# INNOVATION FOR THE 21ST CENTURY

## HARNESSING THE POWER OF INTELLECTUAL PROPERTY AND ANTITRUST LAW

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OXFORD UNIVERSITY PRESS

# 6. PIONEERING PEER-TO-PEER AND OTHER DISRUPTIVE DUAL-USE TECHNOLOGIES



*Question*: What do the VCR, computer, CD burner, iPod, TiVo, and peer-to-peer (P2P) file-sharing software have in common?

*Answer*: They can be utilized (1) to create revolutionary new forms of interaction and entertainment or (2) to facilitate widespread copyright infringement.

How, then, should copyright law treat these *dual-use technologies*? Should it consider the technology's primary use? Determine whether it has a substantial noninfringing use? Examine its creator's intent?

Courts have considered these tests, among others, in applying copyright law to dual-use technologies. But most of the tests threaten to stifle innovation. And the sheer number of analyses have made this one of the most elusive areas in IP law, further endangering innovation. Given the potentially revolutionary nature

of dual-use devices, particularly in the digital era, and their importance to our economy and livelihoods, the consequences are monumental.

This chapter begins by offering several examples of dual-use technologies from the past century. Next, it discusses the crucial case of *Sony Corporation of America v. Universal City Studios*, in which the Supreme Court held that the manufacturer of the Betamax VCR was not liable for contributory copyright infringement.[1] Given the importance of P2P software to dual-use debates today, the chapter then introduces the technology and three judicial treatments of it.

The focus then shifts from a description to a critique of dual-use issues. It shows that the tradeoff between innovation and creativity is not as intractable as most courts and scholars have thought. The reason is that (at least in the context of P2P technology and CD sales) innovation, but not creativity, is drastically threatened by the selected test. In particular, disruptive innovation is threatened. At the same time, copyright holders have remedies other than suing dual-use manufacturers, including lawsuits against direct infringers, legislation addressing specific technologies, and technological protection measures.

Next, this chapter introduces three dangers facing innovation. First, an *innovation asymmetry* downplays new technologies' future benefits and overemphasizes copyright owners' present losses. Second, an *error-costs asymmetry* reveals that a technology's abandonment has a far more drastic effect than its wrongful continuation. Third, a *litigation asymmetry* ensnares small technology makers in a web of complex tests and unaffordable lawsuits.

After analyzing the P2P court decisions and exploring the technology's benefits, this chapter concludes by recommending a return to the *Sony* test. Such a proposal would maximize innovation. In particular, it would promote the radical, disruptive variety that consumers relish, that challenges the entrenched copyright industries, and that is barely visible in the tip of the innovation iceberg.

## DUAL-USE TECHNOLOGIES

Dual-use technologies are not new. Many of the innovations that consumers have enjoyed throughout the past century fall into this category: the telephone, camera, jukebox, radio, television, photocopier, VCR, computer, Internet, iPod, and P2P file-sharing software, to name just a few.

Each of these technologies has offered the public new modes of entertainment and communication. Each has promised to generate new profit opportunities and markets for creative works. But each also has introduced new prospects for the unauthorized reproduction and distribution of those works. It is this threat that consistently has caused copyright holders to be wary of dual-use technologies and to issue predictions of doom upon their introduction.

1. 464 U.S. 417 (1984).

At the turn of the 20th century, sheet music publishers viewed the player piano, which used copyrighted sheet music in the pianos (and threatened to reduce revenue) with great alarm.[2] Composer John Philip Sousa bemoaned the introduction of the technology, predicting "a marked deterioration in American music and musical taste, an interruption in the musical development of the country, and a host of other injuries to music in its artistic manifestation."[3]

Eight decades later, Jack Valenti, the then-head of the Motion Picture Association of America (MPAA), the trade group representing the U.S. motion picture industry, warned that the market for copyrighted movies would be "decimated, shrunken [and] collapsed" by the VCR and that "the VCR is to the American film producer and the American public as the Boston strangler is to the woman home alone."[4] The year after the *Sony* decision, with box office revenues at their lowest levels in nearly a decade, the industry lamented that "VCR dates" were replacing the teenage ritual of going to the movies.[5]

Just a few other examples demonstrate the point. Copyright owners in the late 1980s "declared war" on recordable CDs.[6] They later attacked broadband networks, claiming that "Verizon and SBC have little or no economic incentive to combat piracy . . . [because] music downloading is driving the [DSL] business."[7] And they charged that "[t]he killer app for the computer industry is piracy" and accused Apple of "telling people 'that they can create a theft if they buy this computer.'"[8]

2. *Sony v. Universal Symposium (Panel 3): A New World Order?*, 34 Sw. U. L. Rev. 211, 218 (2004).

3. John Philip Sousa, *The Menace of Mechanical Music*, 8 Appleton's Mag., 278–84 (1906).

4. *Home Recording Of Copyrighted Works: Hearings on H.R. 4783 et al. before Subcomm. on Courts, Civil Liberties and the Admin. of Justice of the H. Comm. on the Judiciary*, 97th Cong. 4, 8 (1982), http://cryptome.org/hrcw-hear.htm.

5. Jennifer Holt, *In Deregulation We Trust: The Synergy of Politics and Industry in Reagan-Era Hollywood*, 55 Film Q. 22, 23, http://caliber.ucpress.net/doi/pdf/10.1525/fq.2001.55.2.22. To be clear, the entertainment industry was primarily concerned with the VCR's "record" (not "play") button, though a market for VCRs without the record function likely would have been far less robust.

6. Comm. Daily (Nov. 10, 1988).

7. *Consumer Privacy and Gov't Tech. Mandates in the Digital Media Marketplace: Hearing Before the Sen. Comm. on Commerce*, 108th Cong. (2003) (testimony of Cary Sherman, President and Counsel, RIAA), *available at* http://commerce.senate.gov/hearings/testimony.cfm?id=919&wit_id=2584.

8. Brooks Boliek, *Mouse Grouse: Dis Boss Lays into Computer Biz*, The Hollywood Rptr., Mar. 1, 2002, http://www.larta.org/pl/NewsArticles/02Marc01_HR_Eisner.htm (comments of Michael Eisner, then-CEO of Disney). *See generally* http://www.eff.org/IP/P2P/MGM_v_Grokster/20050301_internet_industry.pdf (providing examples of copyright owners' "ominous rhetoric").

Copyright owners, however, have frequently exaggerated the harm threatened by new technologies. Notwithstanding the protests against the VCR, home video had become the industry's chief revenue source within two years of the *Sony* decision, providing distributors with almost half a billion more dollars than box office revenues.[9] By 2003, home entertainment was responsible for more than 80 percent of movie studios' revenues, with box office receipts making up less than 20 percent.[10] Nor are the incorrect predictions harmless. For in each case, copyright owners, facing threats to their business models, attempt to change the law to block the technologies. The copyright law of secondary liability presents the setting in which these debates have most frequently taken place.

## SECONDARY LIABILITY

The copyright laws give creators exclusive rights to reproduce, distribute, publicly perform and display, and prepare derivative works.[11] Any person that engages in any of these activities without permission directly infringes the copyright.

In addition to suing direct infringers, copyright owners can sue any party that assists another in committing infringement. The two primary theories of such *secondary liability* are contributory infringement and vicarious liability. Though often described separately, the courts sometimes blur the theories in application.[12]

*Contributory infringement* stems from the tort concept of enterprise liability, which penalizes someone marginally involved in illegal activity as much as partners playing a more central role.[13] A party commits this offense by (1) knowing about the infringing activity and (2) causing or materially contributing to the infringement.[14]

*Vicarious liability* grew out of agency principles, by which a principal was held liable for the acts of its agent.[15] One is vicariously liable if he or she (1) has the right and ability to control or supervise the infringing activity and (2) derives a financial benefit from the infringement.[16]

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9. Boliek, *Mouse Grouse*.

10. Edward Jay Epstein, *Gross Misunderstanding: Forget About the Box Office*, SLATE, May 16, 2005, http://slate.com/id/2118819/.

11. 17 U.S.C. § 106.

12. In contrast to patent law (which has been codified by Congress), copyright secondary liability is entirely judge-made law.

13. *Demetriades v. Kaufmann*, 690 F. Supp. 289, 292 (S.D.N.Y. 1988).

14. *Gershwin Publ'g Corp. v. Columbia Artists Mgmt.*, 443 F.2d 1159, 1162 (2d Cir. 1971).

15. *E.g., Fonovisa v. Cherry Auction*, 76 F.3d 259, 262 (9th Cir. 1996).

16. *Gershwin Publ'g*, 443 F.2d at 1162.

Early cases applying indirect liability concepts involved the owners of facilities. Courts punished record store owners who sold customers blank tapes and loaned them sound recordings that they copied on store-provided systems.[17] They also found liable a dance hall owner who hired an orchestra that played copyrighted compositions without authorization.[18]

A particularly expansive case applying these theories is *Fonovisa v. Cherry Auction*. In this case, the defendant ran a swap meet (or flea market) and rented booths to vendors, some of whom sold counterfeit recordings of copyrighted music. The Ninth Circuit reversed the lower court's dismissal of the case, finding that the plaintiff presented a claim of vicarious liability. First, because it could terminate vendors for selling counterfeit records (or any other reason), it had control. And second, because it benefited from rental and admission fees, as well as parking and concession stand revenues paid by those coming to buy counterfeit records, it had (an admittedly indirect) financial interest.[19] The defendant also was guilty of contributory infringement because it knew about the activity and materially contributed to it by providing "space, utilities, parking, advertising, plumbing, and customers."[20]

### *SONY*

How would these theories of secondary liability apply in the context of dual-use devices? The first test came in *Sony Corporation of America v. Universal City Studios*.[21]

Universal City Studios and Walt Disney Productions sued Sony, the manufacturer of the Betamax home videocassette recorder (VCR), the first compact and affordable such device on the market. The studios claimed that Sony had committed contributory infringement by providing a device that allowed consumers to record copyrighted movies and television shows. The district court denied relief to the movie studios, but the Ninth Circuit reversed, finding that Sony had committed contributory infringement.[22]

In offering a test to apply to dual-use technologies, the Supreme Court reached into patent law to import the *staple article of commerce* doctrine. This doctrine

17. *Elektra Records v. Gem Elec. Distribs.*, 360 F. Supp. 821 (E.D.N.Y. 1973).

18. *Sony*, 464 U.S. at 438 n.18 (describing cases).

19. For a narrower conception of financial interest, see *Ellison v. Robertson*, 357 F.3d 1072, 1079 (9th Cir. 2004) (holding that a plaintiff must show that a defendant received "a direct financial benefit" from the infringing activity).

20. 76 F.3d 259, 260–64 (9th Cir. 1996).

21. 464 U.S. 417 (1984)

22. 464 U.S. at 419–20; *see* Steve Lohr, *Hard-Hit Sony Girds for a Fight in the American Market*, N.Y. Times, Aug. 14, 1983, § 3 at 8.

finds parties liable for contributory patent infringement if they sell a component that can only be used in a patented invention, as opposed to one that is a "staple article . . . suitable for substantial noninfringing use."[23]

In what was to become one of the most quoted sentences in all of copyright law, the Court asserted that

> the sale of copying equipment, like the sale of other articles of commerce, does not constitute contributory infringement of a copyright if the product is widely used for legitimate, unobjectionable purposes, or even if merely *capable of substantial non-infringing uses.*[24]

The Court also understood that "when major technological innovations alter the market for copyrighted materials," it was the role of Congress—not the courts—to "fashion[] the new rules." Only the legislature "has the constitutional authority and . . . institutional ability to accommodate fully the varied permutations of competing interests that are inevitably implicated by such new technology."[25]

The Court concluded that the consumers' recordings did not constitute direct infringement. Some copyright owners had granted permission to record their shows. And even for those who did not, the use of "time-shifting," or taping of a show to watch later, would tend to increase the potential audience. In addition, the plaintiffs had not been able to prove harm to the value of their copyrights from the practice.[26]

Because time-shifting constituted fair use, the Court found that the technology had a substantial noninfringing use. It thus reversed the Ninth Circuit and found that Sony was not liable for contributory infringement.[27]

In recent years, the exact contours of the *Sony* test have been subject to debate. The entertainment industry has focused on the language "widely used for legitimate, unobjectionable purposes" and has explained that consumers had used the VCR primarily for noninfringing uses.[28] But the more common, broader, reading—advanced by technology manufacturers—requires only that the device is "capable of substantial noninfringing uses" to escape liability.

The reverence in which *Sony* is held by technology makers is matched only by the razor-thin margin by which the test became law. For starters, the Court was only able to obtain the four votes needed to grant certiorari to overturn the Ninth Circuit's holding for the movie studios with a vote from Justice Harry Blackmun.

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23. 35 U.S.C. § 271(c). Other requirements for the offense are knowledge and the presence of a material component.

24. 464 U.S. at 442 (emphasis added).

25. *Id.* at 431.

26. *Id.* at 443–56.

27. *Id.* at 456.

28. Brief for Motion Picture Studio and Recording Company Petitioners at 30, 36, *MGM v. Grokster,* 125 S. Ct. 2764 (2003).

Given that Justice Blackmun wished to reaffirm the ruling, and that Justices in such a position often do not vote to grant certiorari, the merits of the case could very well have never reached the Court.[29]

On the merits themselves, the outcome was far from ordained. The Court initially voted to affirm the finding of liability. Justice Blackmun was assigned the task of drafting the majority opinion.[30] But there were vigorous debates among the Justices on numerous issues relating to private copying, fair use, and the test for secondary liability. Justice Sandra Day O'Connor, in particular, appeared to be the swing vote. Justice Blackmun accepted some of her suggestions, but the course of copyright history was forever changed when he refused to accept all, declaring that "[f]ive votes are not that important to me when I feel that proper legal principles are involved."[31]

Still not able to reach a decision by the end of the term, the Court reheard argument during the following term. It ultimately found for Sony, with Justice John Paul Stevens writing the majority opinion reversing infringement and Justice Blackmun dissenting.

How would *Sony* fare when applied to the very different technology of, and activity unleashed by, P2P file-sharing software? Before examining the courts' treatment of this issue, a brief background on the technology is warranted.

## P2P TECHNOLOGY

### Client-Server Model

The Internet is, among other things, a vast repository of information, similar to a library. As with any large library, a user performs two steps to get the data she wants. First, the user queries an index (such as a search engine) to locate the address of the data she desires. Second, the user goes to that address to retrieve the data.

For much of the Internet's history, these two exchanges occurred in a *client-server* model. The user loads *client* software—a web browser like Internet Explorer or Mozilla Firefox—and contacts a search engine such as Google that runs *server* software. In response to a query, Google returns an address that the user can click. That click initiates the second transaction in which the browser contacts a server that delivers the desired data. The World Wide Web is an example of this model.[32]

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29. Jonathan Band & Andrew J. McLaughlin, *The Marshall Papers: A Peek Behind the Scenes at the Making of* Sony v. Universal, 17 COLUM.-VLA J.L. & ARTS 427, 432 (1993).

30. *Id.* at 432–33.

31. Letter from Associate Justice Harry A. Blackmun to Associate Justice Sandra Day O'Connor at 1 (June 28, 1983).

32. Tim Wu, *When Code Isn't Law*, 89 VA. L. REV. 679, 719–20 (2003).

The data flow in the client-server model is overwhelmingly from server to client.[33] This asymmetry is reflected in the computing resources required. A client machine, which sends messages to the server, does not need to be powerful. A server, in contrast, could be required to find and present the desired data for thousands of requests at the same time.[34]

Two drawbacks plague the client-server model. First, it is not scalable (able to self-adjust to different levels of demand[35]); with each additional user or file, the server must add scarce resources to accommodate the higher usage. Relatedly, the increase in bandwidth costs for widely distributed large files can be prohibitive for many users.[36] Second, it is not robust; a crash at the central server takes down the entire system.[37]

Many copyright owners nonetheless prefer the client-server architecture, which presents little threat to their business models. Servers are few and well-funded, and they decisively control data flow. Owners thus are able to exert pressure to stop infringement at a few discrete points. If they find infringing content on a server, they can ask the operator to remove the material or find a court to order the server shut down.[38]

But the very control that copyright owners appreciate in the client-server model reveals its weakness. For this control mirrors vulnerability. With just a few points that can bring down the network, client-server architectures are more vulnerable to glitches, crashes, and even terrorist attacks, earthquakes, and wars.[39]

As the price of computing resources fell in the 1990s, the client-server model would become subject to challenge. More and more Internet users, running programs like Instant Messenger or Napster, would become servers in their own right.

### P2P

By 2000, the price of advanced computing resources had dropped low enough to be within the average household's budget. The price of one megabyte of hard

33. JAMES D. MCCABE, NETWORK ANALYSIS, DESIGN AND ARCHITECTURE 181 (2007).

34. Wolfgang Gruener, *Google Now Controls More than 50% of Search Requests from Americans*, TG DAILY (June 23, 2007), http://www.tgdaily.com/content/view/32603/118/ (noting that Google processed approximately 4 billion search requests in one recent month).

35. Brief for Respondents, at 7, *MGM v. Grokster*, 125 S. Ct. 2764 (2003).

36. Brief for Creative Commons as Amicus Curiae in Support of Respondents at 7, *MGM v. Grokster*, 125 S. Ct. 2764 (2003) [hereinafter Creative Commons Brief].

37. Brief for Respondents, at 7.

38. Wu, at 719.

39. Simson Garfinkel, *Pushing Peer-to-Peer*, TECH. REV., Oct. 2003, http://www.technologyreview.com/Infotech/13334/?a=f.

disk drive storage (which holds approximately 100 pages of single-spaced text) fell from $100 in 1985 to $1 in 1995 to 3/100 of 1¢ in 2008.[40] Accordingly, the price to store 1 gigabyte (1000 megabytes) of material—the typical size of a movie—fell from $100,000 to 30¢. And the price of persistent broadband Internet connections dropped from thousands of dollars a month to less than $100. Consumers could now afford such a connection to the Internet through cable modem or digital subscriber line (DSL). Once server-class resources became available to many, the client-server model was no longer inevitable. Thus began the era of P2P information-sharing networks.

The defining characteristic of a P2P network is that the second data acquisition step—the transfer of the file—is performed directly between users without any intervening server. On a P2P network, every user is both a client and a server. P2P thus does not suffer from the client-server model's lack of scalability and redundancy.

Peer-to-peer scales more quickly and cheaply because all users bring to the table their broadband connection, drive space, and files. Instead of clients queuing up at the gates of the server, the users simply ask each other for the data they want. On the lower end, the network also provides an opportunity for smaller, niche databases.

Peer-to-peer also provides a more robust system. One peer's crash does not affect the other peers on the system. And rather than residing on one central server, multiple redundant copies of data are dispersed throughout the network. In contrast to the typical client-server architecture, a P2P model improves with each additional user.

In addition to benefits for scalability and redundancy, P2P also has offered a more participatory experience. Users have created compilations and modified popular works, thus "assert[ing] a more active, self-defining role in the enjoyment, use, and creation of cultural expression."[41] In addition, every owner of a home movie or other large file is, for the first time, able to distribute it.

To be sure, there are drawbacks to P2P networks. It is more difficult to perform upgrades on the systems. Files on the networks are often of low quality

40. G. Kent Webb, *A Rule-Based Forecast of Computer Hard Drive Costs*, at 341 (2003), www.iacis.org/iis/2003_iis/PDFfiles/Webb.pdf (providing figures for 1985 and 1995); www.pcconnection.com (last visited August 31, 2008) (providing figure based on Lacie 500-gigabyte external hard drive offered for $149.95 (equivalent to.02999 pennies per megabyte)).

41. Neil W. Netanel, *Impose a Noncommercial Use Levy to Allow Free Peer-to-Peer File Sharing*, 17 HARV. J.L. & TECH. 2, 3 (2003).

or even spoof files inserted by record companies.[42] And some networks have installed intrusive "spyware" onto users' machines.[43]

In the short history of P2P networks, two types have been particularly influential: hybrid and superpeer. The two vary in how they perform the first data acquisition step of searching an index to get the address of desired data.

### Hybrid P2P

In *hybrid* networks, the first data acquisition step is performed under a client-server model. Each peer indexes the files on his or her machine and deposits that index with the central server, which aggregates the files into one giant index. The peers then consult a central server to locate desired information. The P2P aspect occurs when the peers conduct the data transfer between themselves.[44]

The rapidly adopted Napster was a hybrid network that introduced the world at large to the potential of P2P.[45] Napster scaled with astounding ease and swiftness. Only a year after its launch in 1999, the network was swapping three billion MP3 music files a month, a feat that could not have been duplicated with client-server architecture.[46]

Another example of hybrid P2P is provided by instant messaging (IM). Instant messaging servers facilitate communication by maintaining a dynamic list of who is online at any given time and searching for (and presenting a list of) a user's "friends." The communication between friends is done directly through P2P rather than the IM server.

As discussed more fully below, litigation over the Napster system encouraged a movement away from hybrid P2P networks to an architecture set up to prevent an owner's knowledge of, or control over, peers' activities.

### Superpeer P2P

This architecture, the second P2P model, is a *superpeer* (also known as supernode, ultrapeer, or decentralized) network.[47]

In such a network, the creator does not designate specific machines to serve as index servers. Instead, the software running on all the peers takes stock of

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42. Spoof files are "cleverly concealed fakes" that have included silence, a song's chorus repeated endlessly, or bands speaking about a song. Gil Kaufman, *Music Industry Uses 'Spoofs' To Throw Off Illegal File Traders*, THE ENQUIRER, May 18, 2003, http://www.enquirer.com/editions/2003/05/18/tem_download18.html.

43. Bill Rosenblatt, *Learning from P2P: Evolution of Business Models for Online Content*, INDICARE, Oct. 12, 2004, http://www.indicare.org/tiki-read_article.php?articleId=61.

44. *See generally* Wu, at 720.

45. Benny Evangelista, *Napster Names CEO, Secures New Financing*, SAN FRAN. CHRON., May 23, 2000, at C1.

46. Wu, at 710. Peer-to-peer file-sharing is facilitated by the compression of music into a digital file format known as MPEG Layer-3 (MP3), which speeds up transfers between computers.

47. *Id.* at 734.

each other's available resources, including bandwidth, drive space, and processing power. If a peer is well-endowed and the software determines that a new index server is needed, the P2P software will automatically elevate that machine to superpeer status. The superpeer then becomes the index server for a group of nearby "children" peers. Superpeers communicate amongst themselves, creating a secondary network of high-performance, self-managing index servers that can dynamically scale and operate hidden from the network owner.[48]

Superpeer networks, while less centralized than hybrid models, solved the problems confronting even more decentralized systems, known as *pure* networks. In these systems (such as early versions of Gnutella), users maintain an index only of the contents of their own machines, and search queries proceed in an expanding fashion from immediate neighbors outward.[49] But because they lack centralized indexes or supernodes, pure P2P networks are inefficient. Every search must traverse a large number of tiny, individual indexes, with a request for an obscure file or a large set of query results clogging the network with thousands of requests and reply messages. Pure networks thus have not played as important a role as the other two systems.

The most famous superpeer network is FastTrack, which debuted in 2000. Multiple programs, including KaZaA and Grokster, have built on this network. When Napster shut down operations in 2000, millions of file-sharers migrated to FastTrack. The network scaled admirably and soon was supporting more users and swapping more files than Napster at its height.[50]

The overriding legal question with dual-use technologies is whether they are used for infringing or noninfringing purposes. With superpeer networks, however, the software's owner cannot answer this question. Once a user downloads the P2P software, the owner does not know how it is being used. Nor can the owner terminate peers or alter their activity.

The differences among the hybrid and superpeer architectures are crucial in explaining how courts have analyzed these issues.

## P2P LEGAL TRILOGY

Courts in three cases have considered the application of secondary liability theories to P2P software: *A&M Records, Inc. v. Napster, Inc.*,[51] *In re Aimster Copyright Litigation*,[52] and *MGM v. Grokster*.[53]

In the *Napster* case, the court addressed Napster's MusicShare software, which, at the time of the district court decision, was responsible for the sharing

48. *See generally Peer Architectures,* http://www.leuf.com/books/p2p-html/p2p-02.htm.
49. Wu, at 731.
50. *Id.* at 734.
51. 239 F.3d 1004 (9th Cir. 2001).
52. 334 F.3d 643 (7th Cir. 2003).
53. 545 U.S. 913 (2005).

of approximately 10,000 music files per second.[54] Since most of these files were copyrighted, the recording industry sued Napster for facilitating copyright infringement.

Napster worked as follows. First, a user downloaded from the company's Web site its MusicShare software, which allowed it to access the network. Second, the user specified files to be shared with others, and when the user was online the list of files was supplied to Napster. Third, the user searched for other users' files. Finally, to transfer a copy of the file, the user received the Internet address of the "host user" (who had the files) from the Napster servers, connected to the host user, and downloaded a copy of the file directly from the other computer in a "peer-to-peer" fashion.[55]

The district court issued a preliminary injunction against Napster.[56] The Ninth Circuit affirmed, concluding that Napster would likely be held liable for contributory infringement.[57] The company's actual knowledge was revealed through its notice of more than 12,000 infringing files as well as a document asserting "the need to remain ignorant of users' real names and IP addresses 'since they are exchanging pirated music.'" The court sidestepped the *Sony* question, finding that, even if Napster were capable of a substantial noninfringing use, its actual knowledge was sufficient to impose liability.

In addition to actual knowledge, the company had constructive knowledge because its executives, who had recording industry experience and had enforced IP rights, downloaded copyrighted songs and "promoted the site with 'screen shots listing infringing files.'" In addition, Napster materially contributed to the infringing activity since its services were crucial to finding and downloading desired music.

The Ninth Circuit also found it likely that Napster would be vicariously liable. The company benefited from the increase in users that resulted from the availability of copyrighted works. And it had the right to terminate users' access to the system. Vital to this control was the architecture of hybrid P2P systems. Because it managed the centralized search indexes, Napster could observe the peers' activities and eject users from the system.

The second case, *In re Aimster Copyright Litigation*, involved largely similar facts. But there were a few differences: the system operated over the America Online Instant Messaging System, it included tutorials teaching users how to use the software for swapping computer files, and it encrypted communications.[58]

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54. *A&M Records, Inc. v. Napster, Inc.*, 114 F. Supp. 2d 896, 902 (N.D. Cal. 2000).

55. The description of the Napster technology is taken from the Ninth Circuit decision. *See* 239 F.3d at 1011–12.

56. In the context of a preliminary injunction, courts predict the likelihood of success as opposed to making conclusive determinations.

57. The court's legal analysis appears at 239 F.3d at 1020–24.

58. 334 F.3d at 646.

The Seventh Circuit affirmed an injunction against the file-sharing service on the grounds of contributory infringement.[59] In cases of substantial noninfringing uses, the court called for an "estimate of the respective magnitudes of these uses." And it added its own gloss to *Sony* by stating that an actual (as opposed to a potential) noninfringing use was needed to avoid liability. Applying its test, the court concluded that Aimster had "failed to produce any evidence that its service has ever been used for a noninfringing use."

The court rejected Aimster's argument that encryption prevented it from learning about infringement, concluding that "[w]illful blindness is knowledge." And it found knowledge in company tutorials that used only copyrighted works.

Finally, the court raised the bar against technology providers even higher when it required them to show, in cases of substantial infringing uses, that "it would have been disproportionately costly . . . to eliminate or at least reduce substantially the infringing uses." Aimster's inability to make this showing contributed to the court's imposition of liability against the file-sharing service.

The hybrid P2P architecture at issue in the *Napster* and *Aimster* cases thus did not bode well for future P2P operators. It is not surprising, then, that P2P networks moved in the direction of decentralized systems.

Just such a network was at issue in the third case, *MGM v. Grokster*. Grokster's software used the FastTrack technology that routed user requests to computers (supernodes) that collected temporary indexes of files and disclosed the file location for downloading purposes. StreamCast's Morpheus software used Gnutella technology, which was similar but in some versions replaced supernodes with peer computers that communicated directly with each other.[60]

A group of copyright holders, including movie studios, recording companies, songwriters, and music publishers, sued Grokster and StreamCast for contributory infringement. The district court granted summary judgment for Grokster and StreamCast, and the Ninth Circuit affirmed. The appellate court refused to find contributory infringement because there were no central servers that could intercept search requests or mediate the users' file transfers.[61] In short, the software did not allow control over index files or provide the "site and facilities" for infringement. The court denied vicarious liability because the defendants could not prevent users from obtaining access.

The Supreme Court granted certiorari. The copyright community eagerly awaited the Court's resolution of the issue. How would it apply the crucial dual-use technology case, *Sony*? How would the doctrines of contributory infringement and vicarious liability apply in the P2P context?

These questions would go unanswered. The Court highlighted the defendants' evidence of intent and explained that "the [*Sony*] case was never meant to foreclose

59. The court's legal analysis appears at 334 F.3d at 649–53.

60. 545 U.S. at 921–22.

61. *MGM Studios, Inc. v. Grokster Ltd.*, 380 F.3d 1154, 1163, 1165 (9th Cir. 2004).

rules of fault-based liability derived from the common law."[62] It also downplayed the traditional notions of contributory infringement and vicarious liability in relying on a theory of inducement.[63] It held that

> one who distributes a device with the object of promoting its use to infringe copyright, as shown by clear expression or other affirmative steps taken to foster infringement, is liable for the resulting acts of infringement by third parties.

The Court promised that liability would not attach to "mere knowledge" of potential or actual infringing uses or "ordinary acts incident to product distribution, such as offering customers technical support or product updates."

The Court overturned summary judgment for the defendants, finding that they could be held liable for inducement. It found that the defendants advertised a message designed to stimulate others to commit infringement. StreamCast urged the adoption of an OpenNap program for Napster patrons, Grokster distributed an electronic newsletter with links to articles promoting its software's ability to access popular copyrighted music, and both defendants responded to requests for help in locating and playing copyrighted materials.

The Court focused on three pieces of evidence in particular. First, the defendants targeted the market of former Napster users through advertisements, software functions similar to Napster, and (in the case of Grokster) a name derived from Napster and diversions of Napster queries to its own Web site. Second, neither company attempted to reduce infringement by using filtering tools or other similar mechanisms. Third, the companies' business models demonstrated a financial benefit from infringement, as the sharing of copyrighted works increased the user base, which boosted advertisements and revenue. The Court indicated that the second and third factors standing alone would not constitute infringement, but never explained exactly what activity would suffice.

Although the Court did not apply *Sony* to the facts of the case, two concurrences addressed the issue. Speaking for three Justices, Justice Ruth Bader Ginsburg found that the case "differ[ed] markedly from *Sony*" since "there has been no finding of any fair use and little beyond anecdotal evidence of noninfringing uses." Instead, the software was "overwhelmingly used to infringe."[64]

In contrast, Justice Stephen Breyer, also speaking for three Justices, found that the technology was "capable of substantial noninfringing use" and that defendants' 10 percent noninfringing uses were similar to the Sony

62. The Court's analysis appears at 545 U.S. at 934–40.

63. As the *Sony* Court did in borrowing the staple-article doctrine, the *Grokster* Court turned to patent law in borrowing the concept of inducement. Such importation is partially explained by the absence of statutory standards for secondary liability in copyright law.

64. *Id.* at 945, 948 (Ginsburg, J., concurring).

VCR's 9 percent authorized uses. He also supported the *Sony* rule as clear, forward-looking, and protective of new technologies.[65]

After the decision, Grokster settled with the copyright industry, agreeing to not give away its software or participate in the theft of copyrighted works and to pay $50 million.[66] StreamCast continued to litigate but lost at the summary judgment stage. The district court found that the solicitation of former Napster users, assistance to infringing users, advertisement-based business model, and failure to implement filtering technology demonstrated an intent to induce infringement. It explained that the "ultimate question" involved the defendant's intent. And it concluded that a court could find "an inference of intent to encourage infringement . . . [e]ven if filtering technology does not work perfectly and contains negative side effects on usability."[67]

Shortly after the *Grokster* decision, the Recording Industry Association of America (RIAA), the trade group representing the U.S. recording industry, launched suits against other popular P2P programs such as BearShare and LimeWire. These companies and others settled with the RIAA, bringing to a halt nearly all commercial development of P2P software.

The *Napster*, *Aimster*, and *Grokster* courts presented three different views of *Sony* and secondary liability doctrines. Which, if any, got it right?

## CREATIVITY-INNOVATION TRADEOFF

To answer this question, we must wrestle with the fundamental challenge in dual-use technology cases: how to encourage creativity while not stifling innovation. Creativity could be promoted by strong copyright rights but threatened by the reproduction and rapid, widespread distribution of perfect digital copies of works. Aggressive tests for indirect copyright infringement, however, come at the price of innovative dual-use technologies. The more that such technologies are restricted, the fewer revolutionary innovations will be offered.

At first glance, the tradeoff between creativity and innovation may seem intractable. How do we compare the apples of creativity to the oranges of innovation? At least in the context of P2P technology and CD sales, a closer look dispels any struggle. For innovation is far more directly affected by the test selected than creativity.

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65. *Id.* at 952, 957–58 (Breyer, J., concurring). For a view that the concurrences focused on whether a substantial portion of the device's uses were actually noninfringing, see R. Anthony Reese, *The Temporal Dynamics of "Capable of Substantial Noninfringing Uses,"* 13 MICH. TELECOMM. & TECH. L. REV. 197, 218 (2006) [hereinafter Reese, *Temporal Dynamics*].

66. Associated Press, *Grokster Agrees To Shut Down for Good*, Nov. 7, 2005, http://www.msnbc.msn.com/id/9959133/.

67. *MGM Studios, Inc. v. Grokster, Ltd.*, 454 F. Supp. 2d 966, 985–90 (C.D. Cal. 2006).

Four findings demonstrate this point:

(1) There are numerous reasons why CD sales have declined in recent years.
(2) Copyright holders have many potential remedies other than targeting P2P networks.
(3) Individual artists play a crucial role in creativity.
(4) Innovation can create new markets and models for copyrighted works.

In relying on these findings, I do not challenge the conclusion that file sharing has reduced CD sales. Some studies in fact have found such an effect:

- A survey of college students in 2003 concluded that downloading reduced students' purchases of hit albums by approximately 10 percent.[68]
- Downloading "could have caused a 20 percent reduction in music sales worldwide" between 1998 and 2002.[69]
- "Countries with higher internet and broadband penetration have experienced higher reductions in music sales."[70]

But others, in contrast, have concluded that

- because of music sampling, "file sharing has only had a limited effect on record sales . . . statistically indistinguishable from zero"[71];
- file sharing reduced the purchases of 15-to-24-year olds while increasing the purchases of those over 25[72];
- among Canadians engaging in file-sharing, "one additional P2P download per month . . . increased music purchasing by 0.44 CDs per year."[73]

68. Rafael Rob & Joel Waldfogel, *Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students*, at 1, Nov. 2004, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=612076.

69. Martin Peitz & Patrick Waelbroeck, *The Effect of Internet Piracy on Music Sales: Cross-Section Evidence*, 1 Rev. Econ. Res. on Copyright Issues 71, 78 (2004) (examining country-level figures).

70. Alejandro Zentner, *File Sharing and International Sales of Copyrighted Music: An Empirical Analysis with a Panel of Countries*, 5 Topics Econ. Analysis & Pol'y, at 13–14 (2005) (relying on country-level data).

71. Felix Oberholzer & Koleman Strumpf, *The Effect of File Sharing on Record Sales: An Empirical Analysis*, at 3 (2004), http://www.unc.edu/~cigar/papers/FileSharing_March2004.pdf (using download and sales data).

72. Eric S. Boorstin, *Music Sales in the Age of File Sharing*, at 2, http://www.cs.princeton.edu/~felten/boorstin-thesis.pdf (analyzing the relationship between Internet access and CD sales).

73. Birgitte Andersen & Marion Frenz, *The Impact of Music Downloads and P2P File-Sharing on the Purchase of Music: A Study for Industry Canada*, at 33 (2007), http://www.ic.gc.ca/epic/site/ippd-dppi.nsf/vwapj/IndustryCanadaPaperMay4_2007_en.pdf/$FILE/IndustryCanadaPaperMay4_2007_en.pdf.

In offering a conservative approach that gives the benefit of the doubt to creativity in the innovation-creativity tradeoff, I credit the evidence that file-sharing has reduced sales. But even with this approach, four other factors demonstrate the selected test's more direct effect on innovation.

### Reasons for Declining Sales

First, even if CD sales have decreased, there are many possible causes other than file-sharing:

- Higher CD prices
- An unwillingness to offer singles to customers
- Smaller FM radio playlists from consolidation among radio owners and record labels
- The increasing importance of mass market retailers (like Wal-Mart) that carry far fewer titles
- Reduced quality
- Increased offline sharing in the form of burned CDs and DVDs, swapped hard drives, and shared USB drives
- A high sales benchmark in the late 1990s from new acts such as Britney Spears,'NSync, and Christina Aguilera as well as the conversion of LP and cassette collections to CDs
- A downturn in the global economy
- Increasing competition for consumers' entertainment dollars from DVDs and video games.[74]

Even an internal study done by a recording company showed that "between two-thirds and three-quarters of the drop in sales in America had nothing to do with internet piracy."[75] The RIAA itself conceded, in announcing shipment figures for the first half of 2006, that "[c]ompetition for spending on entertainment, especially in a tough economy, likely played a factor" in reduced sales of CDs and DVDs.[76]

In addition, declines in CD sales have been matched by increases in legal digital downloads. In a 2006 press release, the Chairman and CEO of the RIAA

74. Digital Connections Council of the Comm. for Econ. Development, *Promoting Innovation and Economic Growth: The Special Problem of Digital Intellectual Property*, at 20–21 (2004), *available at* http://www.ced.org/docs/report/report_dcc.pdf; Letter from Electronic Frontier Foundation to Commissioner Deborah Platt Majoras et al., Jan. 18, 2005, at 3–5, http://www.eff.org/deeplinks/archives/EFF%20FTC%20P2P%20comments%20Jan05.pdf; Electronic Frontier Foundation, *Campus Lawsuits Against P2P = Stopping File Sharing*, May 30, 2007, http://www.eff.org/deeplinks/archives/005280.php.

75. *Music's Brighter Future*, The Economist, Oct. 30, 2004.

76. *RIAA Announces First Half 2006 Music Shipment Numbers II*, Oct. 12, 2006, http://www.riaa.com/newsitem.php?news_year_filter=&resultpage=7&id=10D868A5-AAD7-6142-4307-2207FE6D7B53.

proclaimed that "[t]he appetite for music is as strong as ever" and that "a digital marketplace now worth nearly $2 billion has emerged virtually overnight." He supported this enthusiasm by pointing to digital music formats, with 586 million downloaded singles representing a 60 percent increase over the previous year, and 28 million downloaded albums representing a 103 percent increase. In short, he claimed, even if "[t]oday's music marketplace has challenges . . . it also offers reason for hope and optimism."[77]

### Other Remedies

Second, even if there were a reduction in sales that could be linked to P2P file sharing, secondary liability is only one potential avenue available to copyright owners. For example, owners could sue direct infringers. And they have: as of July 2006, the RIAA had sued more than 20,000 individuals for file sharing.[78]

Copyright owners also could go to Congress to address particular technologies, which the legislature has done on numerous occasions. It has enacted special provisions for computer programs and rentals of software and sound recordings.[79] It has crafted compulsory license rules for musical works, jukeboxes, public broadcasting, and cable television and satellite systems.[80] It passed the Audio Home Recording Act of 1992 (AHRA), which imposed royalties on digital recording equipment and blank recording media, dividing the revenue among music copyright owners and performers.[81] And it enacted the Digital Millennium Copyright Act (DMCA) to punish the circumvention of technological measures controlling access to copyrighted works.[82] This statute revealed another tool in Congress's arsenal in its safe harbor for Internet service providers that implemented termination procedures for repeat infringers and honored "standard technical measure[s]" for preventing infringement.[83]

In the file-sharing context, Congress could choose from an array of proposals that scholars have recently offered. Professors William Fisher and Neil Netanel

77. *RIAA Releases 2006 Shipment Report*, Apr. 17, 2007, http://www.riaa.com/newsitem.php?news_year_filter=&resultpage=3&id=D98F4958-EBBE-56A7-4B05-FE354C991826. Growth continued the following year, with 810 million downloaded singles representing a 38 percent increase from 2006, and 42 million downloaded albums representing a 54 percent increase. Recording Industry Association of America, *2007 Year-End Shipment Statistics*, http://76.74.24.142/8112 8FFD-028F-282E-1CE5-FDBF16A46388.pdf (last visited June 1, 2008).

78. Electronic Frontier Foundation, *How To Not Get Sued for File Sharing*, http://www.eff.org/IP/P2P/howto-notgetsued.php.

79. 17 U.S.C. §§ 109(b), 117.

80. 17 U.S.C. §§ 111, 115, 116, 118.

81. 17 U.S.C. §§ 1001–10.

82. 17 U.S.C. §§ 1201–05.

83. 17 U.S.C. § 512(i).

have separately called for levy regimes by which products used for file sharing are taxed, with the revenue distributed to copyright owners.[84] Another proposal would create a dispute resolution system that would allow copyright owners to obtain quick relief against abusers of P2P networks.[85]

Congress is better able to address the issue than courts. The legislature can craft solutions for particular technologies. It can draw on a wide array of remedies that includes compulsory licenses, exemptions, and specific technological prescriptions. And it can hold hearings, undertake studies, and engage in other in-depth fact-finding and consensus building.[86] Courts, in contrast, cannot operate with such precision. They issue rules that affect all technologies, including new ones of which they may not even be aware. Their range of remedies is much narrower. They lack broad fact-finding capabilities.

Another avenue for copyright owners involves technological protection measures. Encryption allows only those with special knowledge (a "key") to read protected information.[87] Electronic digital watermarks are identification tags built into digital files that are invisible to humans but that can be tracked by computers.[88] And digital fingerprinting technology converts the content of a work into a unique digital identification mark.[89] These, and other forms of digital rights management (DRM) technologies, allow copyright owners to impose limits on how their works are used.

Owners also could offer improved legal options for offering music and movies online. Apple's iTunes store, which features songs, movies, TV shows, audiobooks, and podcasts, is one obvious example. In February 2008, less than five years after its introduction, Apple became the number two music retailer in the country (behind Wal-Mart), with 50 million customers purchasing more than

84. William W. Fisher, III, Promises to Keep: Technology, Law, and the Future of Entertainment, ch. 6 (2004); Neil W. Netanel, *Impose a Noncommercial Use Levy to Allow Free Peer-to-Peer File Sharing*, 17 Harv. J.L. & Tech. 2 (2003).

85. Mark A. Lemley & R. Anthony Reese, *Reducing Digital Copyright Infringement Without Restricting Innovation*, 56 Stan. L. Rev. 1345, 1351 (2004).

86. Congress's institutional superiority does not automatically mean its attempts will be successful. For example, in the proposed Inducing Infringement of Copyrights Act (Induce Act), Congress would have expansively punished anyone who "intentionally aids, abets, induces, or procures" infringement. S.2560, 108th Cong. (2004).

87. *Encryption*, Wikipedia, http://en.wikipedia.org/wiki/Encryption.

88. Timothy K. Andrews, *Control Content, Not Innovation: Why Hollywood Should Embrace Peer-to-Peer Technology Despite the MGM v. Grokster Battle*, 25 Loy. L.A. Ent. L. Rev. 383, 416 (2005).

89. Lionel S. Sobel, *DRM as an Enabler of Business Models: ISPs as Digital Retailers*, 18 Berkeley Tech. L.J. 667, 681 (2003).

four billion songs.[90] Other examples are Movielink and CinemaNow, which offer movies and TV shows for rental or sale.[91]

This array of options is even more palatable because it is far from clear that rulings banning particular file-sharing systems would have a measurable effect. Peer-to-peer downloading has skyrocketed even after the decisions against Napster, Aimster, and Grokster. By 2007, more than 9 million users in the United States were simultaneously connected to the P2P networks at any given time.[92]

Moreover, off-shore companies such as KaZaA lie outside the reach of U.S. copyright law. Private networks known as "darknets" are difficult to detect. And the decentralization and widespread distribution of P2P software ensures that, even after an adverse court decision, the file-sharing genie cannot be put back in the bottle.

### Artist Creativity

Third, even if the "big four" major recording labels—Sony BMG, Universal, EMI, and Warner Brothers—have suffered losses, this does not equate with reduced creativity.[93] The Copyright Clause of the Constitution endeavors to promote the progress of "Science and the useful Arts," not to maximize the profitability of the entertainment industry.

One of the most useful functions provided by the recording industry is discovering the next superstar.[94] But, as discussed later in this chapter, P2P can serve such a function in a different (and more inclusive) fashion by drawing on the strength of a broad universe of users. The industry has also played a role in producing and promoting albums. Significant declines in the cost of recording equipment, however, have allowed musicians to set up their own recording studios. And the roles of the industry and radio stations in promoting music are being displaced by social networking websites such as MySpace and Facebook.[95]

Even reduced CD sales flowing from P2P would not affect the creators themselves as artists nearly always receive most, if not all, of their income from

90. Apple, *iTunes Now Number Two Music Retailer in the U.S.*, Feb. 26, 2008, http://www.apple.com/pr/library/2008/02/26itunes.html.

91. www.movielink.com, www.cinemanow.com.

92. Eric Bangeman, *P2P Traffic Shifts Away from Music, Towards Movies*, ARSTECHNICA, July 5, 2007, http://arstechnica.com/news.ars/post/20070705-p2p-traffic-shifts-away-from-music-towards-movies.html.

93. Because the record industry has fewer revenue sources than the music industry, it relies more on CD sales.

94. Theo Papadopoulos, *Are Music Recording Contracts Equitable? An Economic Analysis of the Practice of Recoupment*, 4 MEIEA J. 83 (2004), http://www.meiea.org/Journal/html_ver/Vol04_No01/Vol_4_No_1_A5.html.

95. FISHER, PROMISES TO KEEP, at 21–23.

live performances. The Grateful Dead, for example, encouraged free copying and distribution of their live performances but still earned $50 million per year in the early 1990s.[96] Record companies charge artists for production, marketing, and promotion costs, and an artist typically must sell more than one million copies of a CD before receiving royalties. Artists thus are far more likely to be in debt to the recording industry than to receive royalties from CD sales.[97] It is not a surprise, then, that a majority of 2,500 surveyed artists and musicians were not concerned about file-sharing and that two-thirds indicated that the practice poses "a minor threat or no threat" to the movie and music industries.[98] At a minimum, lesser-known artists prefer the sampling and increased exposure that accompanies file-sharing.[99]

Artists have explored ways of distributing their music through P2P channels. A few examples include

- Steve Winwood's release of a free song on a P2P network, followed by a 700 percent increase in album sales in certain regions
- Heart's release of an album on a "try it before you buy it" basis that sold more copies through P2P networks than through Apple's iTunes store
- The model and singer Tila Tequila, who landed a record deal through her active involvement in MySpace, where she accumulated 2 million friends
- Sananda Maitreya (formerly Terence Trent D'Arby), who exclusively released songs on his own customized version of P2P software
- The Dave Matthews Band, which uses BitTorrent to share files and seeks to "foster greater interaction within the fan community" through the trading of taped performances
- Wilco, which responded to AOL Time Warner's Reprise Records' refusal to release its album by distributing it for free over a P2P network, receiving interest from several labels, and garnering a gold album[100]

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96. Ted Drozdowski, *Jam Nation: The Dead Return to a Diversifying Field of Like-Minded Bands*, The Providence Phoenix, June 20, 2003, http://www.providencephoenix.com/music/other_stories/documents/02965382.asp; Urs Gasser et al., *Content and Control: Assessing the Impact of Policy Choices on Potential Online Business Models in the Music and Film Industries*, at AV-2, Jan. 7, 2005, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=654602.

97. Charles C. Mann, *The Heavenly Jukebox*, Atlantic Monthly, at 39, 50 (Sept. 2000).

98. Mary Madden, *Pew Internet & American Life Project, Artists, Musicians and the Internet*, at 21, Dec. 5, 2004, http://www.pewinternet.org/PPF/r/142/report_display.asp.

99. Ram D. Gopal et al., *Do Artists Benefit From Online Music Sharing?*, at 38, Feb. 2004, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=527324.

100. Katie Dean, *Winwood: Roll with P2P, Baby*, Wired.com, July 9, 2004, http://www.wired.com/entertainment/music/news/2004/07/64128; Tony Smith, *P2Pers: We Can Make File-Sharing Secure and Outsell iTunes*, July 22, 2004, http://www.theregister.co.uk/2004/07/22/p2p_vs_itunes/ (Heart); *Multi-Platinum Grammy-Award Winning Artist Sananda Maitreya Becomes the First Major Artist To Fully Embrace File Sharing with his Own*

## New Markets and Disruptive Innovation

Fourth, innovation can enhance creativity. Even if new technologies threaten an existing business model in the short term, they promise to make copyrights more valuable by creating new markets and models in the long run.[101] And because innovation is crucial to economic growth, stifled technologies threaten to hamper the nation's economy. Thwarting innovation could be particularly dangerous because of the revolutionary nature of many of the dual-use technologies, which—as the camera, photocopier, TV, iPod, and others reveal—have a profound effect on our lives.

Of course, copyright owners fear changes that would upset established business models with which they are familiar and from which they have gained significant profits. Their crusades against the player piano, VCR, broadband networks, and other technologies reveal the depth of their concern with any effects on their business models. But "history has shown," as the Ninth Circuit in *Grokster* explained, "that time and market forces often provide equilibrium in balancing interests, whether the new technology be a player piano, a copier, a tape recorder, a video recorder, a personal computer, a karaoke machine, or an MP3 player." This court thus correctly promised "to exercise caution before restructuring liability theories for the purpose of addressing specific market abuses, despite their apparent present magnitude."[102]

In fearing the potential of the new business models, the recording labels offer a classic example of market leaders that fail to appreciate disruptive innovation. Clayton Christensen famously showed that, when faced with a new technology that threatens to upset a profitable business model, the market leader tends not to appreciate the full potential of the new paradigm, instead implementing sustaining innovations.[103] These improvements appear less risky because managers serve customers with known needs and increase their market share.[104] But the very reason they are effective with sustaining innovations explains why they cannot analyze markets that do not exist and cannot appreciate the paradigm shift of disruptive technologies.[105]

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*Branded P2P File Sharing Software*, http://trustyfiles.com/corp-press-sananda.php (last visited June 2, 2008); *Dave Matthews Band Fansite Starts Using BitTorrent To Share Songs*, ZEROPAID, http://www.zeropaid.com/news/8230/Dave%B1Matthews%B1B and%B1fansite%B1starts%B1 (last visited May 21, 2008); *The Official Dave Matthews Band Website*, http://www.davematthewsband.com/legal/index.html (last visited May 21, 2008); Andrews, at 411 (Wilco).

101 Fred von Lohmann, *Betamax Was a Steppingstone*, http://www.eff.org/IP/P2P/MGM_v_Grokster/?f=betamax_20th.html.

102. *Grokster*, 380 F.3d at 1167.

103. CLAYTON M. CHRISTENSEN, THE INNOVATOR'S DILEMMA: WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL 42 (1997).

104. *Id.* at 45.

105. *Id.* at 147.

The recording industry's response to Napster's arrival provides evidence of this blindness. The top executives of the music industry held secret talks in 2000 with Napster. Napster's vice president of product development, Don Dodge, explained that the company's goal was to be "the online distribution channel for the record labels, much like iTunes and the 'new' Napster is today." Napster held out the promise of a new revenue stream that could target niche markets, quickly and cheaply introducing new artists to specific markets while saving the record labels manufacturing and promotion expenses. Although the recording industry initially indicated a willingness to enter licenses with Napster and the company made an offer of $1 billion, the two sides never reached an agreement.[106]

As Dodge explained, the labels "wanted us dead because they felt Napster's digital distribution business would kill the CD business." And as Hillary Rosen, the then-CEO of the RIAA explained, "The record companies needed to jump off a cliff, and they couldn't bring themselves to jump." Unwittingly reading from the script of disruptive innovation, Rosen explained that retailers were telling the industry that they could not "sell anything online cheaper than in a store" and that artists were urging them not to "screw up [their] Wal-Mart sales."[107]

So instead of striking a deal with Napster, the sole dominant P2P service, that would have seamlessly transported the recording industry into the digital era, the industry went on the attack, suing Napster for secondary copyright infringement. And while it may have won the battle in shutting down the service, it began to lose the war as former Napster users migrated to other P2P networks and refused to wait two years until the arrival of the first user-friendly legal alternative to file-sharing, Apple's iTunes Music Store.[108]

Although they missed the critical window in the early part of this decade, the recording industry has belatedly come to appreciate its ability to benefit from new business models. In the past few years, the RIAA has welcomed the "spur to innovation" resulting from new music formats.[109] As it has trumpeted:

> We have transformed the way we do business and deliver music to consumers. The ways fans can enjoy music—and the ways the industry can recognize a

106. Don Dodge, *Napster—The Inside Story and Lessons for Entrepreneurs, Don Dodge on the Next Big Thing*, Oct. 3, 2005, http://dondodge.typepad.com/the_next_big_thing/2005/10/napster_the_ins.html; Brian Hiatt & Evan Serpick, *The Record Industry's Decline*, Rolling Stone, June 28, 2007, http://www.rollingstone.com/news/story/15137581/the_record_industrys_decline.

107. Hiatt & Serpick, *The Record Industry's Decline*.

108. The subscription services started by the labels, PressPlay and MusicNet, were not successful due to their cost, inability to allow CD burning, and failure to work with existing MP3 players.

109. *RIAA Issues 2004 Year-End Shipment Numbers*, Mar. 21, 2006, http://www.riaa.com/newsitem.php?news_year_filter=&resultpage=23&id=15F0FBEE-62A2-DB32-AADF-708D6145E675.

return on its investment—have never been greater: download and subscription services, mobile phone content, enhanced value CDs, burn-on-demand kiosks, digital radio services.[110]

In short, as the RIAA has slowly come to recognize, innovation can have a positive effect on creativity. We thus do not need to choose sides in the tradeoff between creativity and innovation. Copyright owners' predictions of short-term doom notwithstanding, new technologies promise to create new markets and business models. They do not threaten creativity. And the revolutionary innovation they unleash is essential to consumers' livelihoods and the growth of the U.S. economy.

Given the importance of innovation, it is disturbing that courts have been reducing their solicitude for it. A central reason for this development is what I call the *innovation asymmetry*, by which courts downplay new technologies' future benefits and overemphasize copyright owners' present losses. This danger is exacerbated by an *error-costs asymmetry*, which reveals that a technology's abandonment has a far more drastic effect than its wrongful continuation. And dual-use technology makers suffer even more from a *litigation asymmetry*, as a thicket of complex tests providing multiple routes of challenge could push them into bankruptcy.

## INNOVATION ASYMMETRY

Courts in dual-use cases consider a technology's infringing and noninfringing uses. But their comparison will systematically overemphasize the infringing uses and underappreciate the noninfringing uses. Why?

Because infringing uses are immediately apparent, quantifiable, and advanced by motivated, well-financed copyright holders. Noninfringing uses, in contrast, are less tangible and less apparent at the onset of a technology. I call this the *innovation asymmetry*.

The costs of infringing uses can be quantified. A market exists to assign a value to copyrighted works. And the costs are accentuated by the abundant evidence: because infringement has already occurred, plaintiffs need not speculate about future potential infringement. Surveys of downloaded works present tangible evidence of (often massive) copyright infringement to the court on a silver platter.[111]

110. *RIAA Issues 2005 Year-End Shipment Numbers*, Mar. 31, 2006, http://www.riaa.com/newsitem.php?news_year_filter=&resultpage=11&id=B30462E2-ACC9-5EDE-1827-B45EBCAC729A.

111. R. Anthony Reese, *The Problems of Judging Young Technologies: A Comment on* Sony, *Tort Doctrines, and the Puzzle of Peer-to-Peer*, 55 CASE W. RES. L. REV. 877, 890–91 (2005).

Moreover, the costs are vivid in threatening the copyright industries' business models. As the Ninth Circuit explained in *Grokster*, "[t]he introduction of new technology is always disruptive to old markets, and particularly to those copyright owners whose works are sold through well-established distribution mechanisms."[112] Copyright owners' panic upon the introduction of numerous technologies in the past century provides concrete illustrations of this threat.

Finally, all of the tasks needed to demonstrate harms from copyright infringement can easily be undertaken by the recording and motion picture industries, which have no shortage of resources.

In contrast, noninfringing uses are less tangible, less obvious at the onset of a technology, and not advanced by an army of motivated advocates.

First, they are less tangible. Noninfringing uses are difficult to quantify. How do we put a dollar figure on the benefits of enhanced communication and interaction? Estimates of future noninfringing uses will be less convincing than the actual, hard-dollar figures presented by copyright owners.

Second, they are more fully developed over time. When a new technology is introduced, no one, including the inventor, knows all of the beneficial uses to which it will eventually be put.[113] The path of history is replete with inventions for which nobody foresaw the eventual popular and revolutionary use:

- Alexander Graham Bell thought the telephone would be used primarily to broadcast the daily news.
- Thomas Edison thought the phonograph would be used "to record the wishes of old men on their death beds."
- Railroads were originally considered to be feeders to canals.
- Radio technology (which eventually resulted in radar, cell phones, microprocessors, and wireless telecommunications) initially would be used in isolated locations or for ships at sea, where wire communications were not possible.
- Electricity and lasers were not used for decades after their discovery since they did not represent "an obvious substitute for anything that already existed."
- IBM envisioned only 10 to 15 orders for the computer in 1949.
- The VCR (which eventually created the market for the sale and rental of movies) was initially intended only to be used by TV stations, and even after being introduced to households, was employed primarily for time-shifting.
- The iPod (which is used to listen to books, for the distribution of educational lectures, and for time-shifted internet radio broadcasts (podcasting)) initially was used only to listen to music.[114]

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112. *MGM Studios, Inc. v. Grokster Ltd.*, 380 F.3d 1154, 1167 (9th Cir. 2004).

113. *See* Reese, at 889.

114. *See* Dave Finley, *The Radio Century*, ALBUQUERQUE J., Nov. 26, 1999, *available at* http://www.aoc.nrao.edu/~dfinley/radcent.html (radio); Carol Haber, *Electronic Breakthroughs: Big*

There are many reasons it is difficult to accurately forecast the importance of new technologies, including (1) "[t]he initial primitive understanding of innovations," (2) "competitive relationships among technologies," and (3) "[t]he limited capacity . . . to envision entirely new technological systems, rather than simply improvements to existing systems."[115]

Given the uncertainty surrounding a technology's future benefits, it is not surprising that courts tend to discount them. The *Aimster* court, for example, refused to credit five potential noninfringing uses of the P2P system. It downplayed uses that involved uncopyrighted music, increased a recording's value, allowed groups to exchange information, encrypted uncopyrighted works, and permitted a user to copy an already-purchased CD.[116] The court quickly brushed aside these uses in focusing on the widespread infringing uses.

Additionally, the interplay between short-term infringement and long-term development of noninfringing uses has been all but ignored. Infringing uses of digital music have significantly increased awareness of "the advantages and potential of digital music." In fact, such uses have forced copyright owners to create legitimate digital music markets. Digital music thus bears some similarity to the VCR, which consumers bought to record TV programs but then used for prerecorded videotapes and DVDs.[117] It should not be a surprise that uses change as content providers "probe the best ways to exploit new technologies and markets."[118]

Finally, future noninfringing uses are less likely to be raised by a coordinated and motivated group of advocates. The disappearance of those uses (along with the new technology) also will not be lamented as it would be less likely to disrupt settled expectations.[119]

In the end, even if the future benefits of a new technology ultimately outweigh copyright owners' current losses, uncertainty and intangibility lead to insufficient appreciation. That is the innovation asymmetry.

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*Picture Eludes Many*, ELECTRONIC NEWS, June 13, 1994, at 46, http://findarticles.com/p/articles/mi_m0EKF/is_n2018_v40/ai_15516743 (radio, electricity and lasers, computer, and VCR); Mika Pantzar, *Domestication of Everyday Life Technology: Dynamic Views on the Social Histories of Artifacts*, 13 DESIGN ISSUES 52, 52 (1997) (telephone); Nathan Rosenberg, *Factors Affecting the Diffusion of Technology*, 10 EXPLORATIONS IN ECON. HIST. 3, 13–14 (1972) (radio, phonograph, railroads); Brief Amici Curiae Of Innovation Scholars And Economists In Support Of Affirmance at 17, *MGM v. Grokster*, 125 S. Ct. 2764 (2003) [hereinafter Innovation Scholars Brief] (iPod).

115. Haber, *Electronic Breakthroughs*.

116. *In re Aimster Copyright Litigation*, 334 F.3d 643, 652–53 (7th Cir. 2003); Reese, at 887–88.

117. Reese, at 891, 893.

118. Brief of Amici Curiae, The Consumer Electronics Ass'n et al., at 24, *MGM v. Grokster*, 125 S. Ct. 2764 (2003).

119. Lemley & Reese, at 1389.

## ERROR-COSTS ASYMMETRY

The innovation asymmetry explains why a court would discount a technology's future benefits. The error-costs asymmetry exacerbates this effect. Error costs signify the costs of erroneous judicial decisions. Error costs have played an important role in antitrust law. Courts have pointed to *false positives*, or the costs of wrongly punishing benign activity, to justify a more deferential antitrust regime.

In the P2P context, one type of error, a false positive or Type I error, occurs when a court erroneously shuts down the technology. The other type, a *false negative* or Type II error, occurs when a court mistakenly upholds the technology even though it should have imposed liability. Are the two errors equivalent?

They are not. For in the second (Type II error) case, society can witness the effects of the technology. And Congress can always step in to compensate copyright holders. But in the first (Type I error) case, consumers will never know what they are missing.[120] We can only see the tip of the innovation iceberg, and a technology's abandonment will forever deny consumers its possibilities. The error-costs asymmetry is another reason for erring on the side of not quashing the technology.

## LITIGATION ASYMMETRY

The innovation and error-costs asymmetries apply directly to the technology. But a *litigation asymmetry* arises from the effect of the test on technology manufacturers.

Protracted litigation is expensive and favors those with deep pockets. Copyright owners tend to be large media corporations such as the recording and movie studios. Vertical integration and consolidation have only increased these companies' resource advantages. And the industries often join forces in litigation. Thirty entertainment companies brought suit against Grokster, while 28 sued ReplayTV, a digital VCR that allowed users to automatically skip commercials.[121]

In contrast, upstart dual-use manufacturers often lack the financial resources to wage lengthy legal battles. One dual-use maker that needed to raise $60 million in convertible debt to stay afloat found itself face-to-face in litigation over its digital video recorder with a united $100 billion entertainment industry.[122]

120. Raymond Shih Ray Ku, *Grokking Grokster*, 2005 Wis. L. Rev. 1217, 1282; Lemley & Reese, at 1389.

121. Innovation Scholars Brief, at 19.

122. Claire Tristram, *Hollywood's War on Innovation*, Salon.com, Sept. 9, 2002, http://dir.salon.com/story/tech/feature/2002/09/09/sonicblue/index.html.

Another technology executive explained the catch-22 the company faced: "We couldn't raise funding because of the legal issues. . . but we couldn't also fight the lawsuit without raising funding."[123] And given that some of the most revolutionary innovation comes from small inventors—such as the "upstarts who developed the first MP3 players" in the 1990s, which paved the way for the iPod—such consequences are severe.[124] A legal standard that does not resolve the issue of secondary liability at an early stage of the proceedings will lead to "debilitating uncertainty" and exert a chilling effect on innovation.[125]

The danger of the litigation asymmetry is that the copyright industry does not even need to win on the merits. All it needs to do is throw up roadblocks in the form of expensive, complicated litigation.

The carcasses strewn on the side of the technology highway speak volumes:

- Napster filed for bankruptcy after the unfavorable Ninth Circuit decision.[126]
- Aimster's CEO and his two operating companies filed for bankruptcy after the unfavorable Seventh Circuit decision.[127]
- 321 Studios, whose software allowed users to make backup DVD copies, shut down after being subject to seven lawsuits and injunctions that prevented it from selling its products.[128]
- RecordTV.com, which allowed users to record television shows and replay them on their computers, sold its assets after settling a lawsuit brought by the movie industry.[129]
- Scour.com, which allowed Internet users to share music and video files, laid off most of its workforce and filed for bankruptcy shortly after being sued by the music and movie industries.[130]

123. Gwendolyn Mariano, *RecordTV.com To Sell Assets*, CNETNEWS.COM, May 23, 2001, http://news.com.com/RecordTV.com±to±sell±assets/2100-1023_3-258187.html.

124. Heather Green, *Are The Copyright Wars Chilling Innovation?*, BUS. WK. ONLINE, Oct. 11, 2004, http://www.businessweek.com/magazine/content/04_41/b3903473.htm.

125. Innovation Scholars Brief, at 15.

126. Benny Evangelista, *Napster Files for Bankruptcy*, SAN FRAN. CHRON., June 4, 2002, at B1.

127. Brian Garrity, *Victory Eludes Legal Fight Over File Swapping: The Music Industry May Win a Few Battles While Losing Multiple Logistical Wars*, BILLBOARD, Apr. 13, 2002, at 86.

128. Katie Dean, *321 Studios Shuts Its Doors*, WIRED.COM, Aug. 3, 2004, http://www.wired.com/news/digiwood/0,1412,64453,00.html.

129. Gwendolyn Mariano, *RecordTV.com To Sell Assets*.

130. Dick Kelsey, *Listen.com Buys Assets of Bankrupt Scour*, NEWSBYTES NEWS NETWORK, Nov. 1, 2000, http://findarticles.com/p/articles/mi_m0NEW/is_2000_Nov_1/ai_66532929.

- SonicBlue, which created ReplayTV, a digital video recorder with automatic commercial skipping and Internet video sharing features, spent $3 million per quarter on legal fees before being forced into bankruptcy.[131]

Venture capital firms, which provide the funding necessary for technology start-ups to grow, naturally have been less likely to invest as a result of these events. By 2002, "[m]ost investment in peer-to-peer technology . . . dried up . . . partly as a result of the threat of litigation."[132] Investors also have been justifiably fearful about vicarious liability, which has put at risk the personal wealth of a start-up's investors. Lawsuits against Napster's investors proved that this was not a theoretical concern.[133]

In short, the innovation, error-costs, and litigation asymmetries exert a strong, though often hidden, pull in the evaluation of infringing and noninfringing uses. Given the unique importance of innovative new technologies for our economy and livelihoods, any appropriate analysis must take into account such characteristics. It is in this vein that I turn to the specific tests that courts have applied to dual-use technologies.

## EVALUATION OF JUDICIAL TESTS

### *Sony*

The Supreme Court in *Sony* asked if a dual-use technology was "capable of substantial non-infringing uses." Of all the tests offered, this is the most deferential to innovation. As long as there is at least a *potential* substantial noninfringing use, the technology escapes liability. The Court thus offered a solution that squarely addressed the innovation asymmetry.[134]

Of course, the Court also found that most VCRs were being used for lawful purposes. A narrower version of *Sony*, akin to a test determining primary use, would, as discussed below in the context of the *Aimster* test, run into problems.

131. Benny Evangelista, *SonicBlue Goes into Chapter 11*, S.F. CHRON., Mar. 22, 2003, at B1.

132. Garrity, *Victory Eludes Legal Fight*, at 86.

133. *In re Napster, Inc. Copyright Litig.*, 2005 WL 273178, at *1 (N.D. Cal. Feb. 03, 2005) (venture capital firm Hummer Winblad Venture Partners); *UMG Recordings, Inc. v. Bertelsmann AG*, 222 F.R.D. 408, 413–14 (N.D. Cal. 2004) (investor Bertelsmann); *see generally* Brief of the National Venture Capital Association as Amicus Curiae in Support of Respondents at 17 n.14, *MGM v. Grokster*, 125 S. Ct. 2764 (2003) [hereinafter NVCA Brief].

134. Another potential reading, consistent with the two concurring opinions in *Grokster*, asks if the device is *actually* used for noninfringing purposes. Reese, *Temporal Dynamics*, at 215–19.

But the more widespread reading of *Sony* offers a relatively bright-line rule. At a minimum, the rule is easier to apply than other articulated tests that explore primary uses, subjective intent, or sufficient filtering measures. The test also focuses attention on the technology itself as opposed to engaging in endless hunts for subjective intent.[135]

An important advantage of this clarity is that it allows courts to dismiss disputes at a preliminary stage of litigation, allowing technology makers to avoid getting embroiled in the deepest recesses of complex, lengthy litigation. Receiving a quick summary judgment addresses the litigation asymmetry, increasing the likelihood that innovators can manage risk. Fact-intensive investigations into intent or primary use, in contrast, could spell bankruptcy for small defendants.

Another advantage of *Sony* is that it allows inventors to innovate without needing to receive permission from copyright holders. More aggressive tests, by threatening costly litigation, tempt the innovator to alter its technology to satisfy copyright owners. But as Professors Mark Lemley and Tony Reese remind us, "[t]he history of technologies over which copyright owners obtain early control is not promising—ask (if you can find them) owners of digital audio tape decks, dual-deck VCRs, laserdiscs and D[IVX] machines."[136]

Just one example of the effects of obtaining permission is provided by the "broadcast flag," a proposed Federal Communications Commission (FCC) rule that would have required digital TV tuners to recognize a signal embedded in broadcasts that would allow copyright owners to limit consumers' use of the shows. The D.C. Circuit struck down the rule as beyond the FCC's authority.[137] But before doing so, the agency allowed the MPAA to examine the technologies under development. It should not be a surprise that the movie industry "coerced companies including RealNetworks, Thomson, and Microsoft to cut innovative features out of their latest media software programs" that would have "allowed users to make legal copies of TV programs and transmit them over the [Internet] to a limited number of personal devices in, say, a car or a vacation home."[138]

Final support for *Sony* is provided by the robust flourishing of new technologies that has accompanied the regime. In the two decades after the decision, an explosion of dual-use devices rolled off the world's manufacturing lines: VCRs, computer hard drives, Walkmans, digital cameras, CD/DVD burners, iPods, and DVRs, to name just a few. Consumers have received wave after wave of ever

135. The test also seemed to constrict liability beyond the requirements of traditional contributory infringement as Sony had knowledge that the Betamax was being used for infringing purposes. *See* Jonathan Band, *So What Does Inducement Mean?*, at 2 (Nov. 2005), http://www.policybandwidth.com/doc/inducement.pdf.

136. Lemley & Reese, at 1387 n.161.

137. Declan McCullagh, *Court Yanks Down FCC's Broadcast Flag,* May 6, 2005, http://news.com.com/2100-1030_3-5697719.html.

138. Green, *Are The Copyright Wars Chilling Innovation?*

cheaper, ever more feature-rich devices that can copy and store ever-larger collections of files. This revolution has created millions of jobs and contributed billions of dollars to the nation's economy.[139]

While counterfactual hypotheticals should be greeted with a dose of salt, it appears that if the Court had decided *Sony* the other way, the pace and scope of innovation would have been reduced. In such a world, the electronics industry, instead of simply giving the public what they wanted, would have had to thread a needle between the desires of consumers and those of the copyright industry. This would be a monumental task; consumers' desire for all types of content in all settings at all times would not have been easily reconciled with the copyright industry's impulse to restrict consumer options to the few consistent with their existing business models. New products might have had to wait years until the movie or music industry could reach consensus on a particular encoding format or encryption scheme. In short, the consumer electronics industry's incentive to innovate would have been curtailed.

But even if *Sony* has stood guard to a deluge of innovation, is the test still appropriate given the widespread copyright infringement facilitated by P2P networks?

### *Napster/Grokster*

Certainly the courts considering the P2P cases have emphasized the differences between the technologies. The various P2P architectures nonetheless demonstrate the difficulties of applying knowledge-based tests in this context.

Under a typical application of secondary liability analysis, Napster would be guilty and Grokster would go free. Why? Because, by having access to the central index, Napster would be guilty of contributory infringement on account of its knowledge of and material contribution to infringing activity. And it would be vicariously liable (assuming a financial benefit) because of its control over users.

But because of the decentralized nature of the software used by Grokster, that company would lack knowledge and control, and thus not be secondarily liable under either theory. What sort of incentives does such a regime provide? Incentives to design the architecture to reduce knowledge.

In addition, the application of the concepts rests on an appropriate determination of "knowledge" or "control." But the binary nature of such conclusions—one either has knowledge or control or one does not—fails to account for the nuanced characteristics of the activity.[140]

Fleshing this out a bit more, what exactly must defendants know about? That their software could be used for infringing activity? That such activity is likely?

139. NVCA Brief, at 29.

140. Alfred C. Yen, Sony, *Tort Doctrines, and the Puzzle of Peer-to-Peer*, 55 Case W. Res. L. Rev. 815, 851 (2005).

That specific users will commit specific acts of infringement? The first two inquiries would ensnare most technologies—including the VCR—in their grasp. The last would not.

These questions reveal a major difficulty with applying the contributory infringement and vicarious liability theories in the P2P context. A store owner who gave customers blank and prerecorded tapes, or a dance hall owner who watched a musical group perform, had a closer relationship to the infringer, evidencing greater knowledge and control. In contrast, the creator of decentralized P2P software relinquishes all control over that technology at the point of sale and thus lacks knowledge of how the technology is used or how to prevent infringing uses.

Nor is the answer to the dual-use technology issue to be found in Grokster's *active inducement* test. For starters, while the contributory infringement and vicarious liability analyses can be situated in the context of *Sony*, active inducement cannot. It thus adds another layer of potential liability for dual-use manufacturers. Having a technology capable of substantial noninfringing uses no longer is enough to escape liability. The innovator now must worry about how a court interprets its intent. Early disposal of a case thus becomes less likely.

In addition, the Court found active inducement based on evidence such as a name and software similar to Napster, an advertising-based model, and a failure to design filtering tools.[141] These bases for punishment are questionable. In particular, liability for using an advertising model could threaten a vast array of Internet-based and other businesses. And a filtering requirement significantly complicates the analysis and opens the door to unending claims about insufficient remedial measures.

A final irony to this development is that Sony itself would not have escaped liability under the *Grokster* rule. The company did not try to implement a technology that would have reduced the copying of infringing materials, even though such a mechanism was feasible.[142] And with its advertisements exhorting customers to "build a library" and record "favorite shows," the company likely would have lost even under a narrow version of active inducement limited to clear expressions and affirmative steps.[143]

### *Aimster*

Perhaps Judge Richard Posner, the esteemed and prolific jurist and author sitting on the Seventh Circuit and penning the *Aimster* opinion, would offer the solution. In fact, the *Aimster* court introduced new analyses that endeavored to

141. *MGM v. Grokster*, 545 U.S. 913, 939–40 (2005).

142. In 1985, the movie studios began encoding their prerecorded VHS tapes with Macrovision, a technology that prevents duplication to another videocassette. *Macrovision*, WIKIPEDIA, http://en.wikipedia.org/wiki/Macrovision.

143. *Sony*, 464 U.S. at 459 (Blackmun, J., dissenting).

steer a middle ground between creativity and innovation. The court's focus on a technology's primary use and a defendant's remedial measures promised to forge a happy medium. Or did it?

First, the court endeavored to determine the primary use of the technology.[144] But even though it sounds simple in theory, such a determination would prove exceedingly difficult in application.

For reasons mentioned above, the infringing uses would be presented to the court on a silver platter as concrete, already-suffered harms. The noninfringing uses, in contrast, would be less tangible and more likely to arise in the future. In addition, a primary-use test would require courts to trace exactly how many copyright owners permit or oppose use of their works. Finally, any attempts to recognize the evolving nature of uses would face significant predictability hurdles. If inventors do not know how their product will eventually be used, how could they possibly forecast the use that will be predominant?

The *Aimster* court's second novelty required dual-use manufacturers to show that "it would have been disproportionately costly . . . to eliminate or at least reduce substantially the infringing uses."[145] Again sounding reasonable in theory, a practical application reveals considerable dangers.

No technology can block all infringement. It is always possible to do more.[146] Because of this, copyright owners could always claim that technology makers could have done more to reduce infringing uses. Plaintiffs could continually suggest more restrictive fingerprinting, watermarking, encryption, or other technologies.

Of practical significance, such a determination introduces complexity and eliminates early disposition of the case. Litigation over which fingerprinting system to adopt presents a nuanced factual question and forces judges to grapple with intractable issues about the sufficiency of various solutions. In the *Grokster* case, computer scientists explained that Grokster and Streamcast could not force users to install and update filtering software and that filters were so easy to defeat that they would set off an "open-ended arms race between the filter designers and noncompliant users."[147] In *Napster*, even though the company examined dozens of audio fingerprinting systems and installed one that "was able to

144. Because the court required an actual noninfringing use and did not find any, there was very little for the court to "balance." *In re Aimster Copyright Litig.*, 334 F.3d 643, 653 (7th Cir. 2003).

145. *Id.*

146. Perfect enforcement of the copyright laws has never been the goal. Lemley & Reese, at 1432.

147. Brief Amici Curiae of Computer Science Professors Harold Abelson et al., at 14–16, *MGM Studios, Inc. v. Grokster, Ltd.*, No. 04-480 (Feb. 28, 2005).

prevent sharing of much of plaintiffs' noticed copyrighted works," the court demanded "zero tolerance" and shut down Napster.[148]

As a more general concern, feasibility questions could "enmesh courts in disputes comparable to those that have bedeviled design defect litigation in products liability."[149] In cases involving manufacturing flaws, courts can compare a product to the manufacturer's standards. In contrast, there is no objective standard of comparison for design defects since the product is used in its intended condition. The courts thus must "weigh various engineering, marketing, and financial factors" in providing their own standard of defectiveness.[150] Similarly with P2P remedial measures, courts lack a benchmark and could be tempted to find that defendants failed to do enough. Given the cost of such measures and lack of guarantee that they would stop infringement, innovation is threatened.

Adopting a test focusing on whether a technology maker employed sufficient remedial measures would threaten innovation, as the manufacturer would need to consider (1) each of the ways a technology could be used for infringement, (2) how much a court would expect it to spend on modifications, and (3) whether it would need to make these improvements if they would only be partially effective or would depend on users' actions.[151] The manufacturer would also need to continually monitor the technology and how it was used.

Think back, as Professor Tony Reese has, to the onset of the World Wide Web in the mid-1990s. And imagine if the creators of browsers and servers were required, before posting content on a publicly available website, to quarantine that content "for 48 or 72 hours at a special Web site accessible only to copyright owners, who could screen the content before it went online . . . and object to content that they alleged to be infringing." Such a requirement might have been viewed as a reasonable precaution to limit infringement. But it would have led to a far less useful and innovative technology than the Internet we have known and cherished.[152]

Similarly, imagine if courts had required photocopiers to be modified to prevent the copying, absent a copyright owner's approval, of "any document displaying a ©." And imagine if, absent authorization on a webpage, Microsoft were forced to "deactivate the 'print' function from its Internet Explorer browser."[153]

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148. *Sony v. Universal Symposium (Panel 2): The Revolution Arrives*, 34 SW. U. L. REV. 179, 193 (2004); *A&M Records, Inc. v. Napster, Inc.*, 284 F.3d 1091, 1096–97 (9th Cir. 2002).

149. Diane Leenheer Zimmerman, *Daddy, Are We There Yet? Lost in Grokster-Land*, 9 N.Y.U. J. LEGIS. & PUB. POL'Y 75, 92 (2005–06).

150. Michael J. Toke, *Note, Restatement (Third) of Torts and Design Defectiveness in American Products Liability Law*, 5 CORNELL J.L. & PUB. POL'Y 239, 241 (1996).

151. Innovation Scholars Brief, at 15–16.

152. Reese, at 894.

153. Innovation Scholars Brief, at 16.

In the end, giving copyright owners the ability to design dual-use devices might allow them to exploit their business models but would threaten innovation.

* * *

## P2P BENEFITS

After *Grokster*, widespread commercial development of P2P technology independent of the copyright industry has been restricted to a few, supporting roles. Even though it is secure, cheap, and offers unique distribution possibilities, it has had a much more modest effect than is warranted by its promise, appearing mostly in academia, government, and the open-source community. Some examples include:

- Penn State University's LionShare, which has been used to share large digital video files and to allow professors from different universities to collaborate on presentations
- Bibster, which allows researchers to share bibliographic data
- The Internet Archive—a public, nonprofit Internet library that offers permanent digital access to historical collections and that uses five P2P systems, allowing it to distribute files "without going broke on bandwidth fees"
- Soulseek, a site designed to promote underground music by helping unsigned and independent artists
- Skype, a free internet-telephony service that uses P2P architecture to route voice calls between computers
- Joost, an online TV service that includes features such as search, chat, and instant messaging
- Groove Networks, which provides shared workspaces for online collaboration, such as multiple users editing a document at the same time[154]

### Distribution

One of P2P's most significant benefits is its ability to distribute large files. BitTorrent, for example, has solved the file-sharing problem of quick downloading but slow uploading.[155] It does so by requiring downloaders to upload pieces

154. Jamie Oberdick, *Best Uses for LionShare, Penn State's Peer-to-Peer Academic Collaboration Tool*, http://css.psu.edu/news/nlfa06/lionshare.html (LionShare); http://bibster.semanticweb.org/objectives.htm (Bibster); http://www.archive.org/about/about.php (Internet Archive); *In Praise of P2P*, THE ECONOMIST, Dec. 4, 2004 (Internet Archive, Skype, Groove); http://slsknet.org/ (Soulseek); http://www.joost.com/ (Joost).

155. Clive Thompson, *The BitTorrent Effect*, Jan. 2006, WIRED.COM, http://www.wired.com/wired/archive/13.01/bittorrent.html.

of the file to others, thereby allowing uploading to occur as quickly as downloading. And it spreads the cost and bandwidth of uploading files among all users rather than just the host server.[156]

An obvious illustration of such large files involves home movies. One example is provided by the amateur videos that showed the devastation of the 2004 Indian Ocean tsunami and were shared across the globe. The worldwide demand for videos of the event "brought down even the largest traditional hosting providers."[157] But by pooling the bandwidth of many sites, BitTorrent avoided these problems. One site, for example, was able to serve more than 150 gigabytes of bandwidth at a cost of only 1.26 gigabytes.[158]

Another example is provided by *Outfoxed*, a documentary critical of Fox News. One user put part of it on his Web site as a 500-megabyte torrent (a small file containing data about the files to be shared). Almost 1,500 people had downloaded the torrent within two months, resulting in almost 750 gigabytes of traffic. But the site only needed to transmit 5 gigabytes, leading to a bandwidth bill of merely $4.[159]

Other examples include

- Blizzard Entertainment, which uses the network to distribute its online multiplayer game *World of Warcraft*
- NASA, which uses it to distribute high-resolution photos of the Earth
- eTree, which allows fans to distribute authorized live recorded performances of bands
- Software updates that can be downloaded and distributed 20 times faster than a client-server model allows
- Video content that can be distributed by speakers—such as community colleges, religious leaders, and school boards—that could not otherwise afford to do so[160]

156. Bram Cohen, *Incentives Build Robustness in BitTorrent*, May 22, 2003, http://www.bittorrent.org/bittorrentecon.pdf. Web hosting companies typically impose bandwidth limits that prescribe how much data can be transferred to or from the Web site or server in a specified time period. *Bandwidth*, WIKIPEDIA, http://en.wikipedia.org/wiki/Bandwidth.

157. Torrentocracy Blog, Feb. 18, 2005, http://www.torrentocracy.com/blog/archives/2005/02/getting_to_99_b.shtml.

158. *Id.*; Creative Commons Brief, at 11.

159. Clive Thompson, *The BitTorrent Effect*.

160. http://www.blizzard.co.uk/wow/faq/bittorrent.shtml (World of Warcraft); http://visibleearth.nasa.gov (NASA); Joe Stewart, *BitTorrent and the Legitimate Use of P2P*, Feb. 24, 2004, http://www.joestewart.org/p2p.html#foot27 (eTree); Iljitsch van Beijnum, *Dropping 22TB of Patches on 6,500 PCs in 4 Hours: BitTorrent*, Mar. 9, 2008, http://arstechnica.com/news.ars/post/20080309-dropping-22tb-of-patches-on-6500-pcs-in-4-hours-bittorrentdropping-22tb-of-patches-on-6500-pcs-in-4-hours-bittorrent.html (software updates); Creative Commons Brief, at 12 (speakers).

### The Long Tail

Peer-to-peer offers a distribution benefit not only in disseminating large files but also in increasing exposure to little-known works. Chris Anderson, editor-in-chief of Wired magazine, introduced the concept of the Long Tail, which emphasizes the decline of the "small number of 'hits' . . . at the head of the demand curve" and rise of the "huge number of niches in the tail." Even though consumers covet such variety, it was not available until advances in technology lowered production and distribution costs. Bricks-and-mortar retailers with limited shelf space could only stock anticipated hits. Online retailers and P2P networks are not so constrained.[161]

Peer-to-peer fosters the Long Tail by allowing artists to easily and cheaply distribute their works. Such low-cost marketing not only helps the artists increase their visibility but also provides consumers with more options.[162] Peer-to-peer offers "B sides," live recordings, and foreign music never before available. An architecture that allows millions of users to collect works promises to unearth far more than a centralized, top-down approach.

Relatedly, P2P allows users to select the quality of the distribution they receive. For example, iTunes has, to date, only offered a single quality version of its MP3s. Peer-to-peer, in contrast, lets users shop for different, higher (or lower) quality versions of works they desire.

### Promotion

The promotion of copyrighted works reveals P2P's third benefit. Until recently, scarce bandwidth, capital, shelf space, and movie screens have constrained copyright owners. As a result, the owners have relied on tastemakers such as Hollywood studio executives, store purchasing managers, and artist and repertoire (A&R) talent scouts for record labels.[163]

In the 20th century, these selection agents played the primary role in attempting to predict which works would be successful. This was difficult, however, as new artists and products could fail to resonate with the public. In a formula that has been widely cited, 80 percent of products in various industries have lost money, with the remaining 20 percent generating all the profits.[164] Such a model explains tastemakers' fixation on marketing "hits" that pay for all the "misses."

In the 21st century, times are changing. Reduced production and distribution costs often allow all content to be produced and delivered, displacing the need

161. *About Me,* http://www.longtail.com/about.html (last visited August 9, 2008); Chris Anderson, The Long Tail: Why the Future of Business is Selling Less of More 253 (2008).

162. Anderson, at 74.

163. *Id.* at 122.

164. *E.g.*, Papadopoulos, *Are Music Recording Contracts Equitable?* (recording industry). For elaboration of the 80/20 concept, see Anderson, at 130–35.

for tastemakers.[165] The challenge then becomes sifting through vast quantities of information. Aggregators such as Rhapsody (music), Netflix (movies), and eBay (goods) collect products and make them easy to find.[166] But consumers still need guidance in wading through the morass.

One such tool, collaborative filtering, uses similarities between customers to make recommendations.[167] Google ranks the relevance of Web sites by determining the number of other sites linked to it. In doing so, it "filter[s] out the vast panoply of irrelevant material" by collecting users' relevance assessments. Other examples incorporate what "customers like you" have purchased among Amazon's books and Netflix's movies.[168] The broader concept of collective intelligence pools the input of crowds, as seen through eBay's rating system, YouTube's most-watched list, and news sites' "top 10 most emailed" articles.

These filters are superior to tastemakers because they do not need to predict in advance which products will be successful. Instead, they cull through products that have already reached the market. And they provide more customized information and transcend the "generalities, inconsistencies, and information deficits" that have plagued tastemakers.[169]

Peer-to-peer can play an effective role in this context. The sheer number of users with diverse, eclectic interests ensures that a vast array of works will be rated. The unfiltered nature of the recommendations provides another benefit. The threat with more centralized collaborative filters is that the server could influence the feedback. Amazon.com, for example, could recommend products in which it owns a stake. Peer-to-peer is far less subject to such constraints, with millions of users offering reactions absent influence by the intermediary.

Peer-to-peer networks offer additional benefits. Their architecture is able to accommodate an influx of users. And, with thousands of peers (as opposed to one company) assisting, it is easier for users to find what they are looking for.[170]

## TIP OF INNOVATION ICEBERG

Finally, if history is any guide, we can barely see the tip of the P2P innovation iceberg. The technology offers benefits that we cannot even contemplate.

165. Dan Hunter & F. Gregory Lastowka, *Amateur-to-Amateur*, 46 Wm. & Mary L. Rev. 951, 993 (2004).

166. Anderson, at 88.

167. *What's the Difference Between "Collective Intelligence" and Collaborative Filtering?*, O'Reilly Media, http://getsatisfaction.com/oreilly/topics/whats_the_difference_between_collective_intelligence_and_collaborative_filtering (last visited August 10, 2008).

168. Hunter & Lastowka, at 994–95.

169. Anderson, at 122; Hunter & Lastowka, at 995.

170. As discussed earlier in the chapter, the centralized indices of hybrid P2P would be more effective at facilitating users' searches than pure P2P models.

As discussed earlier, no one foresaw the widespread uses of inventions such as telephones, phonographs, and lasers. In addition, P2P concepts are being applied elsewhere. For example, YouTube, MySpace, Pandora, last.fm, Apple's iTunes, and Yahoo! Music Jukebox have borrowed P2P concepts in allowing users to share playlists with others.

Peering into the future, P2P could offer the technology to challenge Google's search engine predominance.[171] Companies must invest billions of dollars in server farms (clusters of servers) to offer competitive search engines. But by harnessing the capacity of users, P2P technologies do not confront these costs. Faroo's search engine relies on an algorithm that indexes users' Web page visits. The simple act of visiting Web pages (with no need even to link to them) provides all the information necessary for page ranking.[172]

Peer-to-peer also could offer protection against cloud computing. Cloud computing refers to Web-based applications and data storage in the "cloud" of the Internet.[173] Examples include Google applications, remote storage, and "software as a service."[174] Cloud computing allows users to move their software applications and data from their desktop computers to remote servers accessible through any Internet connection.[175]

Despite its promise, cloud computing poses threats. Centralized outages threaten access to data. In the summer of 2008, Amazon's online storage service was not available for a 6-hour period and users could not access Google's Gmail service for 2 hours.[176] As another example, it is notoriously difficult for users to

171. *See* Bernard Lunn, *Could P2P Networks Enable a Google Killer?*, ReadWriteWeb, Jan. 9, 2008, http://www.readwriteweb.com/archives/p2p_networks_search.php.

172. Faroo, *P2P Web Search*, http://www.faroo.com/english/technology/architecture.html (last visited August 31, 2008).

173. Erica Naone, *Computer in the Cloud: Online Desktop Systems Could Bridge the Digital Divide*, MIT Tech. Rev., Sept. 18, 2007, http://www.technologyreview.com/Infotech/19397/.

174. One example of software as a service is Salesforce.com, which offers customer relationship management. *See generally* Galen Gruman & Eric Knorr, *What Cloud Computing Really Means*, InfoWorld, April 7, 2008, http://www.infoworld.com/article/08/04/07/15FE-cloud-computing-reality_1.html.

175. *See* M. Scott Boone, *The Past, Present, and Future of Computing and its Impact on Digital Rights Management*, 2008 Mich. St. L. Rev. 413, 431.

176. Richard MacManus, *More Amazon S3 Downtime: How Much is too Much?*, ReadWriteWeb, July 20, 2008, http://www.readwriteweb.com/archives/more_amazon_s3_downtime.php (Amazon); Juan Carlos Perez, *Gmail Users Hit by Outage Again*, Network World, Aug. 12, 2008, http://www.networkworld.com/news/2008/081208-gmail-users-hit-by-outage.html (Google). *See generally* Bernard Lunn, *Cloud Failures Are Serious—Time To Revisit P2P?*, ReadWriteWeb, Aug. 14, 2008, http://www.readwriteweb.com/archives/google_failures_serious_time_t.php.

remove data from the social networking Web site Facebook.[177] Finally, the continual updating of cloud-based services prevents users from retaining older versions of an application and the security features built into them.[178]

Peer-to-peer addresses many of these concerns by keeping users' data on their desktop computers. At the same time, the technology offers benefits flowing from the power of a network of peers. To illustrate, P2P can offer storage that harnesses peers' capacity and allows users to store backup copies of their data, reducing the likelihood of catastrophic data loss.[179] For future users seeking an alternative to centralized cloud computing, P2P's decentralized architecture offers an effective antidote.

In short, like any new technology, we can only discern the tip of the P2P innovation iceberg. Although the technology's uses for copyright infringement have received significant attention, we cannot fathom all the benefits P2P could eventually offer. Presenting alternatives to the Google search engine and the coming cloud computing system are just two of many potential benefits.

## RECOMMENDATION

The innovations promised by dual-use technologies are revolutionary. They promise to transform the way we consume entertainment and interact with each other, and possibly even restructure our society. But such technologies are continually under assault in courts' P2P analyses. They are evaluated in their infancy when their capabilities can barely be discerned. And they do not stand a chance against the widespread, concrete instances of infringement offered by the copyright holders. Given the silent consequences of a vanquished technology and the carcasses of innovators strewn on the side of the technology highway, courts must alter their analysis to better appreciate innovation.

*Sony* offered just this deference. It understood the various asymmetries that challenge innovation. It left the door open for Congress to narrowly address particular technologies. It has accompanied an explosion of dual-use devices.

177. Maria Aspan, *How Sticky is Membership on Facebook? Just Try Breaking Free*, N.Y. TIMES, Feb. 11, 2008.

178. Ephraim Schwartz, *The Dangers of Cloud Computing*, INFOWORLD, July 7, 2008, http://www.infoworld.com/article/08/07/07/28NF-cloud-computing-security_1.html.

179. Amir Javidan et al., *VanDisk: An Exploration in Peer-To-Peer Collaborative Back-Up Storage*, 22 ELECTRICAL & COMPUTER ENGINEERING 219 (2007), http://ieeexplore.ieee.org/Xplore/login.jsp?url=/iel5/4232658/4232659/04232719.pdf?tp=&isnumber=&arnumber=4232719 (describing proposal to alleviate "data backup problems" through "a virtual array of network disks that . . . replicates a user's data over multiple remote machines to increase data availability and durability").

And it even assisted antitrust law in favoring disruptive technologies that could reduce the market power of entrenched companies.

Even if music copyright owners' existing business models are significantly threatened by P2P technologies, creativity is not. Most artists do not receive any royalties from the recording industry. In any event, copyright owners can always sue direct infringers or urge Congress to act.

*Sony* also is consistent with an error-costs analysis. Courts' mistaken approval of technologies allowing copyright infringement may harm existing business models but often will not affect creativity. Erroneous condemnation, in contrast, directly harms innovation by permanently stifling technologies.

In the end, the case for innovation is at least as strong today as it was at the time of *Sony*. In particular, disruptive innovation plays a starring role in the story of P2P. It explains the recording industry's failure to recognize the potential offered by Napster in 2000. And it is threatened by the complicated tests that courts have promulgated in the area of secondary liability. Although we may never realize what we are missing, the future of innovation—and thus our economy and livelihoods—depends on a return to *Sony*.