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Online piracy, innovation, and legitimate business models

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Abstract

This explorative paper examines the impact of online piracy on innovation and the creation of new, legitimate businesses. While viewed only as a legal matter, online piracy has shown to be an important source of technological and strategic innovation to both industry incumbents and newcomers. This paper briefly describes the evolution of pirate technologies and the associated online communities. Then, it examines the processes by which pirate technologies and communities have stimulated innovation and the creation of pirate as well as legitimate business models. The paper concludes with some suggestions by which incumbents and entrepreneurs may deal with and take advantage of piracy.
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…Lawsuits against new technologies provide…opportunities for little minds…to usurp the gains of genuine inventors…and under the smug protest of righteousness, work a hold-up game in the most approved fashion.—Henry Ford, 1911.

From my view, suing your customers is not good business.—Senator Norm Coleman, Minnesota, 2005.

1. Introduction

Online piracy refers to the unauthorized use or reproduction of copyrighted or patented (electronic) material, such as music or software files.[1] Piracy is unquestionably unethical and illegal. Nevertheless, many of today's businesses, strategists, and academics who view online piracy only as a legal matter, or dismiss it altogether as a nuisance, may miss out on one of the most important developments in the media and technology industries.

The potential impacts of online piracy on the broad media and software sectors are both alarming and profound. Piracy has already incurred serious financial losses to business and society (Marshall, 1999; Straub and Nance, 1990). These losses were conservatively estimated to be worth around $265B a year even before the turn of the century (Trembly, 1999). With the increased popularity of the Internet, piracy has become even more widespread. Several information-intensive industries including software and media are most severely affected. Informa Telecoms & Media estimates that in 2004, illegal downloads cost Hollywood roughly $860 M, or 4% of box office receipts. A wide range of companies in content development (e.g., record companies, film studios, and game developers), distribution (including cable and satellite companies), infrastructure technology (e.g., Tivo), and Internet entertainment are likely to have their business models severely challenged by new developments in online piracy.

Historically, piracy has had little to do with legitimate business. While piracy-related copyright infringement has led businesses and societies to take measures towards greater security and content-protection, it was not identified

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[1]Piracy is prohibited by the Computer Software Copyright Act of 1980, 17 U.S.C. sec. 117 (amended by 17 U.S.C. sec. 117, 1980), as follows: "Any exact copies prepared in accordance with the provisions of this section may be released, sold, or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale or other transfer of all rights in the program."

for its ability to spur legitimate businesses or economic value creation. In recent years, however, piracy has had a profound impact on innovation and the emergence of new business models that have alarmed industry incumbents. In general, the more successful the incumbents are, the more severe the damage piracy can have on their business.

Our analysis of recent history of online piracy shows that it has affected innovation and legitimate business creation through a four-step process. First, online piracy has pioneered the use of new technologies. For example, it has made a significant impact in the evolution of file-transfer technology that has created breakthroughs in information distribution for both illegal and legal uses.

Second, pirate communities have been a source of valuable market insight. As consumers of pirated music, game, or software files tend to be early adopters, they have served as a useful source of emerging market trends. By researching pirate communities, perceptive businesses and entrepreneurs have been successful in identifying needs that legacy businesses were not adequately addressing.

Third, online pirates have contributed to new market creation. Often, communities that were once based on the illegal use of copyrighted materials have migrated to become customer bases of legitimate businesses. For example, many of the former Napster pirates have migrated to iTunes and the legal version of Napster as paying customers. Today's piracy communities—4 million strong—may become a legitimate consumer bloc as businesses catch up to meet their demands (Economist, 2005).

Lastly, online piracy has directly and indirectly spurred the creation of legitimate and innovative business models. In some cases, these businesses were technology companies entering the converging market to take advantage of new opportunities. Other cases involved incumbents shrewdly (sometimes reluctantly) finding ways to adapt their business models to the new market environment. In all cases, successful business models took advantage of new technologies, market insights, and installed bases created by the pirate communities.

This pattern of piracy pioneering new market insight, market communities, and business models appears to repeat with each generation of new pirate technology. We observe that companies who understand this pattern and take advantage of the innovation offered by piracy have created substantial economic value.

This paper begins with a brief review of the literature. Then, it briefly explores the evolution of pirate technologies and their associated online communities, starting with the early days of the Internet through the recent Napster and BitTorrent phenomena. In particular, we analyze the influence of the recent peer-to-peer (P2P) technologies and communities on innovation and the creation of new business models in the media sector.

2. Literature review

Online piracy is an area of significant interest and concern in the media and technology industries (Kaplan, 2005; Smith and Rupp, 2004; Delaney et al., 2003; Goodman and Brenner, 2002; Lichtman, 2004; Chmielewski, 2005; Cullen, 2003). Nevertheless, very little academic research exists in the area of online piracy in management literature.

Most of the management-related discussions have been in the popular press in the form of newspaper or magazine articles. Most have been descriptive in nature. For example, Chmielewski (2005) describes the "world of file sharing," while Cullen (2003) reports on the comeback of Napster. Some articles have been more analytical and have attempted to examine the lasting impacts of piracy on the media industry. Pesce (2005) analyzes the potential impact of video piracy on broadcast television, while the Economist (2005) discusses online piracy's impact on the overall entertainment industry.

Much of the academic work has been legal or ethics-related in nature, i.e., published in law or ethics journals. For example, Kaplan (2005) and Smith and Rupp (2004) explore the legal impact of piracy on the entertainment industry, while Delaney et al. (2003) discuss the measures for deterring copyright piracy. Goodman and Brenner (2002) examine the criminality of piracy, and Lichtman (2004) writes about holding Internet Service Providers accountable for Internet piracy.

Leonard et al. (2004) investigate factors that influence ethical behavior intentions related to piracy, while Kruger (2003) discusses how discussing cyber-ethics with students is critical. Easley (2005), on the other hand, raises different kinds of ethical questions—those arising from businesses' responses to innovations that are perceived to be threatening, in particular with respect to music piracy. He argues that it may be reasonable to ask if it is ethical for recording companies to sue their own customers in an attempt to slow down or stop an innovation that is likely to bring about a social good, especially given their history of legal troubles.

Connor and Rumelt (1991) provide one of the first studies that present a positive dimension of piracy. It notes that piracy can expand the size of a product's installed base by giving gifts of free software to "multiplier" recipients. The authors argue that piracy can be an extreme efficient "gift-giving" method because all of the costs of the gift are borne by the consumer rather than by the producer. Piracy also assures that the "gift" actually goes to someone who will use it (e.g., compared to the alternative of mailing free copies to all computer owners). Easley et al. (2003) present evidence supporting the notion that exposure to music piracy actually played a role in pushing record labels to adopt Internet technologies (those exposed to piracy were more likely to be early adopters of internet technology); create richer and more fully featured web sites; and experiment with electronic forms of distribution that are either proprietary or in other ways non-threatening (e.g., short clips of songs).

We believe that our paper is one of the first attempts within management or entrepreneurship literature to

examine the relationship between online piracy, technology innovation, and the formation of legitimate businesses. Specifically, this paper aims to identify common patterns, i.e., processes by which each generation of piracy transitions into or influences the creation of legitimate businesses. Finally, we analyze the parallels between the Napster and BitTorrent phenomena, a topic not yet explored by most researchers.

3. (A slightly different) background of piracy and online communities

While frequently perceived as a fraternity of rebellious and socially inept teenagers, online piracy communities actually had their roots among the most idealistic and sophisticated technologists. In fact, one could argue that what we call piracy today was the protocol by which the early technologists and scientists interacted.

The Internet began with The Department of Defense (DOD) funded program during the late 1960s called the Advanced Research Project Agency (ARPA). It was devised as a method for researchers to "share" information between the large supercomputers of the DOD. The first established computer connections occurred in 1969, when ARPA connected the computers of Stanford, UCLA, UC Santa Barbara, and the University of Utah. These established connections were coined the "ARPANET". It grew quietly and slowly during the next 10 years. The mid 1980s saw a drift of the ARPANET away from its military roots as the DOD released its ban on its commercial use. When the agency abandoned the project, its framework was left intact and well-suited for various commercial and non-commercial uses.

It is important to note that the early adopters of the Internet, many of whom were technologists and scientists, strongly believed in the idea of sharing information for the advancement of technology. After all, the Internet had been created by the Government for that purpose. The computer communities grew over the years and sustained their original idealistic beliefs. Nearly all software was "open-source" during the 1970s and 1980s, meaning that software source-code (not merely the compiled, end-user software) was available for all to see and use so that people across the world would be able to make their own improvements to the software for the benefit of the whole. It is not surprising that software companies, even today, release demos and shareware versions of their software to such communities. In fact, when companies like Microsoft and Novell started charging for their software, many technologists, previously accustomed to free software, were surprised and displeased. It was some of these disgruntled users who became the first software pirates. They did not think much about the legality of their actions. For them, sharing was the accepted convention. It was companies like Microsoft and Novell that were breaking the deeply rooted protocol.

The online piracy scene evolved further with the rise of the World Wide Web in the early and mid 1990s. Online communities served as the central hubs for engineers and programmers from all over the world. These technologists cooperated amongst themselves—fundamentally based on the same ideals that inspired the original Internet concept of the 1960s. A widely known cooperative project was the development of Linux, an open-source operating system started by Linus Torvalds in 1991 and developed together with the community from the Minix operating system. Another prominent project was Apache, one of the world's most popular web server programs, maintained by the Apache Software Foundation (ASF), a decentralized community of developers working on its open-source software projects.

Software development communities have continued to influence commercial software even after the creation of Linux and Apache. In fact, open-source software is now making significant impact on the software industry with JBoss (alternative to Apache), Mozilla's web browser Firefox, and Sun's OpenOffice, a fully operational, freely distributed alternative version to Microsoft Office. For example, Firefox has taken over 11.5% of the global browser market in the past 2 years with over 100 million users (Sarrel, 2005). These independent, open-source communities are constantly pushing commercial software developers to raise their standards.

Other, lesser-known piracy communities have profoundly impacted several industries. Consider the impact "blogging" has had to the news industry. Blog, or 'web-log,' is a term first coined in 1997 by Jon Barger. Blogging refers to the publishing of news and opinions by any individual, in practice ranging from credible reporters to anyone with Internet access. By 2004, more than 8 million people had created a blog (Simmons, 2005). Few people these days spend time thinking about the legality of blogging although much of the reported information is borrowed or copied (pirated) from other reports and writings. Yet, blogging has received wide acceptance and has had a significant impact on the reporting of news. Bloggers discover new information, build on each other's findings (like programmers do), and develop new insights. An impressive, legal blogging site is Slashdot (www.slashdot.org), a technology-related news site that caters to over 4 million pro-piracy, technology-savvy users. In 2002, Microsoft was caught by Slashdot bloggers for creating a fraudulent advertisement that recounted the story of a Mac user converting to Windows. Microsoft was forced to pull the advertisement.

Piracy communities in the gaming industry have been particularly interesting. They have cracked games' basic engines and modified the games extensively to their taste. In lieu of taking legal action, however, some of the leading game developers welcomed the participation. In fact, some of these games have actually increased in popularity as a result of cooperation between pirates and official gaming companies. For example, the most popular game ever sold

for the computer, *Half Life* by Valve Software, experienced even larger sales because of the development of the *Counter Strike* "mod"- short for modification, which was released independently and free-of-charge by two high-school hackers. While *Counter Strike* relied on the use of the Valve-owned *Half Life* engine, its creators designed an altogether new game, complete with customized graphics and game play. Rather than punishing the rogue developers, Valve took the game to market: *Counter Strike* has sold more than 1.5 million copies in boxed form, resulting in significant profits for Valve software (Barnes, 2005).

Even among music and video pirates, the old mentality of "sharing" has prevailed. In 2002, *Wired Magazine* profiled one hardcore Morpheus (a P2P service) user, a 44-year-old computer consultant who had accumulated 2500 music, video and software titles (O'Brien, 2002). He explained, "A lot of people out there don't have any idea what their computer really is for and how much they can enjoy it." He claimed "To anyone who can't afford to take the family to the movies or buy the latest PlayStation 2 title," he was "doing a public service". A homemaker in Orange County, California had collected 3000 files and left them available at all times so that others could have her collection. To her, it was about being neighborly. "If we borrow our neighbor's tools," she said, "are we robbing the tool manufacturer of the revenue they deserve?" While their actions are not legally defensible and likely unethical, their logic was not completely inconsistent with those of the first Internet idealists.

The pervasive pro-piracy philosophy of sharing and the realities of the market economy came to a fierce collision with the emergence of Napster. The legal battles that followed proved to be an important crossroads for the determination of what was legal and illegal. The Napster story also provides a useful illustration of how online piracy can spur innovation and eventually create new, legitimate business models through the aforementioned four-step process.

4. Napster and the peer-to-peer revolution

In the fall of 1999, 19-year-old college student Shawn Fanning became a pioneer in the P2P file sharing technology when he released the original Napster, a software program he had developed in his dorm room. In search of an easier method of acquiring music, Fanning devised a way for computer users to employ the Internet as a channel for copying files stored on someone else's hard drive. Technically, it was very similar to how instant messaging systems worked. Although other sites and mechanisms such as IRC, Hotline, and USENET facilitated the sharing of files across the Internet, Napster specialized exclusively in music in the form of MP3 files and presented a friendly user-interface.

Fanning's idea was initially met with skepticism from friends and other programmers: Who would be willing to open their hard drives to share their files with total strangers located halfway around the world? (Merriden, 2001). To the surprise of many skeptics, however, millions of people became Napster users in a matter of months. Napster servers contained hundreds of thousands of bootlegged audio files donated by them.

Napster's contributions to technology were noteworthy. A leading entertainment and media analyst considered Napster to be "absolutely a groundbreaking technology that changed the way consumers listened to music, discovered music, and interacted with music (Denison, 2002)." Before Napster, Universal, BMG and Sony had promised to make music available for downloading by the end of 1999, only to let the deadline pass, invoking "lack of adequate technology" as their reason (Anand and Cantillon, 2003). The major music labels later participated in industry collaborations such as the Secure Digital Music Initiative (SDMI), an industry standard-setting effort, but they were unable to achieve consensus and abandoned the project in 2001.

From the early days of Napster, it was the software pirate community that bolstered the technology standards. When the music industry incumbents finally embraced MP3s, they released music at a 128 kbps compression rate—noticeably below CD quality. By this time, piracy communities were releasing songs at a 192 kbps rate, which was much closer to CD quality. Thus, most online music enthusiasts preferred to download songs illegally, despite the fact that they were easily accessible through legal alternatives. Since 2004, most legal digital-music distributors have offered their MP3s at 192 kbps. But the piracy community has moved on, now compressing their MP3 files with a Variable Bit Rate (as opposed to Constant Bit Rate), meaning that the compression rate dynamically adjusts to suit the complexity of the song's segments. This compression algorithm ensures practically no loss of sound quality even at the smallest file size possible, once again offering technology superior to current industry standards.

The rapid success of Napster became a source of valuable market insight, although it was ignored by most industry incumbents for many years. Hordes of college students, the music industry's best customers, began embracing Napster and its analogs, causing the music industry to lose up to $4.2 billion each year to piracy (Barnes, 2005). Note that pirate consumers were utilizing Napster and similar P2P services not only because they were free—this is where many industry experts got it wrong. Napster was immensely popular because it offered a wide range of important features, such as a wide selection, high-quality sound, and convenience. Consumers would have been willing to pay for a service with such a collection of beneficial attributes, as Apple's iTunes later proved.

People praised Napster because it enabled them to obtain hit songs without having to buy an entire album. At the time that Napster was released, there was a general market perception that the artistic and creative quality of new albums had decreased. Many people felt that albums

contained only one or two good songs, along with many low-quality "filler" songs. Napster also enabled people to obtain older songs, unreleased recordings, and live recordings from concerts. With the files obtained through Napster, people frequently made their own compilation albums on recordable compact discs (CDs). To the industry, Napster proved the existence of an immense market of customers craving for online distribution, customized CDs, access to older songs and concert recordings, etc. Prior to the advent of Napster, no music label was taking advantage of the emerging consumer behavior. In fact, no one was even selling music online.

Napster and other P2P sites contributed to new market creation—a mass of music lovers who consumed music in a different way: They no longer went to stores to purchase their CDs. They became used to downloading music from their computers, having immediate and convenient access to hundreds of thousands of songs. They were able to take time sampling songs before they decided whether they wanted to own them. They were able to access songs without purchasing an entire CD, much of which contained songs they were not interested in. Finally, they were able to burn their songs onto a CD and create a highly portable music collection of their very own.

The revolution started by Napster gave way to a new generation of business models. Catapulted by the original success of P2P models, the music industry realized that it had to adapt to the changes by creating new business models like PressPlay.com, a joint venture between Sony Music Entertainment and Universal Music Group, and MusicNet, a partnership between AOL Time Warner, EMI, Bertelsmann, and technology from Real Networks—both launched in December 2001. However, these services had severe flaws in their business model: PressPlay only offered songs owned by Sony and Universal, while MusicNet offered songs only from its partners. They also operated with a monthly fee for which its target market was not willing to pay. Concerned about cannibalizing their CD sales, PressPlay and MusicNet offered file formats that restricted members from transferring a downloaded music file to a friend or even to a portable MP3 player. The formats also either prohibited or limited the "burning" of

music files onto a CD. Not surprisingly, PressPlay and MusicNet failed to get significant traction.

Apple Computer, a newcomer to the music industry, operated a vastly different business model. In April 2003, Apple launched the iTunes online music service with a library of more than 200,000 songs from a wide range of artists and labels. Users were free to shop the library of songs through a browser that was easily searchable by song title, artist name, album title, and genre. Users were able to hear a 30-s preview of any song in the library for free. Songs were $0.99 each with no requirement for subscription. Users were able to organize their purchased libraries into customized folders and compilations on their computers. Additionally, Apple incorporated a Digital Rights Management (DRM) system that ensured the music could be transferred up to three Apple computers, burned up to 10 CDs as a given compilation, and downloaded to an unlimited number of iPods. According to reports, iTunes has sold more than 1 billion songs in the US alone, more than 50 million within a year of its launch in Europe, and more than 1 million within 4 days of its launch in Japan (Kageyama, 2005). As of August 2005, the iTunes service accounted for 82% of all legally-downloaded music in the US (Kageyama, 2005). Some of the leading music distribution companies, including Apple, are profiled in Table 1.

Apple, by no means, has a perfect product. The iPod (its media player) is a closed system meaning that no other program works with it. Furthermore, it accepts a very limited file format for video distribution. But because of its ability to address consumer needs more accurately—and stylishly—Apple was able to capture a large installed base of online music consumers.

It should be noted that technological companies, such as Apple, Microsoft, and Yahoo!, have become the newest players in the convergence of the music industry. Microsoft has partnered with MTV to create URGE, its answer to iTunes. Microsoft already acquired RealNetworks along with its distribution service, Rhapsody, which offers music, video, and game downloads. Yahoo! has launched Yahoo! Tunes in its attempt to be the next media conglomerate.

Table 1
Leading music digital distribution companies (as of August 2005)

Service	Pricing	Number of songs	DRM/File format	Portability	Song preview
iTunes	$0.99	1.5 million	Fairplay/AAC	iPod Only	30 s clip
Mashboxx	$0.99	2 million	Microsoft/WMA & MP3, plus free Non-DRM MP3's	Any device that supports Janus format	The whole song (5 listening tries)
Napster	$9.95 per month $0.99 per purchased track	1 million	Microsoft/WMA	Any device that supports Janus format.	30 s clip
Yahoo Tunes	$0.99	1 million	WMA. WAV and MP3	Not available yet	30 s clip

Interestingly, the online pirates have themselves become the leaders in the creation of new, legitimate digital media businesses. For example, Shawn Fanning, the founder of Napster, has become Chief Strategy Officer of Snocap, Inc., a small startup that has inked deals to register the entire catalog of the major music labels that had sued his former company Napster. Snocap has created a database platform to be licensed by record companies, individual musicians, or other copyright holders to manage the sale and distribution of their work. The technology is designed to let copyright holders set prices and other terms of distribution. The staff of KaZaA (pirate P2P service) has gone on to create Joltid, a consulting company which develops and provides legitimate P2P based solutions.

The Napster story demonstrates the potential validity of the aforementioned four-step process, i.e., how online piracy advances technology, offers customer insight, builds a customer base, and creates innovative and legitimate businesses. A diagram of the process is shown in Fig. 1 below.

5. Industry responses and the legalities of P2P business models

The music industry attempted to curtail illegal pirating of music through a number of technological and legal approaches, from demanding restrictions on computers' CD-copying abilities to embedding anti-copying codes in CDs. This effort backfired, as customers resisted buying CDs that could not be played on computers. Besides, such technological blocking mechanisms had the effect of sparking an arms race with computer-savvy hackers who were able to break the codes easily.

Unanimously, the major labels went after music piracy through litigation. As Table 2 shows, they were successful in shutting down the original Napster-era P2P models in 2000. Napter's and other P2P sites' centralized file management software made them easy targets for record companies. The system architecture was such that the illegal information could be perceived (therefore ruled) to reside inside the system, making software developers as liable for illegal piracy as the users who were sharing information.

Following the legal dismantling of Napster, a new generation of developers created file-sharing systems that were no longer based on a centralized architecture. The post-Napster-era P2P models decentralized their server architecture, such that their servers acted only as a medium by which users could find each other's files. Under this new model, a first computer would connect to another in the network, and ask it for a file. That second computer would ask a third, which would in turn ask a fourth, and so on until the file was found. The last computer in line would then connect directly to the first for a download. This decentralized model offered by KaZaA, Morpheus, and LimeWire made P2P technology more legally defensible. Furthermore, KaZaA's software code was controlled by a company off the coast of Britain and in Estonia, a harbor for intellectual pirates.

Beginning in October of 2001, the Recording Industry Association of America (RIAA) sued several decentralized P2P sites, asserting that they were as liable as the Napster-era P2P models. Proponents of P2P technology argued that it had a variety of legitimate applications, including the distribution of licensed games, music, film, and software. In March 2003, the RIAA announced that it would file lawsuits even against individuals who were illegally trading copyrighted files on music sites. While the prospect of legal prosecution might discourage some piracy, it was doubtful that this radical approach would succeed in stopping the vast number of people using file-sharing services worldwide. Although the immediate result was fewer downloads, new technology emerged that allowed for bigger files to be downloaded at faster speeds, more anonymously, and with a more radically decentralized distribution approach.

Between 2003 and 2004, the lower courts favored the new P2P model, considering the precedent of Sony's Betamax video-recording technology. It had faced a lawsuit brought by Disney and Universal in 1984 calling for a ban on the system because it allowed infringement of their copyrighted material. The court concluded that Betamax had "substantial" non-infringing uses, such as
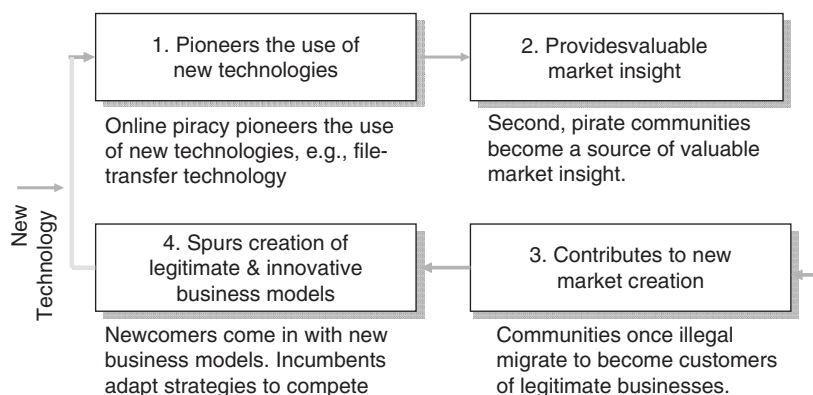

Fig. 1. Four-step process to innovation.

Table 2
Key legal events

Date	Action
December 1999	RIAA sued Napster
July 2000	RIAA sued Scour
July 2000	San Francisco federal court ordered Napster to stop music-swapping
February 2001	An appeals court upheld Napster order; company started blocking swaps soon afterward
October 2001	RIAA sued Kazaa, Grokster and MusicCity (now StreamCast Networks)
April 2003	Los Angeles court ruled Grokster wasn't liable for users' copyright infringement
April 2003	US District Judge Stephen Wilson found that these sites were not violating copyright laws because companies were not responsible for the ways members used their software
September 2003	RIAA filed first lawsuits against individual file-swappers
August 2004	Appeals court upheld Los Angeles Grokster ruling. Following the Betamax decision of 1984, the court ruled that Grokster's business model had legal alternatives that allowed it to exist despite its illegal consequences
December 2004	MPAA began legal attack on BitTorrent hubs
June 2005	Supreme Court ruled on Grokster's legality. The Court ruled that Grokster was clearly promoting the use of illegal downloading, therefore deeming it illegal. Any of the new technology's legality depends on the intent of the company that promotes it

the recording of TV programs to be watched at a later, more convenient date.

Hollywood studio MGM, joined by 27 of the world's leading film and music companies, brought the case to the Supreme Court. In June 2005, in *Grokster* vs. *MGM,* the Supreme Court ruled unanimously (9–0) that developers of software violated federal copyright law when they provided computer users with the means to share music and movie files downloaded from the Internet. Wrote Justice David H. Souter, "We hold that one who distributes a device with the object of promoting its use to infringe copyright, as shown by the clear expression or other affirmative steps taken to foster infringement, is liable for the resulting acts of infringement by third parties. There is substantial evidence in MGM's favor on all elements of inducement."

The ruling initially appeared to be an outright victory for the entertainment industry. Media companies welcomed the Supreme Court decision, as it gave them a firm footing to combat technologies that were created for the purpose of promoting piracy. However, the ruling has not signaled the end of P2P technologies or communities—a fact to which any computer user could attest. If the past is any indication, the ongoing developments in piracy technology and P2P communities are likely to continue in one form or another in significant scope.

The legal strategies employed by the music industry have been reminiscent of the patent protection strategies of the biotechnology arena. Those strategies, mostly of legal methods such as patent litigations, may work in biotechnology where pirates are easily identifiable and the spread of piracy readily controlled. But this is hardly the case in music or software piracy, where millions of average consumers (and kids) are involved. Fighting piracy through litigation alone will likely be a losing battle.

Furthermore, many industry observers felt that the legal reaction by the RIAA was a highly undesirable public relations move (Hits Daily Double, 2000). According to some industry experts, there was nothing worse that the recording industry could have done than to make consumers feel like criminals (Thompson, 2005). Many felt that essentially waging war on consumers (many of whom were teenagers, children and even grandparents, who felt exploited by the escalating prices of music) was not the answer. After all, part of the blame—the lack of innovation in the industry—also lay with the slow-moving record companies. While legal actions may always be necessary, the industry incumbents were to a certain extent using the legal system to make up for their deteriorating business model.

Increasingly, indications were that the recording industry was starting to "get it" and were trying to find ways to work with some of the technology innovators. In mid-September 2005, when the recording industry issued a lawsuit to seven popular downloading-technology companies including BearShare, LimeWire, and eDonkey, the hottest video file sharing company BitTorrent was absent from the assault. The industry was beginning to understand the value of the new BitTorrent technology and its associated communities and appeared to be open to an initial level of collaboration. More details about how incumbents have begun working with the innovators in video file sharing are discussed in the next section.

6. Bittorrent—the new napster?

The new BitTorrent phenomenon is analogous to the Napster story and follows the four-step process discussed above. Before BitTorrent, a major downside of P2P had been the slow speed at which large video files transferred. In February 2002, the 30-year-old Bram Cohen took the P2P model to the next level with the release of the BitTorrent technology (BitTorrent is the name of the technology as well as Cohen's company). The deceptively simple software program allowed a user to download files from a multitude of users, rather than from a single individual, on a bit by bit basis. The technology enabled a user to download large video and movie files in a relatively short period of time.

Like Napster, BitTorrent was immediately considered a significant technology breakthrough. Even Microsoft was reportedly impressed and experimented with the technology (McHugh, 2005). The BitTorrent program also became an instant hit with Linux users who wanted to swap their enormous open-source programs. When the company Red Hat released its Linux 9 operating system, the demand for the product was so strong that downloaders crippled Red Hat's servers. When Red Hat utilized BitTorrent, it was able to transfer, within 3 days, 21.15 terabytes of data—equivalent to all the books in the Library of Congress. The total cost of distribution for Red Hat was estimated to be $99 (of hosting fees) in comparison to the $60,000—$90,000 usual bandwidth-related fees (Roth, 2005).

Furthermore, BitTorrent movie communities primarily adopted DivX and OGM technology to compress their digitized movies and TV shows. These compression technologies offered better quality and smaller file size those conventionally offered by the movie or film industry.

Like the early Napster, BitTorrent's legal and illegal applications have been a source of valuable customer insight. The usage patterns also show that the BitTorrent websites do not merely offer free products to their community members, but also connect pirates to their communities for the purpose of sharing information and their passions (e.g., politics and technology) between like-minded thinkers. Increasingly, illegal BitTorrent communities have begun to focus on certain themes that were created organically from like-minded thinkers. For example, ShunTV, began with the distribution of *Daily Show with Jon Stewart*, specializes in political shows. The site has evolved to include all other political-junkie shows, documentaries, and specials, attracting a strong community of intellectual college students. BitMe, whose slogan is "Feed Your Brain!", specializes in the distribution of technical and scientific journals, books, documentaries, and audio books. UKNova, like its name suggests, has become the main distributor of all UK TV shows. To insightful marketers, BitTorrent communities offer valuable market data—a sort of billboard on what is popular around the world and where things are headed. The success of BitTorrent has demonstrated the technological feasibility and the potential market acceptance of watching movies, music videos, and television shows via the Internet.

The technology innovation and the popularity of online communications have allowed for strong marketplace adoption. More than 45 million people have downloaded a BitTorrent application for legal and illegal uses (Roth, 2005). According to British research firm CacheLogic, BitTorrent files consumed an astounding 53% of all global P2P traffic in 2004 (Mennecke, 2004). On October 15, 2004, CNN's audience for Jon Stewart's appearance on *Crossfire* was 867,000; the number of viewers "torrenting" the show was in millions (Thompson, 2005). The recent success of UPN's *Battlestar Galactica* was attributed to the word of mouth spread throughout the Internet by those who downloaded the shows and quickly spread the word through the use of message boards (Chmielewski, 2005).

As in the case of the Napster, many of the BitTorrent communities have already begun to migrate to new legal communities. Although BitTorrent rose to fame with its popularity centered among Linux communities, its use was, until recently, predominantly illegal. In recent months, however, independent communities have been successful in convincing independent producers to webcast their TV shows, offer educational programs, and distribute various open-source software packages. Game developer Blizzard Entertainment has used BitTorrent to distribute the two-gigabyte World of Warcraft (more than 3 CDs-worth of data) and all the patches that go with it. Sun Microsystems has leveraged BitTorrent to make available its entire Open Solaris operating system to tens of thousands of users (Roth, 2005). In the case of the award-winning documentary, *Outfoxed*, the producers actually gave permission for online viewers to download the movie, which other producers have also started to do.

Established media and technology companies have rapidly begun to adjust their business models to respond to changes brought about by BitTorrent. At the same time, an entire new generation of entrepreneurial businesses has emerged to take advantage of them. Table 3 shows the combination of traditional media companies and entrepreneurial businesses competing, and in other cases, collaborating with the likes of Bram Cohen to prepare for the next generation of media consumers. The new businesses range from conventional video-on-demand (VOD) companies to a wide range of innovative technology providers. Some utilize BitTorrent technology, while others use their own alternatives to file-sharing technology to broadcast their offerings.

Interestingly, Movielink and CinemaNow, two pioneers in Internet video, appear to parallel the story of PressPlay

Table 3
Sample new legitimate business models (Arising from BitTorrent)

Business model	Players
Video on demand (VOD)	Comcast, Newscorp, Disney, Time Warner Cable, Cox Communications, BBC
Internet protocol (IP) TV infrastructure	SBC communications and many regional telcos, Google, Yahoo!, MSN, AOL
Internet TV broadcasters	AOL Video, Google Video, YouTube, Guba, MySpace, Movielink, CinemaNow
Video search	Google, Yahoo, MSN, AOL, Blinkx, The Feedroom
BitTorrent infrastructure	Ourmedia, Avalanche, BitTorrent
BitTorrent consulting	CacheLogic, Joltid, Big Champagne, Cache Logic, Thinkingest, Broadcatch, Internet2 P2P Working Group

and MusicNet. Like their predecessors in the music industry, Movielink and CinemaNow offer incomplete selections, prices that provide little or no savings over the purchase price of a DVD, and technology formats that constrain usage. For example, both Movielink and CinemaNow offer a small set of movies that cannot be burned to DVD (Pegoraro, 2006). Although the company has spent close to $150 million, it has managed to sell an average of only 70,000 downloads a month. The strategies and performances of these two video firms show that the movie industry may have learned little from the music industry's failures (Helm, 2006).

A new phenomenon and business model in online videos is YouTube, a user-generated social network known for its ability to distribute videos online, although it does not use BitTorrent's technology. Since its late 2005 founding, more than 20 million unique users per month use YouTube's site to watch more than 100 million videos per day. The site boasts a mix of legal and illegal material, but allows users to flag the illegal material so that the company can remove it. Due to YouTube's success, dozens of user-generated video sites have entered the market, including Grouper, the second-largest site behind YouTube. Unlike YouTube, Grouper uses P2P technology that allows for faster downloads and supports mobile devices like the Sony PSP. Another user-generated video site, Guba, also offers premium content for which users have to pay a small fee.

The BitTorrent-spurred online community has also grown to also create a new generation of research and professional service companies. For example, CacheLogic, a small startup, has become a premier research company in this space. Other research and consulting companies include Thinkingest and Broadcatch, both of which advise companies interested in distributing Internet content using BitTorrent. Even the NPD group, founded in 1967, and known for introducing market information across several industries, has launched NPD MovieWatch Digital, which monitors acquisition and viewing of movies and videos on consumer PCs.

While the newly emerged businesses models are interesting, the process of acceptance of piracy and online communities by the industry incumbents has been equally intriguing.

Some of the leading media companies seem more willing to work with piracy technologies and communities to experiment to create new offerings and services. Time Warner, for example, has entered into a deal to distribute over 200 movies and TV programs with Bram Cohen's company BitTorrent, the entity that helped ignite the video market via piracy transfers. The service will be selling foreign films and other hard-to-find videos, and is reportedly scheduled to launch at the end of 2006 (Nystedt, 2006). Time Warner also owns its own P2P movie distribution site, In2movies.com, which sells movies in Germany, Austria and Switzerland. As early as May 2005, the venerable British Broadcasting Company (BBC) released the beta version of its integrated Media Player

(iMP), which allows users to download TV and radio shows to their PC or laptop for seven days after the transmission date. The iMP pilot uses P2P technologies, such as BitTorrent, to distribute the features shows from the BBC's television and radio services. The company plans to keep its costs down by using P2P technologies to distribute the shows in its archive.

We also find major media incumbents partnering with or acquiring user-generated video sites, even those that have some pirated content. Both CBS and NBC have been working with YouTube. In particular, NBC and YouTube have forged a strategic partnership that, among other things, let NBC hype its television shows on YouTube's website. Sony Pictures Entertainment, on the other hand, acquired Grouper, the second-largest site behind YouTube. Sony reportedly plans to use the site's P2P technology to distribute its own copyrighted content, and will also take advantage of the user-generated videos to recruit new talent (Red Herring, 2006). Warner Brothers along with Sony Pictures are known to have partnered with another user-generated video site, Guba, which also distributes their movies (Williams, 2006).

Other incumbents have not necessarily been willing to work with pirate technologies or communities, but have accepted their presence as fact of life and have responded with new strategies. One strategy widely adopted by the incumbents involves accelerating the deployment of their product offerings to the market. For example, traditional cable companies are expanding their VOD services as a result of the newest trends. They acknowledge that consumers are increasingly accepting of VOD services and that their customers may get them from the Internet unless they move in more quickly and aggressively. In the meanwhile, looking to cut into the cable companies' profits, telcos are building fiber-optic lines to homes to provide adequate bandwidth for high-definition Internet protocol television (IPTV) streams, which can also provide VOD services. SBC Communications has started a $4B expansion that is expected to deliver 25-Mbps connections to 19 million customers by mid-2008 (McHugh, 2005).

Even the four major search engines (Google, Yahoo, MSN, and AOL) have rushed their product launches to adapt to the rise in demand for online videos. Since 2005, each of the four major search engines has also rolled out video-specific search engines. Companies like Google aim to become proficient at helping Web surfers find and organize all the available online videos related to their interests. Each of the search engines has already established partnerships with the major media content developers to distribute original as well as exclusive Internet content.

The two online media distribution giants, Amazon and Apple, have recently rolled out their own movie services. Amazon struck deals with six major studios to release Unbox, a catalog of films similar to Movielink. A week after Amazon's Unbox, Apple announced it would also start to offer full-length movies on its popular iTunes store, starting with those from the Disney Studios. While new at

Table 4
Traditional media works together with P2P

Date	Action
May 2005	Microsoft promotes Avalanche, a P2P software created by Microsoft
Q4 2005	All four major music labels form distribution deals with Snocap, the online music company created by Shawn Fanning, the founder of Napster
September 2005	BBC launches the trial of a service that will distribute all of its shows and back-catalogue via its own P2P software, integrated media player (iMP)
January 2006	Time Warner launches In2movies.com, a P2P movie distribution site to sell movies in Germany, Austria and Switzerland
May 2006	Time Warner announces distribution deal with BitTorrent
June 2006	NBC agrees to promote its shows via YouTube
July 2006	CBS president admits YouTube is great promotion
June–July 2006	Time Warner and Sony agree to distribution deals with Guba, a user-generated video site
August 2006	Sony buys P2P user-generated video site, Grouper
September 2006	MySpace partners with Snocap to sell music through its site
September 2006	NBC announces launch of its own user-generated video site. Other major studios sign up to the service.

movies, iTunes has already experienced success with videos, offering more than 220 television shows from more than 40 networks. The company has sold over 1 million videos a week. Some of the major strategic moves by the leading incumbents are summarized in Table 4.

At this point, it is highly uncertain where the media industry might be headed or which business models might succeed. What is already clear, however, is that a wide range of technological and business innovations have occurred as a result of BitTorrent's piracy technology, its followers, and associated piracy communities. Many of the new business models that have sprung up among incumbents and newcomers are both innovative and completely legitimate. The evolution depicted in Fig. 1 appears to hold for BitTorrent as it did for Napster.

7. Conclusion

Online piracy has had and is likely to continue to have a large impact on the fast-changing media and software industries. Given the irrepressible growth of piracy communities, legal battles, while necessary, may be limited in their effectiveness. An alternative for both incumbents and entrepreneurs may be to view online piracy as a source of innovation that has been lacking in the traditional media sector. In fact, a review of Napster and BitTorrent phenomena shows that it has been instrumental for innovation and new business creation.

We have observed that online piracy indeed can (1) pioneer the use of new technologies, (2) provide the business world with invaluable market insight, (3) contribute to new market creation, and often (4) spur the development of legitimate and innovative business models. Interestingly, we observe that the four-step process may hold with each generation of new technology. It is imperative for businesses to recognize this pattern and use it to their advantage when developing their future strategy. For the entrepreneurially minded companies or individuals, the changes brought by online piracy can

present unique business opportunities when they are promptly and correctly identified.

Based on the insights obtained from our research, we note a few important lessons that may be applicable to a wide range of companies in the media and software industries.

Be knowledgeable: Companies and entrepreneurs should keep up with the newest developments in piracy technology and online communities. It is important to understand that the reason for their popularity is not just that their offerings are free. Many of the users spending hours of their time on websites with incomplete functionalities and unfriendly interfaces are willing to pay a small fee for a superior product. Innovative companies will find legitimate business models that capture new markets and are financially sound.

Take large steps: An important take-away from the music industry should be that companies should not meet customer needs half way, as MusicNet or Pressplay did with their incomplete song selection, unfriendly pricing model, or complicated customer interface. Innovative businesses should identify what turns customers on and try to meet their needs (e.g., good selection, easy search, flexibility, ability to burn onto a CD or DVD, etc.) to the fullest extent as possible, as Apple has started to do with iTunes.

Utilize pirate technologies: Media and software companies should consider utilizing emerging technologies like Bit-Torrent and its equivalent to their advantage, as some aforementioned software, game developers and media companies have already done. These technologies can minimize bandwidth costs and quickly distribute content.

Modify business model: Incumbent media and software companies whose businesses are being severely challenged,

must take necessary steps to reconfigure their business models as many companies have begun to do. Like BBC, companies should experiment with a couple of initiatives, learn and adapt accordingly. In today's fast moving market environment, there are advantages to being an early mover.

Harbor communities: The Internet is uniting and segmenting people with similar interests more closely than ever before. These groups are developing organically. Companies should identify mutually beneficial relationships with such pirate communities, officially or otherwise. Companies can foster a creative environment in such communities based on the carefully observed tendencies of online pirate communities and provide a stimulating way for their users to participate in the creative process. Companies should also consider the BitTorrent communities for word of mouth or viral marketing as the *Daily Show* and *Battlestar Galactica* have successfully done.

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