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An Economist's Guide to Digital Music

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Abstract:
In this guide, we discuss the impact of digitalization on the music industry. We rely on market and survey data at the international level as well as expert statements from the industry. The guide investigates recent developments in legal and technological protection of digital music and describes new business models as well as consumers' attitude towards music downloads. We conclude the guide by a discussion of the evolution of the music industry.

Keywords: Music, Internet, File-sharing, Peer-to-peer, Piracy,
Digital Rights Management, Copyright, E-commerce

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1 Introduction

With the diffusion of fast internet connections in home computing, the music industry is facing one of its biggest challenges. Record companies even claim that unabated internet piracy could mean the end of the industry as a whole. Contrary to traditional formats, digital music files that can be found on file-sharing networks can be separated from their physical support. They can be compressed and exchanged on the internet in a relatively small amount of time, that is, substantially faster than by renting a CD in a media library or than by borrowing it from a friend. Facing such a threat, record companies have started to sue internet users who share copyrighted files on Peer-to-peer (P2P) networks freely and anonymously without the authorization of copyright owners. At the same time technology companies are developing technological measures of protection, known as Digital Rights Management (DRM), to control the uses of music in digital format. We are thus witnessing the birth of a paradox. On the one hand, new technologies of information and communication increase the value of information goods for consumers who can download songs anywhere at anytime. On the other hand, new Rights Management technologies can restrict and even lock the use of digital music licensed to consumers. The goal of this guide is to understand the roots of the paradox and to analyze the economic consequences of digital music for the record industry. To do so, we rely heavily on international industry data and data from U.S. surveys.

We start the guide by a review of the traditional business of selling music.[1] We then present the causes and the consequences of the digital challenge to the music industry. In Section 3, we describe the legal and technological measures taken by record companies to protect their digital content. We conclude the guide by describing different ways of selling digital music.

2 Challenges to the Music Industry: Facts and Explanations

2.1 Traditional business of selling music

The industry for recorded music is worth a 35 billion US$ in the world (with around 13 billion US$ in both Europe and North America, see IFPI, 2004a). Music plays an important role in the life of most people; they often spend several hours per day listening to pre-recorded music. A change in the way music is listened to is likely to affect many people.

In this first subsection, we describe the players in the industry and present figures related to the production of a CD, which is at the moment the dominant format for pre-recorded

[1] All survey data reported in this article were conducted in the U.S. unless specified otherwise.

music. This section is voluntarily short as there are many books that analyze the traditional music industry. (See Vogel, 2004, for a recent bibliography).

2.1.1 The cost of a CD

There is little information on the costs of making a CD. In general, a CD can be seen as an example of a good with large fixed costs and low variable costs. According to an article in Knack quoting the IFPI the average price of a CD was around 17 Euro in the EU in 2002 (Table 1). The payment received by the record companies for a CD sold at 17 Euro is around 11 Euro; this is the retail price net of the retailer's margin and taxes (which vary across countries in the EU). Costs are incurred at various stages of making a CD. There are manufacturing costs that run below 3.5 Euro (including the costs for recording and the pressing of the CD). There are two other important types of costs: royalties paid to the artist (1.25 Euro) and costs for production, marketing and promotions (1 to 10 Euro). Hence, costs can easily run up to 15 Euro per CD if the marketing and promotion activities do not generate sufficient sales. Record companies keep an important part of the revenues for themselves (2.5 to 4 euros per CD).

Table 1. Average "cost" of a CD in Euro area (in euro)

Recording	2.25
Production	0.25 to 5
Marketing and promotion	0.25 to 5
CD press	1
Margin of retailers	2 to 2.5
Margin of record companies	2.5 to 4
Copyright payment to artist	1.25
Taxes	3.5

Source: IFPI quoted by Knack 11 June 2003, p. 59

Production, marketing and promotions are important cost components of a CD. These costs reflect the nature of music as an experience good, which is a good that needs to be "tasted" before consumers can assess its value. This is confirmed by Chuck Philips who interviewed executives from the music industry on the condition that they would not be identified. He states that "it costs about $2 to manufacture and distribute a CD, but marketing costs can run from $3 per hit CD to more than $10 for failed projects" (see "Record Label Chorus: High Risk, Low Margin", Chuck Philips, Los Angeles Times, May 31, 2001). This is due to the cost structure that involves large fixed costs and relatively small marginal costs.

The Record Industry Association of America (RIAA) elaborates on these costs:

"Then come marketing and promotion costs -- perhaps the most expensive part of the music business today. They include increasingly expensive video clips, public relations, tour support, marketing campaigns, and promotion to get the songs played on the radio. (...) Labels make investments in artists by paying for both the production and the

promotion of the album, and promotion is very expensive." (www.riaa.org, RIAA-Key stats-Facts-Cost of CD). An important question in this article will be to ask in which way these costs are likely to be modified by online music distribution.

There are many new releases each year. Consumers need information on the existence and the genre of these new releases. Listening the radio is the main way consumers obtain information about new songs and artists, discussion with friends and family members being a distant second (see Table 2).

Table 2. Type of media that influenced US consumers to purchase their last CD

Radio	75%
Friends/relative	46%
Music video channel	45%
Saw in store	42%
Move soundtrack	37%
Live performance	29%
TV advertisement	24%
Featured in TV show	23%
TV show appearance	22%
Downloaded MP3	19%
Internet	17%
Magazine/newspaper	17%
Internet radio	15%
Record club	15%
Video game	5%

Source: Edison Media Research, June 2003; in percentage of consumers who have purchased a music CD in the past 12 months.

While most new CDs are sold at similar prices, some become hits, others flops. Indeed, record companies loose money on many new releases. Hence, since few albums become profitable an important part of the profits made on hits need to compensate losses made on other albums. Chuck Philips states that only 1 out of 10 acts ever turns a profit (source see above).

The risky nature of the current music business model was confirmed in Hilary Rosen's statement in the Napster case (Hilary Rosen was president and CEO of the RIAA in 2000, she is quoted from a Press release from the RIAA on May 25, 2000 available on the RIAA.com website):

> Record companies search out artists and help to develop their talent and their image. Much goes into developing artists, maximizing their creativity and helping them reach an audience. In addition to providing advance payments to artists for use by them in the recording process, a record company invests time, energy and money into advertising costs, retail store positioning fees, listening posts in record stores, radio promotions, press and public relations for the artist, television appearances and travel, publicity, and Internet marketing, promotions and contests. These costs are investments that companies make to promote the success of the artist so that both can profit from the sale of the artist's recording. In addition, the record company typically pays one half of independent radio promotions, music videos, and tour support. If a recording is not successful, the company loses its entire investment, including the advance. If a recording is successful, the advance is taken out of royalties, but the other costs I mentioned are the responsibility of the record company. (...)
>
> Statistically, this is a very risky business. Typically, less than 15% of all sound recordings released by major record companies will even make back their costs. Far fewer return profit. Here are some revealing facts to demonstrate what I'm talking about. There were 38,857 albums released last year; 7,000 from the majors and 31, 857 from independents. Out of the total releases, only 233 sold over 250,000 units. Only 437 sold over 100,000 units. That's 1% of the time for the total recording industry that an album even returns any significant sales, much less profit. Fortunately, when it hits, it can hit big. That's what goes to fund the next round of investments to develop and nurture new artists.

This small success rate is due to the nature of a mass-media market in which exposure to the public is scarce and firms maximize audience by selecting a few number of potential one-size-fits-all superstar artists.

Observation 1. Production, marketing and promotion often are the main cost of making a CD and selling it to consumers.

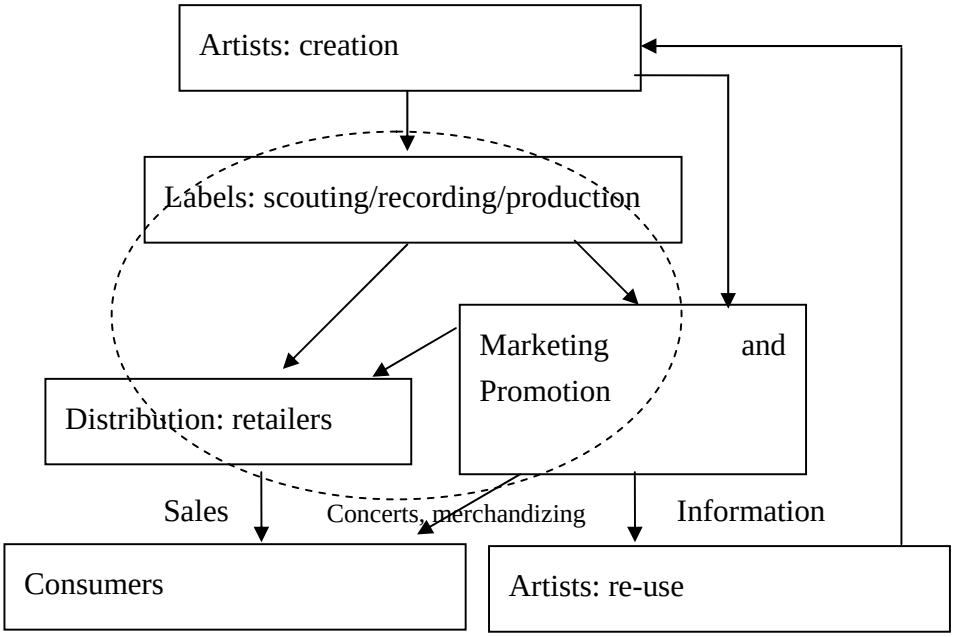
2.1.2 Players in the market

Record companies or labels sell music and complementary products to consumers.[2] These are the two types of players we will be focusing on in this guide. Clearly, music is written by artists, who, if they become well-known, play in an important role in the industry. Other players are disseminating information about new releases. The following diagram describes the players in the music industry.[3] The dotted ellipse indicates that some economic functions are vertically integrated. It is especially important to stress that record companies typically carry out most of the marketing and advertising activities.

[2] Some complementary products are typically offered by the artists themselves. We discuss the most important one, namely live concerts, below.

[3] Some details are missing to simplify the diagram. For instance, a music band has typically a contract with a manager.

Diagram 1. The traditional music industry



Artists. Contracts between artist and labels are of a complex nature. While many small-audience artists complain that big labels tie them into long-term contracts with unfavorable conditions, record labels complain about successful artists in a similar way. In particular, Chuck Philips reports that "successful acts thwart the existing contract system by refusing to deliver follow-up albums until they extract additional advances" ("Record Label Chorus: High Risk, Low Margin", Los Angeles Times, May 31, 2001). However, the majority of musicians make only a small part of their income from recorded music; they have other jobs and make money from live performances (see 2.1.3 below).

Record companies. Record companies function as intermediaries between producers of music (the artists) and the consumers. The big record companies own different labels; each label is active in certain segments of the market. For simplicity, we do not distinguish between a "record company" and a "label". The label's role is to select artists and offer services to artists in order to make "matches" between the music that is recorded and the consumers.

The music industry is highly concentrated – five record companies dominate the market and in the business press there are often talks of further mergers. Annual data on market shares by the different labels are published by the IFPI. The five largest distribution companies, namely EMI, Sony, BMG, AOL Time Warner, and Universal/Vivendi, shared 84% of the revenues in the North American market and 79% of the European market in 2002.[4] Aggregated over all regions, market shares of those 5 companies sum to around

[4] Sony Music and BMG merged their music units to form Sony BMG Music Entertainment in August 2004.

75% (see IFPI, 2003a). Accumulated market share of the top 5 (now top 4) has been relatively stable over the last years. The music industry can therefore be seen as a tight oligopoly on all major markets. Record companies thus have multi-market contact and repeated interaction. Perhaps unsurprisingly, the record companies have a history of alleged price fixing. The most recent case in the US was settled in October 2002 (see Box 1).

Box 1. Alleged price collusion

The top five record labels and three large music retailers (Trans World Entertainment, Towers Records and Musicland Stores, a division of Best Buy and Co.) agreed to pay $143 million in cash and CDs to settle charges they cheated consumers by fixing high prices (see for instance CBS news, Oct. 1, 2002). The alleged price fixing goes back to 1995. Over the next several years, the price of a CD rose from $12 to $15. In 2000, 28 states filed a suit against the 5 major record labels, maintaining that the record labels colluded to fix the prices for music CDs. An out-of-court settlement was then reached in 2002.[5]

Retailers. Retailers make the final sales to the consumers. They may also have contractual arrangements to promote new releases. However, promotion is mainly done by radio and television playtime.

2.1.3 Complementary products

Although a CD is mainly a medium for distributing pre-recorded music, it often contains additional complementary products such as artwork, liner notes, lyrics, or, more recently, videos. Music DVDs include videos and additional audio tracks as well as bonus tracks with interviews, etc. Moreover, some record companies sell or license additional products bearing the artist's name or album title (such as posters etc.), although the revenues from these activities are likely to be small. Indeed, most of the revenues from merchandizing go to the artists themselves.

Merchandizing differs from concert tours, which are typically not controlled by the record companies at all. According to Forbes, the tour business has climbed for four years in a row, from US$1.3 billion in 1998 to $2.1 billion in 2002 (see "Concert Cash", Forbes Jul 11, 2002). For best-selling artists, tours represent a way to promote their new albums. However, for other artists net revenues from concert tours are a main source of income. Or, as Forbes puts it, "the top 10 percent artists make money selling records. The rest goes on tour". (Concert Cash, Forbes Jul 11, 2002). Connolly and Krueger (2004) report that ticket prices and revenues from live concerts have increased much more than the CPI

[5] The FTC condemned the underlying practice of Minimum Advertised Price. In particular, it condemned this practice on the ground that "the arrangements constitute practices that facilitate horizontal collusion among the distributors, in violation of Section 5 of the Federal Trade Commission Act." (see FTC, Press release on May 10, 2000, "Record Companies Settle FTC Charges of Restraining Competition in CD Music Market").

over the last two decades.

It has been argued that due to complementary products the artist's and the record company's incentives are not aligned. Indeed, as Gayer and Shy (2004) argue, this is particularly relevant in the world of file-sharing networks. As an exception to standard contracts the popular press (e.g. *BBC* and *The Economist*) has reported a recent contract for the artist Robbie Williams. According to this contract record companies take a large cut also in revenues derived from complementary products.

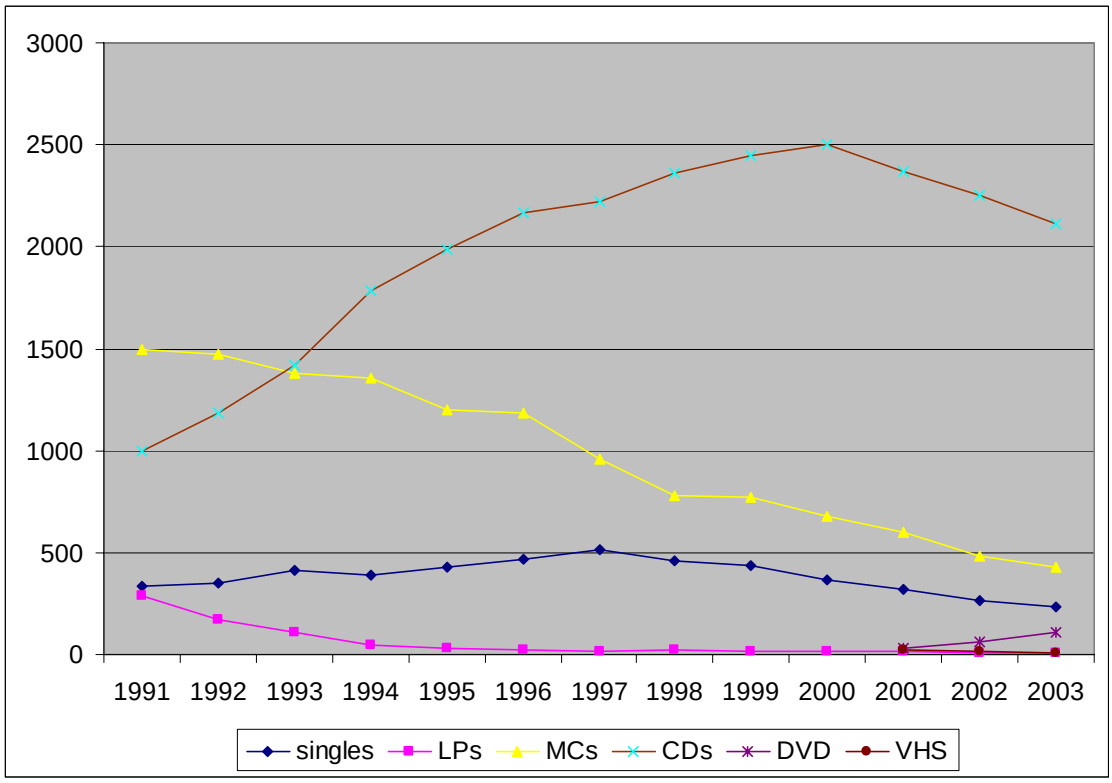
2.2 The Challenge: Digital Music

2.2.1 Music sales over time

To understand the changes in the music industry during the last 5 years, we start by looking at worldwide sales of pre-recorded music in different formats between 1991 and 2003. The aggregate market was relatively flat between 1991 and 1999 (growth in CDs compensating declines in other formats) but there has been a sharp decline starting from 2000 (Figure 1), both in units as well as in dollar amounts. This period coincides with the creation of Napster in the second half of 1999 and new file-sharing technologies in the second half of 2001. It is of course very tempting to attribute the decline in CD sales to the availability of free music files on the internet. We analyze the possible causes of the decline later in this section.

Apparently, sales have stabilized during the second half of 2003, after decreasing by as much as 12% and started to increase in the last quarter to reach an annual drop of 6%. The introduction of new formats such as DVD audio and Super Audio CD is clearly helping the music industry.

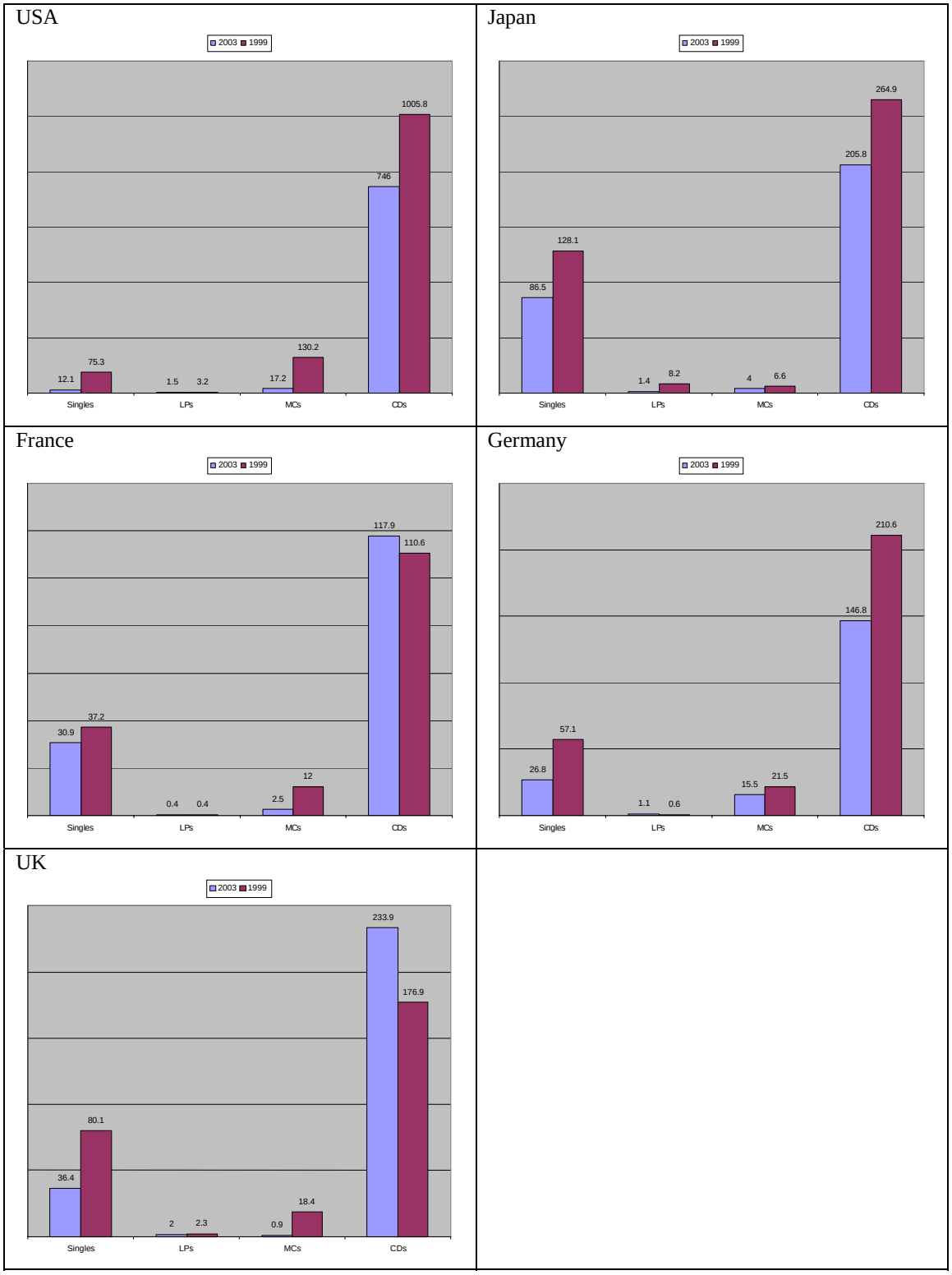
Figure 1. World sales by format (units)



Source: IFPI The Recording Rndustry in Numbers 2001-2003; figures in millions.

This negative trend over the last three or four years is observed in many but not all developed countries. While the trend is contrasted for CD sales, most markets have experienced a drop in other formats, especially singles as illustrated by sales in units in the top 5 market for pre-recorded music (Figure 2). Interestingly, CD sales increased in France and the UK over the 1999 to 2003 period although clearly those countries have also faced internet piracy. Figure 2 also documents that the older MC and vinyl LP formats are no longer relevant.

Figure 2. Top 5 markets for pre-recorded music



Source: IFPI, The Recording Industry in Numbers 2003

Observation 2. There has been a substantial downturn in CD sales since 2000, with a lot of heterogeneity across countries.

2.2.2 Digitalization and new technologies of information distribution

In this section, we describe factors that made digital music available on the internet. To download and share music online, a computer and a fast internet connection are required. In most developed countries, a large percentage of the population has access to a computer. In addition, a significant share of households has access to fast internet connections. A broadband connection is an important prerequisite for sharing files on a Peer-to-Peer network. Indeed, the software needs to be run continuously and files corresponding to an album take time to download.

Broadband penetration. Starting from 1999, the number of broadband users has steadily increased in the top markets for pre-recorded music. In the beginning of 2003, the number of broadband subscribers reached 20 million in the U.S. By February 2004, almost 40% of consumers accessed the internet using a broadband connection in the U.S. (first row of Table 3). This means that a large part of the population has access to music services that can only be delivered through broadband.

Suppose that consumers with a strong taste for music are also more inclined to download music. Then for those consumers broadband connection is even more important than for the average consumer. This means that digital music available on the internet can become a significant channel to listen to new releases for music fans.

Table 3. Broadband penetration in top music markets (% of households)

Country	Internet	Broadband
USA	61	23
Belgium	47	29
Denmark	65	28
France	43	13
Germany	50	14
Italy	37	9
Netherlands	71	21
Spain	32	11
Sweden	70	26
Uk	52	11
Japan	52	28
South Korea	76	75
Taiwan	13	1

Source: IFPI, The recording industry in numbers, 2003

2.2.3 Peer-to-peer (P2P) and file-sharing

Basics of file-sharing technologies. The principle of file-sharing technologies is very simple. Users run the search engine of the software, looking for specific files. Typically, a user types the name of an artist or even the title of a particular album or song. In the second step, the software returns "file results" found on computers connected to the file-swapping network at the time of the search. In the last step, the user proceeds to directly download files from other users sharing the relevant files. Most file sharing software have a backup technology that enables downloaded portions of a digital file to be recovered in case of a software crash or of an involuntary disconnection of the user.

File-sharing consists not only in downloading but also in uploading files. The uploading part of the software is also simple. Downloaded files are by default on the sharing list and can thus be automatically uploaded (unless specified otherwise by the user). In addition, users can transform songs from a CD into digital format and upload them in a similar way.

Most P2P technologies have a built-in priority rating system that provides information about the material shared by users. For instance, Kazaa priority rating is a measure of how many Megabytes have been uploaded compared to how many Megabytes have been downloaded over a given period of time. It is clear that such a system benefits users who share large popular files such as recent movies compressed in DIVX format, or pornographic files (Measuring in MegaBytes rather than by using the number of files can lead to some surprising results; for example, a Palissade study of 2002 found that the majority of requested files were pornographic files).

Private costs and benefits of file-sharing. Sharing and downloading files on P2P networks involves several costs including the opportunity cost of using computers and the Internet to download and burn files.

The main benefit of music downloaded from file-sharing networks is the acquisition of compressed music files that have a technical quality close enough to the original. This digital copy can be stored on hard drive for later listening, can be recorded on a CD-R to share with others or transferred to a portable MP3 player. Moreover, digital files are less cumbersome to carry than a CD, mainly because more songs can be carried using the same (CD-R) or smaller (MP3) device. Finally, MP3 files offer new opportunities for consumers to listen to music. A survey of Ipsos in 2002 found that internet users download music to listen to single tracks and not complete album that are sometimes difficult to find in record stores. They also use the internet to *sample* music, that is, to try new music before making a purchase decision (more on that in Section 3).

Table 4. Digital music attitude (US)

I download music that is not easily available in stores	65%
I download songs that I want, without having to buy an entire album	69%
I like being able to sample music online before making a purchase decision	73%

Source: Tempo, Keeping pace with digital music behavior, 2002 (n = 740)

There are several costs of downloading:

- Waste of time by searching, downloading, testing files; it is only possible to assess the technical quality as well as the content of a file after downloading it, thus wasting time for downloaders; moreover it is difficult to find non-mainstream files (due to the nature of the sharing technology, popular artists and songs are easy to find, while marginal artists are more difficult to find).
- Erroneous, incomplete, badly compressed files; downloaded files could not correspond to what the user expected, mainly because the file name has been changed or was badly encrypted or needed special software.
- Download limitation by providers; many Internet Service Providers (ISP) limit the number of GB that can be downloaded.
- Worm viruses; there are specific types of viruses that proliferate on P2P network; they either use P2P network to propagate and infect victims or they use P2P to construct worms to communicate with one another; worms do not infect other programs but copy themselves and look for specific files that they try to destroy; worms can also replicate in memory and slow down the computer; worm viruses were the biggest threat in January 2004 (for the most prevalent ones see Box 2).
- Adware/spyware; consumers have to internalize the cost of viewing ads and installing spying software that can violate their privacy.
- Storage hungry; transporting files to portable media or burning CDRs is time consuming (if this is the intended use),

Box 2. Most prevalent viruses on the Internet, January 2004

1	Worm/MyDoom.A
2	Worm/Sober.C
3	Worm/Bagle.A
4	Worm/MiMail.I
5	Worm/Gibe.C
6	Worm/Klez.E (including G)
7	Worm/MiMail.J
8	Worm/BugBear.B
9	Worm/MiMail.A
10	Worm/Dumaru.A

Source: Central Command, Inc., 2004

Because of the built-in priority rating that determines how fast a user can download the requested files, the main benefit of uploading is to improve this rating.

Uploading files is costly mainly because sharing files drags computer resources and that there is a risk of being sued. There may also be "moral" cost for those who believe that file-sharing amounts to theft and that theft is immoral. Finally, uploading files opens the computer to intruders who can hack system files or install spyware; the computer is also more vulnerable to viruses.

To sum up, using file-sharing networks is time-consuming and involves different types of risks. Therefore, we expect P2P networks to be mainly used by consumers with a low opportunity cost of spending time online, especially teenagers and college students. Teenagers and college students have substantial discretionary income and could benefit from more flexible pricing schemes.

In the longer term, there may even be a positive effect of file-sharing on CD sales due to an income effect. Indeed, by downloading free music, teenagers and college students can acquire information on the songs and albums that they like. As they become older and increase their purchasing power, these internet users may "legalize" their music archives. In this case, teenagers and college students only temporarily reduce their spending on pre-recorded music.

Frequency and number of downloads. Although Napster, Kazaa and the likes have made headline news, survey data suggest that the majority of consumers do not use these services and that only a small fraction of broadband users share files on a regular basis. This is documented in Table 5. While all survey responses could be biased as they are self-reported, the perception of legal risk was low before the summer of 2003 when the RIAA announced plans to sue P2P users. All survey data that we present in this section cover the period prior to June 2003.

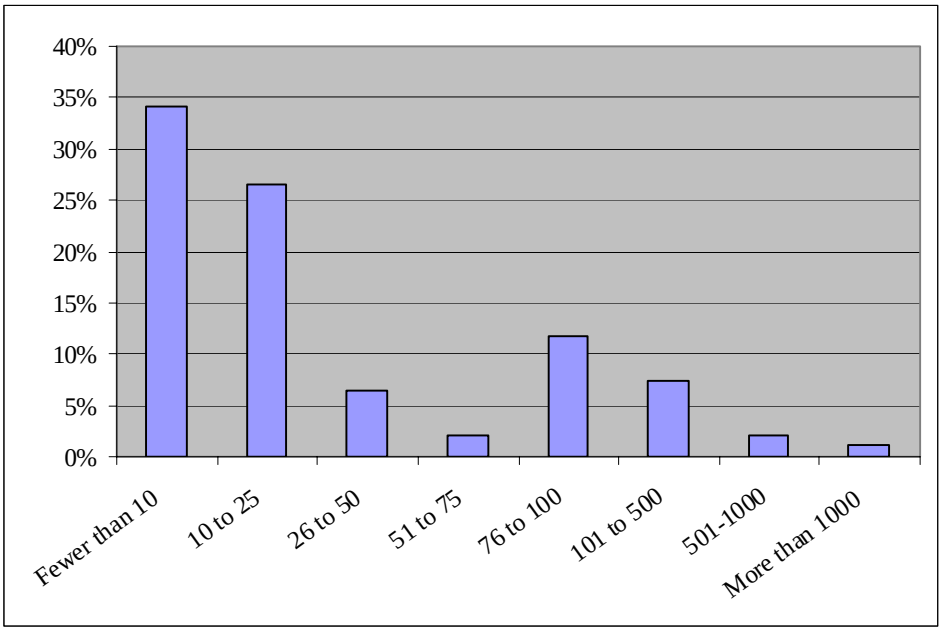
Table 5. Frequency of use of P2P (US)

Never	60%
less than once a month	17%
1-3 times a month	11%
1-3 times a week	9%
Daily	3%

Source: Parks and Associates, Broadband access @ home II, 2003; n = 297

An analysis of the distribution of downloaders according to the number of music files downloaded and stored on computer (Figure 3 from a survey in 2000 and Table 6 from a survey in 2003) suggests that there is a lot of heterogeneity among downloaders: many download very few files but others download a substantial number of songs.

Figure 3. Number of files downloaded (in percentage of the population who ever downloaded music, US)



Source: PEW Internet Report, July-August 2000 (based on 238 respondents).

This pattern is confirmed by a survey of NPD in 2003. In this survey, participants who had digital music files on their hard drives were asked how many files they had. 56 % answered that they had between 1 and 100 files, 28 % between 101 and 500 files, 8 % between 501 and 1000 files, and 8 % more than 1000 files. Note that some of these files reported in this table by NPD have been ripped from CDs and were not downloaded. However, NPD says that two-third of all digital music files can be attributed to file-sharing.

Table 6. Number of music files stored on PC (US)

<50	47%
50-99	9%
100-199	14%
200-299	9%
300-399	4%
400-499	1%
>500	16%

Source: Parks and Associates, Electronics living @home, 2003; n=297

Age structure of downloaders. File-sharing is popular among internet users aged 24 or less. In particular, a large proportion of P2P are teenagers and do not represent a significant percentage of the population with large purchasing power, although they have discretionary income from their parents. The relationship between age and downloading behavior is documented in a number of surveys. A study by Parks and Associates finds that the number of downloads is much lower for households with the household head above 45 (Table 7). Note that the average number of files in this survey is 297 per computer, which is comparable to numbers presented in Figure 3.

Table 7. Average number of mp3 files on home computers by age (US)

Age	Average number of files
65+	72
55-64	124
45-54	177
35-44	340
25-34	721
18-24	348

Source: Parks and Associates, April 2002; n = 711

Respondents to a December 2002 IPSOS survey were asked whether they have downloaded digital music files (or MP3 files) from an online file-sharing service (such as Morpheus, Napster or Kazaa). Table 8 suggests that teenagers and adults between 18 and 24 are the most likely to have used file-sharing networks and that they also tend to do so on a regular basis (last column). Only 8% of adults between 25 and 34 admit to use file-sharing services during the previous month in December 2002. This percentage becomes almost insignificant for adults over 55.

Table 8. Downloading using P2P according to gender and age (US)

	Ever	in the past 30 days
Total (1112 obs.)	19%	9%
Male (566 obs.)	26%	13%
Female (546 obs.)	12%	6%
12-17 (111 obs.)	52%	32%
18-24 (138 obs.)	44%	24%
25-34 (181 obs.)	23%	8%
35-54 (394 obs.)	12%	5%
55+ (282 obs.)	3%	1%

Source: Ipsos-insight, Tempo: Keeping pace with online music distribution, December 2002

The profile of music downloaders reported by Pew Internet Report (Table 9) confirms that young adults (18-24) are more likely to have downloaded music from the internet than older adults. Among the respondents, all internet users were asked whether they ever downloaded music files over the internet so that they can play them at any time. The probability of having downloaded music decreases with the income of the household.

Table 9. Downloading behavior according to demographic characteristics (US)

	Jul. 2000	Feb. 2001	Mar. 2003
All Adults	22	29	29
Men	24	36	32
Women	20	23	26
Whites	21	26	28
Blacks	29	30	37
Hispanics	35	46	35
Age cohorts			
18-29 years	37	51	52
30-49 years	19	23	27
50+ years	9	15	12
Household income			
Under $30000	28	36	38
$30000-$50000	24	31	30
$50000-$75000	20	29	28
$75000+	15	24	26
Education			
Less than high school	38	55	39
High school	25	31	31
Some college	25	32	33
College degree or more	15	21	23

Internet experience			
Less than 6 months	20	27	26*
6 months to 1 year	20	25	
2 to 3 years	24	28	29
3 or more years	22	33	59

Source: PEW Internet Tracking Report, April 2001 and July 2003; n = 2515, * less than a year.

How many internet users upload music? Table 10 shows that, while the whole population has embraced the internet revolution, the number of persons who upload music files on P2P networks represents less than 21% of internet users in the US in July 2003. The number of downloaders is somewhat larger, namely 29 %, because there are more people who download than upload.

Table 10. Sharing on P2P networks (US)

	% of Internet users who allow others to download music or video files from their computers		
		yes	No
% of internet users who download music files onto their computers so that they can play them anytime they want	Yes	12	17
	no	9	62

Source: PEW Internet Report July 2003; n = 1555

Observation 3. A large number of people download copyrighted music without permission from copyright owners. Fewer upload music on file-sharing networks.

2.2.4 Audio-streaming

The internet also gave birth to audio streaming. On the one hand, internet radio stations are owned by sites independent of major technological distribution companies. On the other hand, specific streaming technologies owned by large software producers and content providers (such as Microsoft, Apple, AOL and RealNetworks) have obtained licenses to broadcast music from copyright owners. Indeed, the Digital Millenium Copyright Act requires webcasters and commercial broadcasters to pay licensee fees (see next section). Many small websites had to shut down because they were not able to pay these royalties.

On the cost and benefits of audio-streaming. Contrary to sharing music files on the internet, audio-streaming is legal. Most of the time it is easy to purchase the original provided that a link to merchant sites can be directly accessed from the software.

However, just as for a radio, there is no digital copy of the music played on the audio-stream.[6] Moreover, many audio-streaming sites are ad-based, which can annoy some internet users. More generally, sampling is more difficult since playlists are pre-programmed.

Over 35% of Americans aged 12 and older were "streamies" in July 2002 according to an Arbitron/Edison Media Research. The active audio-streamer is more likely to be older (between 35-54) than the active music downloader (Table 11).

Table 11. Profile of audio-streamers (% of respondents, US)

	Broadband	Dial-up
Men	59	47
Women	41	53
12-17	17	13
18-24	13	11
25-34	15	18
35-44	20	23
45-54	22	20
55-64	9	11
65+	4	6
50K+ HH income	59	48
Online listening habits		
Listened to radio stations online last month	18	12
Listened to radio stations online last week	7	5
Listened (online) to music	62	49
MP3 files you have downloaded	48	30
Music that's not available from local radio	37	26

Source: Arbitron/Edison Media Research, July 2002; n = 2511

2.3 Potential causes of current decline in CD sales

Several explanations for the downturn in music sales have been proposed, among them: the negative economic environment, substitution between music formats, substitution with other forms of entertainment and of course internet piracy. We analyze these factors from an international perspective. Liebowitz (2003a) discusses the impact of these factors on the US market. These factors are presented as potential causes because of a lack of data at the individual or album level.

[6] In principle, it is always possible to record music from an internet radio on analog devices and convert it to a digital file. This is referred to as the "analog hole". However, doing so is time-consuming and results in a degraded technical quality of the song.

2.3.1 Prices

Trivially, the demand for recorded music depends on its price. We first focus on the price of a CD over time. The decline of CD unit sales in recent years (see section 2.2.2) would be little surprising if it was accompanied by a drastic rise in CD prices. Price is very difficult to measure because we only have information on list prices, while price paid by consumers display more volatility due to temporary promotions, record clubs etc.

Using implicit prices of music, we find that over the last 5 years, real prices of music exhibit different patterns in the top 5 countries with no significant trend in real prices. In Figure 4, price changes have been computed by dividing total retail value in local currency by the total number of units sold (singles, LPs, MCs, and CDs; except for 2003 were music DVDs were added). We then subtracted inflation to obtain Figure 5. It should be emphasized that CDs represent more than 85% of the available formats during the period; therefore changes in nominal and real prices can be mainly attributed to changes in CD prices.

Figure 4. Nominal price changes (in percentage)

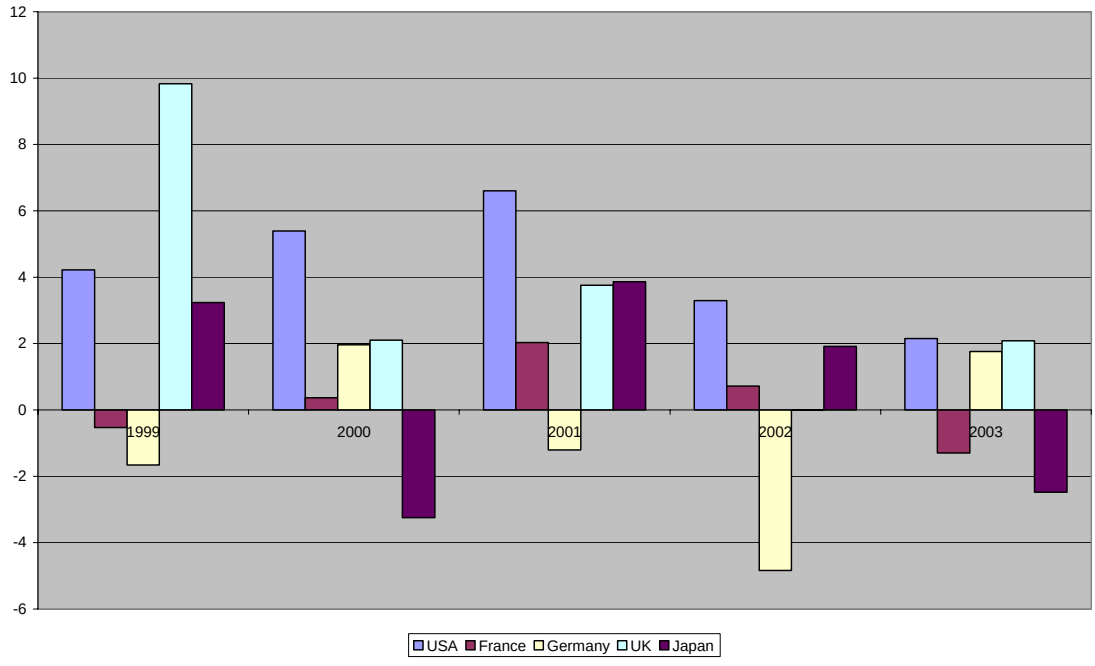
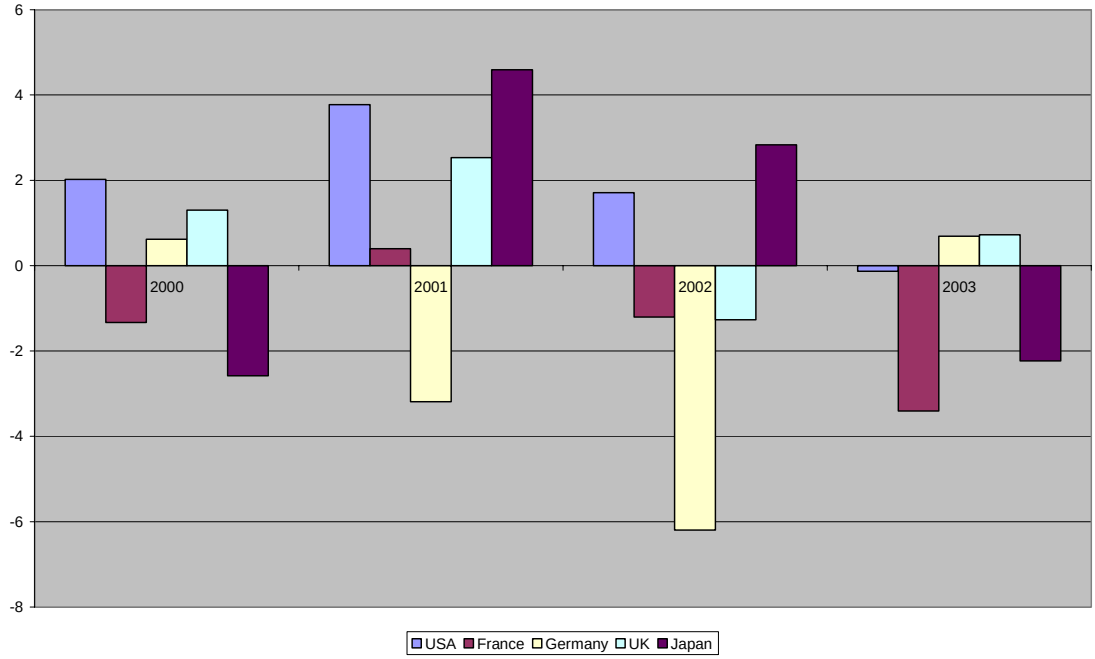


Figure 5. Real price changes (in percentage)

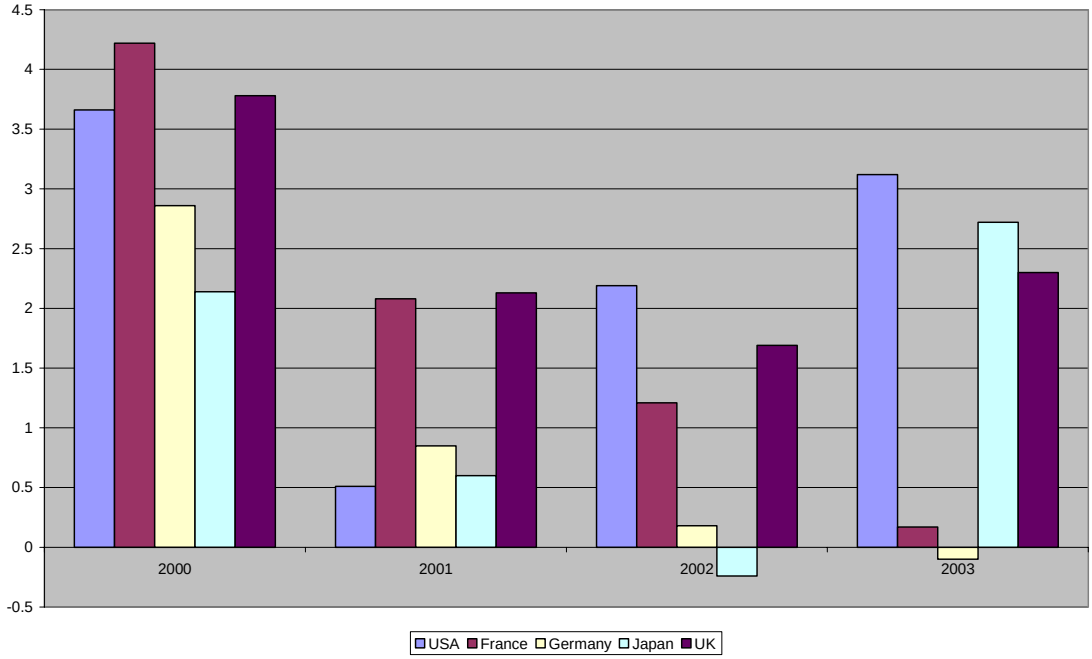


Source: IFPI, The recording industry in numbers, 2001-2003 and own computations. Data for 2003 have been computed by including music VHS and DVD sales.

2.3.2 Economic environment

It is clear that the demand for CDs depends on the economic environment, measured by GDP growth (Figure 6). In fact, we find that it is one of the main reasons CD sales have declined during the period 2000-2001 in the econometric study that we discuss later in this section. Moreover, economic conditions after the bust of the internet bubble in 2000-2001 probably impacted consumer CD purchase decisions, especially because people who suffered the most from the crash were 25-35 year old people starting day-trading. Historically, this share of the population has a strong taste for music.

Figure 6. GDP in top music markets (in percentage changes)



Source: The Economist

2.3.3 Quality/variety/new releases

The number of new releases is not available for 2000 and after. Some analysts of the music industry have argued that consolidation in the radio broadcasting industry due to mergers have favored the superstar system and reduced variety on radio time. Provided that consumers use a lot the radio to motivate purchase (as documented for the U.S. in Table 2), reduced variety offered on radio playlists could be a factor influencing music sales. However, the net effect is ambiguous because increased radio playtime favors sales of music superstars.

To document the trend in the number of new releases over the last 5 years, we have reported in Table 12 the number of European Platinum Awards and the number of new releases in 1999, 2001 and 2002 in Table 13. European Platinum Awards are attributed to albums selling at more than 1 millions units. There seems to be a negative trend in the number of new releases receiving the award. More research is needed to confirm this finding, since this award is only a poor measure of the total number of new releases in a given year.

Table 12. European Platinum Awards

Year	Total albums receiving awards	New releases receiving awards	Number of Artists receiving awards
2003	70	21	57
2002	92	32	77
2001	87	30	69
2000	80	35	73
1999	81	39	68

Source: IFPI, the record industry in numbers, 2003

In an article in Business Week ("Big Music's Broken Record", February 13, 2003), Jane Black discusses a study of Soundscan that found that the number of new releases decreased by as much as 20% in 2001.

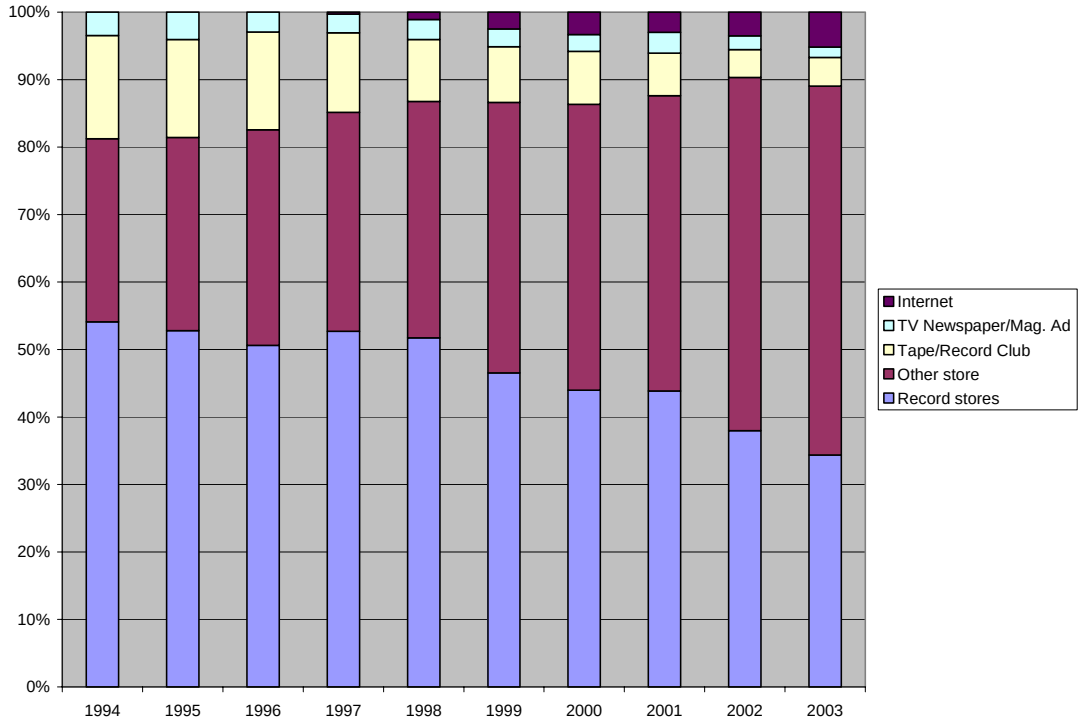
Table 13. New album releases

	1999	2001	2002
Number of new releases	38,900	31,734	33,443

Source: Nielsen Soundscan quoted in Business Week, Feb. 13, 2003

Consumers are also influenced by CDs they saw and listened to in record stores to motivate their purchase (see Table 2). Therefore, a shift in distribution channels could reduce the exposure of consumers to the potential variety of releases. Again the net effect on sales is ambiguous because each superstar should see their sales increase due to more exposure of their music to the public. Figure 7 reports the shift from record stores to other stores in music distribution for the U.S.

Figure 7. Channels of music distribution (US)



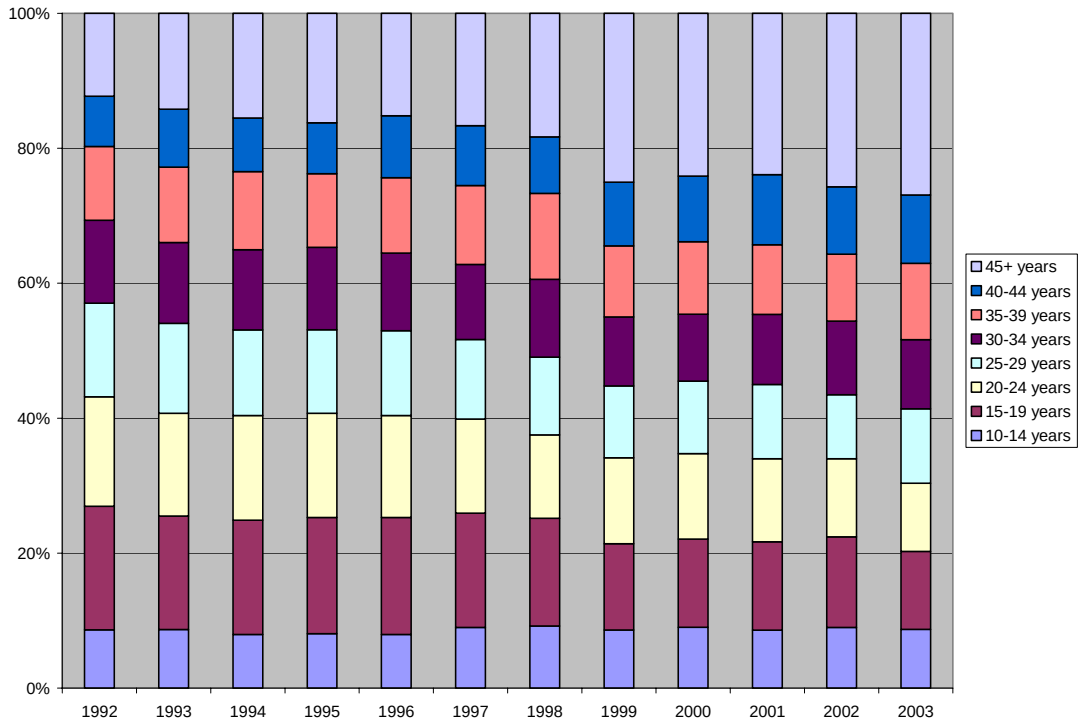
Source: RIAA, Consumer Profile, December 2003

Changes in distribution channels have been overlooked, but more recently, articles in the specialized press have pointed out that the strategies of marketing and promotion of large retail stores (low inventories, high turn-over in shelves, decreasing shelf space due to the popularity of DVDs, focus on top-selling artists together with large price volatility due to temporary price discounts that confuse the consumers about the value of CD) are not suited to increase the value of music to consumers and are detrimental to new artists.

2.3.4 Demographics

It appears that the youth is purchasing less music over the last decade. On the contrary, the older population seems to be replacing its old LP collection in CD format as illustrated in Figure 8.

Figure 8. Music consumption by age (US)



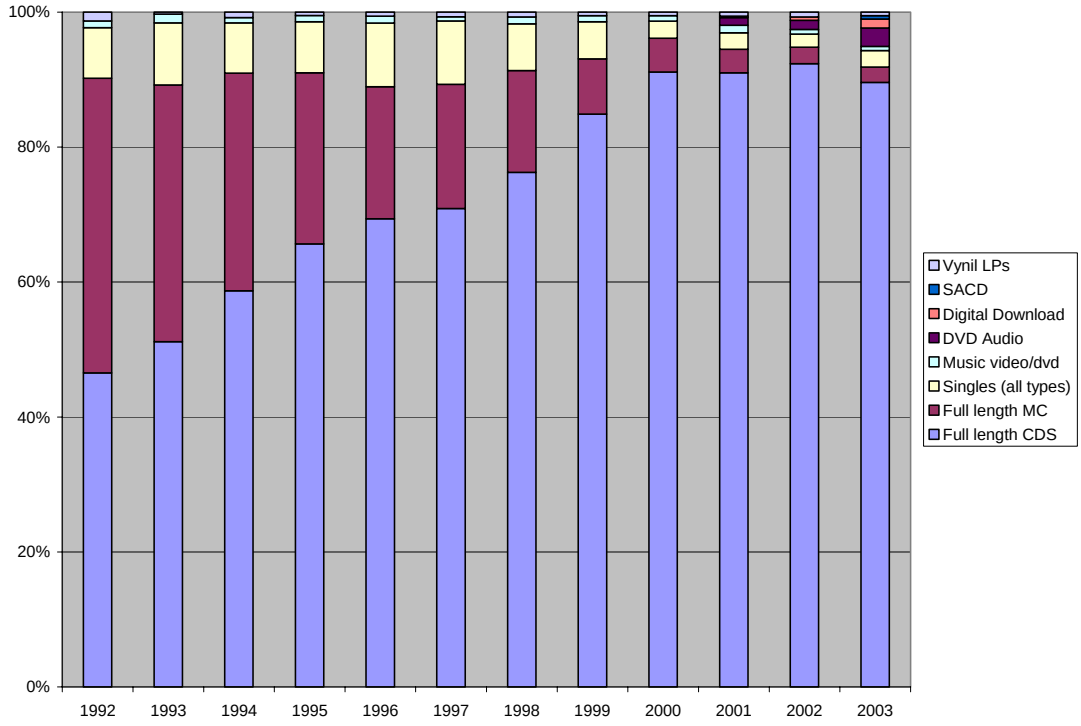
Source: RIAA, Consumer Profile, December 2003

2.3.5 Substitution with other media and devices

Substitution between different types of media can potentially explain the downturn in CD sales. Figure 9 indicates that the year 2000 also coincides with the end of a strong substitution/replacement effect between cassettes and CDs.[7] When such a replacement no longer takes place, revenues are lost.

[7] From year 2000 onward MC sales contribute little to the overall music sales. However, the replacement effect may continue to work for a while beyond 2000 because consumers need time to build up a CD collection.

Figure 9. Substitution between Different Types of Media in the US



Source: RIAA and own calculations

With the replacement of music cassettes by CDs more or less completed in the US and Western Europe, the music industry is introducing new formats.

Music on DVD. As of 2001 a new type of medium has become more and more popular: music on DVD. Apart from the improved copy protection (see Section 3 for a discussion), record companies hope that the replacement of CDs by DVDs will increase revenues. As for any new format, the industry is gambling on its acceptance by consumers. However, different from other formats, DVD has already a market for films. DVD player penetration in US households was 41% in 2001. It has climbed to 70% in 2003. In Western Europe and Japan the respective numbers are 19% and 28% in 2001 and 47% and 42% in 2003 (see IFPI, the record industry in numbers, 2003).

Table 14 shows that the sale of music DVDs is picking up in the major markets. For the moment, it cannot fully compensate for the decrease in CD sales. The music industry has also high hopes for the Super Audio CD (SACD), which gives better sound quality than a regular CD and offers surround sound.

Table 147. Music on DVD and CD in Units (Millions)

	DVD			CD			
	2001	2002	2003	2000	2001	2002	2003
North America	8.8	12.3	21.5	1008.2	942.7	860.7	799.1
Europe	7.3	14.3	35.2	861.8	857.5	854.2	807.6
Asia	16.0	30.2	38.9	363.3	332.3	308.3	286.7
Latin America	1.7	3.1	4.4	198.3	162.4	156	198.3
Australasia	0.9	2.6	5.7	53.3	59.7	56.8	53.3
World	34.7	62.8	105.7	2,504.9	2,372.2	2,253.4	2,111.6

Sources: IFPI , Recording Industry in Numbers, 2003

MP3-players and portable devices. Ipsos-Insight (Tempo, Dec. 2003) found that 19 percent of U.S. downloaders own a portable mp3 player, up from 12 percent in September. This is confirmed by Parks Associates (Sept. 2003) who found that 20 percent of digital music users own an MP3 player. However, according to their survey data only 8 percent plan on purchasing one in the next 12 month. Similar figures are available from a survey of Jupiter Research (Dec. 2003) who found that 6 percent of online adults said they would be buying a portable device in the next 12 month, and the likely buyer is male (79 percent) and under age 35 (over 65 percent). Jupiter Research also expects U.S. shipment of MP3 players to double in 2003 to over 3.5 million and to continue to grow almost 50 percent per year for the next several years. IDC forecasts the worldwide MP3 player market to grow to $44 billion in revenues by 2007, with annual growth rate of 30 percent.

Observation 4. There is a strong (potential) demand for new media, such as DVD audios, Super Audio CD and MP3 portable devices.

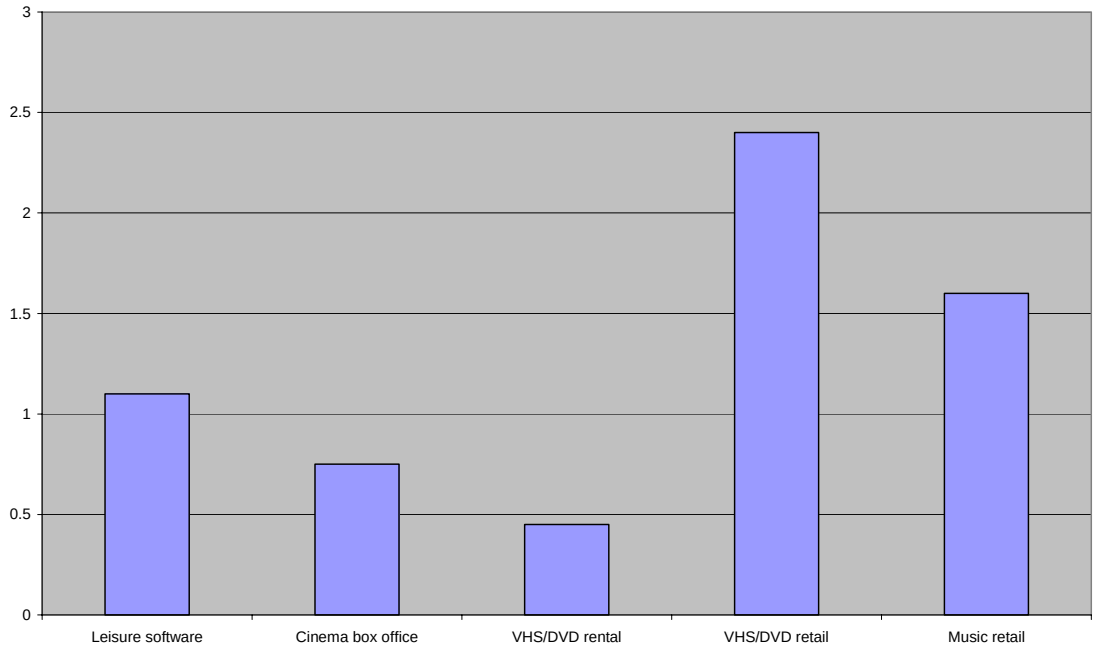
There are, however, three other types of substitution which have taken place but from which the music industry does not benefit. First, due to the penetration of CD burners, consumers can more easily make copies of CDs they do not own, for example, by making a copy of a friend's CD or by burning songs downloaded from the Internet. Second, movie DVDs and computer games are taking time away from pre-recorded CDs. Finally, broadband connections at home allow internet users to start new forms of activities.

Penetration of CD burners. In many countries the penetration of CD burners is such that the majority of the population can easily record CDs. In a September 2003 survey, Parks and Associates found that 80 percent of PC users in the US owned a CD burner. This statistic combined with the fact that more than 90 percent of household have computer at home and that sales of CD-R's have also increased indicates that many consumers could use their burner to make copies from existing CDs. Similarly, the shipments of DVD recorders increased 416% to 22.92 million units in the global market in 2003 from a year earlier in the US, and 362% to 5.93 million units in the Japanese market. Jeita, the company that conducted the survey, expects that global sales of DVD

recorders will hit 88 million units by 2006, and that the market share of DVD recorders will exceed that of CD-R/RW devices by that time. The 2003 shipments of optical disc devices rose by 114% from a year earlier to 222 million units in the global market, and by 113% to 20.06 million units in the Japanese market.

DVD and computer games. There is some evidence that consumers have substituted time listening to pre-recorded CDs to playing computer and video games and watching pre-recorded DVDs. Figure 10 indicates that consumers purchase more DVDs than they purchase music in the U.K.

Figure 100. UK Entertainment Spending



Source: Screen digest from industry sources, 2004

Internet activities. A high-speed internet connection at home offers new ways to spend leisure time. Among these "digital" activities, looking for information on hobbies, products, travel, reading the news are prominent, as illustrated by a survey from Pew Internet Report (see Table 15).

Table 15. Internet activities in 2000 and 2001 (in percentage of internet users, US)

Activity	March 2001	March 2000
Communication activities		
Email	100	75
Instant messages	48	36
Fun activities		
Info on a hobby	83	64
Online just for fun	66	53
Video/audio clips	56	40
Listen/download music	40	30
Play a game	40	30
Sports scores	38	28
Information utility activities		
Product information	82	63
Travel information	72	55
Information on movies, books, music	69	53
News	64	52
Health information	64	47
Government website	60	42
Job-related research	52	41
Financial information	45	38
Look for job	44	31
Look for place to live	32	20
Religious/spiritual information	27	18
Transactions		
Buy a product	58	40
Buy a travel service	46	29
Online banking	25	14
Online auction	22	12
Buy/sell stocks	13	10

Source: Pew Internet Report, Getting serious online, March 2002; n = 862 (March 2001), n=723 (March 2000)

Analyzing daily music related activities, broadband users are more likely to have experimented with music downloads and file-sharing networks (Table 16). Overall, there are slightly more broadband users who use audio-streaming technologies (19%) than broadband users who download music files (17%).

Table 16. Daily internet activity by connection (in % of respective category, US)

	All Home broadband	Broadband elite (25%)	Other broadband (75%)	Dial-up
Communications				
Email	67	58	80	52
Instant messaging	21	48	14	14
Chat rooms	10	23	7	5
Information seeking				
News	46	56	49	24
Look for product information	32	68	24	18
Information producing				
Share computer files with others	17	50	8	4
Create content (e.g. web pages)	16	38	10	3
Downloading				
Download games, video, pictures	22	61	12	4
Download music	17	43	10	6
Download movie	5	17	2	n/a
Media/streaming				
Watch video clip	21	55	12	6
Listen to music/radio station	19	48	11	4
Transactions				
Buy a product	21	59	11	3

Source: PEW internet tracking survey February 2002 (broadband) and August-September 2001 (dial-up); elite broadband users are doing on average 10 or more activities on a daily basis and represent 25% of the broadband population; n=507 (Broaband users), n=1391 (Dial-up users).

A survey of Arbitron Media Research 2002 reports that many people have substituted time spent using traditional media (Newspapers, radio, pre-recorded music) with online activities (see Table 17). Substitution is stronger for activities that require full attention such as watching television than for music (one can listen to music while reading newspapers or surfing on the Internet).

Table 17. Internet and other forms of entertainment (US)

"Are you spending less time with each activity due to the time you spend online?"	
Activity	% saying spending less time
Watching TV	37%
Reading newspapers	31%
Reading magazines	27%
Listening to the radio	20%
Listening to music CDs	19%

Source: Arbitron/Edison Media Research, July 2002; n = 2511

Observation 5. There is evidence that the increasing availability of broadband is changing the spare time activities of consumers in favor of online activities.

2.3.6 Effect of Internet piracy and music downloads on CD sales

In this section, we investigate what are the main effects of internet piracy on CD sales. We first start with a review of the economics of internet piracy to understand what economic mechanisms increase or decrease sales. Next, we discuss recent survey data and summarize econometric studies.

2.3.6.1 The economics of piracy

The economic rationale of intellectual property protection is to give incentives for creative activities that involve large sunk costs. With the traditional distribution technology, the cost of creation included costs of recording, marketing and promotion. Since this activity is risky, it seems efficient to share revenues of intellectual property between artists and distribution companies. We will argue later in this guide that the situation has changed and that online distribution services have a different cost structure.

By giving an exclusive right to authors of original artistic work, the copyright law tends to increase market power in the music industry (even if ignoring collective efforts such as price fixing). Ex post, this situation is inefficient: it is optimal to price a "public good" at its marginal cost, which is very small. Ex ante, this situation is necessary. The trade-off between “investment” incentives and ex-post efficiency is at the core of the debate on the optimal copyright and patent policy.

Despite the technological breakthrough brought by file-sharing technologies, the debate on the implications of piracy goes a long way back in the economic literature on unauthorized copies of copyrighted material – this literature is reviewed in Peitz and

Waelbroeck (2003a). Instead of duplicating the review here, we discuss the arguments of the literature that can be applied to the music industry.

When a copyright owner can monitor the amount of copies likely to result from the purchase of original material, he or she can indirectly appropriate revenues by charging a higher price for the original (See Liebowitz, 1985; Besen and Kirby, 1989; Bakos et al., 1999). The first argument is related to the pricing of a club membership and the nature of the cost to copy. The second argument is related to the literature on bundling and how club formations can reduce the variance of the demand of the club as whole compared to individual demands. Potentially, indirect appropriation could arise if users of file-sharing technologies would be ready to pay a premium to purchase the original version of a popular hit song in order to improve their priority rating on a P2P network (for discussion see Liebowitz (2002)). However, both arguments are unlikely to play a key role in the case of P2P technologies since it is extremely difficult to monitor file exchanges and only a minority of P2P users share files.

Most of the time, the copy is of lower quality than the original and product differentiation in many models imply that the increases in consumers' surplus more than compensate the static losses of producers. This argument is easily understood since the ex-post welfare-maximizing price is equal to the marginal cost (which can be assumed to be zero). However, in a long term perspective, such profit loss will result in less incentive to provide quality on the market (an important contribution to this idea should be credited to Novos and Waldman, 1985). To summarize, for the reasons that we have already mentioned (see section 2.1.3), digital music files can be argued to have a lower expected value than an original CD so that some elements of product differentiation should be part of the debate on internet music piracy.

In some cases, positive network externalties generated by copies can benefit copyright owners as shown by Conner and Rumelt (1991), Takeyama (1994) and Shy and Thisse (1999). There is a case for network effects in music consumption if users place a value on the number of people listening to the same music. These social network effects can result from the fact that consumers want to belong to a community or be able to talk about music in social gatherings. In principle, network effects could depend on both the number of originals and copies.[8]

Finally, digital copies can provide information on the genre and style of a CD. For instance, Takeyama (2003) shows how copies that give information on the characteristics of a durable good can solve adverse selection problems. Arguments based on sampling are developed by Duchene and Waelbroeck (2003) and Peitz and Waelbroeck (2004a). In particular, Peitz and Waelbroeck (2004a) show how a multi-product firm can benefit from better *matching* consumers to their ideal products through better sampling on P2P networks, despite the negative *competition* effect due to the availability of digital copies.

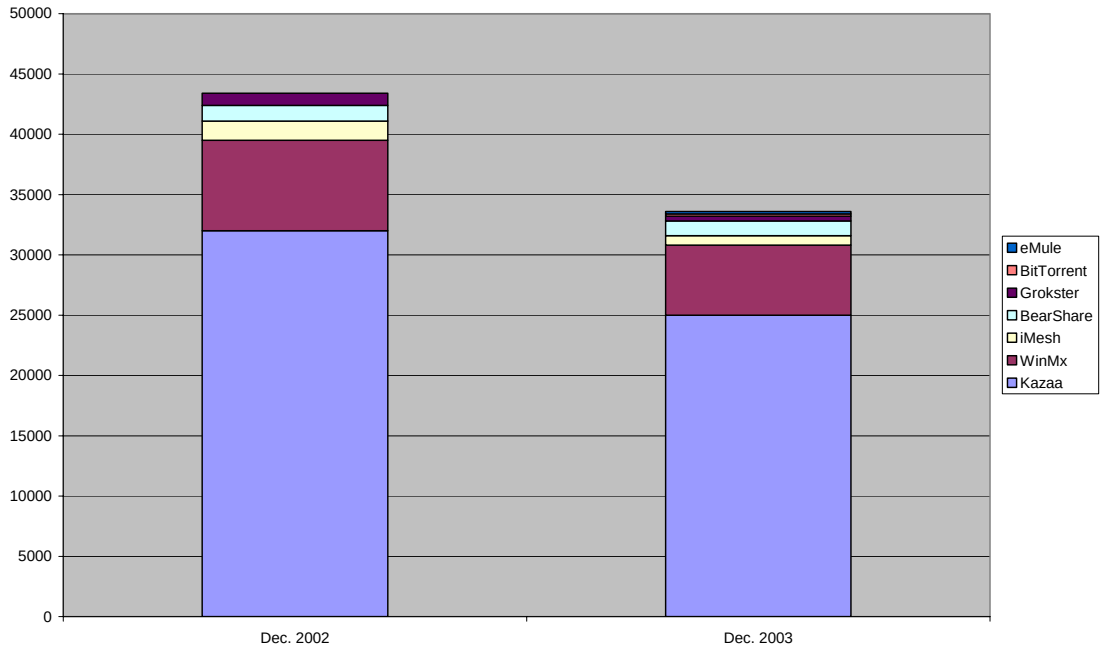
[8] There is a different rationale for the existence of network effects among copiers using file-sharing technologies. Namely, the fact that the speed of downloading music files grows along with the size of the network. However, if there is only a small number of users sharing a large number of files, the extent of network effects will be limited (for a discussion see Peitz and Waelbroeck, 2003a).

We believe that arguments based on the informational role of copies are important for music consumption.

2.3.6.2 Data on file-sharing

Evolution of the number of downloaders and uploaders. After a fast increase, the number of people using P2P applications started to decline in the second half of 2003 following the legal actions undertaken by the RIAA after the summer of that year. Numbers on the popularity of P2P networks can be obtained by monitoring the use of file-sharing software applications running at a given time. Following the announcement of the RIAA to sue P2P users during the summer of 2003, most file-sharing networks have seen their number of users drop by 10 to 30 percent (Figure 11).

Figure 11. Unique users of file-sharing (worldwide, 2002-2003)



Source: comScore, 2004; data in millions.

The IFPI tracks the number of infringing music files on the internet and also reports a significant decline after the summer 2003 when the RIAA announced it would sue music uploaders (Table 18).

Table 18. **Number of infringing music files on P2P networks (world)**

June 2004	700
January 2004	800
June 2003	1000
April 2003	1100
November 2002	900
June 2002	500
April 2002	600

Source: IFPI, Online Music Report, 2004; figures in millions of units available at any time

2.3.6.3 Survey data

Contrary to a survey carried out by Peter Hart that was commissioned by the RIAA in 2002 and that found that 15% of music downloaders who burn music on CDRs spent more on music purchases while 27% spent less on music since they started downloading, a survey of Ipsos 2002 reported in Table 19 found the opposite. Therefore, survey data do not give a clear-cut effect of music downloads on CD purchases. We will document empirical studies on the effect of internet piracy on music sales in the following section.

Table 19. Probability to purchase after downloading (US)

Since you initially began downloading music or mp3 files off of the internet, would you say that your compact Disc purchases have	
Decreased	19%
Increased	24%
Stayed the same	57%

Source: IPSOS Tempo 2002; n = 834.

Finally, a recent Pew Internet Report interviewed 2755 musicians in the US and asked them their opinions on file-sharing on the internet. Results are reported in Tables 20 and 21. Only five percent of the musicians answered that free music downloads had a negative impact on their career. However, these survey data are constructed from a non-representative sample and should therefore be interpreted with caution.

Table 20. What are the musicians saying about free downloads? (1/2, US)

Has free downloading on the Internet increased, decreased or not really affected					
	Increased	Decreased	No effect	This item does not apply to me	Don't know refused
Sales of your CDs or other merchandize	21	5	34	25	14
Radio play of your music	19	1	39	28	13
Attendance at your own concerts or live performances	30	0	29	27	13

Source: Pew Internet report, June 2004

Table 21. What are the musicians saying about free downloads? (2/2, US)

In general, would you say that free downloading on the Internet has (%)	
helped my career	35
hurt my career	5
not really made any difference in my career	37
has both helped and hurt my career	8
don't know	15

Source: Pew Internet report, June 2004

2.3.6.4 Econometric studies

As a first attempt, in Peitz and Waelbroeck (2004b), we try to estimate the effect of music downloads on music (mainly CDs, music cassettes and singles) sales, controlling for other factors during the period *1998-2002* for which we have cross-country survey data on music downloads. We find that there are three main factors that significantly influence cross-country variation in sales over the period: GDP growth, MP3 downloads and broadband penetration. The overall impact of internet piracy on *music* sales is estimated at 20% for the period. In Peitz and Waelbroeck (2004c), MP3 downloads led to a 7% reduction of *CD* sales worldwide and to a 12% reduction in the US during the period *2001-2002*. Subsequent drops can hardly be explained by music downloads only. These two studies should be taken with caution since we consider a small number of countries in the econometric analysis.

Zentner (2003) uses individual survey data from October 2001 in large European countries. Preliminary estimation results suggest that music downloads do not significantly reduce the probability to purchase music. However, after controlling for unobserved heterogeneity in music taste, Zentner finds that music downloads reduce the probability to purchase music by 30%. Assuming that people who download music purchase as much as people who do not, Zentner finds that internet piracy could have decreased CD sales in unit by 7% in the countries considered. This study gives roughly the same aggregate effect as in Peitz-Waelbroeck (2004c) for the same period.

These three analyses use download data based on surveys. This can be questioned for a number of reasons. We only mention two. First, survey data on downloads may be biased because some respondents might be aware of the illegality of their actions (although in the period considered legal concerns were not as high as in the second half of 2003). Second, the survey data used are not sufficiently rich because they do not distinguish between frequent and occasional downloaders.

Oberholzer and Strumpf (2004) use actual download and sales data. They determine which albums have been downloaded most on file-sharing networks during the last quarter of 2002. Controlling for possible endogeneity issues, they show, contrary to the previous studies, that the number of times an album has been downloaded does not have a

statistically significant effect on sales. They also conclude that “estimates are of moderate economic significance”. This study has been criticized by some academics and representatives of the music industry. Liebowitz (2004) argues that the effect of file-sharing on sales of individual albums is hard to extrapolate at the industry level and questions the validity of the instruments chosen by the authors. IFPI market research director Keith Jopling quoted by BBC News (“Legal song downloads rise tenfold”, April 1, 2004) criticizes the choice of the last quarter of the year to carry an empirical study because of the changing nature of music sales due to Christmas. He adds "they [Oberholzer and Strumpf] establish no causality between file-sharers and music sales. The link they make is tenuous at best".[9]

Rob and Waldfogel (2004) use a survey of college students to determine which albums have been downloaded most at the individual level. Using a list of hit albums (hit list) and a list of albums acquired by the respondents during the past year (current list), they explain variation in individual CD consumption by the number of albums downloaded from the corresponding list. They find a statistically negative effect of downloaded albums on CD purchases (current list) and a much weaker effect for the (hit list). Next they use answers to valuation question to determine if students download high- or low-value albums. Data suggest that depreciation and the nature of music as an experience good can explain the difference and the correlation between ex-ante and ex-post valuations and that students download low-valuation albums.

Overall, the empirical results so far do not give a clear indication whether music downloads has a significant effect on current CD sales. However, the available evidence suggests that the qualitative claim by the music industry should be taken serious (For a complementary analysis with alternative conclusions see Liebowitz, 2004).

Different factors, which are not captured in the regressions, may at least partly explain the recent downward trend in CD sales. One such factor may be the effect of the diffusion of fast internet connections on leisure activities. People are listening to audio clip and internet radio more than they are downloading music files. While it is not clear how audio streaming will affect record companies in the future, it is only one of the many activities that broadband users are doing on any given day. Other forms of digital activities include instant messaging, looking for news, job and hobby information, creating online content (pictures, web pages), watching video clips and movies, playing online games, purchasing products online and undirected browsing. These new forms of entertainment that have been embraced by broadband users, are clearly a substitute to traditional forms of entertainment. Indeed, as documented in section 2.3.5, survey data provide evidence that heavy internet users have already reduced the amount of time watching television and listening to music.

There has also been self-selection. Teenagers and college students with low purchasing power have the highest propensity to use file-sharing technologies and for this reason adopted the technology first. Older internet users are late adopters with higher purchasing

[9] For an elaborate and critical discussion of the current empirical evidence see Liebowitz (2004).

power and high opportunity cost of using file-sharing networks to download music. Using the terms previously defined, the matching effect may dominate the competition effect for older internet users, while the converse may be true for teenagers and college students. This would imply that the reaction by older internet users to music downloads may actually be an increase in spending.

The interpretation that early adopters behave differently from late adopters is compatible with our empirical study that finds that music downloads have had a large impact on CD sales in the early period of file-sharing networks and a much smaller impact from 2002 onwards. It is also compatible with the study of Boorstin (2004) who finds that the number of teenagers and adults younger than 24 who have internet access significantly decreases total CD sales in a given area, but that the total number of older adults with internet access significantly increases total CD purchases. However, with respect to the study by Boorstin, it is problematic to equate internet access to internet piracy, as we have argued that internet access can serve a number of purposes, only one of them being downloading music from file-sharing networks. Moreover, analyzing the effect of internet access of a subpopulation on *total* sales does not provide the correct partial effect of that subpopulation.

Finally, the music industry has experienced several technological cycles related to the introduction of a new format. Cassettes partially replaced LPs. In the main markets for pre-recorder music, CDs have replaced cassettes and LPs. In particular, consumers have over a long period of time replaced their LP collection by purchasing the same albums on CDs. This substitution pattern seems to be approaching an end. New formats have also been introduced such as the Super Audio CD and music DVDs as documented earlier in this section. However, it remains to be seen whether these new formats can trigger a new replacement cycle of the same magnitude.

3 (Re)actions and Opportunities

High-speed internet has created new technological opportunities to distribute music to consumers. On the one hand, the technology of selling digital music is built on a new cost structure. On the other hand, technological protection of digital music files raises new economic and legal challenges both for players in the market and for policy-makers. From a legal perspective, new amendments to the U.S. Copyright Act make it a crime to circumvent technological measures of protection of digital content. This has opened the market to firms producing so-called Digital Rights Management (DRM) solutions that can monitor and control access to digital music. As a matter of fact, all business models that we describe in this section rely on DRM to distribute digital music to consumers.

3.1 What has changed?

3.1.1 Cost of digital music distribution

In most business models that we will describe in this section, one music download is

charged $1. Table 22 provides a breakdown of this price according to C|Net, an internet company specialized in technology news.

The large fixed cost of setting a CD press and reproducing CDs has vanished, which means that potentially artists with smaller audience can become profitable to distribute. However, fixed marketing costs are still necessary to provide information to consumers on new releases, but probably to a lesser extent, as we will argue at the end of this section. Although costs related to financial intermediation already existed, their proportion is larger for digital music. It remains to be seen if new payment methods can bring that cost down. Overall, one can say that variable costs relative to fixed costs are more important for music downloads than for CDs. This suggests that acts with a smaller audience can succeed in the digital music market. As a consequence, we could observe more music diversity and a less skewed distribution of sales among artists.

Table 22. Digital music distribution: A dollar divided

Labels:	Receive 60 cents to 70 cents. This includes publishing rights of about 10 cents to 12 cents per song, which are bundled with the labels' cut in the kind of wholesale arrangement reportedly brokered by Apple.
Financial transaction:	Costs 10 cents to 15 cents. Credit card companies charge transaction minimums of up to 30 cents, making this one of the biggest line items for download retailers. Experienced music executives said micro-payments are prohibitively expensive at fewer than three downloads per purchase. "Credit card fees can eat you alive," asserts Yahoo Launch CEO Dave Goldberg.
Marketing:	5 cents to 10 cents. Assumes marketing budget of $5 million to $10 million a year.
Staff:	3 cents to 5 cents. Assumes 30 to 50 employees at $3 million to $5 million a year in salary and benefits.
Bandwidth and hosting:	2 cents to 5 cents. This includes the cost of delivering the bits to the customer and is highly sensitive to volume. Large numbers of downloads can mean big savings, assuming rates have been locked in advance.
Start-up costs:	2 cents to 3 cents. Assumes a $20 million to $30 million investment--about what Sony and Universal put into the Pressplay service being sold to Roxio--amortized over 10 years.
Total:	82 cents to $1.03
Profits:	$17 million to a $4 million loss

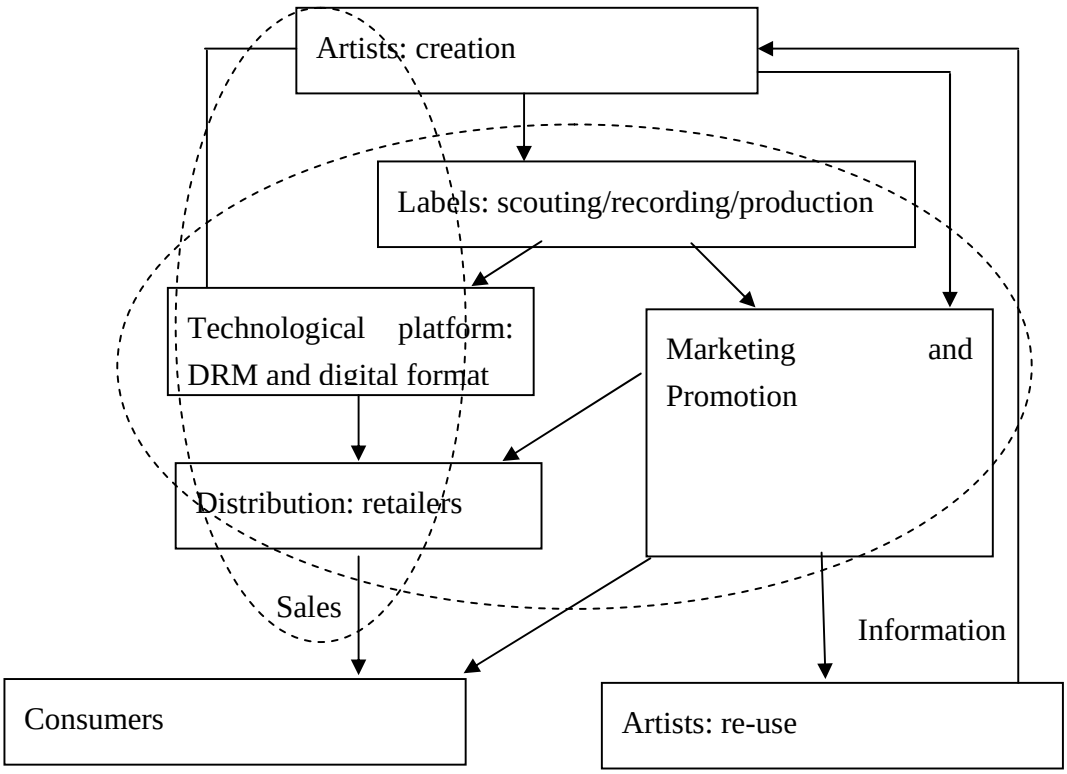
Source: C|Net News.com, "Microsoft, again: Apple's old nemesis", May 29, 2003

3.1.2 New players

Since digital music does not require a physical support, new players can sell digital music to consumers: traditional/hybrid stores (Fnac, Amazon, Walmart, BuyMusic), technology

companies (Apple's iTunes/iPod, Microsoft Media Player, RealNetworks), Online content provider (Yahoo! Launch), Online music sites (Mp3.com; OD2), Electronics companies (Sony Connect Store), and Internet service providers.

Diagram 2. Players in the digital music industry



Moreover, copyright owners need to choose the digital format of the music that they intend to sell to consumers. They also have to determine their restriction policy, i.e. how much freedom consumers have with respect to streaming, transferring, and burning music files (see the section on Digital Rights Management later in this chapter for a detailed discussion).

The organization of the digital music industry is represented in Diagram 2. Dotted ellipses indicate potential sources of vertical and horizontal integrations.

3.1.3 Consumer's behavior and digital music

In this section we present facts on digital music available in compressed format on the internet. Clearly, downloading music files is only one way to get access to music on the computer. An early picture is provided by a survey carried out by Ipsos-Reid in the US in 2001 (with a representative sample of 1112 respondents): approximately a quarter of respondents said that they ever downloaded music from the internet. A similar number of all respondents said that they listened to internet radio, to streamed music clips or audio

files. At that point in time more than one third ever listened to a prerecorded CD on the computer.

In this subsection, we focus on consumers' attitude with respect to music downloads and audio streaming.

The use of music downloads. Music downloads can be used to:

- sample new songs,
- add songs to a playlist on the computer (and transferring them to other computers),
- burn songs on CD,
- transfer music to a portable device (MP3-player).

For the first two purposes no additional devices are needed. To burn a CD, a CD-burner is obviously needed and for portable use an MP3-player is required. Hence, to assess the importance of burning music files on CDs or transferring files on portable players, it is relevant to analyze the penetration for CD-burners and MP3-players in households. Although consumers purchase CD burners for a variety of reasons, burning music and video files on CDs is likely to be the main use for most consumers. However, while a CD burner is a prerequisite for burning downloads on a CD, the possession of a CD burner does not indicate that the owner intent to use it only for infringing purpose.[10] MP3-players are almost exclusively used to listen to recorded music (see section 2.3.5. for a discussion).

Sampling. If sampling occurs, consumers purchase music on CDs after downloading or streaming the songs from the internet. This means that they do not fully substitute CDs by digital music. To assess the interaction between downloading and purchasing behavior, we document in Table 23 answers to surveys on sampling. The results indicate that there are only 26% of freeloaders in a survey of Pew Internet Report, while 50% of music downloaders have declared to have actually purchased the original on a regular basis.

[10] If the consumer owns the original CD and copies it for its own use, e.g. for playing in the car or at work, this does not constitute a copyright infringement.

Table 23. Downloads and music purchases (US)

Did you buy the music you downloaded or did you get it for free?	%
Bought it	15
Got it for free	79
Don't know/refused	9
Did you download music that you already own on a CD or tape or did you download new music?	
Music already owned	28
New Music	63
Don't Know/refused	9
After you downloaded music to your computers and listened to, how many times if ever have you bought that same music on a CD or cassette?	
Most of the time	21
Some of the time	29
Only a few time	19
Never	26
Don't know/refused	5

Source: PEW internet tracking, July-August 2000; n = 218

When they sample, downloaders can discover new artists. According to Table 24, 31% of music downloaders have listened to new artists. This percentage can be seen as a lower bound on the sampling effect because currently P2P networks are not good at providing cross-recommendations, customized playlists, etc.

Table 24. Downloading new music (US)

What type of music have you downloaded?			
	Yes	No	Don't know refused
Music you'd heard before by artists you were familiar with	86	9	5
New music by artists you were already familiar with	69	27	4
Music by artists you had never heard before	31	65	4

Source: PEW internet tracking, July-August 2000; n = 218

An indication that sampling can affect music consumption is provided by a recent survey of Ipsos in 2002. 30% of participants acknowledged that they have changed their listening or purchasing habit since they started downloading music. Because internet users are able to experiment with new music, 27 % of those who answered the survey

reported that their listening or purchasing habit has changed (see Table 25).

Table 25. Downloading and changes in music taste (US)

Has the genre of music that you typically listen to/or purchase changed since you initially began downloading music or mp3 files off o the internet?	
No	71%
Yes	30%
In what ways? (n = 242)	
was able to experiment with different forms of music	27%
like different/a range of music	23%
introduced to new age/techno/electronica	10%
more aware of new bands, groups, artists, songs	10%
listening to more country/introduced to country	6%
listening to more classical/introduced to classical	5%
listening to more pop/introduced to pop	4%
listening to more hip-hop, rap/introduced to	4%
listening to more jazz/introduced to jazz	4%
Other	19%

Source: Ipsos-insight, Tempo: Keeping pace with online music distribution, 2002; n=834

Burning. There is little data on the behavior of P2P users with respect to burning downloaded files. One survey with a small sample size finds that the majority of internet users who download music burn a small number of files (see Table 26). This pattern is compatible with the distribution of the number of files stored by music downloaders presented in section 2.2.3.

Table 26. Number of music tracks burned to CDs (US)

Number of tracks burned on CD	Answers
<50	54%
50-99	5%
100-199	10%
>200	11%
don't know	20%

Source: Parks and Associates, Electronic living @ home, 2003; n=285

Observation 6. Digital music downloads have a number of purposes, the most prominent ones being sampling, burning, adding to playlists on computer, and transferring to portable MP3 players.

3.2 Legal protection of digital music

Technological protection, which is at the core of all business models proposed by the major players in the music industry, has its foundation in the Digital Millenium Copyright Act. To understand the new economic challenges posed by technological protection of digital content and the legal actions undertaken by the record companies, it is necessary to review some key elements of the U.S. Copyright Law.

3.2.1 Basic facts about copyright

The U.S. Copyright Law serves the purpose of protecting authors of "original works of authorship," including literary, dramatic, musical and artistic works. The protection is available for published and unpublished work. In addition to protection, copyright gives an exclusivity right on the revenues generated by the copyrighted work. Two U.S. Acts are of particular importance for the music industry: the Audio Home Recording Act and the Digital Millenium Copyright Act.

3.2.1.1 Audio Home Recording Act (AHRA)

US Congress enacted the AHRA in 1992 in response to the appearance of home digital audio recording devices. The law imposes monetary duties on equipment and supplies, but non commercial users are protected from copyright infringement. According to the Alliance of Artists and Recording Companies (AARC), a non-profit organization representing featured performing artists and record companies, as a first approximation, 40% of the Sound recording fund (2/3 of total royalty payments the other 1/3 goes to the Musical recording fund) is distributed to artists and 60% to copyright owners (i.e. music distribution companies) in proportion of their sales. The royalty payment is under section 1004 2% of the transfer price of the device and 3% for the media. A digital audio recording device is, according to the law, "the digital recording function of which is designed or marketed for the primary purpose of, and that is capable of, making a digital audio copied recording for private use." Congress also used the AHRA to introduce a DRM known as the Serial Copy Management System (SCMS) that authorizes unlimited first copies of copyrighted material but prevents additional copies of the first copies. Devices that do not include such technological protection can not be sold in the U.S. There is much debate on the definition of "digital audio recording device" and the obsolescence of the AHRA itself in the fast evolving technological environment around digital music.

3.2.1.2 Digital Millenium Copyright Act (DMCA)

Following the World Intellectual Property Organization (WIPO) convention in Geneva, in 1998, Congress enacted the Digital Millenium Copyright Act (DMCA) that extends the Copyright Act. The DMCA

- makes it a crime to circumvent anti-piracy measures built into most commercial software (except for research purpose, non-profit libraries, etc.),
- limits liability of copyright infringement of Internet Service Providers (ISP) and institutions of higher education,
- requires webcasters and commercial broadcaster to pay licensee fees: these fees are set to 0.07 cents per performance with a minimum of $500 a year; fees are collected by the Royalty Panel (CARP),
- does not affect conditions of copyrights infringements, including fair use.

DMCA lays the ground for the legal foundation of pay per use even for material that is no longer protected by the copyright law.

3.2.2 Exemptions to copyright infringement

In most countries, the copyright law includes several exemptions to copyright infringement. In the U.S, the most ambiguous exemption, especially in the digital era, is fair use. Four elements have to be balanced to determine whether an activity is within fair use: the purpose of the use, the nature of the work being used, the amount of the work used, the effect of the use on the market for or value of the original work. We will come back to these elements in the context of the Napster case. In Europe, the exemptions are listed. However, more products and services are taxed. The proceedings are redistributed to copyright owners.

In 2002, collections for broadcasting, public performance and other sound recording royalties topped US$ 605 million at the 49 collecting societies reporting to IFPI's income survey. This is an increase from US$ 566 in 2001 and US$ 505 in 2000. Of the collected revenues, US$ 59.5 million were distributed to companies in the UK, US$ 59 million in Japan, US$ 47 million in France, US$ 43 million in Germany, US$ 17 million in the Netherlands and US$ 9 in North America (IFPI, 2003b).

3.2.3 Napster: court decision

A year after its creation in the second half of 1999, the pionneering file-sharing company Napster was sued by the RIAA. The Ninth Circuit court in some cases using simplistic arguments found that the four elements weighted against fair use in the Napster case. The court found that the use of Napster harmed the music industry on two economic grounds: loss of sales of CDs and heightened barrier to entry by the music industry in the online distribution market.

The empirical study used to show that music download harmed the music industry provided only weak evidence of a decline in CD sales in record stores near college campuses and ignored the effect of online sales of CDs. At the same time, the argument of sampling used by Napster, according to which higher CD purchases are generated, was supported by an empirical study that the Court ruled out as flawed and non-objective.

The Court also ruled out computers, MP3 and hard drives that can be use for other purposes than listening and copying music as "digital audio recording devices", which made the AHRA exemption difficult to apply. In other words, music downloaders are not exempted from copyright infringement when they use computers and the internet to acquire MP3 files without authorization. Finally the Court did not resolve the question of whether Napster was an ISP, but the question did not eventually go to trial. However, this issue was raised in the series of legal actions undertaken against developers and users of file-sharing networks.

3.2.4 Kazaa, the RIAA and file-swappers

Two series of legal actions were undertaken by the RIAA against file-sharing networks: the first against developers of P2P networks and the second against uploaders of MP3 files on P2P networks such as Kazaa.

The RIAA sued campus file-swappers who created P2P or indexing services at Rensselaer Polytechnic Institute, Princeton and Michigan Technological University in the beginning of 2003. The software ranged from indexing technologies to local and generic search engines. Four campus file-swappers agreed to pay between $12,000 and $17,000 to the RIAA to settle piracy charges.

Kazaa became the most popular P2P-network after the departure of Napster. Contrary to its predecessor Napster, files are exchanged in a decentralized way. Kazaa therefore claims that it is not responsible for copyright infringement and that it should be treated like an ISP.[11] Services like Kazaa and their users were the next target of the RIAA.

[11] Before installing the Kazaa Media Desktop software users have to accept the end user license agreement (checked March 2003). It contains the following paragraphs: "5 Things you need to do when using the Kazaa Media Desktop 5.1 It is your responsibility to ensure that you obtain all consents, authorizations and clearances in any data owned or controlled by third parties that you transmit, access or communicate to others using the Kazaa Media Desktop. 5.2 Sharman will not be liable in any way: ... 5.2.3 for any allegations or findings of infringement of copyright or other proprietary rights as a result of your use of the Software. 6 Copyright Infringement 6.1 Sharman respects copyright and other laws. Sharman requires all Kazaa Media Desktop users to comply with copyright and other laws. Sharman does not by the supply of the Software authorize you to infringe the copyright or other rights of third parties. 6.2 As a condition to use the Software, you agree that you must not use the Software to infringe the intellectual property or other rights of others, in any way. The unauthorized reproduction, distribution, modification, public display, communication to the public or public performance of copyrighted works is an infringement of copyright. 6.3 Users are entirely responsible for their conduct and for ensuring that it complies with all applicable copyright and data-protection laws. In the event a user fails to comply with laws regarding copyrights or other intellectual property rights and data-protection and privacy, such a user may be exposed to civil and criminal liability, including possible fines and jail time. ... 15 Termination 15.1 It is you responsibility to comply with the terms of this License and to obey the laws of your jurisdiction. Your rights under this License will terminate immediately and without prior notice if: you violate any term of this License, including violating any applicable laws or rights of any third party including the intellectual property rights of any such third party. You may be subject to legal action if you continue to use the Kazaa Media Desktop in violation of this License." (Other file-sharing software contain similar provisions.) In its written statements the Kazaa website discourages the sharing of those files that infringe copyright or other proprietary rights (March 2003), quite in contrast to some other websites offering file-sharing software.

After monitoring file-sharing activities on P2P network in the summer of 2003, the RIAA launched a massive series of lawsuits targeting individual file-swappers. While many observers of the music industry view the strategy of suing your own customers as extremely risky, which could only lead to the development of better anonymous file-sharing technologies, the RIAA has so far (May 2004) totaled an impressive 2454 cases. Many charges were settled out of court for $3,000. According to Jason Schults, a staff attorney at Electronic Frontier Foundation defending music uploaders, "many of the people who have called us who have been sued have been single parents whose children were using the computer while the parent was at work" (Battle not over for file shares, Wired News, Dec. 23, 2003). At the same time, the number of unique users of P2P networks has decreased between 15 to 50% during the second half of 2003. However, while many people stopped using the popular Kazaa software, some switched to less well-known file-sharing software such as Bittorent and Emule.[12]

On the legal front, the lawsuits against Kazaa and its users have brought key interpretation of the Copyright Act. First, a federal judge from Los Angeles, Judge Stephen Wilson, ruled that Streamcast (a parent of Morpheus) and Grokster were not liable for copyright infringement from users of their software. The ruling does not directly affect Kazaa. The decision was partly based on a comparison with companies selling home video recorders or copy machine. The difference between Napster and new P2P technologies is that the latter are not in control of the content that circulates through their applications. The ruling follows a court decision in the Netherlands in March 2002 that ruled that Kazaa could not be liable for copyright infringements done by people using their software application. A reference was made to the Betamax Case of 1984, which made the sales of VCR legal.

Secondly, the RIAA initially won a court order forcing Verizon Communications to divulge the identity of Kazaa users suspected of copyright infringements (putting ISPs into the middle of huge copyright mess threatening the privacy of individuals). However, reversing the previous decision in favor of the RIAA, a Washington DC appeal court decided that the law does not allow the RIAA to send out subpoenas asking ISPs the identity of P2P users without a judge's consent. In other words, record companies have to file a lawsuit to obtain a subpoena to uncover the identity of P2P users, which substantially increases the cost of tracking P2P users. Finally, Judge Konrad von Finkelstein in Canada ruled that uploading music files is not in itself a breach of copyright and that “before it constitutes distribution, there must be a positive act by the owner of the shared directory, such as sending out the copies or advertising that they are available for copying.”

Observation 7. Active uploading is considered illegal distribution of copyrighted material but developers of P2P networks are not held responsible for the files that are being exchanged on their networks.

[12] The latter creates serious legal issues as it belongs to an open-source movement and is not backed by a commercial company.

3.2.5 Concluding remarks on legal protection

The copyright law is alive and has been tailored to the digital era. U.S. Copyright Law includes complex definitions that are subject to interpretation for digital products. Computers are not exempted by the AHRA. Fair use has been interpreted as follows: transformative uses are strongly favored but digital copies are not transformation of CDs; music is considered a creative work and fair use is narrow in this domain; effects on current and future markets are taken into account.

Legal protection of digital content is being enacted in the rest of the world. For instance, the EU Intellectual Property Rights Enforcement Directive was passed in March 2004 and seems comparable to the controversial DMCA. However, one amendment says that action should not be taken against consumers who download music "in good faith" for their own use.

3.3 Technological protection of digital music

The DMCA legally enabled Digital Rights Management, a small piece of software that can detect, monitor and block (unauthorized) use of copyrighted material.

New DRM solutions for digitally compressed music files open the door for new ways of distributing digital content as well as for second-degree price discrimination.[13] From a legal perspective, DRM requires a re-thinking of the notion of fair use.

Digital Rights Management for music generally includes: copy control, watermarking (digital identification inserted in digital files, i.e. ex ante constraints), fingerprinting (converts the files content into a unique identification number, i.e. ex post control), authentication and access control.

DRM protection on original CDs has proved to be quite unpopular. For instance, EMI is fighting a lawsuit against European organizations for the protection of consumers' rights who claimed that some of the legitimately purchased CDs would not play in old stereos or in cars. New DRM protection of digital files has similar problems. It is difficult to stream legally purchased files onto wireless audio receivers or to transfer music files to video-editing software for instance.

3.3.1 Uses and Misuses of DRM

The fact that digital music can be compressed, exchanged and monitored over a network

[13] Offering different transfer possibilities allows to target different consumer segments. To the extent that one of the offerings is more restricted than the other, the arguments found in the literature on damaged goods initiated by Deneckere and McAfee (1996) can be applied. More generally, versioning allows for second-degree price discrimination.
[15] This section builds on Gasser (2004) and Berchtold (2003).

has implications for both users and producers of music.[15]

3.3.1.1 DRM and users

DRM can protect any digital content even if it is not protected by the Copyright law such as document in the public domain. It reduces the value of fair use and can force consumers to listen to content that is not desired (such as ads). Because of these restrictions, DRM is sometimes called by its critics "Digital Restrictions Management" (Samuelson, 2003). Moreover, it can potentially protect over an infinite amount of time, which is contrary to the spirit of the Copyright Act. In a sense, DRM creates the basis for a perpetual payment system.

Fair use and indirect appropriation

Fair use is an exemption to copyright infringement and is economically justified when the cost of writing a formal contract to authorize use is less than the benefit to the user (Gordon, 1982). DRM can reduce the value of fair use if digital music can not be used as before. Indeed, nothing in the copyright law prevents legitimate owners of digital music to include songs in video-editing software for instance, an action that is sometimes difficult to undertake with current technological protection. However, DRM is not necessarily hostile to fair use. It could be designed with symmetric rights (See section 3.3.3). There is currently a debate on whether fair use is still necessary when copyright owners can monitor and appropriate all uses of digital music. Indeed, one could imagine in not-so-distant future an environment in which all music is streamed from a centralized server (*Digital Locker*).

Does contract Law override Copyright Law?

DRM is linked to a contractual agreement (clickware) that can conflict with copyright law if it reduces the set of actions permitted by copyright. Moreover, DRM can protect work in the public domain, over an infinite period of time, which is contrary to the spirit of the copyright law. It is not clear whether contract law overrides copyright law, but if it is indeed the case, potential conflicts need to be resolved.

First sale doctrine (exhaustion principle)

There is currently a debate on whether the first-sale doctrine could be applied to digital music files. The first sale doctrine states that a legitimate purchaser and owner of a copyrighted work can resell or rent it on a secondary market. Although this doctrine could be in principle applied to digital media files, it is practically difficult to realize for the following reason. Copying and transmitting digital files require to make a temporary copy in the memory of the receiving computer, which could be considered as an infringement to copyright.

Privacy

Privacy can be economically defined as the ability to control information (in/out) about one’s action in a private intellectual space. Privacy is in general protected in places where

one can consume intellectual goods (libraries, video-rental stores, cable subscription). DRM can invade privacy by monitoring and constraining unauthorized uses. DRM can also invade privacy by forcing consumers to view or listen to undesirable content (ex: spam). However, firms could use DRM to collect information in order to sell products better suited to the tastes of the consumers. There is currently a debate on who should protect privacy: should it be protected by the law or should consumers protect themselves with personal firewalls? The latter scenario raises the possibility of a technological protection war between users and producers of digital music.

3.3.1.2 DRM and producers

Price discrimination, versioning, targeted offers

Because DRM allows producers to price discriminate, Liebowitz (2002) argues that DRM is unlikely to significantly reduce use compared to the social optimum. In the extreme case of first-degree or perfect price discrimination, use is not reduced at all. However, price discrimination tends to reduce the surplus to consumers and raises distributional concerns. DRM can also be used to target different segments with different types of restrictions and pricing schemes. Since DRM can transmit information on consumers' behavior (see the discussion on privacy above), firms can use DRM to version their products to consumers' needs.

Promoting new acts

As discussed before, there is a strong heterogeneity of tastes in music consumption. It is therefore difficult for a consumer to evaluate a cultural good from a catalog. For this reason, music can be classified as an experience good that consumers need to "taste" before they can make an informed purchase decision. Transmitting this information is the first challenge. A second and related challenge is to predict the success of a new act.

A properly designed DRM could solve both challenges if properly designed. Limited free sampling gives useful information to both consumers and record companies. Different from free downloads on Kazaa, artists and record companies do not forego future earnings since free use is restricted in time (see the discussion of the DRM-protected files available at Kazaa and Microsoft music store later in this chapter).

It is interesting to note that some record labels' executives have discreetly looked at music download data to assess how well an act is doing. Maverick Records used download data to promote Story of the Year's "Until the Day I die" song that was a top 20 downloaded song selling at half a million copies. Similar strategies have been said to be used by Warner Bros. to promote the song "Headstrong" from the band Trapt (see Dawn Chmielewski, Music labels use file-sharing data to boost sales, Mercury News, March 31, 2004).

However, the popularity of an artist's songs on P2P networks does not necessarily translate into commercial success. For instance, Digital News reports that of the typical bands that are exchanged on P2P networks, Ben Jelen and Atreyu, Atreyu has half of Ben Jelen's P2P audience but nevertheless manages to generate stronger album sales (See

BigChampaign.com who tracks the success of these two bands).

This phenomenon can be explained by the fact that the variety offered on music download charts targets different consumers than those who purchase singles. As an illustration, we report in Table 27 the top 20 UK singles and downloads charts for September 2004. It is interesting to note that the two most downloaded songs are not even in the top 20 singles chart. However, in a world in which most people buy their songs online the difference can be expected to fade away. Changes in popularity on chart rankings in the file-sharing era have been recently studied by Gopal et al. (2004).

Table 27. UK Top 20 songs (September 2004)

	Downloads		Singles	
1	Flying Without Wings	Westlife	My Place/Flap Your Wings	Nelly
2	Blazin Day	Blazin Squad	Leave (Get Out)	Jojo
3	She Will Be Loved	Maroon 5	Sunshine	Twista
4	Lolas Theme	Shapeshifters	These Words	Natasha Bedingfield
5	American Idiot	Green Day	Baby Cakes	3 Of A Kind
6	This Love	Maroon 5	Dumb	411
7	Dry Your Eyes	Streets	Gravity	Embrace
8	Bedshaped	Keane	You Should Really Know	The Pirates feat. Enya/Ama/Boss/Ishani
9	Laura	Scissor Sisters	She Will Be Loved	Maroon 5
10	Apocalypse Please	Muse	Gun's Don't Kill People Rappers Do	Goldie Lookin' Chain
11	Sick and Tired	Anastacia	Wishing On A Star	Paul Weller
12	Dumb	411	Popular	Darren Hayes
13	Everybodys Changing	Keane	Is It Cos I'm Cool	Mousse T feat. Emma Lanford
14	Left Outside Alone	Anastacia	Thunderbirds	Busted
15	My Happy Ending	Avril Lavigne	My My My	Armand Van Helden
16	Guns Dont Kill People Rappers Do	Goldie Lookin' Chain	Jesus Walks	Kanye West
17	Single	Natasha Bedingfield	Caught In A Moment	Sugababes
18	Harder To Breathe	Maroon 5	All These Things That I've Done	Killers
19	Hey Ya	Outkast	Girls	Prodigy
20	Sunshine	Twista	Stand Up Tall	Dizzee Rascal

Source: The Official UK Charts, September 2004.

3.3.2 Designing DRM

DRM could substantially increase the cost of creation if artists have to check and clear melodic lines belonging to other artists. There is no efficient market mechanism for processing information contracts efficiently, although many new genres rely on sampling (electronica and rap for instance).

However, there is nothing in the nature of DRM that prevents subsequent use or diminish consumers' rights. In principle, one could design a value-centered DRM that respects interests of various parties. Indeed, the “R” in DRM stands for rights but not only producers’ rights.

Some authors have advocated the use of “Rights expression language” to enhance creativity and deal with multiple rights owners (Bechtold, 2003). Others are proponent of a “Copyright Commons”, where DRM is used to controls copyrighted works that are registered in a metadata system (Lessig, 2001; DRM is used to enforce openness and enrich the commons). Several artists have released content under Copyright Commons licenses: Chuck D., Beastie Boys, David Byrne, Gilberto Gil and Cornelius (see BBC News, "A Sharing Approach to Copyright," Oct. 5, 2004).

Finally, other observers of the music industry have strongly argued that the current levy system on digital audio material in Europe is not compatible with the current restrictions imposed by DRM solutions. In most European countries, there are taxes on blank media, MP3 players and CD burners that are redistributed to copyright owner (see Bechtold, 2003, for the numbers in Germany). These taxes give copyright owners remuneration without control of the way music is consumed. However, DRM currently allows both remuneration and control of copyrighted work and represents an additional financial source that is at odds with the existence of a levy system.

3.3.3 Alternative DRM-based remuneration systems

Sobel (2003) distinguishes two extreme forms of copyright arrangements. These extreme forms are:

- Anti-copyright models: they would eliminate copyright entirely; DRM is only used to tip some artists.
- Beyond copyright models: DRM could be used to control all form of access to digital work, even non-copyrighted work.

Note that all DRM-based models authorize some form of price discrimination according to use. Among copyright-based models Sobel (2003) distinguishes between:

- Statutory license models: authorize noncommercial use against a levy on providers;

- Tax and royalty system: tax ISP access and technologies to play digital files. The tax is redistributed to copyright owners.

Both models use DRM to determine the amount of copyrighted work that has been flowing over the ISP network and have been advocated for instance by Lessig (2001). The basic idea of this tax and royalty scheme is to tax ancillary products such as blank CDs, CD writer, ISP, etc. A compulsory license requires that the copyright owner makes his work available to users at a given price, usually fixed. It is based on a comparison with the blanket license for which broadcasters pay copyright owners a fee that is redistributed to copyright owners and are cleared from copyright infringement. The advantages of a compulsory license are of course that it would eliminate wasteful resources spent on lawsuits and monitoring P2p networks and users, which could violate their privacy. Moreover, consumers could download as many MP3 files as they want without fearing to be sued. Finally, a compulsory license could simplify contractual disputes over which albums could be released online: there is usually a conflict of interest between copyright owners who benefit from putting an album online and artists who fear they might not been fairly compensated.

As Liebowitz (2003b) discusses, compulsory license models suffer from several shortcomings. First, making MP3 downloads legal could reduce CD sales further. Secondly, a tax introduces inefficiencies in the market for the taxed product. Thirdly, the right price (tax) is difficult to compute especially in a distant future since it is arduous to get accurate statistics on mp3 downloads in a given country in an inter-network environment. Fourthly, it is difficult to assess how much money should be raised, especially over a long period of time. Finally, how will the money be distributed? It should depend on the relative importance of music downloads by artists. But this statistic is hard to find and can be manipulated and does not translate into the number of lost purchases (the harm).

3.3.4 DRM and the music industry

DRM = Down-Right Messy?

Because DRM can be implemented in the hardware, in the Operating System and also in the player, which are all provided by different firms, the issue of setting standards and making sure that all platforms are compatible can not be neglected. For these reasons, some observers of the computer industry consider DRM as "Down-Right Messy".

DRM and competition between platforms

Clearly, a music site needs to offer a large variety of music, at least for the music segment in which it is active. Among the record companies, it is useful to distinguish between those who are backing a particular music site and those who are not. For instance, Napster 2.0 and Sony Connect are owned by Bertelsmann and Sony, respectively. This means that the music sites have access to the available repertoire of the labels owned by the respective companies. However, for the time being, to become a major music site other labels have to be on board as well. Other labels must be assured of

not being discriminated against or must have the possibility to cross-license their distribution technologies. Thus, it may turn out to be a disadvantage for a music site to be owned by a major label. (Note that the incentives for Sony to enter with a music site are different from those of a record company because Sony is primarily a consumer electronics firm)

At the moment, labels multi-home, that is, they offer their repertoire on different sites. This implies that the same track is available in a number of different proprietary formats. One of the open questions is whether the market will tip at some point so that eventually only one or two music sites will attract most of the traffic.

DRM to control ancillary markets

Proprietary DRM can be used to control ancillary markets: the DMCA prohibits reverse engineering and as a consequence Apple's DRM could use its first-mover advantage to control the portable market with its iPod player. Effectively, it creates an entry barrier in the market for portable players ("The iPod makes money. The iTunes Music store doesn't" – Apple Senior vice-president Phil Schiller).

DRM to control the evolution of technology and business models

Proprietary DRM can be used to control technological development: content providers can ask technology companies to comply with their business strategy if they want to distribute digital content. For instance, record companies have asked Apple to reduce the number of times a playlist can be burned to 7, down from 10.

3.3.5 Examples of DRM

iTunes.com

Apple iTunes service uses the Advanced Audio Coding (AAC) format in combination with FairPlay DRM. Users can burn a playlist 7 times and transfer music files to up to 5 computers. Users need to unauthorize old computers when they purchase a new one or when they sell them. The procedure to do so is relatively straightforward. Users can offer their playlists for preview to other members of the community. iTunes' users can offer musical gifts to other subscribers of the music service. The iPod player is compatible with music files in MP3 format.

Microsoft

Contrary to Apple, Microsoft has developed its own series of DRM solutions. The first type of DRM protection is implemented in its WMA music format that is used by many e-tailers and works like Apple's DRM, restricting the number of CD burns and transfers to desktop computers. The most recent DRM solution, named Janus, can also limit the use of a music file in time thus enabling business models based on subscription services that do not limit the number of computers or portable players the music file can be loaded to. In terms of business strategy, it is rent vs. buy.

Music.walmart.com

Walmart offers songs in the Microsoft WMA format. Products must be downloaded within 90 days of purchase and played within 120 days. Music files can be burned 10 times to a CD and transferred an unlimited number of times to a portable device. Files are downloaded to a computer and can be backed up to two additional computers. However, the procedure to do so is not straightforward (see Box 3). It is not possible to sell the songs nor share them with friends or offer them as gifts. This set of restrictions is common to all songs offered on the site.

Box 3. Backing up files with Microsoft Windows Media is not straightforward

1. Copy and transfer song files:

Copy song file(s) and transfer (via email, on CD or through a shared network) to a designated music folder on another computer.

2. Back up license files:

Go to the Tools menu on Windows Media Player and click on License Management.

Choose the location to store the license backup files.

Click the "Back Up Now" button to save all your license files to this location.

3. View license files:

License files are hidden by default until you change your folder viewing options. **You must show hidden license files in order to transfer them to another computer.**

Open the file where you placed your license backup files.

Go to the Tools menu and click Folder Options.

Select the View tab and click "Show hidden files and folders."

Click "OK."

4. Transfer licenses to a different computer:

Copy your license backup files. (Look for filenames drmv1key.bak, drmv1lic.bak, drmv2key.bak, drmv2lic.bak.)

Transfer all license files (via email, on CD or through a shared network) to a designated music folder on the new computer.

5. Restore licenses:

You must restore the licenses on the new computer before you can play the songs.

Go to the Tools menu on Windows Media Player and click on License Management.

Point to the location where you saved the license files on the new computer.

- Click "Restore Now" to allow Windows Media Player to access the licenses on the new computer.
- Open the song to play it.

Source: Walmart.com

BuyMusic.com

BuyMusic.com uses the Microsoft WMA format with a DRM that authorizes transfers to 3 to 5 computers and limits the number of burns to 7-10. Contrary to music.walmart.com, songs and albums are priced individually with different usage rules.

Sony

Sony launched in May 2004, its Connect Store, which offers music for downloads of

released and unreleased songs and remixes. Sony uses the ATRAC3 format and develops its own OpenMG/MagicGate DRM technology that is in use in most of its portable CD and digital music players. The existing restrictions limit the transfer of music files to only one computer. Restrictions on the use of music files depend on the artist and the album. Music downloads are only compatible with the Sony SonicStage software and portable players that uses the DRM OpenMG/MagicGate. Moreover, many Sony portable players do not accept the MP3 standard. However, Sony announced that it will change its compatibility policy in future portable players. Some industry analysts see the Connect store as an attempt to improve sales of Sony's portable players vs. Apple's iPod and other MP3 players.

Kazaa/Altnet/Cornerband

Kazaa tries to provide a platform for information sharing. It licenses its software free of charges. The business model is built on a two-sided marketplace in which advertisers pay for advertising and users do not receive payments for receiving advertisements. Kazaa also offers what is called "premium content" for which users are charged. This is a pay-per-download service. Users can sample songs for a limited number of times. After the sampling period, the user sees a window with a link to a merchant site.

Artemis Records has used Kazaa and other file-sharing networks to distribute music files by artists such as Lisa Loeb, Ricky Lee Jones and Steve Earl.[16] They use a DRM technology developed by a partner of Kazaa that allows the first uses for free and after that the downloaders must usually pay 99 cents to purchase the song (see Dawn Chmielewski, Music labels use file-sharing data to boost sales, Mercury News, March 31, 2004). This probably comes closest to a fee-based business model in which consumers pay per download and in which there is limited sampling.

Observation 8. Labels and intermediaries have undertaken a series of uncoordinated efforts to use DRM as a part of their distribution strategies.

3.4 Legal downloads and new business models

3.4.1 The demand for legal downloads

A survey from Ipsos-Reid (documented in Ipsos, Tempo 2002) shows that average respondant is not eager to use online subscription services and fee-based downloads in 2002 in the population as a whole. Asked how likely would the respondent be ready to pay to download or stream music from the internet if there was no free material available, only 1 % answered that this was likely, 11 % answered that this was somewhat likely, and an overwhelming 84 % answered this was not likely. While a strong reticence to pay for downloads is confirmed by a survey of Jupiter Research in 2003 for consumers who

[16] As a side-remark, this discredits the major labels' claim that the file-sharing systems such as Kazaa do not have a significant legitimate use. Also, the fact that some labels use download data to promote acts shows that labels derive some benefits from file-sharing systems such as Kazaa.

do not sample a lot using the Internet (last two rows of Table 28), there is evidence that internet users who do sample a lot are ready to pay for music, even more so if there is a charge per download than for subscription services.

Table 28. Demand for Music Subscriptions and Downloads in 2003 (US)

Type of Consumer (number sampled)	Subscriptions	Downloads	Will Not Pay for Music
Music aficionados (357)	21%	25%	46%
Free-music fans (514)	13%	19%	60%
CD purists (280)	10%	16%	71%
Passive populace (746)	7%	10%	79%

Source: Jupiter Research 2003

3.4.2 Demand by college students

It is worthwhile to have a closer look at college students because they represent an important share of music buyers; also they typically are leaders in technology adoption so that future trends for the whole population can be anticipated by analyzing students' behavior. There were 14.5 million students enrolled in US colleges and universities in 2002 or 5% of the population. According to comScore, 7.7% of US internet users connected from college and university based PCs in 2001. Harris Interactive/360 Youth Fall 2002 Study finds that 93 percent of college students access the internet in a given month, 88% own a computer and 56% have a broadband connection.

According to the Pew Internet Project (1021 college students in March-June 2002), college internet users who have ever downloaded music is larger than the average internet population (60% have done so compared to 28% overall) and three times as likely to download music on any given day (14% compared to 4% overall, a percentage similar to the respective percentage for broadband users). College students also lead other internet users in file sharing of all kind (44% against 26% overall). Moreover they share files other than music in a greater proportion: 52% downloaded files other than music compared to 41% for the overall internet population.

There is serious money to be made from college students. According to Harris Interactive/360 Youth Fall 2002 Study, students spent more than $210 billion in 2002. Around 2/3 of college students have paying jobs that represent $53.9 billion in discretionary spending annually. Most of the spending goes on entertainment and leisure related expenses. College students were spending $5 billion on travel, $790 at the movies, $390 million on attending music concerts, $318 million at amusement parks and $272 million at professional sporting events.

College students are both high-volume music consumers and their behavior is likely to be strongly influenced by new technological opportunities such as P2P networks. This can

be documented by the fact that several web sites (among the top 20 sites where the total and relative amount of traffic from colleges is particularly high) are related to music. All sites in Tables 29 and 30 had more than 1 million total US home work and college visitors in Aug 2002.

Table 29. Selected websites visited by college students (US)

Web site	Primary activity	Proportion of traffic that comes from college PCs
audiogalaxy.com	P2p file-sharing service	18.1
billboard.com	Online music magazine	17.7
imesh.com	P2p file-sharing service	17.1
azlyrics.com	Resources for song lyrics	16.4
winamp.com	Entertainment site for winamp downloads	15.7
astraweb.com	Portal for mp3 and song lyrics search engines	15.5
lyrics.com	Song lyrics search enginge	14.6

Source: comScore, 2002

Table 30. Selected online purchases by college students (US)

Web site	Primary activity	Proportion of traffic that comes from college PCs
cdnow.com	Music retail	13.3
Allposters.com	Online poster and print store	11.8
Bestbuy.com	Electronics and media retail	11.2
ticketmaster.com	Entertainment ticketing site	10.2
Emusic.com	Subscription mp3 music service	10.2

Source: comScore, 2002

3.4.3 Digital music initiatives from established agents backed by major labels

Online distribution companies offer different listening options that we review in Table 31. Digital music distribution is not the exclusive business of dedicated music services anymore. With the appearance of iTunes in the U.S. and OD2 in Europe, technology companies, as well traditional retailers, have started to distribute music online. Below we describe some of these initiatives.[17]

[17] Part of this information on business models is taken from C|Net News.com, "State of the art: A Medium Reborn", May 28, 2003.

Table 31. Listening options for digital music

A-la-carte download: most services allow users to pay a single fee for one song, which they download to their PC hard drive or to a portable music player
Tethered download: these allow consumers to 'rent' tracks for a given period of time. These tracks are non-transferable to portable music players, but sit on the consumers' PC hard drive until they 'time-out' or the subscription ends. These have been popular on European services and are a good way for consumers to preview songs before they decide to buy
Download an album: a popular option that enables consumers to pay a single fee for one album.
Download a bundle: some services enables consumers to download a 'playlist' that has been suggested by other consumers, or perhaps the artist. Such 'bundles' may also include video content or artwork/photography
Streaming: allows the consumer to listen to a song one and is very low cost. Streaming is ideal for listening to exactly what you want without having to pay to own a copy of the song. It is the preferred option for consumers who want to explore a broad range of songs, artists or genres.
Customized streaming: these services offer subscribers the ability to compile their own program of tracks based on their favorite genre, artist or choose an already compiled program.

Source: IFPI Online Music Report 2004, p. 9

Dedicated music sites. Pressplay acquired by Roxio and distributed by Yahoo and Microsoft offers downloads, streaming, access to 99 cent per-song CD burns and a catalog that includes more than 300,000 songs. Pressplay is a subscription service with limited portable downloading, available for US residents (March 2003). For a US$ 9.95 subscription per month it allows unlimited streaming and downloading; for a US$ 17.95 per month it allows in addition 10 monthly portable downloads (March 2003). Pressplay offers content from the five big labels, namely EMI, Sony, Universal, Warner, and BMG. It is pushed by MSN and Yahoo!, as well as MP3.com. Pressplay offers in the WMA format. Downloaded files, which are not portable, can only be listened to on the computer where the file was downloaded and can be backed up to one additional computer. Such files can only be listened to as long as a subscription is active. Recently, Roxio also bought the Napster Brand and now combines both services under the name Napster 2.0.

Similar offers are available from Real.com with its Harmony DRM that favors compatibility between formats and portable players (distributed by Realnetworks; subscription allows download, streams, access to limited number of CD burns per month; catalog includes more than 250,000 songs) and Listen.com who distributes Rhapsody, an online subscription service (a $9.95 monthly subscription fee allows access to unlimited streams, 99 cent per song burns; catalog includes more than 250,000 songs).

In the past, Sony started a number of initiatives (the Sony Connect Store is described below). On its website, Sony has offered to its US customers CD on demand (checked February/March 2003): each customer can select 12 Bob Dylan tracks (in any sequence)

and Sony will press the custom CD on demand (charging US$15 plus shipping). Sony also offers for all US concerts official bootleg CDs and MP3s for US$ 15 plus shipping (checked February/March 2003). This can be seen as an attempt to appropriate revenues that would otherwise be to lost illegal bootlegs. Consumers have to sign up before the concert; they have access to MP3 downloads one day after the concert and receive the CD around two weeks after the concert.

Technology companies. Apple's iTunes Music Store offers downloads of 200,000 tracks at 99 cents per single and $9.99 per album using Apple's AAC format and also offers some music videos from albums. A year after its creation, 70 million music files were sold; this has increased to 150 million by November 2004. Buyers can store their music on 5 computers (up from 3) and burn a playlist 7 times (down from 10). No subscription service is planned. iTunes also offers the possibility for consumers to offer their playlist for preview and purchase to other consumers.

Microsoft aggregates promotional music videos, Internet radio stations and downloads at WindowsMedia.com from a variety of sites using its Windows Media technology; Microsoft's MSN Web portal also offers various music selections, from ad-supported and premium radio stations to music videos and free downloads. Microsoft is also pushing its Media Center PC that will be a convergence of different technologies from the computer and electronics industries. Microsoft Janus DRM allows users to stream content online and to play on portable players for a limited time and is implemented in all songs that are sold on the recently introduced MSN Music site. The music service is fully integrated in the web portal Msn.com and the Windows media player. Standard features are available such as 30 second preview, fan recommendations, artist and video pages. Note that Microsoft and Apple follow two very different business strategies, in particular, sell versus rent.

RealNetworks offers free access to Internet radio and some music videos on its Web site, recently including an exclusive live concert clip of The Vines, as well as paid content through its Music Store Internet service. The basic service is free, the premium subscription service costs US$9.95 a month. Similar streaming models are proposed by Napster 2.0 and MusicMatch. In addition, RealNetworks develops an interoperability policy that ensures that songs purchased from different stores can be played with the RealPlayer.

Sony launched in May 2004 its Connect Store, which offers music for downloads of released and unreleased songs and remixes. The Connect store is also welcoming the distribution of international and independent labels. Some industry analysts see the Connect store as an attempt to improve sales of Sony's MiniDisc Player as an alternative to Apple's iPod and other MP3 players. Price of individual songs and albums can vary from one artist to the other and over time. Consumers can offers gift coupons to other subscribers of the store.

Retailers. Amazon.com offers free downloads in MP3 and Liquid Audio formats from major artists and newcomers, with customer ratings.

Tower Records offers free and paid downloads in MP3, Microsoft Windows Media and Liquid Audio formats. Singles cost between 99 cents and $1.49, while albums typically sell for $9.99.

Walmart sells individual songs at 88 cent and has a DRM policy that does not vary across artists and albums. On the contrary, Buymusic.com sells individual songs and albums at different prices and has a DRM policy adapted to each product.

Table 32 presents the differences between the major services' business models.

Table 32. Major services' business models

Service	Core offer	Payment method	Unique offering
iTunes	a-la-carte downloads	pay per song, music allowance accounts, gift certificates sold at iTunes and Apple stores	audiobooks, exclusive tracks and on-demand videos, customized playlists, transfer to portable player (iPod)
Napster 2.0	track streaming, customized streaming, a-la-carte downloads	monthly subscription for Napster Premium, Napster Card sold at over 14,000 retailers	playlist recommendations and sharing, exclusive material, transfer to portable player
Rhapsody	track streaming, customized streaming	monthly subscription with additional charge for CD burning	access music from any PC
MusicMatch	track streaming, customized streaming, a-la-carte downloads	one-off fee for MusicMatch Jukebox Plus, pay per song thereafter	transfer to portable players, personalize CD package, new music recommendation based on customer playlist
OD2 (branded by HMV, Fnac, MSN etc.)	track streaming, a-la-carte downloads	pre-payment credits, pay per song, subscription	discounts for products paid with credits, transfer to portable player, news and special features with artists

Source: IFPI Online Music Report 2004, p. 7

To sum up, new business models propose music experience from à-la-carte downloads to customized streaming and transfer to portable players. Most services offer a technology that allows users to exchange audio and video sample, playlists and recommendations.

Observation 9. Most new business models combine information-push and information-pull technologies. Both streaming and downloading services are available.

3.4.4 Other initiatives

In this section, we list a number of recent initiatives by artists and P2P network developers.

Artists initiatives. Matador Records offered free MP3 singles posted on the label's web site from most active bands such as Wilco. The company also allowed downloads of album "Yankee Foxtrot Hotel" online for much of the year before its release, most likely in order to create word-of-mouth. Follow-up EP "More like the moon" was released free on WilcoWorld.com.

Madonna sold "American Life" single on Madonna.com.

Kristen Hersh allows fans to subscribe to a series of MP3 demos before albums are released through ThrowingMusic.com.

P2P networks – legal downloads. Kazaa also signed a deal with Cornerband.com to distribute work by signed-up artists and to promote so-called emerging artists on its network. Cornerband.com explains: “Thirty new subscribing bands will be selected on a quarterly basis through a combination of an online rating system and a panel of expert judges from the music industry enabling every band and musician a chance to receive mass exposure to the millions of KMD users.“ (Cornerband.com website, category “band benefits“, checked March 2003). The rating is done by users of Kazaa/Cornerband.com. *Cornerband.com* writes of itself: “Cornerband.com is an online music community dedicated to the promotion and distribution of secure, downloadable music from emerging artists. The online music service is available on the Kazaa Media Desktop ("KMD"), the most widely distributed peer-to-peer application in the world for finding, downloading, and playing musical content, or directly at www.cornerband.com. This service enables the musicians in the Cornerband.com community to gain exposure to the millions of KMD users worldwide. All Cornerband.com artists will have control over the secure distribution of their music, including the way in which songs are downloaded, sampled and priced to the consumer.

The business model of Cornerband.com can be seen as a partial substitute to traditional labels. It offers online DRM protected distribution, online sales of CDs and merchandizing (via CD Street). It also selects and promotes emerging artists. However, the company describes itself as an entry ticket into the music industry: the service allows "bands and musicians to securely reach consumers in efforts to secure a major record label contract“ (Cornerband.com website, category “band benefits“, checked March 2003).

Altnet uses this business model to distribute legal content on Kazaa. Most of the files can be previewed for a set length of time. At the end of the trial period, the user is prompted with information about purchasing the file. Each file has an individual pricing and licence agreement.

mp3.com offers free mp3-files for downloading (it is part of the Vivendi music empire).

It promotes artists and let them sell their CDs through the portal. To do so, artists can select between different service levels of an artist program, the lowest being provided for free, the highest at US$ 99.99 per year (checked March 2003). This program allows artists to sell CDs through mp3.com: they upload music in mp3-format and material for cover and booklet, mp3.com then presses the CD and distributes it through its portal. The artist controls the pricing of the CD and receives 50% (or 60% if signed up to the highest level of the program) of all revenues exceeding US$ 3.99 per CD. mp3.com can also be seen as a partial substitute to the traditional distribution channel through a label.

Observation 10. There are several attempts to bypass the Majors or use P2P networks in the selection and the distribution of acts.

3.4.5 A new landscape for the music industry

To get consumers on board of a music site, price and non-price strategies are important additions to music services. The most common pricing strategy is to charge 99 cents for a download – this is for instance the pricing strategy chosen by iTunes and OD2. Survey data suggest that subscription-based models are less popular among internet users, but this is a snapshot depending on time and space (see section 3.1).

An important part of the non-price strategy is the choice of DRM, which defines the potential use of a download. Ceteris paribus a more flexible use is appreciated by users. However, labels are likely to reject uses that could reduce CD sales.

It is important to stress that many popular songs and albums have not been cleared to be distributed in digital format online. For instance, the songs of The Beatles can not be purchased in compressed format. Other artists' songs are not for download: Led Zeppelin, AC/DC, Grateful Dead, Garth Brooks to name a few. Other songs can only be downloaded with the full album including albums by Madonna, Red Hot Chilli Pepper, Radiohead (see Frank Ahrens, Washington Post, 19 January 2003). Microsoft Msn Music plans to offers album-only downloads, which should attract artists such as Metallica who are reluctant to license individual songs.

In addition to DRM, which defines the use of digital music, music sites can enhance the value of a download by providing additional information, additional songs, discussion forums, cross recommendations and communication possibilities that can create virtual music communities that made Napster so popular. A music site backed by companies that can provide some of these services (such as Amazon for instance) is in a stronger position.

The final question is where the money will be made. Companies selling complementary products such as Apple's iPod, Sony's portable players, and Microsoft's software may be well placed. This certainly explains Nokia's interest to enter the digital music distribution market. However, since devices from Apple and Sony cannot be declared yet the winners of the battle, it is not clear whether a particular complementary product will turn out to be an advantage or a disadvantage. The success of the music site is simply tied to the

success of the device and of the DRM standard. Although the practice of tying products is frowned upon by competition authorities, it remains to be seen how their traditional arguments apply to an emerging industry.

Well-known online or hybrid retailers and information sites have also some comparative advantages. They start with a users' base and enjoy brand recognition. Retailers such as Amazon or Fnac can sell products such as DVD, concert tickets related to the download. They should be able to offer attractive bundles. Moreover, some retailers have already developed the practice of acquiring information on how well a product is doing. For instance, Amazon has a system of recommendations and a lot of information on its users, which is also valuable to companies selling music downloads. This means that OD2 together with internet retailers could become successful even though it lacks complementary products such as software or portable devices.

4 Conclusion

We have argued that file-sharing and other forms of online music distribution can be used as:

- a device for consumers to test new music
- an advertising tool
- an instrument to open the market to small artists
- a source of information on downloads which is valuable to producers in order to select products and resolve situations of asymmetric information

We infer from the success of Apple's iTunes that digital music downloaded from the internet will partly replace music sales on traditional format. In this sense, it would just become another channel through which music is distributed: instead of selling records through record stores the labels sell downloads through music sites.

However, new online distribution technologies offer new ways to acquire information on consumers and products and are likely to decrease the role of labels. Music sites can collect detailed user information, which allows them to make targeted offers to users. They could become efficient at spotting new trends and potential stars. Also, the promotion of acts could be partly done by the music sites themselves. This means that music sites would take over some of the functions that belonged in the past to the labels.

Clearly, this does not mean the death of the big labels but it is an open question to know whether internet music sites will at least reduce the role of labels in selecting music. Moreover, because of vanishing economies-of-scale, the rationale among record companies for staying big is weakened and a larger number of artists could bypass labels. For this to happen, it is necessary that revenues from downloads and complementary products become an important part of industry revenues.

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