCC and Congress moved to enact a campaign that sought to reduce oversight and greatly shift national broadcasting and media policy (Fowler and Brenner 1982; Horowitz 1989; Johnson 1994; Krattenmaker and Powe Jr. 1995; and Le Duc 1987). This shift in policy resulted in specific deregulatory moves by both Congress and the FCC throughout the 1980s. Beginning with an extension of television licenses by

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<http://www.arl.org/news/ppenews/>.

the FCC in 1981 and continuing through the elimination of the Fairness Doctrine in 1987, along with deregulation of competition mandates in the television and cable industries, the FCC and Congress began a re-conceptualization of the media industry. Media was defined as an industry like other industries operating in a commercial marketplace (Powe Jr 1987; Tunstall 1986; Krattenmaker and Powe Jr. 1995).

The significance of this policy change under the Reagan administration to the motion picture industry and their ancillary counterparts cannot be understated. In less than a decade, from 1976 to the mid 1980s, the federal government in the United States loosened restrictions on media ownership, virtually encouraging the wave of mergers and acquisitions that would transform the film and television industries. Combined with other factors, including new revenue streams from home video, the activities of the FCC and the Department of Justice stimulated the mergers of studios and multinational media conglomerates that would continue through the period surrounding DVD's introduction. Only a few decades earlier, the motion picture industry was subject to investigations by Congress for anticompetitive behaviors. The divestiture of the Hollywood oligopoly occurred during a period of change and uncertainty for the industry. The House Un-American Activities Committee, under the direction of Joseph McCarthy, investigated Hollywood's involvement in Communist Party activities shortly after the Paramount decree was enacted. These investigations were at least tangentially related to the Paramount case; the collusive practices of the studios and the powerful guilds representing virtually all employees in the industry were subject to interrogation by government. The cooperative oligopoly and unions were conflated with anti-

Americanism; Hollywood took a sizable public relations hit. Avoiding a similar situation in the contemporary environment meant continuing to involve government in the activities of the industry. Working closely with the Department of Justice and Congress during the period of industrial formation, Forum members were assured that they would not be subject to antitrust violations.

Meanwhile, the MPAA's predecessor, the MPPDA (Motion Pictures Producers and Distributors of America), and the MPEA (Motion Pictures Export Association) were working internationally in the late 1940s and 1950s under the old collusive practices of block booking and blind bidding to assure global dominance following World War II.[229] The MPPDA, under the direction William Hays and Joseph Breen prior to the appointment of former White House aid Jack Valenti in the 1960s, lobbied Congress on behalf of the major studios, seeking favorable international trade conditions for film and television content.[230] Additionally, the MPAA, as it was called after 1945, was responsible for keeping the government from censoring filmed content, establishing a system for self-regulation through the Production Code and the ratings system. The 1950s and 1960s also saw a greater affinity between the television and motion picture industries, as the studios moved into television production to remain profitable following the divestiture of their theaters. Through their lobbying efforts in Washington, the

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[229] The MPEA, formed in 1945, changed its name in 1994 to the MPA (Motion Picture Association). The organization is responsible for a wide range of foreign activities falling in the diplomatic, economic, and political arenas. The Motion Picture Association conducts these activities from its headquarters in Washington, D.C. and from offices in Los Angeles, California; Brussels; São Paulo; Singapore; and Toronto.

MPAA was able to keep Congress from regulating filmed content while simultaneously supporting the industry through favorable antitrust and copyright law. These lobbying efforts would play an important role in the regulation of DVD; by creating a precedent with Congress, the MPAA and the DVD CCA could expect favorable treatment from legislators.

Home Video Litigation

The conglomeration of the media industries in the 1960s and 1970s, under the supportive regime at the FCC, did not radically alter the quantity or quality of content production and distribution in the United States. The distribution of motion pictures continued, prior to the mid-1970s, according to historically tested patterns, with television distribution occurring after the end of all worldwide theatrical runs. With the HSR Act and the Copyright Act of 1976 signaling a shift in governmental policy regarding the media industries, new technologies threatened to shift the existing business model, creating instability and uncertainty. Home video threatened to destabilize the marketplace, giving consumers the ability to freely copy and trade movies and television programs. The Copyright Act of 1976 provided the industry a legal guideline for challenging the introduction and functionality of the Betamax. After reading advertisements produced by Sony's advertising agency Doyle, Dane, and Bernbach (DD&B) for the Betamax encouraging consumers to record programs and films in their entirety off of television, Universal City Studios, Inc. (MCA/Universal) filed suit in U.S.

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[230]I n 1934, Joseph I. Breen took over as head of the Production Code Administration (PCA) and served until retiring in 1945 when Eric Johnston took over and the name was changed to the Motion Picture

Federal District Court in Los Angeles on November 11, 1976 (Wasser 2001, pg. 83). The defendants, Sony Corporation of America, DD&B, several retailers selling the Betamax, and an individual Betamax customer were accused of violating copyright law. The plaintiffs, Universal and Walt Disney Productions on behalf of the Hollywood majors, charged that the violation of copyright was directly connected to the VCR's ability to record live programming and sought to halt the sale of the machines. The studios were ostensibly trying to protect film and television producers from the economic consequences of unauthorized mass duplication and distribution. However, other motivations were likely at play as well. One possible motivation for Disney's involvement in the case was fear that the new technology would erode their systematic reissue and withdrawal of family oriented content targeted at successive generations of consumers; MCA/Universal's motivations were likely related to their market position in television production, by far the leading profit earners in that field in 1976 (Wasser 2001, pg. 84). However, Universal might have also wanted to prevent Betamax from capturing a significant segment of the fledgling home video market before its parent company, MCA, could introduce its DiscoVision laserdisc system, which was scheduled for test marketing in the fall of 1977.[231]

Handing down its decision in October 1979, the U.S. District Court ruled in favor of Sony, citing fair use as grounds supporting consumer activities such as taping off air for entertainment or time shifting. Additionally, the court ruled that copying an entire

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Association of America; Jack Valenti was appointed in 1966 and served in that position until 2004.

program also qualified as fair use; that set manufacturers could profit from the sale of VCRs; and that the plaintiffs did not prove that any of the above practices constituted economic harm to the motion picture industry.[232] By the time the decision came down, the public had enthusiastically adopted the technology; to curtail their activities would have been virtually impossible. The court also upheld the First Sale Doctrine set forth in the Copyright Act of 1976. This decision, eventually upheld by the Supreme Court in 1984 after an Appeals Court had overturned the ruling, was the legal basis for the home video rental boom and the eventual push by the studios to regain control of the home video industry through a new technology. Ironically, the decision favored the studios as well as the consumer electronics industry. The studios realized long before the final ruling in the case that home video was returning enormous profits to film studios via the rapidly emerging rental market. By 1986-87, the revenue returned to the studios from the home video market surpassed theatrical revenues; Sony, after being beaten in the home video market by rival Matsushita's VHS machine, moved into the content production business, exploiting media deregulation initiated by the HSR Act, by purchasing Columbia-TriStar in 1989; Matsushita followed suit soon thereafter, acquiring MCA/Universal in 1990.

The regulatory context surrounding the motion picture and home video industries impacted the structure and behaviors of the studios and their parent conglomerates in the

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[231] "Supreme Court O.K.'s Home Taping: Approve 'Time Shifting' for Personal Use." By Paul Harris, *Variety* (Los Angeles), 18 June 1984.
[232] Lardner, James. "Annals of Law; The Betamax Case: Part 1."*The New Yorker* (New York), 6 April 1987. _____. "Annals of Law; The Betamax Case: Part 2." *The New Yorker* (New York), 13 April 1987.

1990s, just as it had in the 1970s. The codification of the First Sale Doctrine and the Fair Use Doctrine in the Copyright Act of 1976 guaranteed that the home video business would function in particular ways relative to the motion picture industry. Through the deregulation of the media industries beginning with the HSR Act in 1976, and supported by the deregulation of ownership rules throughout the Reagan administration, the motion picture companies began to wrest control from their home video counterparts, acquiring leading companies and/or forming home video divisions within the corporate structure of the media conglomerate. The delay between the filing of the Sony Betamax Case and the final decision by the Supreme Court some eight years later allowed for the home video market to be established via the activities of the rental sector and consumers renting, purchasing, and recording content. Thus, by the time the Sony decision was handed down, upholding the First Sale Doctrine and the Fair Use Doctrine, home video/VHS had diffused into a majority of homes in the U.S., creating a big business that was returning enormous sums to the studios through a two-tiered pricing strategy.[233]

Digital Copyright Law

With the rise of the VCR and home video, copyright law came to be of paramount concern for the content industries. Protecting content meant consistent efforts to lobby Congress for favorable regulation would need to be supported through the courts, through technological protection measures (where applicable), and through the enforcement

[233] As was discussed in previous chapters, films were initially priced between $40 and $75 for purchase by rental retailers in the first six months of distribution on home video, followed by a significant price reduction once demand for the title had fallen. Reduced pricing targeted consumers through direct sale, rather than the home video retailers.

activities of the Federal Bureau of Investigation. In 1988, the United States finally became a Berne signatory, radically altering the U.S. copyright system by bringing it in line with international copyright law. Through the efforts of major industry lobbyists, including the MPAA and leading computer industry groups, the copyright system expanded to provide greater protection for proprietors, formed new international copyright relationships, and eliminated the requirement of copyright notice for copyright protection.[234] Further changes to copyright law came in the early 1990s, prior to the widespread diffusion of the internet and DVD technology. In 1990, Congress amended the Copyright Act of 1976 to prohibit commercial lending of computer software, modifying the First Sale Doctrine for the first significant time in support of industry leader IBM.[235] Amending the Act again in 1992, Congress made copyright renewal automatic, curtailing the entry into the public domain of works protected by copyright prior to 1978.[236] By the time President Bill Clinton took office in early 1993, the Copyright Act was being amended several times annually, most often in support of copyright holders and industry content providers through increased criminal and civil penalties and extensions of the terms of copyright.

A paradigm shift of sorts took place with the election of Clinton in 1992. Clinton recognized the technological and information revolution looming on the horizon. The

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[234] "A bad idea whose time has come?," *IEEE Micro*, vol. 08, no. 2, pp. 6-7, Mar/Apr, 1988.
[235] Computer Software Rental Amendments Act of 1990, title VIII of the Judicial Improvements Act of 1990, Pub. L. No. 101-650, 104 Stat 5089, 5134, enacted December 1, 1990.
[236] Copyright Renewal Act of 1992, title I of the Copyright Amendments Act of 1992, Pub. L. No. 102-307, 106 Stat. 264 (amending chapter 3, title 17 of the *United States Code,* by providing for automatic renewal of copyright for works copyrighted between January 1, 1964, and December 31, 1977), enacted June 26, 1992.

internet and the DVD offered new opportunities for distributing digital media seamlessly and without loss of quality in reproduction. One of his top priorities upon taking office was to establish a task force within governmental agencies to develop an agenda related to what was deemed the "National Information Infrastructure" (NII).[237] The principal goal of this task force was to define U.S. priorities and action points for domestic and international legal reform.[238] The group defined their agenda thusly: "Carefully crafted government action will complement and enhance the efforts of the private sector and assure the growth of an information infrastructure available to all Americans at reasonable cost. In developing our policy initiatives in this area, the Administration will work in close partnership with business, labor, academia, the public, Congress, and state and local government."[239] Some of the objectives of the task force were to "promote private sector investment, through appropriate tax and regulatory policies…to act as a catalyst to promote technological innovation…to help the private sector develop and demonstrate technologies needed for the NII…to reform regulations and policies that may inadvertently hamper the development of interactive applications…to protect intellectual property rights to strengthen domestic copyright laws and international

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[237] THE WHITE HOUSE, Office of the Press Secretary, February 22, 1993 "REMARKS BY THE PRESIDENT AND VICE PRESIDENT TO SILICON GRAPHICS EMPLOYEES," Silicon Graphics, Mountain View, California.

[238] Members of the Task Force included "all the key agencies involved in telecommunications and information policy," working under the White House Office of Science and Technology Policy and the National Economic Council. The IITF was chaired by Ron Brown, Secretary of Commerce, with staff work done by the National Telecommunications and Information Administration of the Department of Commerce. Additionally, the committee was advised by 25 members of industry, labor, academia, public interest groups, and local governments. From the "Agenda for Action" website, http://www.ibiblio.org/nii/NII-Task-Force.html

[239] Online version of the NII "Agenda for Action," http://www.ibiblio.org/nii/toc.html

intellectual property treaties [and] to prevent piracy."[240] Through the private sector, the argument followed, new technologies and the new electronic infrastructure could transform life and work in America. Protecting the interests of corporate America meant protecting the working interests of the American people. Establishing regulatory policy through the NII Task Force, the Clinton administration sought to balance the right to protect intellectual property with the right of the public to access information and make use of it according to their needs.

In 1994, the Department of Commerce, working under the NII Task Force, published a report calling for public input on the need for expanded regulation of the digital environment. Led by the Commissioner of the U.S. Patent and Trademark Office, public hearings were held throughout 1994, culminating with a Conference on Fair Use (CONFU) to determine changes to Fair Use guidelines as originally stipulated in the Copyright Act of 1976.[241] While the conference was being held and the Task Force was working towards providing recommendations for altering copyright law, President Clinton engaged the international copyright community, signing the Uruguay Round Agreements Act (URAA) which implemented the General Agreement on Tariffs and Trade (GATT) including Trade-Related Aspects of Intellectual Property (TRIPs). This piece of legislation removed thousands of works from the public domain and retroactively granted them copyrights. In a legal brief challenging Congress' power

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[240] Ibid.

[241] Lehman, Bruce A., "The Conference on Fair Use : final report to the commissioner on the conclusion of the Conference on Fair Use," September 1998. See Appendix 5.1 for a complete list of conference participants.

regarding copyright, a group of activists, scholars, and litigators claimed, "These laws have greatly harmed plaintiffs' artistic endeavors, and their ability to perform, teach, and disseminate works to the public….the government does not stop there. It even claims that this Court has absolutely no authority to review plaintiffs' challenges because they involve 'policy' debate reserved exclusively for Congress. In the government's view, Congress has *carte blanche* authority to enact *any* copyright law. And it is this Court's 'duty' to just 'apply and enforce settled law' enacted by Congress." (emphasis in quotation).[242]

The debate over digital copyright law was heating up. While CONFU continued to hear objections from the public and debate between industry, government, academia, and the public carried on, the NII Task Force released the Report of the Working Group on Intellectual Property Rights (known as the White Paper) in 1995. The report claimed that existing copyright law was well-suited for most of the potential issues stemming from digitalization, but a few alterations would strengthen existing law. Those suggestions included expanding the exclusive rights of copyright owners to include the right of transmission, creating new penalties and prohibitions on devices or programs designed to circumvent mechanisms protecting the rights of copyright owners, and protecting content through legal recourse for infringement of copyright management

[242] IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLORADO, Civil Action No. 01-B-1854 LAWRENCE GOLAN, *et al*., Plaintiffs, vs. JOHN ASHCROFT, in his official capacity as Attorney General of the United States, Defendant. "PLAINTIFFS' MEMORANDUM IN OPPOSITION TO DEFENDANT'S MOTION TO DISMISS"

information.[243] These recommendations, adopted in slightly revised form in the Digital Millennium Copyright Act, were the basis for sustained outrage and debate over the constriction of Fair Use policy applied through technical protection measures on the DVD. Before the bill became law, however, another round of international networking shifted the debate once again.

Because Presidents George H.W. Bush and Clinton altered U.S. policy regarding international copyright treaties, first by signing the Berne Convention and then engaging with international standards through GATT and TRIPS, a veritable Pandora's Box was opened that led to sustained lobbying efforts by the MPAA and the other domestic content industries (see figure 6.1).

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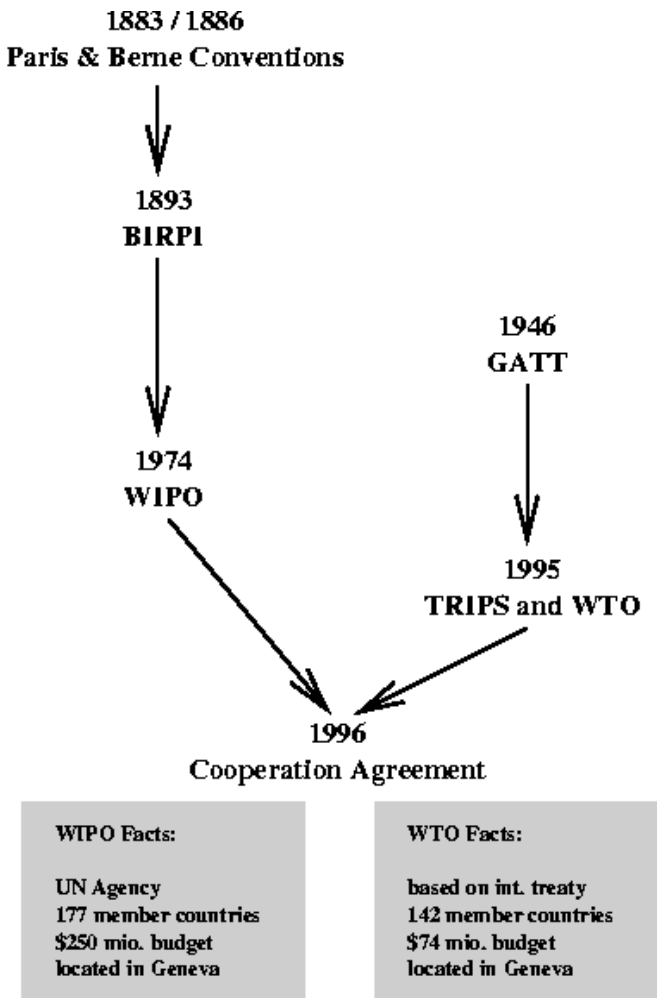
[243] "Primer on the Digital Millennium: What the Digital Millennium Copyright Act and the Copyright Term Extension Act mean for the library community," by Arnold P. Lutzker, Arnold P. Lutzker, Esq., Lutzker & Lutzker LLP, Washington, D.C. 2005, American Library Association, Washington Office, from http://www.ala.org/ala/washoff/WOissues/copyrightb/dmca/dmcaprimer.pdf

Figure 6.1: Copyright Law Timeline



These lobbyists recognized that through Congress' interaction with the World Intellectual Property Organization (WIPO) U.S. copyright terms and standards for enforcement could be improved to align with international standards. Beginning as early as 1993, lobbyists for the content industries pushed for extension of copyright protection to life plus 70

years (95 for work for hire).[244] Ongoing debate at the CONFU hearings resulted in a quagmire of competing ideas and interests, with no unanimous recommendations in sight. At the conclusion of the year, an international conference under the auspices of the WIPO considered the recommendations of the White Paper in an attempt to develop international consensus on copyright for the digital environment. Lobbyists for industry and the public worked overtime to convince the diplomats to side with their respective organizations. Delegates from 160 World Intellectual Property Organization member countries adopted a statement ensuring the "application of fair use in the digital environment." The treaty language emphasized "the need to maintain a balance between the rights of authors and the larger public interest, particularly education, research and access to information." Ultimately, however, the conference sided with industry, agreeing to the recommendations set forth in the White Paper as a model to amend the Berne Convention (WIPO Treaty).[245]

The Digital Millennium Copyright Act

In turn, this international agreement influenced the activities of the United States Congress which, as DVD was entering the marketplace in 1997, considered proposals to prohibit circumvention of technological protection measures (TPMs) through legislation complying with the WIPO and Phonograms Treaties. While legitimizing and protecting TPMs was a principal concern of the industries engaged in the commercialization of DVD, the move to align U.S. policy concerning digital copyright should be seen within a

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[244] Ibid.
[245] Ibid.

broader context of protecting intellectual property online. The digitization of information and commerce online required legal standards for both protecting intellectual property and limiting liability of service providers connecting the public to content. The House Judiciary Subcommittee on Copyrights worked throughout 1997 with input from industry and academia to establish legal guidelines to be applied in an all-digital environment.

By 1998, CONFU hearings were continuing, with content owners (represented by the MPAA) refusing to budge from their stance regarding TPMs not being a violation of Fair Use laws. "Fair use" is a crucial element in American copyright law--the principle that the public is entitled, without having to ask permission, to use copyrighted works in ways that do not unduly interfere with the copyright owner's market for a work. Fair use covers personal, noncommercial uses, such as employing a VCR to record a television program for later viewing. Fair use also includes activities undertaken for purposes such as criticism, comment, news reporting, teaching, scholarship or research. Jack Valenti testified before Congress more than half a dozen times during the course of 1998, stressing the concern of the motion picture industry over the potential damage to be incurred by free access to digital content through unrestricted Fair Use and the trafficking of circumvention software. According to the MPAA, DVD (and the internet) represented a completely different technology from anything then in the marketplace and required protection through legal, regulatory, and technological protection measures. Fritz E. Attaway, general council for the MPAA, explains the ongoing debates:

> Generally the position that we expressed throughout this process with regard to fair use was that copyright owners or property owners in general have never been prevented from locking up their property preventing

> access, and that the Fair Use Doctrine has never been interpreted to permit someone to throw a brick through a Blockbuster window in order to gain access to a motion picture in order to exercise fair use…the issue is access, and the Fair Use Doctrine has never been interpreted to allow unauthorized access… the [Section] 1201(a)(1) prevents unauthorized access, just as the Communications Act has prevented unauthorized access to cable programming and satellite programming for many years. The Fair Use Doctrine was not an issue there and we believe that it's not an issue in the DMCA anti-circumvention provisions.[246]

Mr. Attaway's assertion that anti-circumvention provisions did not constitute infringement of Fair Use guidelines illustrates the official position of the entertainment industry. Consumer advocacy groups disagreed. Technological protection measures virtually eliminated the *possibility* of fair use activities on DVD. Artists, teachers, and others wishing to access content for repurposing would not be able to do so with technological and legal measures in place prohibiting them from doing so. The official position of the MPAA, explicitly expressed through the deposition, incurred the wrath of the Digital Future Coalition, who balked at the claim that fair use of copyrighted materials would not be restrained by the combination of measures being employed by industry. They argued that the legal measures set forth in the DMCA completely obliterated the Fair Use Doctrine set forth in the Copyright Act of 1976 and upheld in the Sony Betamax Case. It is clear that the MPAA was seizing the opportunity afforded by

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[246] Deposition of FRITZ E. ATTAWAY, at the offices of Proskauer Rose LLP, 1233 20th Street, Northwest, Washington, D.C., commencing at 10:51 a.m., and the proceedings being taken down by Stenotype and transcribed by KAREN YOUNG.UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK: UNIVERSAL CITY STUDIOS, INC.; PARAMOUNT PICTURES CORPORATION; METRO-GOLDWYN-MAYER STUDIOS, INC.; TRISTAR PICTURES, INC.; COLUMBIA PICTURES INDUSTRIES, INC.; TIME WARNER ENTERTAINMENT CO., L.P.; DISNEY ENTERPRISES, INC.; AND TWENTIETH CENTURY FOX FILM CORPORATION, Plaintiffs, vs. ERIC CORLEY A/K/A, "EMMANUEL GOLDSTEIN," AND 2600 ENTERPRISES, INC., Defendants, Washington, D.C. Wednesday, June 7, 2000 INTERIM COURT REPORTING 545 FIFTH AVENUE, SUITE 900 NEW YORK, NEW YORK 10017 (212) 490-3430.

new digital delivery technologies to circumvent the Sony Betamax Case ruling; the lobbyists for the MPAA, including Jack Valenti, were drawing on legislative precedent, including the Telecommunications Act of 1996, to establish new legal and regulatory guidelines to ensure that their content would not be subject to open copying and trading as in the VHS/Betamax era.

While this debate continued, Senator Warren Hatch, chairman of the Senate Judiciary Committee, renamed the WIPO Treaty Implementing Legislation the Digital Millennium Copyright Act (DMCA). Before the bill became law, another round of debate in Congress occurred, with political gamesmanship impacting the final contents of the DMCA. While copyright jurisdiction traditionally belongs exclusively to the House and Senate Judiciary Committees, the potential impact on industry resulted in joint referral of the DMCA to the House Commerce Committee.[247] The committee, which had long-standing relationships with the MPAA, the computer industry content lobbyists (ITI), and the consumer electronics lobbyists (through the CEA), urged direct negotiations between these groups and the representatives of library and educational groups. Ultimately, compromise was negotiated through the Digital Future Coalition; the final guidelines of the DMCA regarding anti-circumvention and technological protection measures included limited exemptions for libraries and universities, and required review of the law every three years.

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[247] "Primer on the Digital Millennium: What the Digital Millennium Copyright Act and the Copyright Term Extension Act mean for the library community," by Arnold P. Lutzker, Arnold P. Lutzker, Esq., Lutzker & Lutzker LLP, Washington, D.C. 2005, American Library Association, Washington Office, from http://www.ala.org/ala/washoff/WOissues/copyrightb/dmca/dmcaprimer.pdf

The DMCA passed through Congress in the closing days of the 105th Session of Congress, 1998. Congress had secured, through an unprecedented pro-industry piece of legislation, the rights of the content providers to completely restrict Fair Use. This singular act, perhaps the most important piece of legislation for all intellectual property owners regarding copyright in the twentieth century, was indicative of Congress' position regarding copyright. To wit: during that same congressional session, the House and Senate passed S. 505, the "Sonny Bono" Copyright Term Extension Act (CTEA) which once again sided with the content industries, extending protection from life of the author plus fifty years to life of the author plus seventy years. In 1999, the 106th Session of Congress approved a significant hike in the minimum statutory damages for various types of copyright infringement in the Digital Theft Deterrence and Copyright Damages Improvement Act.[248] Literally dozens of similar examples of the federal government's willingness to alter existing copyright law in the 1990s to protect industry in the digital era reflect the atmosphere pervading the Copyright Office, the House and Senate Judiciary Committees.

While the DMCA empowered the Copyright office to grant limited exemptions, it has repeatedly refused any such requests by consumers. Movie fans, film scholars, movie critics, and public interest groups have all repeatedly asked the Copyright Office to grant DMCA exemptions to allow the decryption of DVDs in order to enable non-infringing uses and have been denied. For example, exemptions were sought to allow movie critics

[248] The law increased the minimum statutory damages for infringements from $500 to $750 and increased the maximum from $20,000 to $30,000. The maximum for willful infringement increased from $100,000 to

to post movie clips, DVD owners to skip "un-skippable" previews and commercials, and legitimate purchasers to bypass "region coding" restrictions on their DVD players.[249] None of these requests were approved. Even if an exemption were granted, however, the Copyright Office is powerless to grant an exemption to the DMCA's "tools" ban, which means that fair users would be left without the tools necessary to exercise any exemption that might be granted. Direct requests from such groups to the members of the MPAA, according to Attaway, have not been made.[250] This pro-industry atmosphere initiated by Congress and upheld through the activities of the Copyright Office was supported, as we will see, by the judiciary.[251]

ESTABLISHING CONTROL, PROTECTING DVD: ANTI-PIRACY TECHNOLOGIES AND LICENSING STRATEGIES

Prior to the regulatory bodies and the judiciary acting in favor of the studios and the burgeoning DVD industry, Hollywood recognized that their content would be at considerable risk in an open market where piracy of perfect digital copies would devalue their product. They required some form of copy protection for their movies if they were

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$150,000.

[249] See www.eff.org/ip/dmca/unintended_consequences.php#34

[250] Deposition of FRITZ E. ATTAWAY, at the offices of Proskauer Rose LLP, 1233 20th Street, Northwest, Washington, D.C., commencing at 10:51 a.m., and the proceedings being taken down by Stenotype and transcribed by KAREN YOUNG.UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK: UNIVERSAL CITY STUDIOS, INC.; PARAMOUNT PICTURES CORPORATION; METRO-GOLDWYN-MAYER STUDIOS, INC.; TRISTAR PICTURES, INC.; COLUMBIA PICTURES INDUSTRIES, INC.; TIME WARNER ENTERTAINMENT CO., L.P.; DISNEY ENTERPRISES, INC.; AND TWENTIETH CENTURY FOX FILM CORPORATION, Plaintiffs, vs. ERIC CORLEY A/K/A, "EMMANUEL GOLDSTEIN," AND 2600 ENTERPRISES, INC., Defendants, Washington, D.C. Wednesday, June 7, 2000 INTERIM COURT REPORTING 545 FIFTH AVENUE, SUITE 900 NEW YORK, NEW YORK 10017 (212) 490-3430

[251] For a complete list of Copyright Law amendments, position papers by Marybeth Peters (Registrar of Copyrights), testimony before Congress, etc., visit www.copyright.gov.

to support DVD as a new digital delivery mechanism. Working with the newly formed DVD Forum, and its core constituency of consumer electronics manufacturers and computer companies, the studios asked for the development and implementation of technological protections to limit copying from the format. They required that the system be "voluntary" and "cost effective," with the goal of "keeping honest people honest."[252] A voluntary system would divide consoles and computer drives and their manufacturers into compliant and non-compliant categories. Since all discs from the content providers would be compliant, any non-compliant device would be unable to play the discs. Therefore, the protection plan encouraged manufacturers to be compliant and to license the necessary technology for decryption from the licensing bodies (discussed below). This scenario effectively made a "voluntary" protection system mandatory while circumventing any possible antitrust infringement. Additionally, the "cost-effective" part of the equation limited the efficacy of the protection technologies. The studios realized very early in the development process that any protection technology that was cost effective would be vulnerable to determined hackers. The goal was to provide a barrier to content duplication for the average consumer; determined hackers could be prosecuted for circumventing the protection scheme in the courts. As long as any "hack" did not become so ubiquitous and easily integrated into consumer products (as with "Napster") that the entire system was in jeopardy, the content was considered reasonably protected.

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[252] "Copy Protection for DVD Video," by Jeffrey A. Bloom, Ingemar J. Cox, Senior Member, IEEE, Ton Kalker, member, IEEE, Jean-Paul M. G. Linnartz, Member, IEEE, Matthew L. Miller, and C. Brendan S. Traw, PROCEEDINGS OF THE IEEE, VOL. 87, NO. 7, JULY 1999, Manuscript received Macrh 2, 1999; revised April 25, 1999. Publisher Item Identifier S 0018-9219(99)04956-7.

Of course, in a perfect world the studios could rely on impenetrable copy protection technologies, but the realities of the open-source and hacker movements online forced the content providers to reconcile degrees of protection and loss to piracy. However, by developing a slew of technological protection measures, the industry could virtually guarantee that decryption and hacking software and hardware would not reach the masses. The resulting specifications for copy protection were so numerous as to overwhelm both the casual consumer and the casual researcher. Protecting content on DVD meant using any and all means necessary, including antiquated analog technologies, new digital encryption methods, watermarking, region controls, and new techniques and technologies to control the transfer of digital data between devices. All of these strategies were developed and implemented for the express purpose of controlling access to, and use of, Hollywood's content. Piracy was a concern, but at least as important was assuaging Hollywood's concern that unrestricted access would undercut the tiered distribution system that had proved so profitable over the previous decades. Controlling the markets into which DVD would be released, maintaining the primacy of theatrical exhibition as a distribution window, and continuing the efficient tiered global distribution strategy for home video could be assured through the various copy control technologies developed for use on DVD.

Thus the three industries worked to develop an inexpensive system that would:

- ensure the quality of the digital content
- be effective against unauthorized consumer uses
- be robust and tamper-resistant

- be revised if a breach occurred in the system
- be applicable to all forms of distribution
- be suitable for implementation on consoles and computers (Taylor 2000, p. 191).

This laundry list of requirements from the studios was supplemented by the consumer electronics manufacturers which asked for a low cost, voluntary, tamper resistant system that would not affect the normal use of the device and that would not require extensive resource requirements from the device. Working towards these goals, Working Group 9 of the DVD Forum in partnership with a newly formed entity (as of 1996), the Copy Protection Technical Working Group (CPTWG), spent millions of dollars and hundreds of thousands of man-hours to create a mutually agreeable protection system that would make digital and analog copying from DVD difficult. Initially, the DVD Forum intended to include copy protection as part of the original specification for DVD (discussed earlier), but after a series of delays and combative disagreements between interested parties, they separated the work, assigning the CPTWG and WG-9 to the task.

The CPTWG solicited proposals for copy protection technologies from interested companies, handing them off to WG-9 for submission and approval from the DVD Forum's steering committee (Taylor 2000, p. 192). A coalition of groups within the Forum developed a framework for security and access control called the Content

Protection System Architecture (CPSA).[253] This system was designed to be employed on all DVD and future digital delivery technologies, defining the content protection requirements of hardware devices. Because DVD content protection was designed to be complex, including a variety of different mechanisms for protection, it required a formal architecture to coordinate all of its various components.[254] CPSA includes two types of content-protection mechanisms: watermarking and encryption. While watermarking, a technical system to identify the status of the content through embedded information, offered a more secured form of protection that dictated how content could be accessed, played, or copied, its development and implementation on DVD-Video was difficult to develop and implement; DVD-Video would rely initially on encryption technologies, like CSS, to protect usage and control access.

Digital and Analog Protection Technologies

Encryption technologies scramble content until it is decrypted by a device that has the requisite descrambling technology. The Content Scramble System (CSS) (discussed earlier) was developed as the primary mechanism to safeguard pre-recorded DVD-Video content. CSS employs an authentication and encryption system whereby the data on the disc is encoded, only to be decoded by keys embedded within compliant players.[255] The

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[253] At the behest of the 4C Entity (Intel, IBM, Matsushita, and Toshiba; all of whom would eventually be steering committee members), the CPTWG, 4C, and the Secure Digital Music Initiative (SDMI), worked on this aspect of copy protection.

[254] CPSA is made up of eleven rules that define standard ways to implement access and recording controls intended to prevent redundancies and incompatibilities.

[255] One of the keys is unique to the disc, while another is located within the MPEG file (the compressed movie data) to be descrambled. Unauthorized copying is prevented through the system by requiring that a player interacting with a recording device authenticate that both devices are licensed to use the system.

average consumer's console or drive on her personal computer decrypts data from the disc in sections through keys and locks on the discs and devices. CSS was developed by Matsushita and Toshiba in 1996 to comply with Hollywood's demands and U.S. export restrictions. Hollywood's concern over perfect digital copies was assuaged by CSS; perfect copies of an MPEG stream could be made, but would not be playable since the copy would not include the keys for decryption.

Complying with U.S. export restrictions, however, proved to be the Pandora's Box to illegal copying and the litigation discussed in section three. Because the restrictions limited CSS to 40-bit encryption technologies, with only 25 of those bits being actively employed through the algorithms, hackers like Jon Johansen could easily crack the code through reverse engineering or brute-force techniques within minutes.[256] Additionally, U.S. Patent Law, and the availability of public patent records, enabled any curious hacker access to information the industry consistently argued was protected as trade secrets, disseminated only to companies willing to pay exorbitant licensing fees. Recognizing the potential vulnerability of the system led developers to additional protection measures and a complicated decryption procedure within CSS that utilized multiple levels of keys.[257] CSS was, and continues to be, the primary protection mechanism on all DVD-Video discs and players. It is, however, just one of many technological protection measures curtailing free use, enabling complete market control

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Data is exchanged between devices only after algorithms confirm that each device is licensed to playback or record.

[256] http://www.extremetech.com/article2/0,1697,1231643,00.asp

through restricted access to content, and limiting piracy through copying by non-hacker consumers.

Home video technologies have long been a source of discomfort and concern for content providers. Because VHS and Betamax technologies were based on analog technologies, whose use in copying content fell under the Fair Use guidelines of the Copyright Act of 1976, protecting content was virtually impossible. While DVD offered the content providers a means to an end of limitless copying and trading of content through digital encryption methods, once the digital stream was decrypted it was possible to copy directly from the DVD player to a VCR. The Analog Protection System (APS), also known as Analog Content Protection (ACP), was developed by Macrovision (whose technology was the primary protection mechanism for VHS) for use on DVD players in 1996.[258] The system was designed to prevent the average consumer from transferring DVDs to VHS by scrambling the signal between devices.[259] Like all of the copy-protection technologies devised for public distribution, APS was quickly hacked, this time by enterprising consumer electronics manufacturers working outside of the DVD Forum. Seeking an entrée into the market, Asian firms marketed VHS machines that

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[257] These keys included title keys, disc keys, and player keys, all controlled through licensing authorities set up under the DVD-Copy Control Agency (DVD-CCA). Once the disc is inserted in a device, the player key decrypts the disc key, the disc key decrypts the title key, and the title key decrypts the stored content.
[258] The system modifies the NTSC/PAL video signals coming from the DVD player such that they can be displayed on televisions but cannot be recorded on VCRs. The system confuses the automatic gain control on VCRs through either Pseudo-Sync Pulses (PSPs) or through modulated color-burst signals such that the recording from DVDs is severely degraded. APS was integrated into the CPSA as a functional counterpart to CSS and other technological protection measures.
[259] Its interaction with the architecture and functionality of the entire system is based on its designed interface with the NTSC/PAL encoder within the player. This encoder, another control mechanism that distinguishes between television output signals in the United States (NTSC) and Europe and a majority of

could circumvent the scrambled code and record from DVD machines. In fact, these devices have become so popular around the world that Macrovision subsequently developed a VCR that could circumvent its own technology and applied for a patent for the process.[260]

Yet another technology for controlling use and access to content was developed by Macrovision for use on DVDs (see figure 6.2 for more on copy protection technologies and their effectiveness). The Copy Generation Management System (CGMS) was designed as a mechanism to direct the recorder to allow or prevent copying.[261] The system was designed to function according to two formats (analog and digital) and three functional states in the recording process (copy enable, copy one generation, or copy never).[262] While the studios were quick to adopt the CGMS system, predictably encoding all discs with "copy never" bits, Macrovision failed to enforce or police implementation on consoles or drives. Consequently, the flag that effectively limits the number of copies that can be made from a single disc is often not included in the vast majority of drives and consoles.[263] Why Macrovision never patented the technology is a mystery; one possible explanation may be that the system was not

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the Eastern world (PAL), interacts with the MPEG stream header and then applies the encryption through the output ports on the device. http://www.extremetech.com/article2/0,1697,1231647,00.asp

[260] Ibid.

[261] The bits are encoded in the authoring process on the disc itself and on the DVD player and DVD recorder. The DVD player adds the CGMS data to the video output stream before the recorder recognizes the setting and allows for copying.

[262] "Preserving an Effective DVD-Copying System," Macrovision Corp., copyright 2003; accessed via http://www.macrovision.com/pdfs/Preserving-an-effective-DVD-Copying-System_0303.pdf

[263] Recent tests of over 100 models of the DVD players in the market have shown that approximately 60% either did not implement CGMS-A, or the implementations were incorrect, resulting in CGMS not being preserved on the video output during playback. Ibid.

endorsed by the DVD-CCA, which was not willing to license the technology through one of the many licensing bodies under their umbrella (see licensing discussion below). Without the support of the major licensing body, whose members were the same as the controlling body of the DVD Forum, Macrovision was in the precarious position of encouraging the retrofitting of DVD players with CGMS--not a logistically feasible solution. Additionally, because Macrovision was profiting from the widespread inclusion of analog copy protection measures, licensed by the company independently from the DVD-CCA or its subsidiaries, resources may not have been available to enforce the implementation and licensing of CGMS.

Figure 6.2: DVD-Video Copy Protection Technologies and Performance

	VHS/VCR Recording	DVD Recorder	Analog Input To PC DVD Recorder	Digital to Digital Copy on PC	DV Camcorder Analog In	Digital VCR Analog In
CSS	N/A	N/A	N/A	100% Effective (without DeCSS)	N/A	N/A
CGMS	None	Nearly 100% Effective	Unknown	Unknown	Nearly 100% On CGMS	Nearly 100% On CGMS

		On the 40% Of devices w/CGMS			Equipped DVD Players	Equipped DVD Players
APS	Nearly 100% Effective on VCRs produced After 2000	100% Effective	Effective On Major Brands	Not Effective	100% effective	100% Effective

Source: Macrovision Testing, March 2003, Macrovision Corporation

Keeping Up with the Hackers: Supplemental Protections

APS and CSS were the two principal technologies protecting DVD-Video in the open marketplace. When new DVD formats emerged, new protection measures were designed and implemented to better protect content. The Content Protection for Prerecorded Media (CPPM) system was designed to replace CSS for use with DVD-Audio.[264] The technology performs similarly to CSS, utilizing an authentication mechanism between disc and player. While DVD-Audio has failed to achieve the widespread success of its video-based sibling, DVD-Audio encryption through CPPM represents the continuing efforts undertaken by DVD the industry to improve and integrate new protection schemes (Taylor 2000, p. 194).[265] These technologies are

[264] The system was designed by the 4C alliance (IBM, Intel, Matsushita, and Toshiba)

[265] The principal difference between CPPM and CSS is the level of sophistication in the encryption sequence and the robustness of the protection provided by the technology. CPPM replaces the disc key utilized by CSS with an album identifier that provides a key that cannot be duplicated on recordable media.

distributed and controlled by the DVD Forum's licensing bodies. These licensing organizations supply device manufacturers with the device keys, and can revoke a key in circulation if it is hacked that will make all future discs with new media key blocks unplayable. After 1999, with the potential for recordable and re-writable discs and DVD recording drives on the market, the 4C group improved CPPM to compensate.

The Content Protection for Recordable Media (CPRM) system binds a recording to the medium on which it is recorded. The system allows discs to be recorded and played back on drives, but does not allow copying of content from the drive to another disc or other media.[266] CPRM, like many of the protection technologies discussed herein, was designed for beta-testing on DVD hardware and software. Once the systems were found to be robust and sufficiently functional, they could then be applied to other digital technologies and platforms. When CPRM was announced in 1999, the online and hardware-enthusiast communities balked at the potential application of the technology to computer software systems, PC hard drives, and future digital technologies, calling for boycotts and organizing through the Electronic Frontier Foundation.[267] Through 2001, consumer advocacy groups rallied support, citing fair use constriction and collusion. The

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Each drive or console player has a set of 16 device keys that decrypt information on the media key block (MKB).

[266] Utilizing a series of keys and media IDs on discs, the system encrypts content as it is copied onto the storage drive. Once the content is encrypted with the individual ID from the disc, it cannot be copied onto another disc with a different ID.

[267] "Protecting Digital Assets," Digital Content Protection, Part II, CPRM: The Full Story, Ziff Davis Publishing Holdings Inc., 2001: http://www.extremetech.com/article2/0,1697,1231646,00.asp

4C entity finally issued an official policy statement declaring that CPRM was not to be licensed for hard drives.[268]

Yet another group of technical protection measures was developed for use on supplemental DVD formats, with the intention of eventual inclusion on DVD-Video. Watermarking employs a digital signature that appears on the video or audio track and can be recognized by the recording or playback equipment.[269] Watermarking has yet to be included on DVD-Video, but the various industry organizations, including the 4C and 5C groups are determined to enlist it to limit piracy.

The transmission of digital content afforded by DVD, and the potential for limitless perfect copies from digital masters, continues to be a matter of paramount interest and investment to protect content. While DVD provides pristine digital content regardless of the particular specification (DVD-Video or DVD-Audio), digital interconnect standards have limited the free and unconverted flow of digital content from devices to receivers. Most DVD players convert the digital content to analog for output before the receiver reconverts the content back to digital for display. Once the standards for digital transmission have been resolved, digital content will flow unimpeded between device and display, providing potential pirates another opportunity to hijack content. The

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[268] Ibid.

[269] The functionality of watermarking was designed to link content to the signature through conversion from digital to analog or vice versa. Watermarking is then connected to encryption technologies like CSS or CPPM; in order for manufacturers to get the required decryption keys that afford access to the content, they must sign a license requiring that watermarking detection be implemented. Watermarking was deployed through DVD-Audio players; developed by Verance and utilizing CGMS to limit the number of copies that can be made by any one player. DVD-Audio recorders include encoders that can change the watermark embedded on the disc from a "copy-once" to "copy no more," thus limiting copies to one.

5C alliance (Intel, Sony, Hitachi, Matsushita, and Toshiba) developed the Digital Transmission Content Protection (DTCP) system to establish secure channels between DVD players and digital receivers (like HDTVs). This secure pathway prevents unauthenticated devices from stealing the signal en route. Another similar protection technology was developed in 1999 to create a universal interface standard between computers and displays.[270] In this way, the protection can be updated continuously through consumer's usage of the system, thus protecting high definition video content on computers. Without this protection technology, Hollywood's support for the next-next generation high definition disc on computers could not be expected.

Controlled Distribution: Region Controls

The final aspect of copy and access protection employed by Digital Video Discs is a technology known as region (or territorial) control. While the content protection technologies discussed above would seem to cover all potential copyright infringement techniques, none of these restrict access based on geographic location. Region control technology divides the world into a number of regions (6 for DVD), allowing discs sold in a certain region to be played only on players manufactured in a given region (see Figure 5.3). The reason this technology exists is because movie studios typically sign complicated cross-licensing deals for international distribution and desired to maintain the tiered distribution strategy to maximize profits in each distribution window; region

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Through this structure, DVD-Audio discs were protected, while a concession was made to the fair use community.

[270] The High-Definition Output Protection (HDCP) scheme, also known as the Digital Visual Interface (DVI), utilizes a variety of keys and selection vectors to verify that the receiving device is authorized to

control allows studios to cooperate in regions around the world and to stagger marketing and distribution. Region control was intended to maintain the primacy of the theatrical window; if DVD versions of films were released in one part of the world while the film was still in theaters elsewhere, pirated copies of DVDs could undercut box office sales. In addition to employing technology to discourage copying, CSS-encrypted DVD-Video discs may "optionally" contain region management information to allow the studios to control the distribution of their products throughout the world.[271] To prevent discs intended for sale in one part of the world from being distributed and used elsewhere, all devices automatically check discs for region codes and only play titles for which they are authorized. For computer DVD-ROM drives and recorders this task is accomplished through Regional Playback Control (RPC). There have been two phases employed by the DVD industry: Phase I implementations were used prior to the end of 1999 and function through the computer's video playing software, decoding system or operating system to manage region control. In this case, the region code could be set only once; for some decoders, sometimes the region was even preset at the factory. Phase II implementations have been in use since 2000 and hand-off responsibility for region management exclusively to the drives and recorders implementing the necessary functions in their firmware. Under this system, the user could change the region code up to five times, with

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display or record video. The player maintains a list of active keys and vectors, and is updated by system renewability messages (SRMs) that come from the discs.

[271] All devices that are equipped with CSS technology (mandated through a "voluntary" system whereby any non-CSS device will not play ANY disc from the studios) must contain regional playback controls under the terms of the CSS license.

the manufacturer having the additional ability to then service the unit and reset this counter (up to four times).

Regional Playback Control (RPC) was one of the most controversial of the technical protection technologies employed on DVDs. Controlling access to content through this scheme bordered on illegal restraint of trade, according to the Australian Competition and Consumer Commission.[272] International regulatory bodies balked, but were relatively ineffectual in combating the use of RPC. Because RPC is not strictly a copy-protection technology, circumventing the system is not illegal in the United States and around the world. Consequently, "universal" and "code-free" players are widely available and patches that modify Windows and Mac operating systems to disable RPC II in DVD-ROM drives are easily found online. The studios responded by developing the Regional Coding Enhancement (RCE) system to prevent Region I discs from working in code-free players.[273] Predictably, the hacker community quickly found ways to circumvent this new protection measure, creating piracy software and making it widely available online.

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[272] http://www.extremetech.com/article2/0,1697,1231651,00.asp

[273] Essentially, the discs are embedded with codes that can detect if the player has been altered to allow playback across regions, preventing playback once the player has been identified as being non-compliant by the disc.

Figure 6.3: DVD Regions

Controlled Compliance: Licensing Bodies

While there is as yet no hack-proof technology or protection system that can stop piracy by the determined hacker, mechanisms for control over access to content continue to be relatively effective in preventing most mainstream consumers from casually copying or importing regional coded discs. Additionally, the systems and technologies deployed to prevent illegal copying were supplemented by an industrial control mechanism that forced device and disc manufacturers to be compliant with the various

protection technologies. A licensing system was set up by the CPTWG and the DVD Forum's various members for each of the copy protection technologies. Through licenses, the collective power of the DVD Forum, and the DVD Copy Control Administration, could be wielded to assure compliance in all global markets. Because each of the licenses was under the purview of members of the DVD Forum and was developed through either the CPTWG, the 4C alliance, the 5C alliance, or Working Group 9 of the DVD Forum, final specifications and the licenses dictating their form and function were agreed to by the most powerful industry members.[274] By virtue of the collective standing of these member organizations, who were also steering committee members, and the desire of the studios to protect content from digital piracy, all discs were encrypted with the CSS technology. Therefore, any device manufacturer wishing to produce a player or drive capable of playing encrypted discs must obtain a license. The license gives the manufacturer the right to use the technology and provides them with the necessary technical locks and keys provided by the licensing body (initially Matsushita licensed the technology on an interim basis). Because the three industries agreed to implement the technology jointly, they set the terms and obligations imposed by the license stipulating how content would be treated once it was decrypted.

The license was offered royalty-free, with an administrative fee paid to the licensing organization. This licensing organization was developed for each of the TPM technologies as a governing body consisting of member organizations from the content,

[274] For instance, the CSS system was developed by Matsushita and Toshiba as a proprietary technology that was ascribed particular intellectual property rights.

computer, and consumer electronics industries. The licensing body, initially Matsushita before the formation of the DVD CCA, held the direct rights and responsibilities for enforcing the license and the related specification requirements. Additionally, the studios were afforded special enforcement rights as "third party beneficiaries" to bring injunctive and "equitable relief" litigation against non-compliant licensees.[275] The licensing structure for the various protection technologies is divided over several legal bodies, with License Management Incorporated (LMI) being the central management body for current protection technologies and the 4C Entity taking over future technologies (see appendix 6.1).[276] While tracking the licensing structure for copy protection technologies seems to be an impossible task, given the convoluted structure and relationships between entities, the power structure is much simpler than it at first appears. All of the licensing agencies are managed by the same executive director, John Hoy, and share the same physical address.[277] In fact, the DVD CCA, 4C Entity, LMI and the DTLA are actually the same organization split up into a multiple organizational structure to avoid antitrust litigation.[278] We'll see in section three how these various entities behave to enforce licenses and to bring litigation against computer and code hackers, working with the MPAA, whose members overlap those of the DVD CCA, LMI, and 4C entities.

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[275] "Copy Protection Measures: The Intersection of Technology, Law and Commercial Licenses," by Dean S. Marks and Bruce H. Turnbull; Workshop on Implementation Issues of the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT), Geneva, December 6, 1999.

[276] For example, the next generation of CSS will be licensed by 4C Entity, not by the DVD CCA which licensed CSS.

[277] (225 B Cochrane Circle, Morgan Hill, CA 95037).

LITIGATING DVD

The passage of the DMCA and subsequent pieces of legislation supporting or extending copyright protection were important steps in securing the confidence of the MPAA member companies and guaranteeing their continuing support of DVD technologies. The legislative environment, including the behaviors of the Copyright Office and the Department of Justice Antitrust Division, supported the patent pooling and licensing strategies employed by the DVD Forum and consistently upheld the rights of the content producers to restrict Fair Use and protect their content from unauthorized access. The DMCA outlined and legitimized the legal and technological protection measures hoped for by the MPAA member companies working in conjunction with the consumer electronics and computer industries. However, it was not until the state and federal courts assessed the legislation that the DMCA would prove its worth to the industry. In October of 1999, not even a year after the passage of the DMCA, Jon Johansen, a fifteen year old Norwegian computer enthusiast published DeCSS on LiVID project, an open source software development site working to build a DVD player for the Linux operating system. DeCSS was a software program that "cracked" the protection algorithm employed through the Content Scramble System (CSS) on DVDs (see appendix 5.2 for a complete description of the process leading to the release of DeCSS).[279]

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[278] Specifically, DVD CCA is the licensing body for CSS, 4C Entity is behind the CPRM hard-disk encryption and several watermarking technologies, DTLA licenses DTCP, and LMI is, of course, the central management institution for all these.

[279] http://www.vg.no/pub/vgart.hbs?artid=206926

The First DVD Hacker: Jon Johansen vs. DVD CCA

In January of 2000, attorneys for the DVD-Copy Control Agency, a licensing body composed of members from the MPAA and the DVD Forum, in conjunction with the MPAA's international counterpart, the MPA, filed a complaint against Jon Johansen with the Norwegian Economic Crime Unite (OKOKRIM) asking for the prosecution of the teenager for publishing DeCSS. Shortly thereafter, the Norwegian authorities raided the home of Johansen, seeking evidence in support of a criminal case. It was not until two years later, however, in January of 2002, that Johansen was indicted.[280] The prosecution began in earnest in December, with legal briefs filed in Oslo City Court against the defendant for "building his own DVD playing software."[281] In January of 2003, the Norwegian court ruled that Johansen was innocent, citing evidence that he had made no illegal copies of movies. An appeal was immediately filed. The second trial of Johansen began before a seven-judge panel in appellate court in December, 2003. A brief trial resulted in affirmation of the lower court's ruling; Johansen was exonerated. The MPA and DVD-CCA lawyers chose not to appeal the ruling the Norwegian Supreme Court, instead turning their attention to the ongoing cases in the United States.

The significance of this court battle resides not in its ultimate outcome, but in its relevance in establishing precedent for controlling DVD content, upholding the international copyright laws through the WIPO treaties, and maintaining the support of the MPAA member companies releasing content on DVD. While the case ultimately

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[280] The indictment claimed Johansen was in violation of Norwegian Criminal Code Section 145.2, a data theft law that carried a potential criminal penalty of up to two years in prison

[281] http://www.ipjustice.org/publications/decsstable.htm

resulted in acquittal of the defendant, failing to demonstrate the efficacy of international copyright law, the very fact that the DVD-CCA and the MPA brought charges illustrates the lengths these industrial bodies were willing to go to protect content. Potential copyright violators could expect to face legal ramifications, at considerable inconvenience and personal expense; the studios could be comfortable knowing that their lobbying and legal representatives in the MPA, MPAA, and DVD-CCA were willing to go outside the United States to protect digital content on DVD.

Meanwhile, in the United States, three cases were filed in December, 1999 against alleged violators of section 1201 of the DMCA. While all three of these cases were issued concurrently, they were separate cases, arguing different legal statutes and grounds for prosecuting defendants. The first case tested the jurisdiction of the California courts in prosecuting tort offenders who were potentially damaging California industries through the internet; the second tested the legality and constitutionality of the First Amendment relating to computer code (DeCSS) as free speech; the third was the first example of a case pertaining to the DMCA's legality.

Trade Secrets: Pavlovich vs. DVD CCA

The first case was filed by the DVD-CCA in California State Court against Matthew Pavlovich under a trade secret misappropriation claim. Pavlovich was a Purdue University computer science student who maintained the website for the LiVID project where Johansen originally posted DeCSS. The DVD-CCA filed suit against Pavlovich and literally hundreds of other anonymous re-publishers of DeCSS code, claiming that CSS was a trade secret and that the publishing of DeCSS was in violation of state law

pertaining to publishing "highly confidential" trade secrets. In its complaint, DVD-CCA alleged that Pavlovich misappropriated its trade secrets by posting the DeCSS program on the LiVid Web site because the "DeCSS program . . . embodies, uses, and/or is a substantial derivation of confidential proprietary information which DVD CCA licenses."[282] In response, Pavlovich filed a motion to dismiss the charges, contending that California lacked jurisdiction over his person. DVD-CCA opposed, contending that jurisdiction was proper because Pavlovich "misappropriated DVD CCA's trade secrets knowing that such actions would adversely impact an array of substantial California business enterprises—including the motion picture industry, the consumer electronics industry, and the computer industry."[283] In a brief order, the trial court denied Pavlovich's motion, citing California case law, and issued an injunction forcing Pavlovich to remove the DeCSS code from the website. By September of 2000, Pavlovich was appealing this ruling to California's appellate court and California's Supreme Court, challenging the assertion of jurisdiction over him since he was then a resident of the state of Texas, with no connection to the state of California. In December, the California Supreme Court granted Pavlovich's petition and ordered the appellate court to dismiss the case or show why jurisdiction should be granted over a non-resident. After nearly eight months of deliberations and arguments from both sides in the California Court of Appeals for the 6th District, a ruling was made that validated the DVD-CCA case for

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[282] Pavlovich v. Superior Court, **Review Granted** XXX 91 Cal.App.4th 409**, Opinion No.** S100809 **Date Filed:** November 25, 2002**,Court:** Superior**, County:** Santa Clara**, Judge:** William J. Elfving; accessed through http://www.eff.org/IP/Video/DVDCCA_case/20021125_pavlovich_opinion.pdf

jurisdiction over the defendant for publications made to the LiVID mailing list.[284] Pavlovich filed another appeal to the California Supreme Court challenging the appellate court's decision. The California Supreme Court, ruling in November, 2002, sided with the defendant (see appendix 5.3 for the ruling).[285]

While the ruling of the California Supreme Court ultimately sided with the defendant, the case was significant to the DVD industry in a number ways. Because the case against Pavlovich was centered around the infringement of California laws pertaining to trade secrets, the case was subject to the standards and evaluative mechanisms of the state rather than the federal government or federal judiciary. This distinction is important because the case ultimately establishing that in order for the DVD-CCA to successfully prosecute DeCSS cases, they would need to base future cases on federal laws, including the DMCA. Additionally, the case in the state of California tested the jurisdiction of the California courts, ultimately revealing that the federal courts held jurisdiction in matters impacting industry across state lines. The final noteworthy outcome of the Pavlovich case is revealed through depositions and summary judgment in the case; the notion that DeCSS violated trade secrets, even after it was posted by hundreds of websites, was dismissed by the courts on grounds that enforcing trade secret

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[283] Ibid.
[284] http://www.ipjustice.org/publications/decsstable.htm
[285] "California Reviews DVD Code Case," May 29, 2003, Reuters; Wired.com. Copyright 2007 CondeNet Inc.

infringement after the publishing of that secret online was tantamount to "putting the genie back in the bottle" and not the responsibility of the courts.[286]

The First Amendment: Bunner vs. DVD CCA

The second case was filed in December, 1999 by the DVD-CCA against Andrew Bunner, McLaughlin, et al., in California State Court under a similar trade secret misappropriation claim. The case tested the First Amendment's protection for technically oriented speech; if trade secret claims were upheld, then censoring online information after it was available worldwide would have been under the purview of the courts. Unlike Pavlovich, Bunner was a California resident who had re-published the DeCSS code online on a site called Slashdot. In December, the California Superior Court denied a request from the DVD-CCA to enjoin all online publishers of DeCSS. Shortly thereafter, in January, the court reversed its earlier ruling and issued an injunction against Bunner and all other online DeCSS publishers. By May, 2000, Bunner and his co-defendants appealed the injunction to California's Court of Appeals for the 6th District, claiming that the ruling was an unconstitutional restraint on freedom of speech. The following November, the California Appellate Court overturned the injunction based on the First Amendment rights of Web publishers who republish information obtained in the public domain. The DVD-CCA appealed the decision immediately to the California Supreme Court. On August 25, 2003, the California Supreme Court upheld the free speech claims, but sent the case back to the appellate court for reconsideration. Perhaps recognizing their position, the DVD-CCA filed a motion to dismiss the case against

[286] Ibid.

Brunner in January, 2004, only to have the court deny the request. Finally, on February 27, 2004 California's 6th Appellate Court ruled that the original injunction was an unconstitutional prior restraint on freedom of expression rights. The court again cited that the computer program could not be restrained from publication because the program was not a trade secret at the time it was published.[287]

One of the side-effects of the Bunner Case was to identify two constituencies in the ongoing battle over content protection, fair use, and First Amendment issues. A number of Amici Curiae and Amicus Briefs were filed after the preliminary injunction was handed down by the Superior Court.[288] Bunner's support was largely based on the role of the case in shaping future laws regarding trade secrets; the Amici Curiae reads as follows: "Both individually and as a group, they are concerned with the proper evolution of trade secrecy law, the consistency of this law with federal constitutional interests, and with preservation of legal rules that permit reverse engineering in order to promote innovation and competition in high technology and other industries."[289] Conversely, the supporters of the DVD-CCA case stated, "*Amici* are alarmed that if the lower court's decision is upheld, its consequences will extend well beyond the unlawful publication of

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[287] Case description culled from summary briefs and motions posted through the website for the defense, the Electronic Frontier Foundation (EFF): http://www.eff.org/IP/Video/DVDCCA_case/#bunner-main

[288] Siding with the DVD-CCA were the Attorney General of California, Microsoft, Ford Motor Company, The Boeing Company, Sears, Roebuck & Co., The Proctor & Gamble Company, AOL Time-Warner, Bellsouth, Coca-Cola, and the Intellectual Property Owners Association and the National Association of Manufacturers. Siding with Bunner and his co-defendants were the Computer Professionals for Social Responsibility, the ACLU, Intellectual Property Law Professors, the Computer and Communications Industry Association, and the United States Public Policy Committee of the Association for Computing Machinery.

[289] "Brief of Amici Curiae," by Jennifer M. Urban (Bar No. 209845), Samuelson Law, Technology and Public Policy Clinic, University of California at Berkeley School of Law (Boalt Hall), 396 Simon Hall

trade secrets in this case to include a much broader array of situations in which the intellectual property of American business is embedded in trade secrets. If the decision is affirmed, businesses will no longer be able to rely on California courts to preserve a wide range of trade secrets, from customer lists to blueprints to industrial know-how – even the secret formula for Coca-Cola. The loss to California will be that valuable trade secrets will not be protected against unlawful misappropriation and disclosure, and the State could become a haven for intellectual property thieves."[290]

Clearly, the case was generating interest from industry and consumer advocacy groups, for different reasons. Industry groups were concerned that the case would legitimize, if not encourage, hacking and publishing trade secrets. If the courts sanctioned such behavior, major industries with intellectual property and trade secrets could lose their competitive advantage in the marketplace. Conversely, advocacy groups fought to assure that protections remained in place that protected inventors and innovators who might improve existing technologies through reverse engineering. What the final decision of the courts established were guidelines for web-publishing relative to the First Amendment. Additionally, the case demonstrated, once again, that the state of California's courts were not likely to side with industry against individuals who were challenging the legitimacy of CSS and the DMCA.

Berkeley, CA 94720-7200

[290] "Brief of Microsoft Corp. et al as Amici Curiae Supporting Plaintiff/Respondent," by Richard A. Epstein, Cal. Bar No 43329 (Counsel of Record) 111 East 60th Street Chicago, Illinois 60637. Attorney for Amici Curiae; accessed via http://www.eff.org/IP/Video/DVDCCA_case/20020718_bunner_ms_amicus_brief.pdf.

The DMCA Case: *2600 Magazine* vs. MPAA

The third part of the legal battle over the publishing of DeCSS was filed by the MPAA (the DVD-CCA's sister organization) vs. *2600 Magazine*, a publication targeted towards the increasingly organized "hacker" community, in New York Federal Court under the Digital Millennium Copyright Act. The case, which came to be alternately known as Universal City Studios, Inc v. Reimerdes (for the principal studio and one of three defendants responsible for the article posting the DeCSS code), or simply "The DMCA Case," hinged on the studios' claim that *2600 Magazine* provided a technology for circumvention access and copy controls on copyrighted works by posting and linking to DeCSS and was therefore in violation of Section 1201 of the Digital Millennium Copyright Act. The courts would ultimately agree with the studios, ruling for the plaintiffs by identifying that DeCSS was an unlawful circumvention device. The case was the first to directly test the scope and constitutionality of the DMCA's anti-circumvention provisions and was crucial to the fight for fair use being waged by consumer advocacy groups.

The studios, through the MPAA, maintained their right to control the manner in which movies are played, and challenged the defense's assertion that the code itself constituted free speech under protection of the First Amendment to the Constitution. The case began as early as October, 1999, when the MPAA, aware of the online availability of DeCSS, began sending cease-and-desist letters to web site operators posting the software. By January, 2000, the studios had identified a target for prosecution: Eric Corley, Emmanuel Goldstein, and Shawn Reimerdes, publishers of

2600: The Hacker Quarterly Magazine. After a preliminary hearing, the Court ruled for the plaintiffs, granting a preliminary injunction barring the defendants from posting DeCSS. Following the injunction, the defendants removed the code from the website, but defiantly posted links to other websites offering the software for download. Additionally, the website posted this banner: "We have to face the possibility that we could be forced into submission. For that reason it's especially important that as many of you as possible, all throughout the world, take a stand and mirror these files."[291] Judge Lewis A. Kaplan issued a ruling after a three-day trial, upholding the constitutionality of the DMCA and enacted a permanent injunction barring the site from posting DeCSS code and from linking to any site known to post the code:

> In the final analysis, the dispute between these parties is simply put if not necessarily simply resolved. Plaintiffs have invested huge sums over the years in producing motion pictures in reliance upon a legal framework that, through the law of copyright, has ensured that they will have the exclusive right to copy and distribute those motion pictures for economic gain. They contend that the advent of new technology should not alter this long established structure. Defendants, on the other hand, are adherents of a movement that believes that information should be available without charge to anyone clever enough to break into the computer systems or data storage media in which it is located. Less radically, they have raised a legitimate concern about the possible impact on traditional fair use of access control measures in the digital era…. In our society, however, clashes of competing interests like this are resolved by Congress. For now, at least, Congress has resolved this clash in the DMCA and in plaintiffs' favor. Given the peculiar characteristics of computer programs for circumventing encryption and other access control measures, the DMCA as applied to posting and linking here does not contravene the First Amendment.[292]

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[291] www.2600.com

[292] "Opinion," Judge Lewis A. Kaplan, UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF NEW YORK, UNIVERSAL CITY STUDIOS, INC, et al., Plaintiffs, -against- SHAWN C.

On January 19, 2001, the Electronic Frontier Foundation, serving as defense council, filed for appeal with the Second Circuit Court of Appeals. Shortly thereafter, on January 26, 2001, *Amicus Curiae* briefs were filed in support of the defendants. Amongst those supporting the appeal were the ACLU, the Digital Future Coalition, the American Library Association, the American Research Libraries, the Music Library Association, seventeen leading computer scientists, well-regarded and activist-oriented law professors Lawrence Lessig and Yochai Benkler (amongst forty-five other law professors from the United States and around the world), eight cryptographers, and a coalition of journalists and publishers.[293] Filing in support of the studios on February 27, 2001, was a collection of entertainment industry organizations, major sports leagues, and major industries involved in intellectual property production and protection.[294] The constituencies

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REIMERDES, et al., Defendants. 00 Civ. 0277 (LAK); accessed through http://cyber.law.harvard.edu/openlaw/DVD/NY/trial/opinion.pdf.

[293] The coalition included the Online News Association, the Reporters' Committee for Freedom of the Press, the Newspaper Association of America, the Student Law Center, Wired Magazine, the Pew Center on the States, the Silha Center for Media Ethics and Law, the College of Communication at California State University-Fullerton, a collection of Fair Use Interests, and the ACM Law Committee.

[294] Amongst those filing on behalf of the DVD CCA: the Recording Industry Association of America (RIAA), the American Federation of Musicians of the United States and Canada (AFM), the American Federation of Television and Radio Artists (AFTRA), the American Film Marketing Association (AFMA), the American Society of Composers, Authors and Publishers (ASCAP), Broadcast Music, Inc. (BMI), the American Society of Media Photographers (ASMP), the Association of American Publishers (AAP), the Business Software Alliance (BSA), the Directors Guild of America, Inc. (DGA), the Graphic Artists Guild, the Interactive Digital Software Association (IDSA), the National Association of Theater Owners (NATO), the National Cable Television Association, Inc. (NCTA), the National Collegiate Athletic Association (NCAA), the National Football League and National Football League Properties, Inc. (NFL), the National Hockey League (NHL), the National Music Publishers' Association (NMPA), the office of the Commissioner of Baseball, the Producers Guild of America (PGA), the Professional Photographers of America (PPA), Reed Elsevier, Inc., the Satellite Broadcasting and Communications Association (SBCA), the Screen Actors Guild, Inc. (SAG), the Software & Information Industry Association (SIAA), and the Writers Guild of America, West, Inc. (WGA). The DVD-CCA, filed for the studios on March 13, 2001, along with four law professors, Rodney A. Smolla, Erwin Chemerinsky, Kenneth L. Karst, and Marcy Strauss. For access to each brief in its entirety, see the Openlaw/DVD website: http://cyber.law.harvard.edu/openlaw/DVD/NY/

identified on this list suggests that there existed a discernible divide between industry and civil liberties groups; the battle over fair use and the legality of the DMCA would make obvious the differing positions and irreconcilable agendas of industry and fair use activists. Any industrial organization concerned with maintaining the future commercial viability of their respective businesses supported the MPAA. The fact that the MPAA was supported by *all* of the major entertainment unions is, in itself, unprecedented in the history of the industry. These organizations, representing the labor forces within the industry, supported the MPAA's case because they recognized the financial stakes and the potential repercussions to their employees should the DMCA fail to gain the support of the courts. Conversely, the associations supporting the defendants understood the importance of the case in setting a legal precedent regarding free speech issues, industrial control over technologies and fair use, and the impact of the decision on the open-source online community. This community of amateur and professional technologists sought to improve upon existing software by sharing codes online. Regulating the activities of this community would constrain invention, improvement, and innovation in the technology field. Furthermore, those supporting the defendants recognized that the courts were the last bastion of hope to combat the pro-industry regulatory trends. While the California Courts were deciding the legality and jurisdiction of the studios in regards to DeCSS postings and prosecutions, the Federal Courts ultimately held the power to overturn the states, uphold the DMCA's constitutionality, and set legal precedent that would impact all future decisions regarding online intellectual property, "hacking" technological

protection measures, and the classification of software and circumvention techniques as First Amendment rights.

Oral arguments were heard on May 1, 2001 before Circuit Court Judges Newman and Cabranes and District Court Judge Thompson. On November 28, 2001, the Second Circuit Court of Appeals affirmed Kaplan's decision that *2600 Magazine* violated the DMCA by posting the DeCSS code. The opinion of the court stated that the restriction of fair use claimed by the appellants to be in violation of the Copyright Clause of the First Amendment was rejected for three primary reasons. The court ruled that Supreme Court "has never held that fair use is constitutionally required…[and] such matters are beyond the scope of this lawsuit… [because] the Appellants do not claim to be making fair use of copyrighted materials, and nothing in the injunction prohibits them from making such fair use."[295] Secondly, the Circuit Court agreed with the District Court's ruling that there was dearth of evidence supporting the claim that the DMCA's anti-circumvention provisions prevented fair use. Finally, the Court ruled that the constitution provided no support for copying the original work in its original format.

The Appellate Court ruled in favor of the studios across the board, upholding the District Court ruling that the DMCA should not be read "narrowly" to avoid constitutional doubt. The court opinion stated that the DMCA targets the circumvention of digital walls guarding copyrighted materials and trafficking in circumvention tools and

[295] Electronic files of the Court of Appeals for the Second Circuit, via PACER and http://cyber.law.harvard.edu/openlaw/DVD/NY/appeals/opinion.html

does not apply to the use of those materials after circumvention has occurred.[296] The ruling stated flatly that the DMCA "is not read to prohibit 'fair use' of information just because that information was obtained in a manner made illegal by the DMCA."[297] Furthermore, the ruling agreed with the lower court's assertion that individuals purchasing a DVD do not have the authority of a copyright owner, citing a lack of evidence that the studios ever authorized DVD buyers to circumvent encryption technology to support use on multiple platforms. The court did rule that computer code and computer programs constructed from code can merit First Amendment protection, but that protection was limited by its "non-speech" elements. The argument outlined the differences between computer code and more traditional written communications, identifying restrictions on computer code protection as free speech. Because DeCSS instructs the computer, rather than an individual human being, to circumvent the CSS code on DVDs it is classified legally as "non-speech" and is not protected by the First Amendment. According to the court, computer code requires substantially less human action for activity and impact than blueprints or recipes; "the functionality of computer code properly affects the scope of First Amendment protection."[298] Outlining the limits of protection for computer code, specifically DeCSS, the court claimed "Differences in the characteristics of new media justify differences in the First Amendment standards applied to them."[299] The court distinguished between types of content and the

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[296] Ibid.
[297] Ibid.
[298] Ibid.
[299] Ibid.

functionality of the computer code in determining the constitutional standards. If the content was beneficial or "content-neutral," it would be protected by the First Amendment. If not, as was determined to be the case with DeCSS, the First Amendment would not protect the content. These differences ultimately resulted in the Circuit Court's upholding the lower court's injunction barring the defendants from posting DeCSS as well as the permanent injunction barring them from linking to DeCSS sites.

Implications and Impacts: Fair Use and Movies on DVD

The decisions of the District and Circuit Courts upholding the constitutionality of the DMCA were crucial wins for the DVD industry and the MPAA. While failing to receive the prosecutorial support of the state courts in California may have created unease amongst content providers, the federal courts assured the major studios that the new guidelines and restrictions contained within the DMCA would be upheld and employed as legal grounds to prosecute copyright infringement. Combining with additional technological protection measures, digital rights management software, and tightly controlled licensing bodies, the DMCA would serve the industrial objective of protecting content in digital forms. Concerns over restrictions on fair use clearly were not a principal concern of the industry or of the courts. As Fritz Attaway noted, the MPAA did not consider fair use to be at issue in the passage or implementation of the DMCA's section on anti-circumvention. Fair use activists disagreed; univocal cries for revisions were unsupported through the Copyright Office's three-year review of the law. While activists claimed that the DMCA would unilaterally eliminate fair use through legitimizing technical protection measures designed to control access to and use of

copyrighted works, limiting future innovation and fair use expression, thus forever altering copyright law, the studios continued to cite piracy as a legitimate rationale for the TPMs. The passage of the DMCA, and its eventual legitimization through the courts, along with subsequent copyright term extensions, provided the studios with one of the three necessary approaches to protecting their content in digital form. Technical protection measures and tightly controlled licensing bodies assured that content could be legally and technically protected on DVD.

By prosecuting copyright violators, the studios, through the MPAA and the DVD-CCA, were setting an important precedent not only legally, but socially as well. Through these well-publicized cases, the studios displayed their position relative to digital copyright and digital intellectual property protection to all potential violators. The fact that DeCSS had been disseminated via the internet to countless thousands of would-be-violators of the DMCA was somewhat irrelevant; the vast majority of consumers were willing to pay for content and the studios tracked and prosecuted the most egregious violators or the innovators of new circumvention software or hardware. The MPAA and the DVD-CCA continued their prosecutions in open court, bringing a federal case against 321 Studios Inc. for violating the DMCA through the distribution and sale of a product called "X Copy." The courts ordered the product removed from stores. Targeting companies trafficking in circumvention software included bringing a case against Tritton Technologies for manufacturing and distributing "DVD CopyWare," and three website

distributors of similar software; the courts ordered the companies to cease manufacturing and distributing the software.[300]

The ramifications of the DMCA and the court's decisions relating to DVD technical protection circumvention also had far-reaching effects on technological innovation and e-commerce. When a company called "Streambox" developed and commercialized a technology capable of time-shifting streamed Internet media, RealNetworks, suppliers of RealAudio webcasts, invoked the DMCA and the precedents set forth in the cases cited above to obtain an injunction against the product.[301] The "open-source" community, responsible for the original cracking of CSS, also has been directly impacted by the DMCA; a group of developers was threatened with DMCA violation and prosecution after distributing a software application known as "Streamripper," capable of recording MP3 audio streams.[302] Assessing the impact of the "DMCA Case," Yochai Benkler, a law professor and Internet expert at New York University who submitted a friend-of-the-court brief in support of Corley, said in an interview with the *New York Times* that the DeCSS case is "immensely important…this case is a well-focused presentation of the question of whether or not the DMCA created a new right to control access to a work if the work is encoded and encrypted in digital

[300] www.eff.org/IP/DMCA/unintended_consequences.php#33
[301] www.eff.org/IP/DMCA/unintended_consequences.php#36
[302] www.eff.org/IP/DMCA/unintended_consequences.php#37

media…no one has made the argument so audaciously as the movie studios have done here, that the DMCA has created that new right."[303]

DVD was regulated through technological protection measures, the passage of the DMCA, its ratification in federal courts, and through the activities of licensing bodies. Controlling consumer access to DVD content was accomplished by a variety of digital and analog technologies designed to stop illegal copying. Additional technologies restricted access in global markets, maintaining a tiered distribution and access system for Hollywood content. Restricting piracy and protecting intellectual content meant assuring that all industry members producing discs, consoles, or computer drives were compliant with industry standards for copyright technologies. Licensing bodies working in concert with the DVD Forum assured that each manufacturer produced technologies that would protect the content on the disc. The passage of the DMCA, at the behest of the Forum's lobbying partners the DVD CCA and the MPAA, legitimized the TPMs already in use by the DVD industry. The DMCA sanctioned the protection of content through these technological barriers, setting a precedent that was then tested in the courts. After failing to successfully prosecute DVD hackers in state and international courts, the DVD CCA found success on the federal level. "The DMCA Case" upheld the constitutionality of the law; the DVD Forum and its members were assured that their technologies were protected and hackers could be prosecuted.

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[303] "DVD Case Will Test Reach of Digital Copyright Law," by Carl S. Kaplan, July 14, 2000, Copyright: 2000 The New York Times Company. Accessed through http://www.nytimes.com/library/tech/00/07/cyber/cyberlaw/14law.html

The development of viable technological protection measures was a crucial first step in assuring Hollywood would support the technology by releasing movies on DVD. Once these technologies were in place in 1997, Hollywood began to release a small number of films on disc. However, their full support did not come until it was clear, after the passage of the DMCA on October 8, 1998, that Congress would provide a mechanism for prosecuting digital copyright violators. By the time the court cases were settled in 2002, consumers had made it clear that DVD had arrived as the dominant home video, gaming, and computer storage technology. Revenues from the technology were staggering, with DVD-Video dominating. The DVD Forum had regulated both consumer and industrial access to the technology and its software. In so doing, they convinced Hollywood to release their movies in perfect digital copies.

Chapter Seven: Conclusion

From 1994 to 2002, DVD became the most successful consumer electronics product in history. Early in its developmental period, as competing firms worked independently to corner the market with proprietary technologies, doubts existed as to the viability of competing DVD platforms in the marketplace. Conceptualized as a technological commodity by the consumer electronics industry, DVD promised to be the "next-generation" optical media storage device capable of delivering high quality audio/visual data to televisions and computer screens. As a replacement technology for both the CD-ROM and the VHS, DVD promised new revenue streams to industry and a markedly different experience to potential consumers. At the behest of the computer industry, led by IBM, and with input from the Big Six media conglomerates, the two competing camps agreed to a single standard, thus launching the dynamic process of DVD technological development and diffusion. As an innovation, DVD held a significant relative advantage in both the home video and computer markets. DVD was introduced to these markets and their respective publics through product demonstrations and through targeted advertising hailing DVDs superior performance, reliability, and flexibility compared to VHS and CD-ROM. DVD was made meaningful by virtue of these campaigns and successive periods of discourse in the trade and popular presses which oriented the new technology along a continuum of home video, computer, and digital music experiences. The industries involved in commercializing the technology realized the importance of integrating the new technology into the previous experiences,

values, and needs of potential adopters. Through the advertising campaigns detailed in chapter five, we have seen how DVD targeted early adopters: young, affluent, male demographics. The early and late majority of consumers joined these early adopters by 2000. DVD was sold to early adopters with rhetoric hailing the technology as a marked improvement over existing technologies that was capable of creating a more complete theatrical experience. The degree to which DVD fit into existing practices and pleasures related to existing home video and computing cultures and the value associated with the technology assured that the majority of consumers would quickly adopt DVD. Because technological development and early marketing efforts involved multiple industry members (for instance joint campaigns for hardware consoles and software titles from Toshiba and Warner Bros. respectively), DVD was sold as a package product of hardware tools and software as information bases for the tool.

This element in the process of making DVD meaningful through advertising and marketing campaigns simplified the potential range of uses and meanings available for the convergent technology. Potential adopters were encouraged to understand the technology as a playback mechanism for pre-recorded Hollywood feature content. DVD's potential complexity was simplified by these campaigns and via the functionality of the console devices entering the market. Additionally, DVD consoles were offered to the public on a trial basis through video rental chains, thus affording consumers the opportunity to test the technology before investing in their own consoles. DVD, as a technology and as a cultural artifact, performed similarly to pre-existing CD technologies; consoles operated very much akin to CD players, with consumers placing a

disc on a tray that moved on a horizontal plane, pushing it into the console and interacting with content through remote controls or via the buttons on the machine itself. Once the machine was properly connected to a television set, the performance of the shiny little disc left no doubt as to its superior performance. Because the developmental process for the technology involved such rigorous cross-industrial input and testing, very few fatal errors or flaws in the technology were reported. Because DVD offered a clear relative advantage to its technological predecessors, was compatible with existing experiences in home video and compact disc cultures, was relatively easy to understand and use, was available on a trial basis, and because the innovation was supported by the content providers, its diffusion into society achieved unprecedented success.

The various perceived advantages and their communication via multiple media and interpersonal networks contributing to DVD's diffusion intersected with favorable contexts and conditions in culture, technology, industry, economics, and the regulatory environment. Throughout this project, I have argued that these favorable contexts aligned with the collective behaviors and desires of the media industries, the computer industries, and the consumer electronics industry to replace existing technologies and business practices. We have seen how the technological context was primed for the development of DVD technology via improvements in compression, bonding, laser, and manufacturing processes and/or technologies originating in compact disc or laser disc. The cultural context was uniquely well-suited for DVD's introduction, as consumers were able to reference existing semantic networks of meaning to orient their experiences with the new product. DVD was made meaningful via its association with video culture,

digital technologies, and digital audio disc functionality. Because cultural practices pertaining to the shift from VHS to DVD could be compared with the shift from audio tape/records to compact disc, consumers were able to situate this shift as similarly beneficial to their experience with high quality digital media. Furthermore, because an effective marketing campaign encouraged potential adopters to conceptualize the technology as a "revolutionary" and "futuristic" platform that would make VHS obsolete, cultural practice in adopting the technology was tied to discourses of change. The cultural context was articulated by the trade and popular presses, whose hyperbolic language stimulated early adopters and synchronized with the industrial rhetoric in advertising campaigns. These discourses introduced the technology in specific and targeted ways to home theater, computer, gaming, and digital technology enthusiasts. By tracking the format battle between Toshiba/Time Warner and Sony/Philips, et al., the press created a semantic context that titillated their various publics while building desire for the potential technology capable of creating a war between industrial giants. When DVD was in development by competing developers at Toshiba/Time Warner and Sony, the widespread success it would attain in global markets was but a goal. This goal was reached through the efficient organization, cooperative behavior, and exploitation of contexts by the filmed entertainment, consumer electronics, and computer industries, along with the enthusiastic adoption of the technology by consumers.

The industrial contexts into which DVD was introduced and diffused also were uniquely favorable to its rapid diffusion. As I explain in chapter three, the film industry in the early to mid 1990s was undergoing a series of mergers and acquisitions. These

shifts in ownership and control resulted in tightly integrated media conglomerates whose business model was tied to the efficient exploitation of cultural products in all outlets and global markets. In order to capitalize on cross-media ownership, the media conglomerates sought a shift in the existing business model for their most lucrative market, home video. Seeking a way around the First Sale Doctrine and the powerful rental retailers that would allow for more control over filmed entertainment, the media conglomerates desired a "playback-only" replacement technology for VHS. DVD would allow the content providers to circumvent the existing rental business model through a sell-through business model. Newly formed home video divisions within the conglomerate structure could then deal directly with mass retailers, and new business models could be developed for use with rental retailers. The consumer electronics industrial context also was primed for a new home video technology. Because Sony's Betamax had lost the first home video battle to Matsushita's VHS, Sony desired a new proprietary technology that would allow them increased market share in the home video business. Additionally, industrial factors such as the dissolution of a viable domestic consumer electronics industry stemming from the collapse and sale of RCA, the cooperative research and technology initiatives of the Japanese consumer electronics firms, the passive reliance on Japanese firms for innovation and commercialization of new technologies by both domestic (U.S.) and European consumer electronics companies, and the increasingly hybridized computer and consumer electronics industry in Japan and Taiwan led to a favorable industrial environment in Japan for DVD development. Additionally, the consumer electronics industry in the Asian markets was

in a period of sustained downturn prior to the commercial success of DVD. VHS products had saturated global markets by the early 1990s and failed to return significant profits to manufacturers. New technologies like the Sony Walkman temporarily stimulated the market, but failed to be significant profit generators for any company other than Sony. CD technologies continued to drive the market through the early 1990s, but profit margins continued to decrease as per-unit retail costs dropped. Therefore, the consumer electronics industry, dominated by Japanese corporations who had attained global market control from the success of VHS and CD technologies, was uniquely positioned for an industry-wide development and diffusion effort with a new optical storage technology. The fact that the entire consumer electronics industry recognized the viability of DVD and worked together to develop and commercialize it, at times acting against their corporate cultures to share proprietary technologies, is unprecedented in the history of that industry.

Meanwhile, the global computer industry also was uniquely predisposed for a new and improved optical storage technology. Prior to the introduction of the World Wide Web and the resulting upturn in the personal computing business, IBM had begun to lose ground as the global market leader in computing. After a period of sustained success in all markets in supercomputing and industrial mainframes, IBM had begun to lose market share to domestic and global competitors due to their decision to release an open-source personal computing technology that relied on supplier networks for peripheral technologies. In so doing, IBM had ceded market control and power to Intel and Microsoft, who quickly dominated the market via their processor and software elements

respectively. IBM, unable to innovate new technologies independent of their supplier networks in Asia, desired a new drive technology to stimulate the stagnant CD-ROM market. The Japanese computer industry, whose members were working in close concert with consumer electronics manufacturers, took up the slack and developed the DVD as both a consumer electronics product and as an upgrade-drive for personal computers. DVD's significance to the personal computing industry cannot be understated. The arrival of DVD-ROM and supplemental technologies affording high-quality digital audio-visual playback on personal computers simultaneously gave rise to numerous personal computing companies in the United States, including Dell, Gateway, and the newly merged HP. It also resuscitated IBM in the global market, stimulated the growth of Microsoft and Intel (along with AMD and others), and spurned the rapid growth of the World Wide Web. DVD-ROM brought content from the Hollywood content providers to the personal computer, at once mobilizing the reception environment for watching filmed entertainment, and bringing together the interests of the IT industry and Hollywood. The fact that three industries, once separate and distinct, synchronized their technological development and commercialization efforts for DVD is noteworthy for several reasons. While the filmed entertainment and consumer electronics industries had had a brief history of interaction prior to the early 1990s, with Sony entering the media content industry via their acquisition of Columbia-TriStar and Matsushita following suit with their purchase of MCA, never before in the history of these industries had all three aligned their resources and desires to develop, innovate, and commercialize a new technology. Additionally, the fact that each industrial context was individually aligned in

such a way that member firms would agree to work together both intra-industrially and inter-industrially on a singular technology is unprecedented in history.

The fact that the filmed entertainment, consumer electronics, and computer industries came together to create and commercialize a new technology in the process forming a wholly new ancillary industry, related to but distinct in its organization, performance, and behavior from the respective core industries, make the story of DVD of value to contemporary industry studies. The formation of mechanisms and industrial administrative bodies for controlling the technology represent a limit case in the study of contemporary industrial power and control. Through the structure of the DVD Forum, the leading members of the three constituent industries guaranteed their dominance in the DVD industry. Through patent pooling, licensing bodies, technological protection measure development, maintenance, enforcement, and new technological platform development, the DVD industry relied on cooperative behavior and centralized power hierarchies to assure the successful exploitation of the contexts detailed above. Through the DVD Forum, the leading members of the computer industry, the consumer electronics industry, and the film industry were encouraged to behave cooperatively for the benefit of all, often in direct conflict with long-standing competition and animosities between industrial members. Together, these firms could develop not only unified technologies and patent pools, but unified barriers to entry for outside firms with competing technologies, litigators seeking antitrust rulings in state and federal courts, regulators working towards new copyright legislation, distribution networks around the globe, and potential pirates who might develop and distribute means and mechanisms to illegally

copy content from the discs. By establishing and legitimizing the administrative body of the DVD Forum, the ten founding member firms, with additional support from market leaders in each constituent industry, formed an ancillary industrial context that assured their initial, and continuing, control over the technology in all markets. Through the hierarchal structure established by virtue of the various committees and subcommittees reporting to the steering committee, the founding members at once opened membership to all interested corporations, in the process avoiding antitrust litigation, and closed access to the seats of power by channeling decision making authority and membership decisions directly through the steering committee.

In the process, relationships and partnerships were formed between steering committee members on an unprecedented scale. Once completely independent firms from the consumer electronics and media industries partnered together to market, strategize, and commercialize the technology. Cooperation within and between industries led to lasting relationships between firms and numerous synergies in marketing, distribution, and production of goods leading to the exploitation of global markets. The managerial philosophies and corporate strategies stimulating widespread conglomeration across industrial lines had finally been efficiently realized through the activities of the DVD Forum. What Sony had hoped to achieve in hardware/software synergies through the acquisition of Columbia-TriStar was now de-rigueur corporate behavior by multiple firms relating to DVD industrial practices. Time Warner partnered with Toshiba to market DVD titles and DVD hardware consoles. Pooling resources and associating hardware consoles with high profile Hollywood content proved to be mutually beneficial

for each firm. What DVD industrial formation and the resulting structuring, conduct, and performance of member firms suggests is that synergies between industries are fully realized only through tightly regulated mechanisms for control. These mechanisms assure both the continued industrial relevance and efficacy of leading firms and discourage dissent and cessation. If a member company refuses to cooperate with the collective behaviors of the Forum, the collective remaining resources can be brought to bear. Principally, the structure of the DVD Forum established mechanisms for control over both the technology and member firms. Through the collective power of member firms, the processes of technological development, maintenance, licensing, marketing, distribution, etc., could be tightly regulated while outside innovation and competition could be discouraged. Barriers to entry in the industry were established on a heretofore unprecedented level; any attempt to work outside of the Forum meant challenging the hegemony of the largest media conglomerates, global leaders in the consumer electronics industry, and the largest and most powerful computing companies in the world.

The myriad ways in which the members of the DVD Forum exploited favorable existing contexts in culture, technology, industry, and economics, including their cooperation in innovation and technological standardization, was supplemented by their efficient exploitation of the regulatory environment discussed in chapter five. The regulatory context had undergone marked shifts prior to DVD's introduction and diffusion. Changes in media ownership regulations, including significant and successive acts by Congress and the FCC, removed barriers limiting cross-ownership of media companies, thus stimulating waves of mergers and acquisitions that brought consumer

electronics companies into the content production and distribution businesses. The Department of Justice sanctioned cooperation between firms and repeatedly ruled in favor of media and technology companies. Meanwhile, the regulatory context pertaining to copyright law and enforcement was undergoing significant shifts that affected the introduction and technological form and function of DVD. Throughout the decade prior to DVD's introduction, copyright law in the United States was being reshaped to more closely align with international standards. The fact that copyright law was repeatedly altered throughout this period to extend intellectual property and copyright terms for creative works assured the content providers in Hollywood that their shift to digital platforms would be protected by virtually limitless copyright terms. Additionally, digital technologies, including the internet and DVD spurned another wave of copyright revisions in the United States Congress. DVD was at the center of debates leading to new laws sanctioning the implementation of technical protection measures and digital rights management technologies. These technologies would restrict the ability of consumers to copy content between devices while constricting any creative sampling of content from digital delivery technologies. In the process, digital copyright law not only granted additional control mechanisms to the producers of content and technology, it limited potential fair uses of digital content. The passage of the Digital Millennium Copyright Act, a watershed decision in the history of copyright law, assured the various industries involved in developing digital technologies like the DVD that technical protection measures embedded within their technologies were not only legal, but the

circumvention and distribution of any software or hardware designed to circumvent them was illegal.

In order to guarantee the support of the content providers in Hollywood, DVD needed these technological protection measures to guarantee the security of content embedded within the discs, thus assuring its functionality as a playback-only technology. While the technical specifications for anti-piracy technologies with DVD were not "robust" enough to discourage the determined expert hacker, they did assure content providers that their films and eventually their television programs would be protected from piracy with the average consumer. The regulatory context sanctioning the increased control mechanisms proffered by the industrial members pertaining to DVD was solidified through the series of cases brought against individuals and companies involved in the inevitable cracking of the protection technologies. Once the protection mechanisms had been broken, it was imperative that the content providers and their hardware partners in the consumer electronics and computer industries not only prosecute those responsible for circumventing the technology, but to win in federal court. While the various lobbying and administrative bodies controlling the interests of industry players (including the MPAA, the MPA, and the DVD-CCA) found little prosecutorial success in state and international courts relating to the "DeCSS" cases, their efforts served as catalysts to the continued diffusion of DVD throughout the late 1990s.

The very fact that the collective resources of industry were brought to bear against individuals for cracking, publishing, or distributing circumvention codes served two crucial functions: the protracted nature of the cases encouraged content providers to

continue distributing films on DVD while the cases went through the system; and coverage in the international trade and popular presses functioned as a public relations coup. A clear message was sent around the world through these ultimately unsuccessful early cases: any attempt to hack protection measures on digital delivery technologies would be prosecuted to the fullest extent of the law. As we've seen, "the law" relating to digital copyright was decidedly pro-industry, with Congress, the FBI, and the Department of Justice firmly on the side of those companies involved in the manufacturing and distribution of digital content and delivery technologies. Eventually, the federal courts would uphold the Digital Millennium Copyright Act, thus securing legal precedent in digital copyright enforcement relating to DVD and all future digital technologies. In so doing, the courts aligned themselves with their counterparts in the other two branches of government, siding with industry, limiting the ability of consumers to engage with digital technologies in any creative way that would traditionally have been sanctioned under the Fair Use clause in copyright law. Additionally, the fact that the federal courts barred individuals and companies from publishing or distributing circumvention mechanisms encouraged industry members to continue to support the distribution of content on DVD, meeting consumer demand for titles and guaranteeing the continued viability of the platform for the foreseeable future.

LESSONS LEARNED: THE DVD STORY

What this story of DVD provides are several lessons in technological diffusion that are of value to industry and researchers alike. In explaining the unprecedented success of DVD, this project has detailed the dynamic synchronicity of multiple

favorable contexts in culture, technology, industry, economics, and the regulatory environment. DVD became the most successful consumer electronics product of all time through the combination of these forces and their efficient exploitation by key industry players in the consumer electronics, filmed entertainment, and computer industries. Without any one of these conditions, DVD would have faced a much different process of introduction, commercialization, and diffusion. Each of the contexts detailed in this tome alone do not account for the success of the technology or its eventual impacts on the cultural, industrial, and economic spheres. Only through their combination can we begin to draw lessons that are applicable to future technological introductions. Additionally, through examination of these multiple influences we can begin to assess the significance of the mid-to-late 1990s for the historical record. Never before in the history of the media industries did factors as diverse as consumer demand, regulatory shifts, cross-industrial cooperation, technological developments, and economies of scale combine to assist a singular technology in its process of diffusion into global markets. Comprehension of these development accounts for the uniqueness of this historical moment, comparing its various components to past, present, or future conditions surrounding technological introduction. Taking the long-range view of this story, we can begin to see how each of the contexts discussed herein developed over time to eventually align at this unique point in history. The fact that film culture had undergone a series of shifts over time with the distribution of content into homes via television beginning in the 1950s, to home viewing of tapes and discs with home video and laserdisc in the 1970s, to cable and satellite, begins to explain the cultural context into which DVD was introduced.

But home viewing of pre-recorded content should also be understood relative to other cultural shifts over time leading to DVD. Disc culture, beginning with laserdisc, primed cultural consumers for high quality content and supplemental features beyond the film itself, including director's commentary, "making of" documentaries, and deleted scenes. Disc culture expanded upon the introduction and diffusion of the compact disc, setting the stage for a similarly sized home video disc more than a decade later. The long view of the cultural context affords insight into the events and technologies impacting meaningful interaction with digital content on discs leading to the introduction and adoption of DVD by consumers. Additionally, if we are to understand the cultural context related to DVD as a temporal historical process, shaping and being shaped by technologies and uses and gratifications stemming from those technologies, we must also begin to explore how DVD afforded consumers with, at the very least, the appearance of significant improvements in their interaction with content control. DVD, by virtue of it technological functionality, offered consumers random access to content; through supplemental materials included on the discs, consumers were presented with "access" to the process of filmmaking and to the personalities engaged in the production of content. In so doing, DVD tapped into a cultural zeitgeist defined by increasing access to information and control over that information. The combination of these two factors aligns with the historical trajectory of digital and home viewing cultures.

Taking this approach to each of the contexts impacting DVD's diffusion affords similar perspective on the singular uniqueness of the historical moment. Each of the three invested industrial contexts aligned to afford cross-investment, partnerships, and

cooperation in the process of technological commercialization. As we've seen, the consumer electronics industries in Europe and the United States were decimated by the rise of the Japanese and South Asian companies. Their demise, related to mismanagement associated with outsourcing, resource management, and mergers and acquisitions, opened the door for their counterparts in Japan, Taiwan, and Korea to fill the void. The filmed entertainment industry, seeking an alternative to the existing business model for home video dictated by the First Sale Doctrine, was undergoing a series of mergers and acquisitions of their own that brought the studios under the corporate umbrella of tightly integrated media conglomerates. As discussed above, the computing industry also was engaged in dynamic shifts over time relating to the rise and fall of market leaders through strategic moves relating to technology. Taking the broad historical view of the industrial context sets the stage and offers perspective on the processes involved in cross-industrial cooperation. The fact that each of the three industries involved in the technological development and commercialization of DVD desired, by virtue of their specific industrial context, a new digital disc technology is unto itself noteworthy; the fact that the three industries desired a similar technology at the same historical moment is staggering in its historical importance. Furthermore, the fact that multiple industries cooperated to meet and develop demand from consumers engaged in a favorable cultural context should be viewed as a piece of this complicated synergistic process that is, unto itself, an example of miraculous good fortune. Due to the synchronicity of these two contexts, combined with the favorable contexts detailed above

in the regulatory environments, technology and economics, the efficient exploitation of all of these contexts the newly formed DVD industry could be realized.

Above all else, the lessons learned from the processes of DVD's development, introduction, commercialization, and diffusion suggest that a variety of contexts influence the introduction of new technologies. Take, by way of example, the story of DVD's potential successor, high definition disc technology. While the technological context provided for the mechanisms and underpinnings for the next generation disc technology, and the regulatory context continued to support industrial efforts to control digital content, several contexts proved to be out of alignment. The industrial context into which high-definition discs were developed and introduced had shifted significantly after the success of DVD. As was discussed in chapter four, Sony and Philips had broken ranks from the DVD Forum, developing competing technologies for DVD recordable discs. Attempting to challenge the hegemony of the Forum, these companies also began developing a proprietary high definition disc technology, BluRay, that would compete with the consortium's HD-DVD. Because the computer industry was not invested in high definition drive technologies, as they were with a replacement for CD-ROM technology, there existed no impetus for them to encourage concessions between competing camps. The Big Six media companies asked the competing camps for technical protection measures, backward compatibility, and reliable functional operability for the new technology, but refused to support one camp exclusively over the competitor.

Of course, this hedging of support between formats was directly related to the industrial context; Sony controlled their library of titles through Columbia-TriStar, the

MGM library (purchased in 2004) and all new content coming from their studio. They were primed to finally realize their hardware/software synergies by releasing content on BluRay exclusively. Meanwhile, Time Warner's longstanding leadership role within the DVD Forum, and their partnership with Toshiba and Matsushita in the development of HD-DVD, virtually guaranteed an adversarial debut for high-definition discs. Additionally, the cultural context, and the related level of consumer demand for high-definition disc technologies, was not primed to the extent present with DVD technological introduction. Because HD-TV had not achieved significant penetration of the television market upon the eventual introduction of competing disc formats, there was little demand from the masses for a unified disc technology. Without an enormous installed base of high definition television sets, there would not be enormous demand for new hardware consoles capable of delivering high definition pre-recorded content. Furthermore, high definition discs were not discernibly different from their standard definition counterparts. The new discs were the same size, shape, color, and contained the same labels as DVDs. Unlike the shift from VHS to DVD, the shift from DVD to high definition discs did not tap into semantic networks of meaning like "futuristic," "digital" (from analog), and "revolutionary" as detailed in chapter two. The new discs offered a higher quality image from their predecessors, but without high definition television sets in tens of millions of homes across the United States, there was little hope of effectively demonstrating the difference.

What the introduction of competing high definition discs suggests is that the various industries involved in developing the next-generation technology for home video

failed to learn the lessons offered by DVD. What they are missing is the alignment and synchronicity of all contexts, including culture, industry, technology, economics, and the regulatory environment. Instead, they have attempted to push a new technology into a limited market in the hopes of establishing a winner prior to the widespread diffusion of the necessary television technology. While this strategy is noteworthy to the extent that it offers a lesson in technological commercialization and diffusion in a limited context, it will ultimately fail to resonate historically due to the disengagement with lessons of the immediate past. DVD offered these companies, and all other industries, a model for the efficient exploitation of contexts to virtually guarantee that a new technology would diffuse rapidly into the marketplace. In order for that lesson to be applied, however, industry must carefully analyze the contexts detailed in this study. Additionally, new technologies must align with both consumer demand and supporting technological products. If, for instance, high definition televisions were in 99% of all households in the United States, as was the case with standard definition television sets upon DVD's introduction, and high definition discs offered consumers a markedly different experience in both the tangible interaction with the artifact and with its embedded digital content, rapid diffusion might be expected. For this rate of diffusion to occur, of course, a single technological platform would need to be introduced with the full support of all content providers and computing software companies.

The future of the DVD market appears convoluted at best. While DVD continues to dominate global markets and will be the primary delivery mechanism for digital content for at least the next decade, new technologies threaten to unseat the current

champion. If we look, for instance, to a related lesson learned in the recent past stemming from high definition format battles, we might begin to see the future of digital content distribution. After the CD had conquered the music industry and given life to digital music delivery, competing camps went to market with a next generation high definition compact disc. While this format battle was directly related to the development of the DVD, with one of the next-generation CD formats developed through the DVD-Forum as DVD-Audio, the rush to market failed to account for cultural shifts in listening to and playing back music. After a long history of dominance for the album, the music industry was promoting single songs to enthusiastic consumers as the next phase of content delivery. When competing high-definition discs entered the market, as DVD-Audio and SACD, without clear guidelines for optimum playback and problems with new console devices, consumers shifted to online music downloads of singles through file-sharing networks. Individual songs could be downloaded for free, illegally of course, and played on a computer or burned to a recordable CD. In turn, CD sales slumped and a new industry was born online; MP3 players were introduced to make single songs portable, and the iPod quickly dominated the market by virtue of its flexibility and a savvy marketing campaign targeting young people. According to RIAA (Recording Industry Association of America) in 2003 only 0.4 million DVD-Audio disks were sold, 1.3 million SACD were sold through to consumers, 1.5 million LP, and 745.9 million CD. CD sales reached the peak level in 2000 and have experienced a sharp decline since the widespread adoption of online digital distribution. If, as is expected, broadband technologies continue to develop at the current rate, and the high definition format battle

between HD-DVD and BluRay continues into the future without a clear winner, online distribution of high definition movies and television programs could displace the DVD as the primary delivery mechanism for content.

DIRECTIONS FOR FUTURE RESEARCH

This study has laid significant groundwork for the study of DVD and digital technologies. By examining a variety of influences on the diffusion process, it has been my goal to expand traditional approaches to diffusion and technology studies by taking a contextual, modal approach to the subject. This study has highlighted the contingent nature of various contexts impacting the dynamic processes of DVD commercialization. What we have seen throughout this work is that these contexts worked in concert to enable the most successful diffusion of any technology in history. However, work remains to more fully examine additional contexts that may have impacted the process. While my discussion has privileged certain contexts in an effort to identify their eventual exploitation by industry, I have not fully addressed the favorable contexts within the mode of feature film production. Future analysis of this subject needs to account for the favorable (for industry) labor contexts within the filmed entertainment industry leading to the introduction of DVD. Contractual agreements between the Screen Actor's Guild and the studios limited the amount of monies to be recouped for actors from the sale of DVDs. While SAG has repeatedly balked at the current deal, they have yet to force any significant action in renegotiating with the studios. Similarly, the Writer's Guild (WGA), the Director's Guild (DGA) and the Producer's Guild have been unable to break the stranglehold established by the studios during the VHS-home video era. A study of the

history of these agreements would undoubtedly reveal how the labor context was favorably suited for DVD; the studios refused to renegotiate contracts with the introduction of DVD because they had established a royalty structure and residual payment plan through home video that existed within the context of other negotiations related to health benefits, salaries, and retirement packages. The guilds did not want jeopardize their contractual benefits in these areas for a larger slice of the DVD pie.

Additional research on the subject could also begin to explore shifts in industrial practices relating to the waves of cooperation and industrial cultural formation related to the DVD industry. This study has outlined grounds for further inquiry on this subject by detailing the structural logic of the DVD Forum; additional analyses could further examine the behaviors and cultural practices occurring within the Forum compared to periods prior to its formation in each of the three invested industries. Much work has been done on the corporate cultures within the Sony Corporation; additional studies could explore shifts within that culture instigated by Sony's involvement within the DVD Forum and their eventual secession—not to mention the culture of production surrounding Blu-Ray development and commercialization. Additionally, scholars could begin a comparative analysis between corporate cultures at Sony and their chief rival, Matsushita that could afford insight into the shifting nature of intra-corporate and inter-corporate cultures. What this study has suggested is that through administrative and industrial bodies such as the DVD Forum, the DVD-CCA, and the MPAA, corporate cultures expand into industrial cultures wherein discrete corporate cultures combine into an often contradictory, complex, and dynamic cultural logic that exists tenuously

alongside pre-existing corporate cultures of production. Industrial cultures could also be the subject of studies examining technological research initiatives conducted throughout Japan, Korea, and Taiwan as discussed in chapter three.

This study has focused on the contexts surrounding DVD commercialization. There exists a fertile ground for additional research into DVD technology. A growing body of research has begun to explore DVD impacts on fan cultures (Johnson 2005; Kendrick 2005; Cubbison 2005), aesthetics and authority (Carroll 2005), and supplemental content histories and subgenres (Hight 2005), much more work remains to be done on the aesthetics of digital transfers and compression technologies employed by DVD, interaction and interface theory with DVD menus and accessibility, and DVD and pedagogy. DVD also offers researchers the opportunity to examine the creation and maintenance of a completely new production culture. DVD divisions within the Big Six have established hierarchies and divisions of labor related to, but distinct from, the existing modes of production employed by the feature film and television industries. Additionally, future analysis can analyze these new divisions relative to shifts in corporate power structures. Besides marketing, production, and distribution divisions within these "home entertainment" divisions, there exists an entire realm of unexplored cultures of production within disc replication plants, the retail market, and distribution companies. There exists an entire field of laborers working exclusively on DVD production, themselves engaged in cultures of production forged by virtue of their positions as compression engineers, graphic designers, DVD producers, editors, after effects technicians and the like. Additional work needs to seriously engage with the

culture of production on feature film sets; the dynamic creation of meaning and conflict between crew and between cast and crew could be examined relative to the place of the DVD supplemental production team. These crews, in my own experience as a DVD Producer, are normally excluded from the primary culture on-set, viewed with a certain disdain by principal crew members.

Future analyses of technological diffusion and the formation of digital industries could apply the contextual, modal approach suggested herein. Revisiting successful and unsuccessful technologies, artifacts, and goods and services through contextual analysis of a variety of contributing factors could shed light on, and provide a model for, diffusion dynamics. If we were to revisit the introduction of the television, for instance, through the approach utilized in this study, would we find a favorable regulatory environment supplementing the efforts of industry? Would we find the synchronicity of contexts identified herein? Much can be gained from an approach that puts aside deterministic effects and impacts and focuses on the explanatory processes through which technologies, business models, goods or services gained a foothold in society. Additional work pertaining to DVD employing this approach should begin to explore the various contexts outside of the United States, principally the variety of different cultural contexts around the world into which DVD achieved successes. As researchers, we must begin to examine the contemporary media industries through not only their product, but through their process. It is through the dynamic interaction of forces in society that these industries produce meaningful and commercially viable products for consumption. In

order to more fully understand their products, we must also begin to understand the world surrounding them.

Appendix 3.1: Computer Industry Statistics, early 1990s

Market share by Machine Size

Source: Dataquest, WSJ, 1/4/94, (from Marvin Sirbu, CMU)

Segment	1992 Revenue $ (millions)	Market Share(%)	Revenue $(millions)	Market Share(%)
Supercomputer	2,062.10	1.8	2,198.30	1.8
Mainframe	23,376.40	20.6	21,151.10	17.5
Midrange	21,809.80	19.2	21,000.50	17.4
Workstation	9,327.90	8.2	10,127.50	8.4
PCs	57,045.20	50.2	66,265.00	54.9
Total	113,621.40	100.0	120,742.40	100.0

Large Scale Systems, Revenue in $millions

Source: Datamation, (from Marvin Sirbu, CMU)

Company	1992 Rev.	1991 Rev.	1990 Revenue	Change 91-92	Market Share (%)
IBM	8,190.0	9,100.0	10,623.0	-10.0%	29.1%
Fujitsu	4,431.3	4,446.1	2,843.1	-0.3%	15.7%
Hitachi	4,043.5	3,501.9	3,414.2	15.5%	14.4%
NEC	3,079.0	3,063.5	2,593.6	0.5%	10.9%
Unisys	1,966.0	850.0	1,016.0	131.3%	7.0%
Amdahl	1,489.6	987.2	1,360.0	50.9%	5.3%
Nihon	1,029.3	965.4	951.0	6.6%	3.7%
Siemens	962.2	964.4	1,018.5	-0.2%	3.4%
Gr.Bull	857.3	830.2	825.4	3.3%	3.0%
Cray	550.5	582.0	590.2	-5.4%	2.0%

Personal Computers, Revenue in $millions

Source: Datamation, (from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	1990 Revenue	91-92 Change	Market Share (%)
IBM	7,654.5	8,505.0	9,644.0	-10.0%	17.2%
Apple	5,412.0	4,900.0	3,845.8	10.4%	12.2%
Compaq	4,100.0	3,271.4	3,598.0	25.3%	9.2%
NEC	3,986.8	4,135.8	3,211.1	-3.6%	9.0%
Fujitsu	2,618.5	2,319.7	1,419.6	12.9%	5.9%
Toshiba	1,949.4	2,093.5	1,953.7	-6.9%	4.4%
Dell	1,812.5	667.4	n/a	171.6%	4.1%

Olivetti	1,348.7	1,586.1	1,791.7	-15.0%	3.0%
AST	1,140.5	800.7	n/a	42.4%	2.6%
Gateway	1,107.1	627.0	n/a	76.6%	2.5%

Personal Computers

Source: Dataquest, (from Marvin Sirbu, CMU)

Company	1992 Revenue $mil	1992 Market Share	1993 Revenue $mil	1993 Market Share(%)
IBM	7,448	13.1%	9,015	13.6
Apple	6,048	10.6%	7,267	11.0
Compaq	3,478	6.1%	6,603	10.0
NEC	2,824	5.0%	3,795	5.7
Dell	1,769	3.1%	2,532	3.8
Others	35,478	62.1%	37,053	55.9
Total	57,045	100.0%	66,265	100.0

WorkStations, Revenue in $millions

Source: Datamation, (from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	1990 Revenue	91-92 Change	Market Share (%)
Sun	2,394.0	2,455.3	1,934.0	-2.5%	17.4%
IBM	1,890.0	1,400.0	1,000.0	35.0%	13.7%
HP	1,530.0	1,055.0	920.0	45.0%	11.1%
Fujitsu	1,510.7	1,353.2	865.3	11.6%	11.0%
Digital	1,120.0	1,250.0	1,250.0	-10.4%	8.1%
Matsush	1,112.4	1,013.8	848.1	9.7%	8.1%
SGI	730.0	550.0	414.6	32.7%	5.3%
Unisys	650.4	100.0	n/a	550.4%	4.7%
Intergr	615.5	616.0	344.7	-0.1%	4.5%
Siemens	384.9	211.0	n/a	82.4%	2.8%

WorkStations

Source: Dataquest, WSJ 1/6/94 (from Marvin Sirbu, CMU)

Company	1992 Revenue $mil	1992 Market Share%	1993 Revenue $mil	1993 Market Share(%)
Sun	2,991.3	32.1	3,220.6	31.8
HP	1,753.7	18.8	2,289.6	22.6
IBM	1,516.7	16.3	1,470.3	14.5
Digital	982.4	10.5	970.8	9.6
SGI	675.1	7.2	936.3	9.2
Others	1,408.7	15.1	1,240.0	12.3
Total	9,327.9	100.0	10,127.5	100.0

Software

(from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	1990 Revenue	91-92 Change	Market Share (%)
IBM	11,365.9	10,524.0	9,952.0	8.0%	31.9%
Fujitsu	3,524.9	2,513.0	1,607.0	40.3%	9.9%
Micrsft	2,960.2	2,045.9	1,323.0	44.7%	8.3%
NEC	1,840.3	1,761.5	1,358.5	4.5%	5.2%
Comp As	1,770.8	1,437.8	1,310.7	23.2%	5.0%
Siemens	1,058.4	964.4	925.9	9.7%	3.0%
Novell	988.6	632.6	n/a	56.3%	2.8%
Hitachi	982.5	959.1	798.1	2.4%	2.8%
Lotus	810.1	828.9	642.2	-2.3%	2.3%
Digital	800.0	796.0	810.0	0.5%	2.2%
Oracle	782.0	1,085.0	1,002.0	-27.9%	2.2%

Peripherals

(from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	91-92 Change	Market Share (%)
IBM	7,948.6	10,278.0	-22.7%	12.6%
HP	4,590.0	4,370.0	5.0%	7.3%
Canon	3,892.8	3,139.0	24.0%	6.2%
Hitachi	3,401.0	3,092.9	10.0%	5.4%
Fujitsu	3,122.0	2,996.3	4.2%	4.9%
Seagate	3,079.4	2,668.7	15.4%	4.9%
Digital	3,000.0	2,900.0	3.4%	4.8%
Xerox	2,708.0	1,200.0	125.7%	4.3%
AT&T	2,283.2	2,100.0	8.7%	3.6%
Conner	2,240.0	1,590.0	40.9%	3.6%

Data Communications

(from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	1990 Revenue	91-92 Change	Market Share (%)
AT&T	3,315.0	1,790.0	1,465.0	85.2%	19.5%
N. Tele	2,300.0	1,460.0	1,220.0	57.5%	13.5%
IBM	2,200.0	2,000.0	2,950.0	10.0%	12.9%
NTT	1,871.7	1,495.4	1,230.3	25.2%	11.0%
Matsush	1,262.3	1,267.2	1,060.1	-0.4%	7.4%
Ricoh	956.1	892.2	837.4	7.2%	5.6%
Motorol	745	n/a	n/a	n/a	4.4%
Racal	690.7	679.0	625.2	1.7%	4.1%
Mitsubi	647.3	550.9	492.0	17.5%	3.8%

HP	630	450	n/a	40.0%	3.7%

Services

(from Marvin Sirbu, CMU)

Company	1992 Revenue	1991 Revenue	1990 Revenue	91-92 Change	Market Share (%)
IBM	6,410.0	2,018.0	1,500.0	217.6%	13.3%
EDS	4,272.6	3,666.1	2,870.0	16.5%	8.9%
CSC	2,474.4	1,944.7	1,679.3	27.2%	5.1%
Anderso	2,445.0	2,083.0	1,670.2	17.4%	5.1%
ADP	2,075.0	1,810.0	1,736.0	14.6%	4.3%
Fujitsu	1,913.5	1,546.5	988.9	23.7%	4.0%
Cap Gem	1,892.5	1,462.1	1,465.9	29.4%	3.9%
TRW	1,800.0	1,839.0	1,739.0	-2.1%	3.7%
Digital	1,570.3	1,570.3	1,162.3	0.0%	3.3%
Unisys	1,336.0	600.0	n/a	122.7%	2.8%
NTT	1,247.8	996.9	883.7	25.2%	2.6%

Projected quantities of Personal Digital Assistants

(from Marvin Sirbu, CMU)

Number of units

	sales	installed base
1993:	65,000	65,000
1994:	150,000	215,000
1995:	330,000	545,000
1996:	750,000	1,300,000
1997:	1,400,000	2,400,000
1998:	2,300,000	4,400,000

Appendix 3.2: Consumer Electronics Timeline (with hyperlinks)

- 1877: Edison Cylinder Phonograph
- 1878: Thomas Edison Demonstrates the Cylinder Phonograph
- 1881: Earliest Identified Flat Disc Record
- 1885: Tainter Graphophone
- 1887: Berliner Gramophone
- 1900: Gramophone Disc Record vs. The Edison Cylinder
- 1906: De Forest Audion Vacuum Tube
- 1916: Thomas Edison Holding an Edison Disc Record
- 1922: RCA Superheterodyne Radiola
- 1926: Baird Mechanical Television
- 1926: Image from Baird's Mechanical Television
- 1927: Baird Phonovision VideoDisc Apparatus
- 1928: Baird Televisor
- 1929: Zworykin Kinescope
- 1939: RCA Transparent TRK-12 Television at the World's Fair
- 1941: Atanasoff-Berry Electronic Digital Computer
- 1941: VideoDisc Jukebox
- 1946: The Eniac Computer is Unveiled
- 1946: RCA's First Postwar Designed Television
- 1946: Williams Tube CRT Memory Storage Unit
- 1947: RCA's First Rear Projection Television

- 1947: Invention of the Transistor
- 1950: Simon Electromechanical Personal Computer
- 1951: Whirlwind Computer - The First to Display Real Time Video
- 1952: UNIVAC Computer Used to Predict the 1952 Election
- 1952: IBM 701 - The Company's First Fully Electronic Computer
- 1953: Winky Dink Interactive Television Show
- 1953: IBM 650 Magnetic Drum Calculator
- 1954: RCA's First Commercial Color TV
- 1955: RCA Black & White Television Converted to Color
- 1955: TRADIC - The First Fully Transistorized Computer
- 1956: Ampex VRX-1000 - The First Commercial Videotape Recorder
- 1956: RCA Bizmac Computer
- 1956: IBM 305 RAMAC Computer with Disk Drive
- 1956: RCA "Hear See" Videoplayer Presented to David Sarnoff
- 1958: The Integrated Circuit is Invented by Jack Kilby
- 1959: Philco Predicta Princess Swivel Television
- 1960: DEC PDP-1 Precursor to the Minicomputer
- 1962: Telstar - First Satellite to Transmit Live Transoceanic Television
- 1963: First Consumer-only Video Tape Recorder
- 1964: IBM Introduces the System/360 Family of Business Mainframe Computers
- 1964: Control Data Corporation CDC 6600, the First Supercomputer
- 1965: NASA Project Gemini Computer - The First in Space
- 1965: DEC PDP-8 Desktop-sized Minicomputer is Introduced
- 1966: The Acoustic Modem is Improved for General Use
- 1967: Ampex Instant Replay Disk Recorder

- 1968: The First Computer Mouse is Demonstrated
- 1969: CBS EVR or Electronic Video Recording System Prototype
- 1969: RCA SelectaVision HoloTape Player Prototype
- 1970: Telefunken Teldec VideoDisc Player Prototype
- 1971: First CED Patent Applications by RCA
- 1971: Intel 4004 - The First Microprocessor on the Market
- 1971: Computer Space - The First Arcade Video Game
- 1972: Magnavox Odyssey - The First Home Video Game System
- 1972: Cartrivision - The First VCR with Prerecorded Tapes
- 1972: The First Successful RCA SelectaVision VideoDisc
- 1972: First Public Demonstration of the MCA Disco-Vision System
- 1973: RCA "February" Prototype CED Player
- 1973: Xero Alto Computer
- 1973: RCA SelectaVision MagTape Prototype VCR
- 1975: Telefunken Teldec Production VideoDisc Player
- 1975: RCA EM-2 CED VideoDisc Player Prototype
- 1975: Altair 680 and VideoDisc Articles in Popular Electronics
- 1975: IBM 5100 - The First IBM PC - Is Released
- 1975: Sony Betamax Combination TV/VCR Released in the U.S.
- 1976: First Stand-alone Sony Betamax VCR Released in the U.S.
- 1976: Apple Computer Co. Comes Into Existence
- 1976: Fairchild Channel F - First ROM Cartridge Video Game System
- 1976: RCA Studio II Home TV Programmer
- 1977: VideoDisc Players - Here At Last ?
- 1977: Consumer Computers at the West Coast Computer Faire

- 1982: Capacitance Electronic Disc System Goes Stereo
- 1982: Vectrex Graphic Computer System
- 1982: Timex Sinclair Computer for $99.95 is Introduced
- 1982: Sony CDP-101 - the Compact Disc is Introduced
- 1982: Compaq Portable - The First IBM Compatible
- 1983: Apple Lisa with Graphical User Interface and Mouse
- 1983: Commodore SX-64 Executive - The First Color Portable Computer
- 1983: RadioShack Model 100 - The First Truly Usable Notebook Computer
- 1983: JVC VHD VideoDisc System Hits the Market in Japan
- 1983: RCA Introduces Their J-Line of CED VideoDisc Players
- 1983: Coleco Adam Computer with Daisy Wheel Printer
- 1983: Unified Digital Command Center for the SJT400 Interactive CED Player
- 1983: The CED System is Marketed in Great Britain
- 1983: AT&T Sceptre - WebTV in 1983 ?
- 1983: IBM Introduces the PCjr Home Computer
- 1984: Macintosh Hits the Market
- 1984: Dimensia - The Next Dimension in Sight and Sound
- 1985: The Commodore Amiga Is Introduced
- 1987: IBM Introduces the PS/2 Family of Personal Computers
- 1988: The Cube-shaped NeXT Computer Becomes Available
- 1993: Macintosh Color Classic - The Last Classic Mac
- 1993: The Graphical WWW is Born with the Release of NCSA Mosaic
- 1994: The RCA Digital Satellite System (DSS) Begins Broadcasting
- 1996: WebTV Using a Television to Access the Internet is Launched
- 1997: DVD Achieves a Nationwide Market

- 1998: DIVX the Pay-Per-View DVD System is Launched
- 1999: Personal Video Recorders from ReplayTV and TiVo are Introduced
- 2002: Apple iMac Pedestal Computer

Appendix 3.3: U.S. Consumer Electronics Spending

US consumer electronics sales data

Patterns of consumer electronics sales in the United States. Sales are shown in millions of dollars.

Type of device	1990	1995	1997	1998	1999	2000	2001
Cordless telephones	842	1,141	1,672	1,745	1,808	1,307	1,358
Corded telephones	638	557	515	489	471	393	294
Cellular telephones	1,133	2,574	5,940	6,000	6,066	8,995	8,651
Home computers	4,187	12,600	15,950	16,640	16,390	16,400	12,960
Computer printers	(NA)	2,430	3,900	4,188	4,500	5,116	5,245
Computer software	971	2,500	3,450	3,930	4,480	5,062	5,771
Home fax machines	920	919	1,137	647	455	387	349
Digital	(NA)	(NA)	483	519	1,209	1,823	1,972

cameras							
Standard color TV	6,197	6,798	6,023	6,122	6,199	6,140	5,130
TV/VCR combos	178	723	684	832	1,014	969	790
VCR decks	2,439	2,767	2,618	2,409	2,333	1,861	1,058
Home satellites	421	1,265	726	733	957	1,102	921
DVD players	(NA)	(NA)	171	421	1,099	1,713	2,697
Video game hardware	975	1,500	1,650	1,980	2,250	2,700	3,250
Video game software	2,400	3,000	3,900	4,480	5,100	5,850	6,725
Blank audio cassettes	376	334	281	248	208	162	106
Blank videotapes	948	708	695	647	590	567	604

Appendix 4.1: DVD Forum Member Companies (as of 3/07)

1K Studios 4M Systems SA http://www.4m-inc.ch
A & R Cambridge Limited http://www.arcam.co.uk http://www.arcam.co.uk/news/index.cfm
Accuphase Laboratory, Inc.
Action Asia Limited
Action Electronics Co., Ltd.
Adobe system
Advanced Micro Devices, Inc. http://ati.amd.com/
Aisin AW Co., Ltd. http://www.aisin-aw.co.jp/
Alco Electronics Limited http://www.alco.com.hk
Almedio Inc. http://www.almedio.co.jp
Alpine Corporation
Analog Devices K.K. http://www.analog.com/
Aplix Corporation http://www.aplix.co.jp/
Apple Computer Inc.
ArcSoft, Inc.
Arima Devices Corporation
Asahi Kasei Microsystems Co., Ltd.
ASUSTeK Computer Inc.
ASV Corp.
Atmel Corporation
AudioDev AB http://www.audiodev.com
B.D. FOX & FRIENDS, INC.
B&W Group / Classe Audio Inc. http://www.classeaudio.com/ http://www.rotel.com/
B1 Media
Bayer MaterialScience AG http://www.bayer-ag.de
Bcom Electronics Inc.
BOSE Kabushiki Kaisha
Broadcom Corporation http://www.broadcom.com/
Cheertek Inc. http://www.cheertek.com.tw
China Electronics Technology Group Corporation No.3 Research Institute
Cinram Inc. http://www.cinram.com
Citron Electronic
Clarion Co.,Ltd.
CMC Magnetics Corporation http://cmc.taiwanet.com
Coding Technologies http://www.codingtechnologies.com
Columbia Digital Media, Inc. http://www.columbia-dm.co.jp/
Columbia Music Entertainment, Inc. http://columbia.jp/ http://www.columbia-dm.co.jp/
Crest National http://www.crestnational.com
Custom Flix http://customflix.com
Cryptography Research http://www.cryptography.com/
CyberLink Corp. http://www.gocyberlink.com/

D&M Holdings, Inc.
DAEWOO Electronics Corp.
Daikin Industries, Ltd.
Data Storage Institute, Singapore
DaTARIUS Technologies GmbH http://www.datarius.com/
Daxon Technology Inc. http://www.daxontech.com/
DCA Inc. http://www.dcainc.com
Delphi Technology, Inc.
Deluxe Digital Studios, Inc. http://www.bydeluxe.com
Denca Industrial Limited
Dolby Laboratories Inc.
DPHI, INC http://www.dataplay.com
DTS, Inc. http://www.dtstech.com
Eclipse Data Technologies http://www.eclipsedata.com
ECOM Inc.
EIZO NANAO Corporation http://FORIS.TV/ http://www.eizo.co.jp/
Emfasys Corporation
ESS Technology, Inc.
Expert Magnetics Corp. http://www.expertmg.co.jp/
Flexplay Technologies, Inc. http://www.flexplay.com/
Foster Electric Company, Limited http://www.fostex.co.jp/http://www.fostex.co.jp/
Fraunhofer IIS-A http://www.iis.fraunhofer.de/amm/
FUJIFILM Corporation
Fujitsu Ten Limited
Funai Electric Co., Ltd.
GEAR Software, Inc. http://www.gearsoftware.com
Gigastorage Corporation
Gork Enterprises, Inc.
Harman International
Hioki E.E. Corporation
Hewlett-Packard Company
Hitachi, Ltd. http://dvd.hitachi.co.jp
Homenema Disk Incorporation http://www.homenema.com
Horizon Semiconductors Ltd. http://www.horizonsemi.com
Hyundai Autonet Co.,Ltd. http://www.hyundaiautonet.com
IBM Corporation
Imagica Corp.
Imation Corporation
Industrial Technology Research Institute (ITRI)
Infodisc Technology Co., Ltd. http://www.infodisc.com
INFOMEDIA INC.
Info Source Multi Media Korea Ltd.
Intel Corporation
Intersil Corporation http://www.intersil.com/cda/home/
InterVideo, Inc. http://www.intervideo.com/
Kenwood Corporation

KONICA MINOLTA OPTO, INC. http://konicaminolta.jp/
Laser Pacific Media Corporation
Lead Data Inc.
Leader Electronics Corp. http://www.leader.co.jp
Lenovo Group Ltd. http://www.lenovo.com
LG Electronics Inc. http://www.lge.com http://www.lge.com/product/product.html
Linn Products Ltd. http://www.linn.co.uk
Lite-On It Corp.
LSI Logic Corporation
M2 Engineering AB
Macrovision Corporation http://www.macrovision.com
Magnum Semiconductor, Inc.
Manufacturing Advanced Media Europe
Marvell Semiconductor http://www.marvell.com/
Matsushita Electric Industrial Co., Ltd. http://www.panasonic.co.jp/dvd/
MediaTek Inc. http://www.mtk.com.tw
Megan Media Holdings Bhd http://www.meganmedia.com.my
Memory-Tech Corporation
Meridian Audio Limited http://www.meridian-audio.com
Mico Technology (Shenzhen) Limited
Microsoft Corporation
MIPS Technologies http://www.mips.com
Mitsubishi Chemical Corporation
Mitsubishi Electric Corporation http://www.mitsubishielectric.co.jp/dvd/index.html
Mitsui Chemicals, Inc. http://www.mitsui-chem.co.jp/cdr/
Mitsumi Electric Co.,Ltd.
Moser Baer India Limited http://www.moserbaer.net
Movielink, LLC. http://movielink.com/
MPO International http://www.mpo.fr
MUST Tech. Co. Ltd. http://www.musttech.com.tw
Nagase & Co., Ltd. http://www.nagase.co.jp
NBC Universal, Inc.
NEC Corporation
Nero AG http://www.nero.com http://www.nerodigital.com
NHK Technical Services, Inc. http://www.nhk-ts.co.jp/
Nichia Corporation http://www.nichia.co.jp
NTT Electronics Corporation
NuCORE Technology Inc. http://www.nucoretech.com/
NVIDIA Corporation
OC Oerlikon Balzers AG http://www.oerlikon.com/datastorage
Odeon Cineplex S.A.
Onkyo Corporation http://www.onkyo.co.jp/DVD_compo/index.htm
ONO Sokki Co., Ltd.
OPT Corporation
Optical Disc Corporation http://www.odc-nimbus.com

Optical Memory National Engineering Research Center, China
Optodisc Technology Corporation
Orion Electric Co., Ltd. http://www.orion-electric.co.jp
Pegasys Inc.
Pinnacle Systems GmbH http://www.pinnaclesys.com
Pioneer Corporation
Pixela Corporation http://www.pixela.co.jp/
Plannet Associate Co., Ltd.
Pony Canyon Enterprise Inc.
Postech Corp.
Princo Corp.
Prodisc Technology Inc.
Pulstec Industrial Co., Ltd.
Quanta Storage Inc.
Realtek Semiconductor Corp. http://www.realtek.com.tw/
Ricoh Company, Ltd. http://www.ricoh.com/
Ritek Corporation http://www.ritek.com.tw
Rohm GmbH & Co. KG
Royal Philips Electronics http://www.philips.com http://www.licensing.philips.com
Samsung Electronics Co., Ltd.
Sanken Media Product Co.,Ltd.
Sanyo Electric Co., Ltd.
Scientific Atlanta Inc. http://www.scientificatlanta.com
Sensio Technologies Inc.
Sharp Corporation http://sharp-world.com/
Shibasoku Co.,Ltd.
Shinano Kenshi Co.,Ltd.
ShinShin Co., Ltd. http://www.ssnet.co.jp/
Shinwa Co., LTD http://www.shinwa.co.jp/
Sigma Designs, Inc. http://www.sigmadesigns.com
Silicon Image http://www.siimage.com
Singulus Technologies AG http://www.singulus.de/
SM Summit Holdings Ltd. http://www.smsummit.com.sg/
Sonic Solutions http://www.sonic.com
SONY BMG Music Entertainment
Sony Corporation http://www.sony.com
Spb Software House GmbH
Starlight Video Limited
STMicroelectronics K.K.
Sun Cheer Technology Ltd.
Sunext Technology Co., Ltd. http://www.sunext.com
Taiyo Yuden Co., Ltd http://www.ty-top.com
Target Technology Company LLC http://www.targettechnology.com
Tatung Co. http://www.tatung.com.tw
TDK Corporation http://www.tdk.co.jp/
TEAC Corporation

Techking Technology CO., LTD
Teijin Chemicals Ltd.
Texas Instruments Japan Limited
The Cannery http://www.cannery.com/
Thomson http://www.thomson.net
THX LTD
TNE JAPAN
Toppan Printing Co., Ltd.
TOPTICA Photonics AG http://www.toptica.com
Toshiba Corporation http://www.toshiba.co.jp/index.htm
TOYO Recording Co., LTD.
TRAILER PARK
Trendy Corporation http://www.trendy.co.jp/
Twentieth Century Fox Film Corporation
U-Tech Media Corporation http://www.utechmedia.com.tw
Ulead Systems, Inc. http://www.ulead.com
UmeDisc Ltd. http://www.umedisc.com
Universal Music Group http://www.universalstudios.com http://www.umusic.com
Verance
VESTEL Group of Companies http://www.vestel.com http://www.vestelinvestorrelations.com
VIA Optical Solutions, Inc.
Victor Company of Japan, Limited http://www.jvc-victor.co.jp/ http://www.jvc.com/
Videon Central Inc.
Visionare Corporation
Walt Disney Pictures and Television
Warner Bros. Entertainment Inc. http://www.warnervideo.com
Warner Music Group http://www.wmg.com/
Wipro Limited http://www.wipro.com
YA BANG Industrial Co., Ltd.
Yamaha Corporation http://www.global.yamaha.com/ http://www.global.yamaha.com/products/av/ http://www.global.yamaha.com/news/
Yaskawa Information Systems Corporation
Yokogawa Electric Corporation http://www.yokogawa.com/tm/ http://www.yokogawa.co.jp/Measurement/
Zhenjiang Jiangkui Group Co., Ltd.
ZOOtech Ltd. http://www.zoodigitalgroup.com http://www.zoo-tech.com
ZORAN Corporation http://www.zoran.com

Appendix 4.2: Early DVD Titles, Warner Home Video

Titles released by WHV in 1997: "*10*", *2 Days in the Valley (HBO),A Christmas Story (MGM/UA), A Little Princess, A Time to Kill, Absolute Power, Ace Ventura, Ace Ventura 2, Adam's Rib (MGM/UA), Addicted to Love, Adventures of Pinocchio (NL), All the President's Men, Amadeus, Arthur, Assassins, Austin Powers (NL), Balanchine's Nutcracker, Batman, Batman & Robin, Batman Forever, Batman Returns, Beetlejuice, Best Years of Our Lives (HBO), Birdcage, The (MGM/UA), Bishop's Wife, The (HBO), Black Stallion (MGM/UA), Blade Runner (DC), Blazing Saddles, Blown Away (MGM/UA), Body Heat, Bodyguard, The, Bonnie and Clyde, Bridges of Madison County, Brigadoon (MGM/UA), Bullitt, Caddyshack, Camelot (30th), Candidate, The, Cat on a Hot Tin Roof (MGM/UA), Chariots of Fire, Client, The, Color Purple, The, Conspiracy Theory, Contact, Cool Hand Luke, Cyborg (MGM/UA), Dangerous Liaisons, Dark Victory (MGM/UA), Demolition Man, Dirty Harry, Disclosure, Dog Day Afternoon, Dr. No (MGM/UA), Driving Miss Daisy, Dumb and Dumber (NL), Elvis: That's the Way It Is (MGM/UA), Eraser, Executive Decision, Exorcist, The, Fathers' Day, Fire Down Below, Forbidden Planet (MGM/UA), Forever Young, Free Willy, From Russia with Love (MGM/UA), Fugitive, The, Get Shorty (MGM/UA), Getaway, The (1972), Glimmer Man, GoldenEye (MGM/UA), Goldfinger (MGM/UA), GoodFellas, Green Berets, Gremlins, Grinch/Horton (MGM/UA), Grumpier Old Men, Grumpy Old Men, Hang 'em High (MGM/UA), Hunchback of Notre Dame (RKO), Interview With the Vampire, Island of Doctor Moreau (NL), J.F.K. (DC), Jailhouse Rock (MGM/UA), Jeremiah Johnson, Jezebel, Ladyhawke, Last Man Standing (NL), Lawnmower Man, The (NL), Lethal Weapon, Lethal Weapon 2, Lethal Weapon 3, Little Shop of Horrors, Long Kiss Goodnight (NL), Mad Max: Beyond Thunderdome, Man Who Would Be King, The, Mars Attacks!, Mask, The (NL), Maverick, Menace II Society (NL), Michael, Michael Collins, Midnight Cowboy (MGM/UA), Mortal Kombat (NL), Murder at 1600, My Fellow Americans, National Velvet (MGM/UA), Nat'l Lampoon's Christmas Vacation, Nat'l Lampoon's Vacation, One Flew Over the Cuckoo's Nest, Outbreak, Outland, Pale Rider, Pelican Brief, Philadelphia Story, The (MGM/UA), Player, The (NL), Policy Academy, Poltergeist (MGM/UA), Postman Always Rings Twice, The, Presumed Innocent, Private Benjamin, Purple Rain, Raging Bull (MGM/UA), Rain Man (MGM/UA), Red River (MGM/UA), Right Stuff, The, Risky Business, Road Warrior, The, Rob Roy (MGM/UA), Robin Hood: Prince of Thieves, Rocky (MGM/UA), Rocky II (MGM/UA), Rocky IV (MGM/UA), Rosewood, Rumble in the Bronx (NL), Searchers, The, Secret Garden, The, Selena, Seven (NL), Shine (NL), Show Boat (1951) (MGM/UA), Singin' in the Rain (MGM/UA), Sleepers, Space Jam, Spawn (NL), Spawn Animated (HBO), Species (MGM/UA), Stagecoach, Strangers on a Train, Streetcar Named Desire (DC), Tango and Cash, Teenage Mutant Ninja Turtles (NL), Tequila Sunrise, The, Thelma & Louise (MGM/UA), Tin Cup, Tom Jones (HBO), True Romance (DC), Turbulence (HBO),*

Twister, Under Siege, Under Siege 2: Dark Territory, Unforgiven, Vegas Vacation, Viva Las Vegas! (MGM/UA), What Ever Happened to Baby Jane?, Who's Afraid of Virginia Woolf?, Wild America, Wild Bunch, The, Willy Wonka and The Chocolate Factory, Witches of Eastwick, The, Wizard of Oz, The (MGM/UA), Woman of the Year (MGM/UA), Woodstock -- 3 Days of Peace and Music, Wuthering Heights (HBO), Year of Living Dangerously (MGM/UA), Zeus and Roxanne (HBO)

Appendix 4.3: Revenue Sharing Contract, MGM and Hollywood Video (2001)

REVENUE SHARING TERM SHEET
HOLLYWOOD ENTERTAINMENT CORPORATION

The following (this "Agreement") sets forth the principal terms of the revenue sharing agreement between MGM Home Entertainment ("MGM") and Hollywood
Entertainment Corporation ("Retailer") concerning certain motion picture titles
made available to the public by MGM.

TITLES: All motion pictures and programs released by MGM during
the Term as Rental-Priced (defined below) new release
VHS and day-and-date DVD (in the English and Spanish
language) (hereafter collectively referred to as
"Units"), intended for non-commercial, private in-home
viewing, on an output basis, to the extent that MGM owns
or controls the necessary revenue-sharing rights in each
such motion picture or program (individually a "Title").
For purposes of this Agreement, "day-and-date DVD"
shall include DVD new releases where the DVD release
date is within * of the VHS Street Date. In addition,
Retailer shall have the option to *. Other video
products, and all other media, shall not be included
within this Agreement. Retailer agrees to lease all
Titles offered by MGM during the Term. Notwithstanding
the foregoing, Retailer shall be under no obligation to
lease from MGM more than * Titles per year that have a
Gross Box Office (defined below) of * and that MGM has
not participated in such Title's production (e.g., as
evidenced in the credit block) ("Class C Pictures"). If
MGM releases more than * Class C Pictures in any given
year, Retailer and MGM shall mutually select the * to be
included hereunder and any additional Class C Pictures
shall only be leased by Retailer in Retailer's sole
discretion. "Gross Box Office" shall mean the box
office gross receipts earned by a title in the United
States and Canada measured from the Title's initial
theatrical release in the Territory until the date
ordered by Retailer, as reported by the Hollywood
Reporter. "Rental-Priced" shall mean new release VHS
format Titles not priced for sell-through (as the term
is commonly understood in the United States video
industry).

Retailer agrees that Units of Titles will only be

obtained on a revenue sharing basis in accordance with this Agreement. For the avoidance of doubt, this Agreement is on an output (versus a Title-by-Title) basis, excluding * and excluding certain Class C Pictures as outlined above.

*Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

TERM: The term of this Agreement (the "Term") shall commence upon the date this Agreement is fully executed, and shall continue thereafter for a period of three (3) years; provided, however, that MGM or Retailer may terminate this Agreement at any time after December 15, 2002, upon ninety (90) days' written notice (which notice may be given before or after December 15, 2002).

TERRITORY: United States, its territories and possessions.

TRANSACTION: Lease, with rights to purchase Units at end of the Revenue Sharing Period.

ORDER DATE: With respect to ordering each and every Title pursuant to this
Agreement, Retailer shall provide to MGM (or its designee) order quantities determined by Retailer for such Title not later than six (6) weeks prior to such Title's Street Date (the "Order Date"). The orders shall specify the number of Units (VHS and DVD) for each Title.

SHIPPING: MGM shall ship (at MGM's sole cost and expense) the Units
leased by Retailer to not more than two (2) distribution centers designated by Retailer. MGM shall ship such Units to such designated locations for arrival at such locations not less than fifteen (15) days prior to Street Date. The individual Units will not be shrink-wrapped.

LEASE
COMMITMENT: Retailer and MGM shall mutually agree on the number of Units
for each respective title that Retailer shall lease from MGM. In the event the parties cannot agree on the number of Units on or before forty five (45) days prior to the Street Date of any Title, the number of Units shall be determined by reference to the matrix attached hereto as Exhibit A ("MGM Matrix"). Retailer agrees to provide MGM with written notice of the inability of the parties to agree on or before the expiration of said forty-five (45)-day period ("Matrix Notice").

*

In the event * is used to determine the number of Units acquired by Retailer, Retailer agrees to pay *

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

The allocation between VHS and DVD within the number of Units leased shall be determined by Retailer in Retailer's sole discretion; provided, however, that in the event Retailer elects to increase the percentage of DVD acquired in excess of * percent (*%) of the Retailer's * at the time of the allocation, the allocation in excess of such * percent (*%) increase shall be subject to MGM's prior written consent, which consent shall not be unreasonably withheld. For purposes of illustration, if at the time of the allocation *

Matrix Adjustment: The parties agree that the MGM Matrix * shall be adjusted semi-annually during the term of this Agreement. The first such adjustment shall be made effective December 15, 2001, with later adjustments being made on June 15, 2002, December 15, 2002, June 15, 2003, and December 15, 2003 ("Adjustment Date(s)"). The adjustment in the * for the next period shall be a pro rata increase or decrease in the Unit ranges based upon the percentage year-over-year increase or decrease in Store Revenue for Retailer's stores for the six (6)-month period ending the month prior to the month of the Adjustment Date ("Adjustment Period"); provided, however, that unless the adjustment is greater than * percent (*%), there shall be no adjustment made in the *. Year-over-year increases or decreases shall be effective as of the Adjustment Date and shall be determined by comparison of Store Revenue for the prior Adjustment Period to Store Revenue for the same six (6)-month period of the prior year. The Store Revenue percentage increase or decrease shall determine the percentage increase or decrease in the Unit ranges in the *. For purposes of this Agreement, Store Revenue for Retailer's stores is defined as average store revenue determined from all Comp-stores owned by Retailer and all franchises or licensed stores for which Retailer is responsible for new release acquisitions. The * for any period shall apply to Titles that have a Street Date within such period. For purposes of this Agreement, "Comp-stores" are defined as stores over one (1) year old compared to the same store for the same period for the prior year.

REVENUE
SHARE: For purposes of this Agreement, Revenue Share includes *, excluding any sales taxes, use taxes, and any other government-levied transaction fees collected from the customer.

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

Rental Revenue: Retailer shall pay to MGM an amount equal to * percent (*%) of all Rental Revenue (defined below) with respect to each and every Unit leased by Retailer pursuant to this Agreement ("MGM's Rental Share") during the period commencing upon the respective Street Date for such Title and continuing for * thereafter ("Revenue Sharing Period"). "Rental Revenue" is defined as all monies actually tendered by consumers, including rental fees and extended viewing fees (less amounts refunded * and excluding any sales taxes, use taxes, and any other government-levied transaction fees collected from the customer. For purposes of the foregoing, Promotional or Operation Credit or Discount shall mean *

DVD PVT: *

VHS PVT: *

MINIMUM PER
TRANSACTION: With respect to each Title, Retailer shall pay to MGM the
greater of: (i) * per Rental Transaction (defined below) averaged over the aggregate number of rental transactions for all Units of such Title during the Revenue Sharing Period, or (ii) * amount for such Title. For purposes of this Agreement, "Rental Transaction" is defined as a single-night or multiple-night Rental Transaction involving a Unit, whether or not paid for.

MGM acknowledges that one of Retailer's operation programs is the free rental of new releases to Retailer's store employees prior to Street Date. The purpose of the program is to educate Retailer's employees so they may better serve customers. MGM acknowledges that such program transactions are excluded from Rental Revenue and Rental Transactions. Retailer acknowledges that such program shall be applied to MGM in a manner consistent with its application to other major motion picture studios.

AD ALLOWANCE: * shall be made available by MGM to Retailer for advertising purposes; provided, however, that amounts, if any, in excess of such minimum shall be determined by MGM at MGM's sole discretion. The allowance may be deducted monthly by Retailer from MGM's Revenue Share otherwise payable by Retailer.

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

END-OF-TERM
BUYOUT FEE: VHS Units: With respect to VHS Units of each Title leased by
Retailer, Retailer shall, on the date which is * after such Title's Street Date, *
In the event MGM elects to have Retailer return Units, MGM shall provide the destination address for its distribution center for return of the Units and Retailer shall deliver the Units to such location. Retailer may reasonably retain and consolidate return shipments to fully utilize truck capacities, provided returns shall not be delayed by such for more than *

DVD Units: With respect to DVD Units of each Title leased by Retailer which have not been sold during the Revenue Sharing Period for such Title, Retailer shall, on the date which is * after such Title's Street Date, *

In the event MGM elects to have Retailer return Units, MGM shall provide the destination address for its distribution center for return of the Units and Retailer shall deliver the Units to such location. Retailer may reasonably retain and consolidate return shipments to fully utilize truck capacities, provided returns shall not be delayed by such for more than *.
PVT
CONSUMER
SALES: Only Units that have previously been rented to consumers (PVT) may be sold pursuant to this Agreement during the Revenue Sharing Period. There shall be no PVT sales prior to the date which is * after each Title's respective Street Date for VHS and * after each Title's respective Street Date for DVD (the "Permitted Sale Date"). Thereafter, Retailer may sell Units for each Title leased by Retailer pursuant hereto. *.

PAYMENT
TERMS: MGM's Rental Share and * revenue shall be paid by Retailer to MGM not later than * days after the end of the month during which each respective transaction

occurred. With respect to the * any * shall be payable within * days after the expiration of the applicable Revenue Sharing Period for the Title.

MGM's * shall be paid by Retailer to MGM not later than * days after the date such amount is due to MGM in accordance with * provision set forth above.

*Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

DATA
REPORTING: With respect to each and every Title pursuant to this Agreement, Retailer shall provide to MGM (or its designee), on a weekly basis, all transactional data, excluding Retailer's customer data, for all amounts payable by Retailer to MGM pursuant to this Agreement in the manner set forth in Exhibit "C" attached hereto. MGM acknowledges that Retailer's current electronic reporting capabilities are satisfactory to MGM. Retailer agrees that it will maintain its system to continue to provide such data. Retailer agrees to consider reasonable data format changes requested by MGM, provided that such changes do not require significant expenditures or otherwise present processing problems.

DEFECTIVES: VHS: MGM shall allow Retailer a credit, as the sole remedy for
damaged or defective VHS Units, in an amount equal to * of Revenue Share for VHS Units.

DVD: MGM shall allow Retailer a credit, as the sole remedy for damaged or defective DVD Units, in an amount equal to * of Revenue Share for DVD Units.

The credits may be deducted monthly by Retailer from MGM's Revenue Share otherwise payable by Retailer.

PRODUCT
ALLOCATION: In the event Retailer closes one (1) or more stores during the
term of this Agreement, Retailer shall have the right to transfer Units to other stores or to Retailer's distribution centers.

PRODUCT
PLACEMENT: Retailer shall stock all DVD and VHS Units of all Titles leased
in Retailer's stores. Retailer shall have the right to transfer Units between its stores. Retailer agrees that Retailer shall stock and transfer Units consistent with

Retailer's handling of similar product of other major motion picture studios.

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

AUDIT RIGHTS: With respect to each and every Title pursuant to this Agreement, MGM shall hold all audit and inspection rights in connection with all Units pursuant to this Agreement (including, but not limited to, the right to audit the Matrix Adjustment determinations); provided, however, that MGM shall not audit Retailer more than once per quarter. Such audits shall not continue for more than twenty (20) business days so long as Retailer provides requested audit documentation to MGM in a timely manner. In no event shall MGM have the right to examine records relating to Retailer's business generally or with respect to projects or areas not directly relating to Revenue Share with MGM. The foregoing sentence shall not limit MGM's right to audit and inspect the Matrix Adjustment determinations and the transactional data provided to MGM set forth above.

NO ASSIGNMENT: This Agreement may not be assigned by Retailer without MGM's prior written consent. The sale or exchange of Retailer's stock in a public offering and the subsequent sale of Retailer's stock on a nationally recognized exchange or in NASDAQ, a change in ownership of Retailer as a result of a merger, consolidation, reorganization, joint venture, the exchange of stock between Retailer's parent company and a subsidiary or between subsidiaries, or the sale of all or substantially all of Retailer's stock, or the sale of all or substantially all of Retailer's assets shall not be considered an Assignment. Retailer shall not be required to obtain MGM's consent and MGM shall have no right to delay, alter, or impede any of the foregoing transactions or combinations thereof. Only the event of change in ownership or control of Retailer as a result of such a transaction shall the successor entity have the right to assume Retailer's rights and obligations under this Agreement; provided, however, no such assignment shall operate to release Retailer of its obligations under this Agreement.

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

CONFIDENTIALITY: Neither MGM nor Retailer shall disclose to any third party

(other than its respective employees, in their capacity as such) any information with respect to the terms and provisions of this Agreement except: (a) to the extent necessary to comply with law, administrative order, or rule or the valid order or decree of a court of competent jurisdiction, in which event the party making such disclosure shall so notify the other and shall seek confidential treatment of such information, (b) as part of its normal reporting or review procedure to its partners, its divisions, its corporate affiliates, its financiers, its financial advisers, auditors, and its attorneys, and its profit participants (to the extent deemed necessary by the disclosing party), (c) for reasonable conduct of its business, to Retailer's employees, agents, and business advisors or consultants authorized by Retailer who have a reasonable need to know such information; provided, however, that any and all such parties are advised of the confidential nature of the information and agree in writing to be bound by the confidentiality requirements of this Agreement.

INDEMNIFICATION: MGM hereby indemnifies and holds harmless Retailer, its
successors and assigns, including any customers, from any loss, liability, claim, or damage (including, but not limited to, reasonable outside attorney fees) arising out of or in relation to the content of any Unit of a Title leased by Retailer pursuant to this Agreement; provided, however, that such Unit(s) has not been altered or modified by Retailer.

* Confidential material omitted and separately filed with the Commission under
an application for confidential treatment.

MGM and Retailer contemplate that a more formal agreement shall be entered into
by MGM and Retailer with respect to the foregoing matters and standard terms
and conditions to be negotiated

in good faith. Pending the preparation and execution of such more formal
documentation, this Agreement shall be binding upon MGM and Retailer.

MGM HOME ENTERTAINMENT INC.

By: /s/ David Bishop

HOLLYWOOD ENTERTAINMENT CORPORATION, an Oregon corporation

By: /s/ F. Bruce Giesbrecht

	David Bishop		F. Bruce Giesbrecht
Its:	President	Its:	Executive Vice President Business Development
Dated:	7/31/01		Dated: 7/30/01

Appendix 4.4: Master List of DVD Distributors

(Source: DVDFILE.com)

Alphaville Pictures

A small theatrical production company, they currently use **Universal** as their distributor.

Amblin Entertainment

See The Spielberg Connection special report for more information.

Anchor Bay Entertainment

An independent distributor that solely licenses titles from production companies. Anchor Bay does not comment on titles currently in negotiation, and currently has no *exclusive* DVD distribution agreements with any production companies. Lately, Anchor Bay has specialized in horror titles, but has recently started to license other genres as well. Interestingly, they have just licensed some titles from Walt Disney.

Artisan

Was formerly named LIVE Entertainment, and was/is mainly responsible for smaller "B" titles. They also currently distribute films produced by a three now-defunct companies, Republic Pictures, Vestron Pictures and Carolco, as well as distributing DVD titles in a joint venture with Hallmark Hall Of Fame.

AVCO Embassy Pictures

Independent that produced a large of number of well-regarded cult films in the 70's (including some John Carpenter films), they have long since gone bankrupt. Most of their films were acquired by Nelson Entertainment for home video release, who has since been acquired by **Polygram**. For all intents and purposes, Polygram now has distribution rights for AVCO films on DVD.

Buena Vista Home Entertainment

They exclusively distribute titles from Miramax Films, Dimension Films, Hollywood Pictures, Touchstone Pictures and Walt Disney Pictures.

Cannon

This big B-Movie indie of the 80's (think Invasion U.S.A., Missing In Action flicks, etc.) has long gone out of busness. However, their entire film library was picked up by MGM in their recent acquisition of the Polygram film library.

Carolco

A production company that produced many big-budget spectacles in the 80's and 90's, up until their recent filing of Chapter 11 bankruptcy. All their titles are distributed exclusively by **Artisan**.

Castle Rock Entertainment*

There has been much confusion surrounding Castle Rock releases on all formats. Originally, Castle Rock's films (*Shawshank Redemption*, *Dolores Claiborne*, etc.) were distributed theatrically by Columbia Tri-Star Pictures. However, Castle Rock became a subsidiary of Time-Warner, who then controlled all DVD distribution rights to their titles. However, in a legal situation still undisclosed, DVD rights to Castle Rock titles have been held up, and have become split on a title-by-title basis between **Polygram** and **Warner**. In any case, Columbia DOES NOT control DVD rights to any Castle Rock titles anymore.

CIBY 2000*

A small "art house" producer, they currently co-produce many of their films and use a wide variety of distributors. Unfortunately, they have no one exclusive distributor to make it easier...

Columbia Tri-Star Pictures

Aside from their own extensive film library, they also currently distribute titles for Mandalay Entertainment, Sony Pictures, Sony Pictures Classics and Tri-Star Pictures. Please note that they do not distribute Sony Wonder or Sony Music...those companies handle their own DVD distribution. Also, they used to distribute Castle Rock Entertainment titles theatrically, but do not handle DVD distribution chores for those titles (see Warner and Polygram).

Criterion Collection

An independent distributor that solely licenses titles from production companies. Although they have produced extensive special editions on laserdisc, many of those titles are currently owned by others for DVD. Criterion does not comment on titles currently in negotiation, and currently has no exclusive DVD distribution agreements with any production companies.

DaViD Entertainment

A distributor of adult films only.

Dimension Films

The "B" movie/horror film division of Miramax Films. Now distributed by **Miramax Home Video/Buena Vista**.

DreamWorks SKG

Paramount distributes DVD titles.

Elite Entertainment

An independent distributor that solely licenses titles from production companies. Elite does not comment on titles currently in negotiation, and currently has no *exclusive* DVD distribution agreements with any production companies. Elite specialized in horror releases on laserdisc, but has seen most of those titles picked up by other companies for DVD. It is unsure how aggressive Elite will be with future DVD releases.

Facets Multimedia

A rather small but prestigious independent distributor of small indie and foreign films on home video. Unfortunately, they are currently not supporting DVD.

Fine Line Features

The "art film" division of New Line Cinema. All titles exclusively distributed on DVD by **New Line**.

Full Moon Pictures

A "B" movie/horror film production company. Currently self-distributes their own titles on DVD.

Gramercy Films*

Initially, Gramercy used various distributors for their theatrical product, but has since become a complete subsidiary of **Polygram Entertainment**.

Hallmark Entertainment

The acclaimed home of many award-winning Hallmark Hall Of Fame television miniseries and movies. Recently acquired by **Artisan**, who solely distributes their product on DVD.

HBO Home Video

Most obviously well-known for their cable television films, HBO does produce some theatrical films as well, and acts as their own distributor for DVD.

Hollywood Pictures

Another live-action division of Walt Disney Pictures, they have since ceased operations and been folded into Touchstone Pictures. All their catalog titles exclusively distributed by **Buena Vista Home Entertainment**.

Image Entertainment

The largest supplier of laserdiscs in North America, Image was hit a bit hard by the fast acceptance of DVD. They enjoyed large distribution contracts with the majors for laserdisc, but most of those studios are taking charge of their DVD output themselves. Image is now negotiating for the same limited number of catalog titles with the likes of Elite, Anchor Bay and Criterion. Image does not comment on titles currently in negotiation, and currently has no *exclusive* DVD distribution agreements with any production companies.

King's Road

A small independent film production company, they recently licensed many titles to Trimark for DVD release.

Lightstorm Entertainment*

Currently, Lightstorm exclusively uses 20th Century Fox as their distributor, although a few of their productions (*Titanic, Terminator 2*) have been distributed or co-distributed by other studios. But, for all intents and purposes, **20th Century Fox** is the main distributor of Lightstorm productions.

Lucasfilm*

Uses **20th Century Fox** as their distributor, both theatrically and on home video. However, some older Lucasfilm productions (most notably the *Indiana Jones* films) have gone through **Paramount**.

Magic Lantern

A recent partnership between two known VHS and laserdisc distributors, VCI and The Roan Group, Magic Lantern licenses all their titles, and specializes in cult, horror and exploitation films, presenting them in high-quality special editions.

Metro-Goldwyn-Mayer (MGM)

MGM Home Entertainment acts as a known DVD distributor for its own theatrical films, as well as Turner Entertainment, United Artists and Eon Productions. Also, MGM recently bought Orion Pictures, which has been folded completely into MGM. Orion's library contained over 1,000 films. However, Orion had signed DVD licensing arrangements with other companies before the buyout, and those contracts are being honored by MGM. Once those licensing agreements expire (in around two to three years), MGM will retain full distribution rights over Orion titles.

Miramax Films

Although they are physically distributed by Buena Vista Home Entertainment, and used to license many of their titles to The Criterion Collection on laserdisc, they have recently begun their own line of collector's edition DVDs.

Nelson Entertainment

A smaller production and licensing company, who recently sold a large number of their catalog titles to **Polygram** for distribution.

New Line Cinema

They current distribute their own New Line Cinema and Fine Line Features titles on DVD

October Films*

Initially, October used various distributors for their theatrical product, but has since become a wholly-owned subsidiary of Universal Pictures. Any future October productions will be distributed on DVD by **Universal**.

Orion Pictures*

A pretty big independent up until their recent Chapter 11 bankruptcy filing. They have since been bought by MGM. However, many Orion titles (*Dances With Wolves, Robocop,* etc.) were previously licensed on DVD to Image and Criterion. MGM is honoring those contracts, but as soon as they are up (in 2-5 years depending on title), all rights will revert back to **MGM** exclusively, who can them re-release them on DVD or license them again.

Paramount Pictures

Another big major. They self-distribute their own films, and have recently begun to co-produce some films with the likes of DreamWorks SKG, Touchstone Pictures and 20th Century Fox.

Phoenix Pictures

A small independent production house, it uses **Columbia Tri-Star** for home video distribution exclusively.

Pioneer Home Video

Pioneer Home Video is a subsidiary of Pioneer Electronics (the major source of LaserDisc players and Laser-Karaoke), and handles (obviously) all home video releases. Pioneer licensed (through 2001) many titles for LaserDisc from the majors, and produces many special editions. However, Pioneer does not release DVD titles (aside from Karaoke and music titles), so many of their great laserdisc special editions remain unavailable on DVD. Some studios have started to buy or license the supplements produced by Pioneer to release them on DVD (such as Artisan with *Sophie's Choice* and the upcoming *Basic Instinct* SE). However, some companies have simply released movie only-editions of titles that are available as Pioneer Special Editions on laserdisc (like Universal with *The Frighteners* and *Liar Liar*, amongst others).

Polygram Entertainment

Although having been around for decades, Polygram has only r recently begun to attempt to move aggressively into the major's theatrical territory. They currently distribute their own Polygram Filmed Entertainment titles on DVD, and recently acquired the complete Nelson Entertainment catalog of films, which included many early AVCO Embassy films. Also, they entered into a distribution agreement with Castle Rock and Manga Entertainment for select title releases only.

Republic Pictures

A subsidiary of Spelling Films, Republic was closed down, with their catalog of titles licensed to **Artisan** for DVD release.

Simitar

Currently self-distributes their own titles.

Sony Music / Sony Wonder

Although a subsidiary of Sony Entertainment, Sony Wonder and Sony Music act as their own DVD distributors, and DO NOT go through Columbia Tri-Star Home Video.

Sony Pictures

The "parent" company that owns Columbia Tri-Star, amongst others. Uses **Columbia** exclusively for DVD distribution.

Sony Pictures Classics

The "art film" division of Sony Pictures. Uses **Columbia** exclusively for DVD distribution.

Touchstone Pictures

Essentially the live-action division of Walt Disney pictures. Exclusively distributed by **Buena Vista Home Entertainment**.

20th Century Fox

20th Century Fox holds a large catalog of self-produced titles. Fox also has exclusive distribution rights with such major producers as Lucasfilm Ltd. and James Cameron's Lightstorm Entertainment.

Trimark

Best known for their adventurous streak in film production, Trimark mainly deals in independent, underground and horror films for its library, and distributors their DVDs themselves.

United Artists

Is exclusively distributed by **MGM**.

Universal Pictures

A long-standing major studio. Universal Home Entertainment currently acts as a known distributor for the following production companies: Amblin Entertainment (see above), Gramercy Pictures, Alphaville Pictures, and, of course, Universal Pictures itself (formerly known as MCA/Universal).

Vestron Pictures

A big "B" movie supplier in the 70's and 80's, they have since gone bankrupt. Most of their titles are now owned and distributed exclusively by **Artisan**.

Walt Disney Pictures

Exclusively distributed by **Buena Vista Home Entertainment** (Disney's home video division). Please note that Disney does occasionally license some titles on DVD to independents, most recently Anchor Bay.

Warner Bros.

Castle Rock Entertainment and Rhino Records (select titles only), New Regency Pictures and Icon Entertainment. Also, they distribute Warner Music Group, MGM (through Feb. 2000) and New Line DVD titles domestically, but are not directly responsible for title selection (see the appropriate Warner Music, MGM and New Line sections for that).

Warner Music Group

Although a subsidiary of Time Warner, Warner Music handles their own DVD music video releases under their Special Projects group. They currently act only as a distributor for their own products, and do not license titles 95% of the time.

Appendix 6.1: Conference on Fair Use Participants

CONFERENCE ON FAIR USE PARTICIPANTS

ALLIANCE FOR THE PROMOTION OF SOFTWARE INNOVATION (APSI)
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)
AMERICAN ASSOCIATION OF COMMUNITY COLLEGES (AACC)
AMERICAN ASSOCIATION OF LAW LIBRARIES (AALL)
AMERICAN ASSOCIATION OF MUSEUMS (AAM)
AMERICAN CHEMICAL SOCIETY (ACS)
AMERICAN COUNCIL OF LEARNED SOCIETIES (ACLS)
AMERICAN COUNCIL ON EDUCATION (ACE)
AMERICAN LIBRARY ASSOCIATION (ALA)
AMERICAN MUSICOLOGICAL SOCIETY (AMS)
AMERICAN PHYSICAL SOCIETY (APS)
AMERICAN PRINTING HOUSE FOR THE BLIND (APHB)
AMERICAN SOCIETY OF COMPOSERS, AUTHORS AND PUBLISHERS (ASCAP)
AMERICAN SOCIETY OF JOURNALISTS AND AUTHORS (ASJA)
AMERICAN SOCIETY OF MEDIA PHOTOGRAPHERS (ASMP)
AMERICAN SOCIETY OF PICTURE PROFESSIONALS (ASPP)
ASSOCIATION FOR INFORMATION MEDIA AND EQUIPMENT (AIME)
ASSOCIATION FOR INSTRUCTIONAL TECHNOLOGY (AIT)
ASSOCIATION OF ACADEMIC HEALTH SCIENCES LIBRARIES (AAHSL)
ASSOCIATION OF AMERICAN COLLEGES AND UNIVERSITIES (AACU)
ASSOCIATION OF AMERICAN MEDICAL COLLEGES (AAMC)
ASSOCIATION OF AMERICAN PUBLISHERS (AAP)
ASSOCIATION OF AMERICAN UNIVERSITIES (AAU)
ASSOCIATION OF AMERICAN UNIVERSITY PRESSES (AAUP)
ASSOCIATION OF ART MUSEUM DIRECTORS (AAMD)
ASSOCIATION OF COLLEGE AND RESEARCH LIBRARIES (ACRL)
ASSOCIATION OF RECORDED SOUND COLLECTIONS (ARSC)
ASSOCIATION OF RESEARCH LIBRARIES (ARL)
ASSOCIATION OF TEST PUBLISHERS (ATP)
ART LIBRARIES SOCIETY OF NORTH AMERICA (ARLIS/NA)
AUTHORS GUILD, INC./AUTHORS REGISTRY, INC. (AG/AR)
BROADCAST MUSIC INCORPORATED (BMI)
BUSINESS SOFTWARE ALLIANCE (BSA)
CENTER FOR COMPUTER-ASSISTED RESEARCH IN HUMANITIES (CCARH)
CHURCH MUSIC PUBLISHERS ASSOCIATION (CMPA)
COLLEGE ART ASSOCIATION (CAA)
COLLEGE MUSIC SOCIETY (CMS)
COMPUTER AND COMMUNICATIONS INDUSTRY ASSOCIATION (CCIA)
CONSORTIUM OF COLLEGE AND UNIVERSITY MEDIA CENTERS (CCUMC)
COPYRIGHT CLEARANCE CENTER (CCC)
COPYRIGHT MANAGEMENT SERVICES (CMS)
COPYRIGHT SOCIETY OF THE UNITED STATES OF AMERICA (CS)
COUNCIL OF LITERARY MAGAZINES AND PRESSES (CLMP)

CREATIVE INCENTIVE COALITION (CIC)
EDUCOM/COALITION FOR NETWORKED INFORMATION (EDUCOM/CNI)
FIRST CHURCH OF CHRIST SCIENTIST (FCCS)
GRAPHIC ARTISTS GUILD (GAG)
INDIANA PARTNERSHIP FOR STATEWIDE EDUCATION (IPSE)
INFORMATION INDUSTRY ASSOCIATION (IIA)
INFORMATION TECHNOLOGY INDUSTRY COUNCIL (ITIC)
INSTITUTE FOR LEARNING TECHNOLOGIES (ILT)
INSTRUCTIONAL TELECOMMUNICATIONS COUNCIL (ITC)
INTERACTIVE MULTIMEDIA ASSOCIATION (IMA)
INTERNATIONAL ASSOCIATION OF SCIENTIFIC, TECHNICAL & MEDICAL PUBLISHERS (IASTMP)
INTERNATIONAL INTELLECTUAL PROPERTY ALLIANCE (IIPA)
J. PAUL GETTY TRUST
MAGAZINE PUBLISHERS ASSOCIATION (MPA)
MAJOR ORCHESTRA LIBRARIANS ASSOCIATION (MOLA)
MEDICAL LIBRARY ASSOCIATION (MLA)
MOTION PICTURE ASSOCIATION OF AMERICA (MPAA)
MUSIC EDUCATORS NATIONAL CONFERENCE (MENC)
MUSIC LIBRARY ASSOCIATION (MLA)
MUSIC PUBLISHERS ASSOCIATION (MPA)
MUSIC TEACHERS NATIONAL ASSOCIATION (MTNA)
NATIONAL ASSOCIATION OF BROADCASTERS (NAB)
NATIONAL ASSOCIATION OF SCHOOLS OF MUSIC (NASM)
NATIONAL COORDINATING COMMITTEE FOR THE PROMOTION OF HISTORY (NCCPH)
NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS (NCTM)
NATIONAL EDUCATION ASSOCIATION (NEA)
NATIONAL MUSIC PUBLISHERS ASSOCCIATION (NMPA)
NATIONAL PUBLIC RADIO (NPR)
NATIONAL SCHOOL BOARDS ASSOCIATION (NSBA)
NATIONAL SCIENCE TEACHERS ASSOCIATION (NSTA)
NEWSPAPER ASSOCIATION OF AMERICA (NAM)
OHIOLINK
PICTURE AGENCY COUNCIL OF AMERICA (PACA)
PUBLIC BROADCASTING SYSTEM (PBS)
RECORDING FOR THE BLIND & DYSLEXIC (RFB&D)
RECORDING INDUSTRY ASSOCIATION OF AMERICA (RIAA)
SMITHSONIAN INSTITUTION
SOCIETY OF MUSIC THEORISTS (SMT)
SOFTWARE PUBLISHERS ASSOCIATION (SPA)
SONNECK SOCIETY FOR AMERICAN MUSIC (SSAM)
SPECIAL LIBRARIES ASSOCIATION (SLA)
THE COPYRIGHT GROUP
UNIVERSITY OF TEXAS, OFFICE OF GENERAL COUNSEL
U.S. COPYRIGHT OFFICE
U.S. LIBRARY OF CONGRESS/NATIONAL DIGITAL LIBRARY PROGRAM
U.S. NATIONAL COMMISSION ON LIBRARIES AND INFORMATION SCIENCE (NCLIS)
U.S. NATIONAL ENDOWMENT FOR THE ARTS (NEA)
U.S. NATIONAL ENDOWMENT FOR THE HUMANITIES (NEH)
U.S. NATIONAL LIBRARY OF MEDICINE (NLM)
U.S. NATIONAL SCIENCE FOUNDATION (NSF)
VISUAL RESOURCES ASSOCIATION

WRITTEN STATEMENTS SUBMITTED TO CONFU

[The following submitted written statements at the CONFU meeting on September 21, 1994.]

ALLIANCE TO PROMOTE SOFTWARE INNOVATION
AMERICAN ASSOCIATION OF COMMUNITY COLLEGES
AMERICAN ASSOCIATION OF LAW LIBRARIES
AMERICAN COUNCIL OF LEARNED SOCIETIES
AMERICAN COUNCIL ON EDUCATION
AMERICAN LIBRARY ASSOCIATION
ASSOCIATION OF ACADEMIC HEALTH SCIENCES LIBRARIES
ASSOCIATION OF AMERICAN PUBLISHERS
ASSOCIATION OF AMERICAN UNIVERSITIES
ASSOCIATION OF AMERICAN UNIVERSITY PRESSES
ASSOCIATION OF COLLEGE AND RESEARCH LIBRARIES
ASSOCIATION OF RESEARCH LIBRARIES
BUSINESS SOFTWARE ALLIANCE
COLLEGE ART ASSOCIATION
CONSORTIUM OF COLLEGE AND UNIVERSITY MEDIA CENTERS
COPYRIGHT CLEARANCE CENTER
CREATIVE INCENTIVE COALITION
DAVID NIMMER
EDUCOM
INFORMATION INDUSTRY ASSOCIATION
INTELLECTUAL PROPERTY OWNERS
MEDICAL LIBRARY ASSOCIATION
MOTION PICTURE ASSOCIATION OF AMERICA
NATIONAL ASSOCIATION OF BROADCASTERS
NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES
NATIONAL COORDINATING COMMITTEE FOR THE PROMOTION OF HISTORY
NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS
OHIOLINK
RECORDING FOR THE BLIND & DYSLEXIC
RECORDING INDUSTRY ASSOCIATION OF AMERICA
SMITHSONIAN INSTITUTION
SOFTWARE PUBLISHERS ASSOCIATION
THE COPYRIGHT GROUP
U.S. LIBRARY OF CONGRESS
VISUAL RESOURCES ASSOCIATION

Appendix 6.2: DMCA Timeline

(source: Digital Future Coalition, http://www.dfc.org/dfc1/Active_Issues/graphic/graphic.html)

DMCA Timeline

The following table illustrates the major actions undertaken to pass the Digital Millennium Copyright Act. The left column follows the passage of the DMCA while the right column tracks legislation that either competed with or became part of the final version of the DMCA.

July 1997

7/29/97 -- H.R. 2281 "WIPO Copyright Treaties Implementation Act" Introduced -- referred to House Committee on the Judiciary

August 1997

8/7/97 -- H.R. 2281 referred to House Subcommittee on Courts and Intellectual Property

September 1997

9/16/97 -- H.R. 2281 Subcommittee Hearings held

October 1997

July 1997

7/17/97 -- H.R. 2180 "On-Line Copyright Limitation Act" Introduced -- referred to House Committee on the Judiciary

7/21/97 -- H.R. 2180 referred to House Subcommittee on Courts and Intellectual Property

August 1997

September 1997

9/3/97 -- S. 1146 "Digital Copyright Clarification and Technology Education Act of 1997" Introduced -- referred to Senate Committee on Judiciary

9/4/97 -- S. 1146 Committee on Judiciary hearings held.-- S.Hrg. 105-366

9/16/97 -- H.R. 2180 Subcommittee Hearings held

October 1997

10/9/97 -- H.R. 2652 "Collections of Information Antipiracy Act" Introduced -- referred to House Committee on the Judiciary

10/17/97 -- H.R. 2652 referred to Subcommittee on Courts and

Intellectual Property

10/23/97 -- H.R. 2652 Subcommittee Hearings held

November 1997

11/13/97 -- H.R. 3048 "Digital Era Copyright Enhancement Act" Introduced -- referred to House COmmittee on the Judiciary

11/24/97 -- H.R. 3048 referred to Subcommittee on Courts and Intellectual Property

December 1997 - January 1998

No official action

February 1998

2/12/98 -- H.R. 2180 reintroduced as H.R. 3209, referral to Judiciary

March 1998

3/18/98 -- H.R. 2652 subcommittee mark-up

3/24/98 -- H.R. 2652 full committee mark-up

April 1998

4/1/98 -- H.R. 3209 merged with H.R. 2281 during mark-up of House Committee on the Judiciary -- no further action

May 1998

5/6/98 -- S. 2037 "Digital Millennium Copyright Act of 1998" Introduced -- Placed on the calendar in the Senate

5/11/98 -- S. 2037 Report filed by Sen. Hatch -- S. Rept. 105-190

5/12/98 -- H.R. 2652 reported to House and placed on the Union Calendar

5/14/98 -- S. 2037 put before Senate and passes on a voice vote

5/19/98 -- H.R. 2652 called up in the House under a suspension of the rules and passes by a voice vote.

5/20/98 -- H.R. 2652 is sent to the Senate

June 1998

July 1998

7/10/98 -- S. 2291 "Collections of Infromation Antipiracy Act" Introduced -- referred to Senate Committee on Judiciary

August 1998

September 1998

9/17/98 -- S. 2037 discarded -- amended language substitued for language in H.R. 2281

9/18/98 -- Message on Senate action sent to House

October 1998

10/13/98 -- S. 2291 reffered to Senate Subcommittee on Technology, Terrorism, Government

Appendix 6.3: Partial Media Regulations Timeline (from Bill Moyer's NOW)

1941	Local Radio Ownership Rule, National TV Ownership Rule enacted. A broadcaster cannot own television stations that reach more than 35% of the nation's homes.
1946	Dual Television Network Rule enacted, prohibiting a major network from buying another major network.
1964	Local TV Multiple Ownership Rule enacted, prohibiting a broadcaster from owning more than one television station in the same market, unless there are at least eight stations in the market.
1970	Radio/TV Cross-Ownership Restriction enacted, prohibiting a broadcaster from owning a radio station and a television station in the same market.
1975	Newspaper/Broadcast Cross-Ownership Prohibition enacted. Bans ownership of both a newspaper and a television station in the same market.
1981	Reagan Administration deregulation under the leadership of FCC Chairman Mark Fowler. Deregulatory moves, some made by Congress, others by the FCC included extending television licenses to five years from three in 1981. The number of television stations any single entity could own grew from seven in 1981 to 12 in 1985. (Museum of Television and Radio)
1985	Guidelines for minimal amounts of non-entertainment programming are abolished. FCC guidelines on how much advertising can be carried per hour are eliminated.
1987	"Fairness Doctrine" eliminated. At its founding the FCC viewed the stations to which it granted licenses as "public trustee" — and required that they made every reasonable attempt to cover contrasting points of views. The Commission also required that stations perform public service in reporting on crucial issues in their communities. Soon after he became FCC Chairman under President Reagan, Michael Fowler stated his desire to do away with the Fairness Doctrine. His position was

	backed by a 1987 D.C. Circuit Court decision, Meredith Corp. v. FCC, which ruled that the doctrine was not mandated by Congress and the FCC no longer had to enforce it. (Full history of the Fairness Doctrine)
February 8, 1996	President Clinton signs the Telecommunications Act of 1996. It is generally regarded as the most important legislation regulating media ownership in over a decade. The radio industry experiences unprecedented consolidation after the 40-station ownership cap is lifted. Clear Channel Communications owns 1200 stations, in all 50 states, reaching, according to their Web site, more than 110 million listeners every week. Viacom's Infinity radio network holds more than 180 radio stations in 41 markets. Its holdings are concentrated in the 50 largest radio markets in the United States. In 1999 Infinity owned and operated six of the nation's Top 10 radio stations.
July 17, 2001	Senate Commerce Committee hears panelists speak about media ownership. Senator Fritz Hollings (D-SC) expresses concerns about media consolidation. Mel Karmazin (President and COO, Viacom), Alan Frank (CEO, Post-Newsweek Stations, Inc.), Jack Fuller (President, Tribune Publishing Company), William Baker (President, WNET, New York City), Gene Kimmelman (Co-Director, Consumer's Union), and Professor Eli M. Noam (Columbia Business School) in attendance.
October 29, 2001	FCC conducts a roundtable on media ownership policies. Government officials, business analysts, academics, and media advocates in attendance.
January 18, 2002	A train carrying hazardous materials derails at 1:30 a.m. in Minot, North Dakota, spilling 210,000 gallons of anhydrous ammonia in an incident federal regulators call "catastrophic". Clear Channel Communications owns six out the seven commercial stations in Minot. Minot authorities say when they called with the warning about the toxic cloud, there was no one on the air who could've made the announcement. Clear Channel says someone was there who could have activated an emergency broadcast. But Minot police say nobody answered the phones. (The Associated Press, January 14, 2003 - "A year after derailment, the land has healed, mostly, but what of the people who live in Minot?" by Blake Nicholson). (At the Senate Commerce Committee hearing on January 14, 2003, Senator Byron Dorgan (D-ND) cites Minot as an example of how consolidated media can negatively affect a local community. THE NEW YORK TIMES reported on the Minot radio station market again on March 29, 2003 in "On Minot, N.D., Radio, a Single Corporate Voice")
September 7,	THE NEW YORK TIMES reports that the FCC will conduct a review of

2002	media ownership rules, as mandated by the Telecommunications Act of 1996. The FCC commissions several studies of the media marketplace to review the rules on an empirical basis. They start the review in September, 2002.
September 9, 2002	According to our survey, ABC's WORLD NEWS THIS MORNING is the only network show to acknowledge the FCC's announcement - at 4:40 in the morning. The report, in its entirety: Liz Cho, ABC News: "Government regulators reportedly are likely to allow the country's media giants to get even bigger. THE NEW YORK TIMES says the Federal Communications Commission is reviewing media ownership rules this week. Among other things, current rules prevent a newspaper from owning a TV station in the same city or a network from owning stations that serve more than 35 percent of the national market."
October 1, 2002	FCC releases 12 studies on the media marketplace. The studies comment on how Americans get their news, the state of television, newspaper, and radio industries, and a variety of other media issues.
January 2, 2003	Comments on media ownership due to the FCC. Viacom (owner of CBS and UPN), General Electric (owner of NBC), and News Corporation's Fox Entertainment Group, among others, file a request with the FCC that all media ownership rules be eliminated. They argue that the rules are outdated in the internet age, when average Americans have access to media through countless forms and outlets. (WALL STREET JOURNAL, January 3, 2003 - "Media Companies Seek End to All Ownership Rules," by Yochi J. Dreazen) (Read the comments filed.)
January 14, 2003	Senate Commerce Committee hearing - Chairman Powell and Commissioners Abernathy, Adelstein, Copps, and Martin in attendance. Senators Ernest Hollings (D-SC), John McCain (R-AZ), Byron Dorgan (D-ND) and Ron Wyden (D-OR) are among the participants. Powell declares there won't be radical changes to the current media ownership rules in response to Senators' concerns. Senator Byron Dorgan (D-ND) cites Minot as an example of how consolidated media can negatively affect a local community.
January 16, 2003	Columbia Law School holds forum on media ownership. Chairman Powell and the four other FCC Commissioners attend. Discussions on news and civic discourse, entertainment, localism, and the business of media. Panelists include television executives (including Martin Franks from CBS Television), journalists, academics, union representatives, advertisers, media advocacy groups, and business analysts. Listen to the forum.

January 21, 2003	Chairman Powell writes an op-ed in USA TODAY "The time has come to honestly and fairly examine the facts of the modern marketplace and build rules that reflect the digital world we live in today, not the bygone era of black-and-white television." "Joe Friday knew that only the facts would help him unravel a case. It is the same with this critically important FCC policy review. Only the facts will enable us to craft broadcast-ownership restrictions that ensure a diverse and vibrant media marketplace for the 21st century."
January 30, 2003	Senate Commerce Committee hearing on media ownership - L. Lowry Mays (Clear Channel), Edward Fritts (National Association of Broadcasters), Don Henley (Recording Artists Coalition), Robert Short (Short Broadcasting), and Jenny Toomey (Future of Music Coalition) testify.
February 3, 2003	Thirty Congressmen sign a letter to Chairman Powell criticizing the FCC for not adequately publicizing the media ownership debate and rushing the rules-changing process to favor major media outlets.
February 17, 2003	The Project for Excellence in Journalism releases a five-year study of local television news, "Does Ownership Matter in Local Television News?" They found that TV stations owned by smaller media firms generally produce better newscasts; are better at local reporting; produce longer stories ; and do fewer softball celebrity features. The study concludes that ... "Changes that encourage heavy concentration of ownership ... In local television ... By a few large corporations ... Will erode the quality of news Americans receive."LA Times, February 17, 2003 - "Smaller Stations Fare Better in Local TV News," by Edmund Sanders,)
February 27, 2003	FCC holds its only official public hearing on media ownership rules in Richmond, VA. Chairman Powell and the other four commissioners make statements, panels discuss diversity, competition, and localism. Panelists include television and radio executives, journalists, academics, union representatives, media advocacy groups, and economists. (Press release, program, and presentations)
March 19, 2003	Senator Wayne Allard (R-CO), Senator Susan Collins (R-ME), and Senator Olympia Snowe (R-ME) write a letter to Chairman Powell calling for a broader public debate in the FCC's media ownership review. ("Senators Want Input on Media Rules," Mediaweek.com)
April 1, 2003	A group of lawmakers write to FCC Chairman Powell urging him to keep to his proposed schedule to present the ownership rules decision by

	June 2, 2003. (Read the full letter, signed by Rep. Billy Tauzin, R-La., Sen. John Breaux, Reps. Roy Blunt, R-Mo., John Shimkus, R-Ill., Vito Fossella, R-N.Y., Mary Bono, R-Calif., George Radanovich, D-Calif., and Pete Sessions, R-Texas, and Sens. Gordon Smith, R-Ore., John Ensign, R-Nev., and George Allen, R-Va.)
June 2, 2003	The FCC revised its limits for broadcast ownership (read Media Ownership Rule Changes) but multiple parties appealed this decision. The cases were consolidated and assigned to the U.S. Court of Appeals for the Third Circuit, which stayed the effective date of the new rules.
July 23, 2003	The House voted 400-21 to approve a spending bill that included a provision to block the FCC decision to allow major television networks to own up to 45% of the country's viewers. The Bush administration has voiced opposition to the attempt to rescind the FCC ruling.
September 3, 2003	A federal appeals court in Philadelphia issued an order blocking the rule changes from taking effect. (Read the ruling.)
September 4, 2003	The Senate Appropriations Committee passed a spending bill that contained a provision that would effectively block the ownership rule changes.
September 16, 2003	Congress introduced a "resolution of disapproval" to nullify the new FCC rules which passed in the Senate 55-40 (with overwhelming bipartisan support); however, Republicans in the House have vowed not to pass the legislation. Read the resolution.
October 8, 2003	NBC said it would purchase the entertainment arm of Vivendi Universal for $3.8 billion. See what the "Big Six" own now.
November 5, 2003	A letter signed by 208 members of Congress is sent to House Speaker Dennis Hastert requesting the full House be allowed to consider the resolution of disapproval passed in the Senate on September 16, 2003. Read the letter.
November 24, 2003	In a last minute deal Senate Republican leaders and the White House compromised on the TV station ownership cap. It was increased just enough to allow Viacom and News Corporation to keep all their stations (39% limit).
December 8, 2003 - January 22, 2004	Omnibus spending bill incorporating the ownership cap adjustment passed first by the House on December 8, 2003, and by the Senate on January 22, 2004.
January 6, 2004	At the Smith Barney Citigroup Global Entertainment, Media and Telecommunications Conference, Sumner Redstone, Chairman and CEO

	of Viacom remarks that "2004 will be a breakout year for Viacom." Media reporters speculate that 2004 will be a year of mergers.
January 28, 2004	The Federal Communications Commission ("FCC") released its tenth annual report on competition in the market for the delivery of video programming. The report examines the status of competition, discusses changes that have occurred in the competitive environment over the last year, and describes barriers to competition that continue to exist. The FCC released the report at an open meeting in San Antonio, Texas.
January 29, 2004	The Consumer's Union released its new national survey of where people turn for local news. The survey found "newspapers are more than twice as important a source than the Federal Communications Commission determined when it relaxed its media ownership rules."
February 11, 2004	The Third Circuit Court of Appeals has scheduled a hearing for this date to decide if and when the FCC's decision will take effect. (Read the brief.)

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Deposition of FRITZ E. ATTAWAY, at the offices of Proskauer Rose LLP, 1233 20th Street, Northwest, Washington, D.C., commencing at 10:51 a.m., and the proceedings being taken down by Stenotype and transcribed by KAREN YOUNG.UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK: UNIVERSAL CITY STUDIOS, INC.; PARAMOUNT PICTURES CORPORATION; METRO-GOLDWYN-MAYER STUDIOS, INC.; TRISTAR PICTURES, INC.; COLUMBIA PICTURES INDUSTRIES, INC.; TIME WARNER ENTERTAINMENT CO., L.P.; DISNEY ENTERPRISES, INC.; AND TWENTIETH CENTURY FOX FILM CORPORATION, Plaintiffs, vs. ERIC CORLEY A/K/A, "EMMANUEL GOLDSTEIN," AND

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Vita

Bryan Robert Sebok was born in Findlay, Ohio on June 29, 1978, the third son of Robert and Shelly Sebok. After completing his work at Allen D. Nease High School, Jacksonville, Florida, in 1996, he entered North Carolina State University in Raleigh, North Carolina. He received the degree of Bachelor of Arts in Communication in December, 1999. He worked in television for NBC before returning to school for his Master of Arts in Film Studies at Emory University, Atlanta, Georgia. After receiving his M.A. in 2002, he continued his studies in the doctoral program at the University of Texas at Austin. He has taught undergraduate courses in the history and theory of film and television. In addition, he has produced supplemental DVD content for feature films produced by Burnt Orange Productions and the University of Texas Film Institute. He has published articles on international art cinema, contemporary Hollywood, and early film Modernism.

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