



universität
wien

MASTERARBEIT

Titel der Masterarbeit

Digital piracy – a special focus on the
economic perspective

Verfasser

Marcel Parakkal, Bakk.rer.soc.oec.

angestrebter akademischer grad

Diplom-Ingenieur

Wien, 2009

Studienkennzahl lt. Studienblatt:

A 066 926

Studienrichtung lt. Studienblatt:

Wirtschaftsinformatik

Betreuer:

ao.Univ.Prof. Mag.rer.soc.oec.

Dr.rer.soc.oec. Christian Huemer

Contents

1 Introduction	4
1.1 Relevance of the topic.....	5
1.2 Motivation	6
1.3 Research Questions.....	8
2 Domains of research.....	9
2.1 Recording industry.....	9
2.2 Motion picture industry	11
3 Definition and classification.....	13
3.1 Digital good	13
3.2 Types of Piracy	14
4 Social aspects of digital piracy.....	16
4.1 Piracy as mass phenomenon	17
4.2 Behavioural models explaining piracy.....	22
4.3 Effects of piracy on innovation.....	28
4.3.1 Innovation in distribution	28
4.3.2 Product innovation	30
4.3.3 Technical innovations	31
4.4 Linking sales and piracy	32
4.5 Discussion on free music	35
4.5.1 Sharing	36
4.5.2 Public good theory	38
4.6 Conclusion	39
5 Technical aspects of digital piracy	41
5.1 DRM	41
5.1.1 Components of a DRM system	42
5.1.2 Quality requirements for DRM	44
5.1.3 Effectiveness of DRM	45
5.2 Piracy systems	47
5.2.1 Peer-to-Peer.....	47
5.2.2 File Hosting Sites	51
5.2.3 Usenet, IRC and private networks.....	52
5.3 Conclusion	53
6 Legal aspects of copyright and piracy	54
6.1 DMCA	55
6.2 EU Copyright Directive	57
6.3 Conclusion	58

7 Measures taken against piracy	60
7.1 Legal prosecution.....	60
7.1.1 Campaign against file sharing operators	61
7.1.2 Campaign against individuals.....	62
7.2 Educational campaigns	63
7.3 Technical measures	64
7.4 Conclusion	65
8 Economic perspective.....	67
8.1 Business structure	69
8.2 Business models.....	72
8.2.1 Traditional business models	73
8.2.2 Online business models	77
8.3 New framework and models	83
8.3.1 Business model ontology as framework for new business models.....	83
8.3.2 e ³ value to model new business models.....	85
8.4 Providing added value	85
8.5 A superdistribution based peer-to-peer model	88
8.5.1 Motivation	89
8.5.2 Peer-to-Peer based distribution.....	91
8.5.3 Revenue splitting through superdistribution.....	94
8.5.4 Challenges	96
8.5.5 Discussion	98
8.6 A peer-to-peer streaming model	101
8.6.1 Possible types of distribution.....	104
8.6.2 Financing through advertisements.....	106
8.6.3 Further sources of revenue	108
8.6.4 Usability	109
8.7 A flat rate model	111
8.7.1 Source of income.....	113
8.7.2 Allocation among artists.....	114
8.7.3 Discussion	115
8.8 Niche models	116
8.8.1 Community based model	116
8.8.2 Focus on the concert industry.....	119
8.8.3 Artist to customer	120
8.8.4 Creative Commons	122
8.9 Conclusion	124
9 Conclusion and forecast	125
10 List of figures and tables.....	127
11 References	128

1 Introduction

Every media that can be digitalized can be distributed to a large amount of people at quite a low cost. Be it a song recorded on a CD, a movie recorded on a DVD or software available on any digital media. The cost of making a copy of a digitalized media is almost nil. Considering the infrastructure available today, distribution cost is also nearly nil. So as a matter of fact, creative and imaginative consumers aware of this situation invented a “business model” which in fact does not follow one of the fundamental rules of business at all, which is the purpose to earn money through doing business. But more crucially, they do this with goods that do not even belong to them. “Piracy” is the usual term associated with this business model. Naturally, people doing business the conventional way do not like this idea, so they can choose between several options: 1) ignore the threat and do business as usual 2) fight the new competitors or 3) leave the market.

The main purpose of this work is to look at a fourth way, which in fact is already being developed, but has not yet been very successful: Adapt the way you do business to the current market and technological situation.

In the past decades information technology has gradually been utilized more and more to support and enhance business. With the arrival of the Internet in the early 90s IT started spreading beyond academical and entrepreneurial boundaries to the millions of household around the globe. By the end of this decade the consumer started experimenting around with the available IT and started founding small communities who came up with solutions for their fellow consumers and others started using those solutions to distribute goods at no charge. Pirates, who bypass the economic system through illegal activities like stealing or copying copyrighted goods, have existed long before. But through the Internet, which can be in some sense seen as an instrument of globalization, where every network-capable device in any part of the world is connected to each other, piracy, or more precisely, digital piracy got promoted to a global level. Every potential consumer has also become a potential pirate.

Digital piracy involving millions of people all around the world is a mass phenomenon, which can only be dealt with instruments which are capable of explaining this phenomenon. So, one of the first concerns of this work is to analyze the social aspect of digital piracy, which the author thinks may help in gaining an understanding of the matter being dealt with. The reasons for this phenomenon are various, and so is the consequence for the whole society. Different models have been constructed to analyze the behaviour of consumers with a tendency to pirate, and these will be discussed in this work. The main aim of this section is to find out the incentives that motivate people to pirate. Other than negative effects it will also be scrutinized if piracy is capable of any positive effects like enhancing innovation on the technological as well as on the commercial side.

Since its upcoming mainly due to the wide popularity of the peer to peer network “Napster” in end of the 90s, digital piracy has been increasingly in the cross-

fire of the recording industry. Various efforts have been undertaken since then to prevent digital piracy, from copy protection on the digital media to massive enlightenment campaigns through aggressive commercials right up to online music stores. All the different types of measures and their effectiveness in preventing piracy will be discussed in the next main section of this work. Through analyzing the response from the consumer's side one can note interesting differences in viewpoints of both sides.

Traditional business models have proven not to be suitable to today's customers, who easily have access to a large amount of freely available media on the Internet. They do not depend on the store nearby, but have full freedom to choose between various online sources, where they again can choose to pay or not to pay. So there is a need for new business models that take into account the changing needs of the customer as well as the current and future technological developments. The last and main part of this work will extensively look into the existing models being applied, compare and examine them according to standardized criteria and try to come up with their benefits and drawbacks in order to measure their effectiveness. Following this, innovative business models on the verge of entering the market will be introduced and discussed.

1.1 Relevance of the topic

Recording companies are going through a phase, in which their mere existence is being questioned heavily by their own customers. The value added by the recording company to an album is not easily visible to the customer, so they question their necessity, especially when figures like the ones Fisher III presents in his book [Fisher III, 2004] indicate that the artist receives only a small fraction of the revenue, whereas the retailer and the recording company sack the lion's share, which is approximately 88%. Since the customer has found his way to the Internet to acquire music, many artists nowadays are switching to this new distribution channel to sell their albums. This leaves the recording companies and retailers in limbo.

There might be a lot of kids born in the 1990s, who may never have stood in front of a record store weighing their money against the records they could buy with it. They learnt that music and movies are free goods, which are easily obtainable through the Internet, unless you want to go to a concert or to the cinema. These kids belong to the generation of tomorrow, which the industry will have to target if they further wish to earn money through selling music and movies to them. If the perception of these kids remains as they are, the companies might get degraded itself into a much lesser important component in the life cycle of entertainment products.

A large number of people are working in this industry, with a turnover of multiple billion dollars. With the emergence and sustainability of digital piracy, a ma-

major shift in the money making process is to be expected. Many job profiles may disappear and new ones may take their place. This means that the music industry is altogether going through a period of upheaval, which needs to be observed in detail to examine the possible outcome. Thus, the relevance of this issue is highly present and seeking in-depth analysis, so that decisions on the future of business with entertainment can be made on profound findings.

1.2 Motivation

The Internet was a revolution which changed the way in which information of any sort was obtained and used. But not only general information was available on the Internet; it was with the arrival of digital entertainment media like music and videos that many were forced to rethink their business models.

The author himself belongs to the generation of music lovers who discovered the enormous potential of online music. Like many, he was overwhelmed by the possibilities of the Internet in providing entertainment anywhere anytime in any possible way.

You are in the middle of a party, when someone asks the DJ for a special song. The DJ switches to Napster, types in the name of the song and presses the enter button. Seconds later a long list of possible hits appears on the screen. He chooses the one he wants through double-clicking on the hit. Five minutes later the song is in his play list and the people can already dance to it.

In such a scenario, there is no song wish that cannot be fulfilled. Millions of songs ever recorded and published are available to anyone with an Internet connection. Type in the name of the file you wish to download, choose one from the result set, wait till it is downloaded, and you have it. You could call this the height of usability, height of availability, or simply, height of customer satisfaction.

Nevertheless, this perfect seeming model, which is being used by millions of people all around the world, is considered illegal, culpable and immoral, since the customer is not paying anything in return for the service he is enjoying. This contradiction of an approach loved by the majority of a society and at the same time forbidden by the laws made by this very society is the ultimate motivation for this thesis.

In Austria, on Sundays and holidays, newspapers are being sold by hanging them out on poles, where the customer can buy them on his own through dropping in the money into a small case fixed right above the bag with the newspapers. But these cases are not attached to the bag in a way that forces the customer to drop in the money to get the newspaper. Instead, he can obtain the newspaper even without paying anything. Of course, such an action is considered illegal by law, but in this case, it is simply tolerated, because on one hand it increases the number of newspapers sold (even though there is no revenue collected) and on the other hand the newspaper company can hope that someone who reads their newspaper on

Sunday for free may find it valuable enough to buy it on the weekdays. Needless to say that newspapers not only carry news, but also costly advertisements, which can be sold to the customer.

There are two points to be noted down from this case: 1) An illegal action being tolerated and 2) an illegal action that can be utilized to attract more customers.

Then, there is another analogy, which is interesting too. In Vienna it is easily possible to use public transport for free. There is no hindrance in metro stations which allows you to catch the train only with a valid ticket. The same applies to trams and buses. Needless to say, that using the public transport without a valid ticket is considered illegal. But the difference in this case is that it is not entirely tolerated by the authority. There are a relatively few number of conductors checking the trains, trams and buses randomly. If someone is caught without a valid ticket, he/she has to pay a fine, which is 70 € (around 39 times the cost of a single ticket). Nevertheless, the allurement to risk this fine cannot be neglected since the chances of getting caught by a conductor are somewhat low. When the cost of enforcement is high, then tolerating an optimal level of illegal activity makes sense [Polinsky et al., 1992].

This system of relying on the trustworthiness of the (mostly anonymous) customer is called an honour system and is in practise in various domains such as transportation (like demonstrated in the above example), tourism, education or retail. It is used in cases when a complete supervision is not worth the effort due to efficiency reasons. Checking the tickets of every buss, tram or metro travellers would increase waiting time in the stations.

At the present, the music industry is forced to follow a similar policy as the public transport company in Vienna. It is not possible for them to prevent the customer from illegally obtaining music, so they go around and check users uploading and downloading large amount of copyrighted material and sue them.

Whereas the public transport company is controlled by the city of Vienna and therefore supported by the government, the music industry is a competitive market solely dependent on the revenues made from selling music. They cannot afford it to tolerate piracy to a greater extent. One may get the impression that due to piracy the music industry is suffering from declining revenues and will fall into a recession, which may ultimately lead to bankruptcy of the companies associated with this industry and an end of music production. But fact is, as of 2007, 74.2% of the global recorded music market is being controlled by four labels, Universal, Sony BMG, Warner and EMI [Sabbagh, 2008] and this has not changed for the past few years. So, despite the threat from increased piracy over the Internet, the major labels still go strong without any signs of bankruptcy.

Nevertheless the sales figures are declining steadily and the (theoretic) possibility of everyone downloading music and movies from the Internet for free is the worst case scenario of any executive in the content industry. Therefore it is necessary to review digitally piracy from various angles and come up with solutions acceptable for all stakeholders.

1.3 Research Questions

The previous chapters have given an insight into the complexity of the topic being dealt with. It shows that since an investigation on digital piracy is not entirely limited to the technological field, the scope of this work overlaps with other interesting disciplines such as sociology and economics. The overwhelming impacts of such an interdisciplinary subject needs to be tied up compactly through stating precise research questions. Otherwise you may get answers for questions you never intended to ask.

Please note that the following questions are addressed by an in-depth literature survey.

A) Social aspects of digital piracy

1. Why do people steal digital media (music/video)?
2. Will the generation brought up in the Internet age ever have ethical reservations about obtaining music/video free of cost from the Internet?
3. Can music/video be fundamentally free (at least to private person)?
4. Can piracy actually enhance innovation? Would people have thought about utilizing the Internet to sell their products conveniently if there had been no threat through piracy? If someone downloaded gigabytes of music, does that automatically mean that he would have bought the same amount if he had to pay for it? So doesn't piracy lead to more consumption?
5. Is piracy responsible for decline in sales?

B) Measures taken to fight piracy

1. Which measures have been taken so far to fight piracy?
2. Can technical protection fight piracy effectively?
3. Piracy is a mass phenomenon, not the work of few individuals – can you control the actions of millions without shaking fundamental rights? Is it worth doing so?
4. Are existing copyright rules (copying under certain circumstances allowed) too confusing for customers? Do they allow loop-holes?

C) Discussion on business models

1. Are there any business models which can work as an alternative to piracy?
2. If yes, how effective are they? What are their advantages and disadvantages?
3. What models are being used to pirate? Can they be used against piracy?
4. Can online file-sharing technologies be used to distribute music legally?
5. What is the consumer willing to pay for music/video?
6. Are there any new business models on the verge of entering the market?

2 Domains of research

The crux with digital piracy that differentiates it from other forms of piracy lies simply in “digital”. Any type of media that can be digitalized is exposed to piracy. Be it an audio file, a video file, a picture, a book or any kind of software. Any information that can be described using 1 and 0 can be copied without any loss in value. This special characteristic of information good makes it possible that you can find digital piracy in various domains. So this makes it necessary to define the domain boundaries of this work a priori. The following subchapters will give an insight into the main two industries suffering from the impacts of digital piracy on which the scope of this work will lie. This will be the recording industry and the motion picture industry. Another industry, quite apparently in the crossfire due to its nature, is the software industry. Due to constraints in the size of this work it will not be discussed here though. Also, since the upcoming of the Open Source concept, piracy in the software section is of lesser importance than in the other two industries. But especially because the software industry was able to come up with such a model, it will also be analyzed how or if such a conception can be deployed to the other two fields of interest.

2.1 *Recording industry*

Until the invention of the phonograph by Thomas Alva Edison in 1877, music had been an art form enjoyed live and exclusively. When Beethoven played his symphony on a piano in the courtyard of a king or another elite person, then usually a small crowd was attentively listening to him. When they went back home, all they had were their memories of the piece Beethoven played. But with the phonograph Edison wanted to preserve music. Later on, through the dynamics of industrialization recorded music grew out to become a powerful mass entertainment industry.

Emile Berliner later invented a more reliable form of recording and playing, namely the disc phonograph, a pioneer of the gramophone record, which finally won the dominance in the recording industry soon ousting Edison’s cylinder based phonograph out of the market. It was around the turn of the century when two companies were dominating the US market, the Victor Talking Machine Company and the Columbia Gramophone Company. Both were successful in those days producing records of operas with famous singers of that time. Later on dance music and jazz found its way to this new industry.

This young recording industry experiences its first crisis in the beginning of the 1920s when radio broadcasting started becoming popular among the masses. Suddenly sales fell up to 27% [Lesk, 2003] within two years. Naturally people opted to hear music for free through the radio than to pay money to buy records, which in those days were only able of carrying a couple of minutes music. But soon a

compromise was found with broadcasters paying licenses to the record companies. After some time radio became so popular that the recording companies started paying radio stations money to play their records more often [Fink, 1996].

After a period of low sales in the 1930s following the depression, the recording industry took off dramatically after the Second World War. This was accompanied through technological achievements like the magnetic tape for recording and the LP record as a much more robust and effective playing media. It could carry complete symphonies lasting 20 minutes.

The next development coming up to affect the recording industry was the rise of the television in late 1940s. But unlike the radio, it did not have such a great impact since it targeted another audience altogether with a variety of other programmes. Also, the upcoming of television weakened radio's position as the leading entertainment device, thus strengthening the record companies' position.

Together with musical changes (Rock 'n Roll) came also changes in marketing, structure and technology. Independent labels and producers gained more importance through promoting Rock music. Marketing wise Columbia introduced their Record club in 1955 which soon popularized the mail order record business, which even accounted for 14% of the total record sales by 1965 [Fink, 1996]. Last but not least also technology had a boost by the end of the 50s when the first stereophonic LP was introduced bringing enhancement in listening pleasure.

The 1960s and 1970s were characterized by new technologies and new marketing methods. Through the introduction of multi-track recording a higher level of sophistication was achieved in recording. Noise reduction techniques increased the quality of cassettes, which were introduced by Philips in 1963. Changes in the industry occurred through mergers of independent labels with major companies. Rack jobbing was also introduced in those days as a new marketing instrument. Records were displayed in supermarkets and other stores which were not associated with music until then.

The next decade led to the rise of digital music in the form of compact discs (CD), which became a huge success by the end of the decade. By 1989 already more than 200 million CDs were sold worldwide [Duke09]. But again, like in the case with cassette recorders being introduced at the end of the 1970s, CD sales began dropping with CD burners getting affordable for the end consumer in the middle of the 1990s. New recording technologies have always had a negative impact on sales.

The recording industry today is a widely ramified conglomerate comprising record companies, media manufacturers, broadcasting companies, artists, composers, songwriters, publishers, retailers and a large number of other participants. It is almost impossible to estimate the number of people working in this field, since it is interconnected to many other fields such as the motion picture industry, hardware manufacturers and concert organizers to name a few.

The total global revenue generated by the sales of recorded music in 1998, the year before Napster went online, was 38.7 billion dollars [Laing, 1999]. This figure remained stable in 1999. This being the peak year since then, the sales has

gone down to 29.9 billion dollars in 2007 [IFPI07], resulting in a decline by 23% in 8 years. When looking at older figures, for example from the 1920s when the radio came up, there was a decline in sales in the US music industry by almost 27% in just 2 years. A much severe case was during the big depression where sales had gone down from 34 million in 1929 to just 2.5 million in 1933. Also, when the cassette recorders were introduced in the late 1970s, it took the industry 7 years to top the figures again.

2.2 Motion picture industry

Following the advent of the recording industry, the motion picture industry soon started off as a sector in the entertainment industry which immensely rose in popularity. Just like in the case with the phonograph, Thomas Alva Edison was involved in the invention of the first kinetograph, a device to capture motion picture. With the invention of a kinetoscope in 1894, which was a machine with a peep hole, through which one could watch moving pictures, the first commercial utilization of this young technology had started. Soon penny arcades, curio halls and amusement centres bought kinetoscopes to attract more customers. Due to stagnation in success of these peep hole based viewing, more inventors, especially also from Europe, like Lumiere and Pathe Freres, started developing projector systems, which made it possible that a larger number of people could watch a film simultaneously, thus opening this medium to a bigger crowd.

The next step in the evolution of this young industry was the arrival of the nickelodeon theatres in 1905, the first class theatres in 1915 and the deluxe theatres until the 1920s. It was actually during this time that motion picture started evolving itself from a mere add-on to amusement centres into an independent entertainment industry which was capable of drawing more attention than the until then predominant stage theatres.

Due to high production costs, the nickelodeons started leasing the movies instead of purchasing them. Through sharing the same movie with many operators, it is interesting to note that from a business perspective, the principle of sharing to cut down costs goes way back in the history and did have its justification. We will meet this practice later on in the course of this work.

The first people to make money with moving pictures were those who patented the equipments to produce movies. Initially the exhibitors were bound to the manufacturer and his camera, since the latter party refused to license the moving making technique. Also the short movies were produced by the manufacturer, so the bargaining power of the exhibitors were almost not existent. This started changing eventually when the content of the films rose in quality and length. Professional artists started competing with the manufacturers in creating films and this paved the way for a segregation of competencies. Movie production, distribut-

ing and screening evolved into areas of different specialists, just like the development of movie making devices.

But this segregation of powers did not last for long since the production companies started acquiring various companies from other competencies such as distributors and exhibitors and thus ringing in the era of vertical monopolies. Out of the “Big 5” (the five major production companies) already three were fully engaged in production, distribution and exhibition. This highly oligopolistic nature creating high entry barriers for independent producers was shattered at the end of the 1940s known as the Paramount case. Theatres acquired by the majors had to be sold, thus allowing independent producers to distribute their movies.

With the upcoming of television the motion picture industry had to face its first competitor. Their first reactions were boycotts and a refusal to produce films for television or licensing their own films. Also innovation in cinema technology was further advanced through the introduction of widescreen and 3D movies. The budgets of the movies rose to increase production quality which should draw the crowd back to the cinema theatres. But finally the triumphal procession of television was inevitable. A compromise was found though as the major companies realized that through licensing their movies to television they could further expand their life cycle and collect sustained revenue over many years. This practice is still going strong today. See subchapter 8.1 for further reading on different revenue streams.

A new major development in the production area was more and more independent producers entering the scene. The majors cooperate with these independents through providing them their studios and equipments for a part of the profit. This kind of risk sharing was very much welcomed by the major since it was a highly risky business to produce movies. Like in the music industry a few hits per year have to compensate for a big number of losses [Litman, 1998].

The motion picture industry today is still controlled by an oligopoly consisting of six major production companies and a small percentage of independents. In 2007 global revenue from theatrical releases was 26.7 billion dollars, which means an increase of 5% compared to 2006. Except for 2005 when sales had gone down compared to the year before, the motion picture industry has been steadily growing. From 2001 to 2007 revenues from theatrical releases have increased by 60%. Other revenue streams like the lucrative DVD sales markets are not included in these figures. Since concrete figures of the DVD market are not available, the closest estimate is that the top 100 DVDs sales in 2007 generated more than 6.6 billion dollars revenue [Numbers07].

3 Definition and classification

“Piracy is generally defined as the duplication and/or distribution of a copyrighted good without license.” [Chiang et al., 2002, p. 1]

When looking at the definitions of piracy, there is an important differentiation to be made. At a more abstract level there are two categories [Rayna, 2004].

1. Piracy with monetary gain for the pirates.
2. Piracy for personal use without monetary benefits for the pirates, also labelled “softlifting”.

Even though this work concentrates more on softlifting, which has been enabled by the networking power of the World Wide Web, there are various other forms of piracy which are interconnected to each other and worth looking at. The bootleg industry with their markets and street sellers, especially in Asian countries are still going strong with physical CD or DVD copies of movies and music albums. These sellers obtain their goods either from professional CD-burners who sit in the backrooms of shops and burn the discs on several CD-burners simultaneously or even from groups who press pirated CDs with the corresponding equipment. Lately, with the inclusion of Bluetooth or similar wireless technology into mobile devices like mobile phones, PDAs or MP3 players, a new distribution channel for pirated goods have been created. The following subchapters will give an insight into these different forms of piracy channels.

3.1 *Digital good*

A digital good is information stored as a combination of many codes that devices are able to interpret. When a written word is stored in digital form, then it is only stored which letters are to be used when showing them on monitors or for printing, but not how these letters look like. With pictures it is a bit more complex. A picture is first divided into sections each one containing a certain amount of information about the picture. Only with all these sections together a picture is produced. Audio is even more complex. Analogue waves from microphones are converted to digital values when recorded and again converted into analogue sound waves for hearing. Since electronic equipments (like especially a computer) work with digital data, the digitalization of these art forms eased their processing, for example editing or distribution. But due to this very peculiar ease-of-use-nature it has a couple of characteristics that makes it vulnerable for piracy [Bauckhage, 2003].

Non-rival:	The consumption of a digital good is non-rival. In other words, consumption by one person does not prevent con-
------------	---

sumption by another person. This is possible because digital goods can be copied 1:1 without any loss in quality as in its digital form it is just encoded information waiting to be interpreted (= played) by some device. An mp3 file will never lose its quality no matter how often it is played.

Non excludable: Most goods are excludable meaning that if one person owns something, he/she can exclude others from owning it, for example the milk you bought from the supermarket or your car. Once it belongs to you, no one else can consume or use it. With digital goods this excludability is not given anymore. When you own a song or a movie, you can easily copy it to your friend's computer without losing the possibility of consuming the same good too [Albanese, 2006].

Cost structure: The marginal cost of producing a good usually decreases according to the quantity being produced. So in mass production the cost per unit is much lesser than when producing the first single unit. Concerning music and movies the production of the first copy, the master copy, is a very costly matter. In 2007 the average cost of a Hollywood movie lied around 100 million dollars [Romow08]. The special nature of digital goods is that the cost of making a copy is almost zero. But such high fix initial costs make it a very risky business too.

3.2 Types of Piracy

Digital goods like mp3 files or any movie file can be distributed through various channels. Online piracy, which is the one dealt with in this work, is only one of many forms. In 2005, in the film industry for example almost 60% of piracy was allocated to hard copy piracy [MPA06], which means the distribution of pirated CDs or DVDs. Countries in Asia, South America and Africa with an aggregated population of around 5.3 billion people are the main markets for the bootleg industry. Since broadband Internet is not yet widely available there like in the United States or in Europe, this type of piracy still goes strong in those regions. Also, literacy may be an issue when it comes to online piracy which requires knowledge about the usage of a computer.

A completely new segment of piracy is noticeable in the mobile devices sector, be it mobile phones, PDAs or smart phones. The availability of cheap storage cards such as secure digital cards (SD) used in phones and cameras, together with wireless transmitting technologies like Bluetooth enables a more private way of piracy. A standard 2 GB SD card can store up to 500 mp3 files in near to CD qual-

ity or almost 3 complete movies in near to DVD quality (so called DVD rips encoded with divx or xvid).

Another more recent form of piracy happens through the streaming of media over the Internet. In times of increased bandwidth streaming large media files have become attractive to potential pirates, since you can watch it immediately. This somewhat competitor to modern video-on-demand services do have popular legitimate avatars on the net like YouTube or Metacafe, but the ones showing complete movies in very good quality are still not much in the media like joox.net or ovguide.com serving as a search engine for finding streaming sites.

The term “File-swapping” is attributed to copying of large amount of data from one electronic device to another, like for example from an external hard disc to a computer. USB sticks containing more and more disc space have simplified this process. But also big networks like on university campuses or in companies are popular areas for file-swapping in a big way.

Online piracy, meaning mainly file sharing through the Internet, is the most emerging and uncontrollable form of piracy, theoretically capable of creating a devastating effect on the entertainment industry. According to the piracy report 2006 of IFPI almost 20 billion songs were downloaded illegally from the Internet [IFPI06]. Regardless of whether the same amount of songs would have otherwise been bought legally, the potential of the Internet for piracy is enormous.

4 Social aspects of digital piracy

One of the main concerns of this work is to study about the people behind the whole issue of piracy. First of all, it is a commonly agreed understanding that obtaining a good without giving back anything in return (usually money) is unconditionally considered as an unlawful act¹. Secondly, this understanding is one of the backbones of any righteous society on earth. And finally, this understanding being one of those backbones of righteousness, a maximum number of people living in those societies, which can be quite safely estimated as the whole human population agrees to this “rule”.

Still, millions of people all around the world, members of societies, where obtaining a good without paying for it is considered a crime, commit an obvious crime when obtaining music, film or software free of charge from the Internet. The really interesting factor here is that these millions of people only have one thing in common, and that is an Internet connection; nothing else. There are no characteristic features which would help track down these people. Neither do they belong to any specific segment of the population² nor to any religiously motivated group. They are no terrorists in the common sense with an aim to destroy the industry or any other organized anti-social groups with a motivation to cause chaos in the entertainment business. They are simply everyone desiring to listen to a song, watch a movie or work with an application on the computer. They are what they used to be called, the consumer.

Now there are surely different reasons for the actions of these people. Some may not be aware that their action is considered illegal. Internet connections are not given upon consent about existing copyright laws. Many people, especially those from the former generation, who are new to this technological achievement, may not be aware of the fact that downloading music or movies from websites without paying is an illegal act. They may speculate that since no one is actually hindering them from downloading, it is most probably okay to do so.

Then there may be others who do know the legal consequences of their actions but consider piracy as a peccadillo, as something that is not worth punishing. Many people, especially students, may argue that since they have a comparably low income, the incentive to pirate may be high. In the course of this work we will see that there are more than these three reasons for digital piracy. It is a mass phenomenon, which appears all around the world and involves every type of person. Since everyone has a different motive for his/her action, the study of these motives

¹ The word “theft” is avoided here on purpose since a theft usually involves the non-usability of the stolen good by the original owner. This is not the case when digital goods are exchanged on file-sharing networks, as it is a copy of the original file being shared and not the original file itself.

² According to a study conducted by LEK and MPA in 2005 [MPA06] 44% of digital movie pirates are female. Also 18% are between 40 and 49 years old.

is indispensable for an acceptable solution to the problem digital piracy. In the end of the day, in any free market it is the customer who pays the bill. So only if you understand the customer, you will succeed in your business with him/her.

In the course of this chapter however, it will also be discussed if piracy, as it is demonized, actually serves any good. Until now, the focus of the literature concerning piracy has mainly been on the (obvious) negative effects. But many recent sources indicate that a number of technological innovations can be seen as a result of increasing piracy and the need to fight it. Research in one field often leads to starting points in other areas.

A further mainstay of this chapter will be a detailed look at a reproach of the music industry, namely their claim that piracy is the main reason for declining sales. In the light of the enormous piracy potential discussed earlier, it seems quite natural that there is a link between these two factors. Nevertheless, it cannot be ruled out that the literature offers other findings for the decline in sale. These will be examined.

Another dimension to the social aspect of digital piracy is explored in the last part of this section. It will be discussed how consumers have started treating music almost as a free good, something which is almost seen as a basic need and should be provided for free. The social instruments behind this idea will be examined and the consequences of a free music economy will be derived.

4.1 Piracy as mass phenomenon

According to the last census in 2001 Austria has a population of around 8 million. The estimate for 2007 is 8.3 million. According to the Vienna Institute of Demography, in the year 2000 there were around 1.5 million children who were below 15 years old. According to the CIA world fact book of 2004, the percentage of the population living under the national poverty line in Austria is 5.9%. So in 2007 around 7.9 million people in Austria live *above* the poverty line, and out of them say 6.4 million people were above 15 years old and it can be assumed that each of them are capable of spending one euro for a litre of milk.

Now suppose, instead of spending that euro on milk, due to some unexplained reason, they all give me one euro each. All of them, who live above the poverty rate and have at command a decent amount of money, lose one single euro to me, just once and never ever. Now the effect of that action on each one of them is not even worth mentioning. But, the effect of that one euro I get from 6.4 million people on me is a life changing experience. I would be 6.4 million Euros richer and set for life.

This simply analogy, that any kid would think of at least once in life, is an example for a phenomenon that deals with situations in which a considerable number of subjects are involved. The mere number of these subjects, in our case people, has a significant influence on the outcome of that situation, which can be distinctly

different to a situation with a handful of people. Say you explain a complicated issue to someone face-to-face. Of course this person may not understand what you are saying first as it is a complicated matter. So a number of questions will be asked until the matter is clear to that person. Now imagine doing the same thing to a group of 500 people in a hall. There will be people with different levels of education and experience in that group. Once you finish your explanation they will all start asking questions. Since it will not be easy for you to answer them all, they will apparently start talking to each other, which will finally gain a certain uncontrolled momentum leading to a possible confusion. This may be a plausible reason why in case of an encounter with aliens, those responsible may not communicate it through a regular press report or even an official statement. The impact of such groundbreaking news may be uncontrollable as in the light of religious fundamentalists even a mass hysteria leading to worldwide destruction could break out. Thus severe and unpredictable are mass phenomena.

The entertainment industry has always been a some-to-many-relation. In the beginning of the 20th century there were a few film studios that were capable of producing movies, a relatively small number of established musicians entertaining their audience. When comparing the huge size of the audience with the number of movies or music albums being produced, this relativity has not changed, even at the end of the century. In the last few years around 65.000 to 75.000 movies were produced and released worldwide [IMDB09], watched by at least 3 billion people all around the world.

Physical economy is an economy of scarcity. This means that every store on earth selling CDs or DVDs has a limitation on items that can be put into the shelves for the customers to buy. This applies especially the smaller stores. So ultimately this situation leads to a scarcity of variety. The retailer will naturally try to sell those goods, which will earn him most profit. A current chartbuster is more likely to generate high revenue than an experimental track of an unknown artist from some other part of the world. Thus, the customers will only have access to the limited repertoire of that particular retailer.

The Internet on the other hand is a store without boundaries. Amazon.com offers more than 22 million book titles and 40 million other products, iTunes is offering more than 8 million songs and Netflix has more than 100.000 DVD titles to choose from. These are all examples of stores or portals that are not limited to any physical boundaries on their portfolio. Thus they are able to offer their prospective customers a much wider variety of products than any other retail stores. The mail order business as with Amazon.com is in fact a forerunner of business models that are possible with the Internet. While Amazon.com still has to store all their physical goods at storage locations all around the world, the cost of storing high quality music or video files are considerably low due to sinking hardware costs. Another factor is distribution. While mail order stores need to maintain an extremely effective distribution system, which is in fact one of their key competences, distribution through the Internet holds a lot of potential concerning cost savings, especially in

the light of peer-to-peer technologies, that will be discussed later on in chapter 4.3.1 and 5.2.1.

A store without boundaries does have an impact on the customer's behaviour. Apart from getting things for free, another reason for file-sharing networks becoming highly successful is the huge variety of songs and movies available there. According to the Digital Music Survey 2007 conducted by Olswang [EMR07] 42% of the participants stated that the reason why they download unauthorized files is because they "can find everything looking for". Among all reasons mentioned this is only second to the one stating that the reason to illegally obtain files is because it is free (91%). The same survey from 2008 [EMR08] finds out that 70% of the participants think that "Legal d/l sites don't have the range of illegal ones".

This is quite an indication for an increasing demand for more products, for more variety within the products. People have realized through the Internet that there are a lot more singers and bands out there than the top 40 chartbusters they hear again and again on the local radio station or on music television channels. When looking at the big picture then the Internet has amplified the effects of globalization. No media, either radio nor television or any other development in recent times have stimulated the consolidation of human beings around the globe like the Internet. Social networks like Facebook or Twitter are a driving force behind people all over the world coming together in the virtual world, knowing each other, discussing, sharing and building up entire communities. Another social network named Couchsurfing.com manages to connect virtual world relations to the real world with people offering their couches for a couple of nights to fellow couchsurfers for free. So when going for vacation anywhere in the world, you cannot only sleep for free at someone's place, you are even able to establish a contact to that person and his/her local friends and thus learn about their culture from first hand rather than by being a reserved tourist.

But it is not only the Internet that is behind this development. A one way flight ticket from London to Istanbul costs around 37.61 € these days with one of the European low cost airlines. With a return ticket from Berlin to Madrid costing only 48.48 €³ people are suddenly confronted with listening to local Spanish artists playing good music live in bars and nightclubs in Madrid. Songs these people will never find in their German stores, which will certainly disappoint them.

People are much more mobile these days. Mobility means an increased exposure to all kinds of attractions. An increased exposure means a wider spectrum of different genres, a lot more subcultures, specializations. It is not just rock or pop these days, there are a lot of variations in between like heavy metal, punk rock, psychedelic rock, Britpop, power pop or noise pop. The list of subgenres like these is endless. The reason for their existence and why they get so much attention these days lies in the enormous diversity of consumers being able to explore them more

³ Both flights were looked up six weeks before flight date on www.easyjet.com in December 2009.

conveniently. So in effect the market for niche products is becoming much more interesting now.

Before the Internet led to changes in the customer's behaviour and subsequently in the way business is being done, every producer could more or less rely upon the following reality.

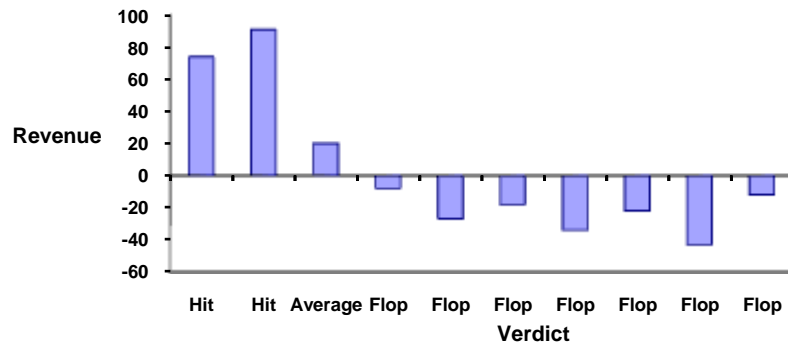


Fig. 1: Typical partitioning of a producers projects in terms of wins and losses

Usually there are one or two big hits that cover up the losses made by several flops. The figures in the above depiction do not correspond to any box office statistics. They are only meant to explain that those few “hits” are very important to the producer, since without them he would soon be bankrupt. But now with the Internet as an infinite online store, the situation is changing. The hits will always be there, same with the flops, but then in between the average ones begin to increase in number. Many songs that never had any takers due to poor marketing or sheer unavailability in certain markets suddenly start to generate moderate revenues. Of course they will never be as successful as the hits, but then they can compensate that through their sheer number. A lot of micro hits put together make up a nice sum of money. Chris Anderson, the chief editor of Wired magazine, calls it the long tail; a thin but long tail capable of making a lot of money.

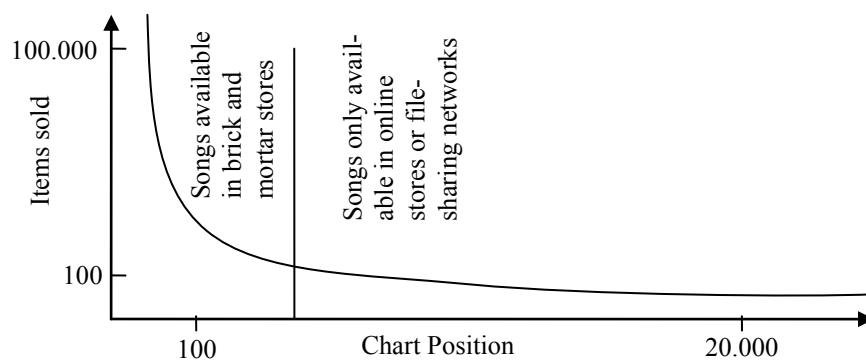


Fig. 2: The long tail [Anderson, 2006]

The long tail in the above diagram is the right part of the line going towards 0. This “tail” has always existed before, but usually reached 0 very soon, which means that the songs at the end of the charts were not even sold once. But in the online digital market this tail tends to get very long, meaning that a lot of songs are at least sold once.

Ecast Network is a company offering music boxes for bars and clubs. These music boxes come with an Internet connection and access to more than 10.000 albums. Robbie Vann-Adibè, CEO of Ecast said that 98% of the songs being offered for sale on these boxes were sold at least once per quarter. This is an unusually high number when comparing it with the sales of Wal-Mart for example, who do not even sell half of their songs once in a quarter. The long tail is an economy of niche products. In this economy the hits are the stars, but the sum of the micro hits are the cash cows with a potential for sustained generation of revenue over a long period [Anderson, 2006].

One of the most prominent examples for a mass phenomenon in another field is Wikipedia. When looking through the history of encyclopaedias one can see that they were always authored by a small group of specialists. But then Jimmy Wales had the idea of using the mass to author his encyclopaedia. The principle behind his idea is pretty simple and nothing new: Two heads know more than one head. What Mr. Wales did is to just spin that thought further to a much wider dimension. Who is more eligible to write about every aspect of life than the collective mind of everyone? There are more than 10 million articles on Wikipedia written by more than 50.000 regular authors and almost 13 million anonymous users [Wikimedia09]. To compare with, the renowned Encyclopaedia Britannica has around 80.000 articles.

Of course the concept of Wikipedia has lead to a lot of criticism concerning the accuracy of the articles and the semi-professional nature. But then again this mass phenomenon has an inbuilt instrument which takes care of the quality. Almost every article can be edited by everyone. The sheer amount of users makes it possible that each and every article is constantly improved in quality and held up-to-date on a regular basis. The risk of vandalism is also reduced through this enormous size of people working on it. Any article sabotaged by anyone will be discovered by others within a short period of time, often within minutes [Anderson, 2006]. Wikipedia also incorporates historical data which makes it possible that each and every action will be logged in their systems.

There are a lot more examples for such mass phenomena. The SETI@home project uses the computing power of more than half a million private PCs scattered all around the world to search for extraterrestrial intelligence. Distributed computing is in this regard a current trend that uses the potential of a large number of CPUs to manage extremely resource-intensive operations. The story of Linux is an example for collaborative work among thousands of individuals all around the world. Thousands of forums and communities on the Internet provide support for software or any other issue. The mass today does not comprise of passive consum-

ers who let them be exposed to some constant stream of content. They are active designers of their own contents [Anderson, 2006].

The main lesson to be learned by the music and motion picture industry is that this phenomenon is something to stay. It is a natural development of a technology-driven society. People have changed their habits, their practices concerning the consumption of entertainment. Enhancements in technology and their utilization by other industries have led to this development. You cannot go back and bury the possibilities these technologies have enabled. So now it is the turn of the entertainment producing industry to evolve themselves to the challenges of the new era.

4.2 Behavioural models explaining piracy

When discussing about digital piracy, one should note that it is actually not a completely new phenomenon. Since “digital” piracy is nothing else than piracy in the context of computers and digital media, “piracy” as such has existed long before; so has research on it. Especially in the science of ethics there have been a lot of academical studies on this topic. Some of these studies have presented behavioural models, which try to explain the actions of humans based upon certain characteristics.

The origins of piracy are of course suited in human behaviour. So the subject of the behavioural studies is a human being. In social psychology, the study of how people and groups of people interact, the attitude of a person towards an intention and subsequently towards certain behaviour is an important factor when predicting his actions. But attitude is again derived from a group of antecedents, which in the end determines the final attitude. So usually it is antecedents to attitude to intention to behaviour. But then as we will later on see, there are factors other than attitude that have a direct influence on intention and behaviour.

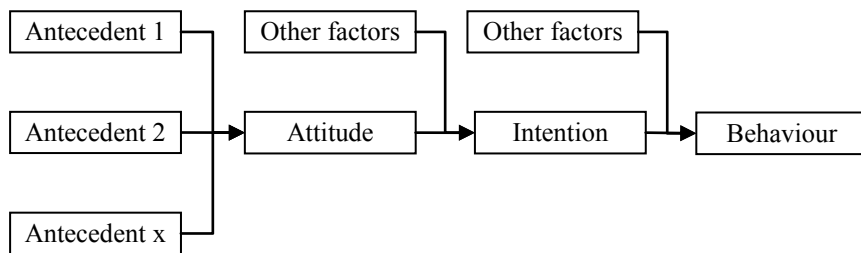


Fig. 3: Factors leading to behaviour

Behavioural models usually try to identify characteristic antecedents that cause a certain attitude, which influences the action to commit digital piracy. If these antecedents can be identified correctly, it will help in predicting under which cir-

cumstances people may pirate digital goods. The ultimate goal of such models is to modify the antecedents in order to influence the behaviour.

There are different theories about the factors leading to digital piracy behaviour. The most significant one among these is definitely the theory of planned behaviour (TPB) by Ajzen [Ajzen, 1991], which he developed out of his previous theory of reason action (TRA). TPB tries to predict behaviour through analyzing the underlying intentions. When going through the literature, it seems this theory is a widely established and accepted one. Nevertheless, in the course of this subchapter, other, equally interesting and valid theories will be presented.

The following depiction is a summarized model of various antecedents that have proven to have an influence on the attitude, intention and in further consequence on digital piracy behaviour. Note that some have a positive influence, in the sense that if the first factor is increased, the second will increase as well. In contrast to that some have a negative influence meaning that rise in one factor will lead to sink in the other factor. Thus the influence-arrows are marked accordingly.

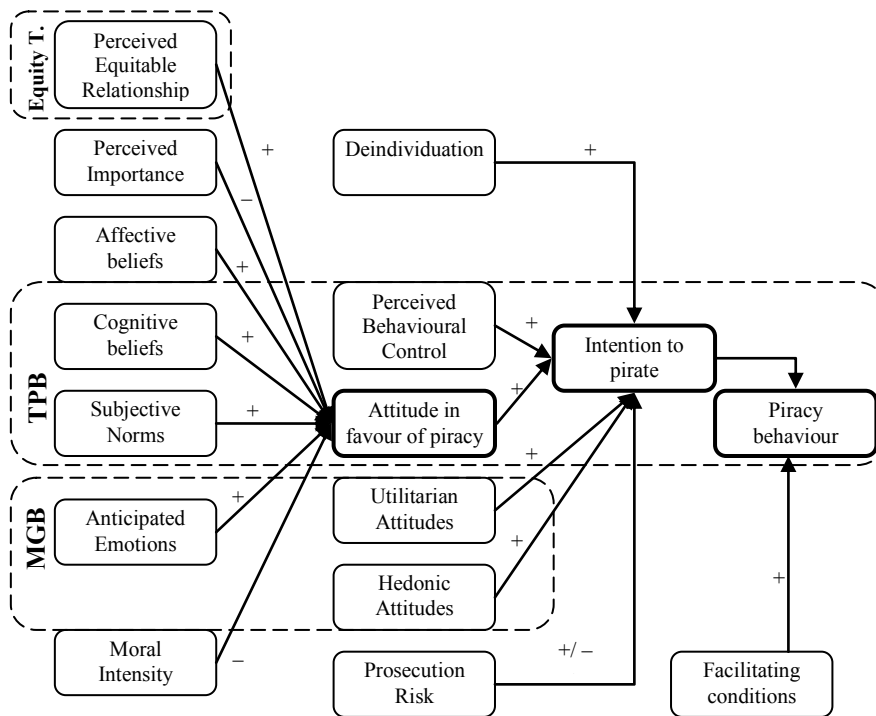


Fig. 4: Antecedents, attitudes and their impact on piracy behaviour

The antecedents found to have an influence on digital piracy behaviour originally derive from different psychological theories about human behaviour. The theory of planned behaviour (TPB) by Ajzen has been used as the building base of

this model. The Equity Theory, first proposed by Adams 1963 [Adams, 1963] and later applied upon software piracy by Glass and Wood in 1996 [Glass et al., 1996], deals with the desire of bringing balance into an unequal situation. This unequal situation is often demonstrated in the music and movie domain with the example of high prices for digital goods. Since pirates perceive the prices set by the industry as too high, they see piracy as a means to balance this unequal condition. A third theory prevalent in this model is the model of goal-directed behaviour first proposed by Perugini and Bagozzi in 2001 [Perugini et al., 2001] and later on extended by [Taylor et al., 2009]. This model adds emotions to the list of antecedents that influence intention. Also, in their model attitude is replaced by desire as the main motivator of intention. In this summarized model though attitude and desire are dealt with as substitutes. All the other antecedents in the above model are additions which have proven to be convincing by various studies [Hill, 2007], [Chiou et al., 2005], [Kwong et al., 2004].

The following table will give an overview of these antecedents.

Antecedent/Attitude	Influence	Meaning
Perceived Equitable Relationship	Positive	If prices for music or movies are perceived as too high and/or if the artists are perceived to earn more than they “deserve”, then this mechanism wishes to “correct” this inequality by acting on it through piracy. It is some sort of a “Robin Hood”-mentality.
Perceived importance	Negative	This antecedent deals with the importance of the matter itself. If one believes piracy is an important matter to be dealt with, then tendency towards piracy may be low due to the feeling that it might be unethical.
Affective beliefs	Positive	Someone who perceives the act of pirating exciting will naturally have a positive attitude towards piracy.
Cognitive beliefs	Positive	While the affective beliefs are based on emotions, cognitive beliefs rely upon the objective opinion of an individual on the act of piracy. The higher it is, the higher the tendency to pirate is.
Subjective norms	Positive	To be found among the most significant antecedents of digital piracy across almost all studies is subjective norms. It also be-

		longs to the original model of planned behaviour. Subjective norms explain the strong dependency of one's own beliefs on the beliefs of peers and other relevant people in society. The more everyone in one's surrounding sees piracy as an acceptable action, the more you seem to accept it as well.
Utilitarian Attitudes	Positive	A very recent study in [Taylor et al., 2009] observes that utilitarian attitudes, which characterizes the practical and pragmatic desire of an individual to obtain something that he/she rates as useful, has a positive influence on digital piracy.
Hedonistic Attitudes	Positive	Hedonism is a philosophical term meaning that personal pleasure is the greatest of all aims. In this context a hedonistic attitude means that the pleasure of consuming an entertainment product is higher than the feeling of offering the creators a fee for this pleasure since that may affect pleasure in a negative way.
Anticipated Emotions	Positive	Emotions as such were already included in "affective beliefs". Here the emphasis lies on the anticipation of emotions meaning that if you predict that you may be happy if you achieve a certain goal (possessing music and movies without paying for it), then the attitude towards piracy may be positive
Moral intensity	Negative	This antecedent describes how much an individual thinks that his/her action may have a consequence on someone else (artist, record company etc.). It is composited by the magnitude of consequence, the probability of a negative effect, how long it may take and how close your relationship is to the possibly harmed party. If your moral intensity is low, then you may favour piracy behaviour.
Deindividuation	Positive	Anonymity in computer networks is a

		powerful force when it comes to the intention to pirate. This is related to the mass phenomenon explained in the previous subchapter. If you are a nameless IP address on some server, it is alluring to pirate.
Perceived Behavioural Control	Positive	One's own judgement of one's own capabilities to acquire information/knowledge/good or accomplish a certain task, also called self-efficacy. If you think you are easily capable of searching for music or movies on file sharing networks and also know how to use it confidently, then you may have intent to pirate.
Prosecution risk	Neutral	The risk of being caught while doing something forbidden has found to have an influence on one's attitude towards piracy. Even though various studies argue that deterrence threat does not have any effect on piracy behavior [Oksanen et al., 2007], [Gopal et al., 2004], it is added here because the author thinks that for the people to perceive it as relevant it may depend on the type of deterrence that they are currently threatened with.
Facilitating conditions	Positive	Factors that directly influence behaviour are conditions that make it easy to execute certain behaviour. In this context a cheaper and faster broadband connection or cheap storage place facilitates the act of piracy because even though one might have pirated without these conditions, their mere existence adds only to the certainty of that behaviour.

Tab. 1: Antecedents/Attitudes and their meanings

Some of the measures taken to decrease digital piracy (see chapter 7) can be seen as attempts to change the antecedents in the above table. When perceived importance for example was low, it meant that pirates were not concerned about the importance of the matter. This means they did not believe that their actions were affecting anyone. The general media gave them the impression that pop stars and

movie stars were still leading a high life travelling around the world, living in big villas and appearing in the news with their escapades from their exorbitant night life. It did not seem wrong to them when they refused to pay 20 € for a CD or a DVD. This is when educational campaigns were introduced to increase awareness in this matter.

A low prosecution risk among the pirates on the other hand was answered with lawsuits against individuals. Even if it was impossible to prosecute each and every pirate, the probability of getting caught was meant to be used as a deterrence measure; a measure, which was found to be ineffective in some studies [Gopal et al., 2004] and effective in others [Kwong et al., 2002], [Oksanen et al., 2007].

Deindividuation and subjective norms are again examples of mass phenomena. Only in a mass one can remain anonymous, which on the one side increases the belief that one person alone cannot cause any harm to a big industry and on the other hand creates a certain feeling of security that the probability of being caught in a mass is too low. Subjective norms then serve as a form of justification for one's actions. With a mass behind you, doing the same things, your confidence in your actions rise.

There are a number of factors that have thought to influence piracy behaviour but had then to be dropped following recent results from various studies. These are for example age and gender. In former studies they used to be relevant though [Gopal et al., 1997]. Same is the case with the income level, which doesn't seem to have an influence on the purchasing behaviour of the customer [Kwong et al., 2002], [Gopal et al., 2004]. This indicates a perpetual evolution in human behaviour. Factors such as emancipation and the increased presence of technical gadgets⁴ in everyday life have motivated women to engage themselves more in the exploration of the possibilities of the Internet. Increased life expectancy, combined with lifelong learning and an increase in people over 50 working with computers is changing the perception of a typical pirate being somewhere between 15 and 24.

There are certainly more theories other than the ones described above which are relevant for the exploration of the tendency in human behaviour to pirate. Various ethical models like the Ethical model of decision making or the general model of ethical behaviour have in one way or the other come to similar conclusions. An interesting study in [Proserpio et al., 2005] viewed the piracy problem from a macro perspective. They concluded that cultural traits in different countries play a significant role in this matter. In Eastern cultures, sharing is often considered as a desirable and noble act, whereas neglecting it may seem rude. Individualistic cultures on the other hand respect the right to make personal use out of inventions rather than sharing it for free with others. So when trying to find solutions for the piracy dilemma later on in chapter 8, the aspect of one-model-suits-all will have to be questioned. It is rather likely that different cultures will require different measures.

⁴ Such as laptops, mobile phones and MP3 players

4.3 Effects of piracy on innovation

When analyzing the background of piracy, not only the behavioural structures that led to it are worth investigating, but also its further implications on society in various domains. Obviously, the focus here lies on the business domain. The future is at least as interesting as the past. It is a common saying that from every (supposedly) negative experience in life you learn something positive for the future. Since piracy is an existing fact, what else is it able of giving us than declining sales figures in the entertainment industry?

It should be quite apparent by now that digital piracy is an offense committed by millions all around the world. Anyone with a PC and an Internet connection can do it. The importance and role of this small detail, the availability of a device and a network, is often overlooked when condemning piracy. Digital piracy, especially its online avatar, is only possible due to advanced technological developments such as the Internet, file-sharing networks and online communities. These developments were initially not made with the intention to commit crime.

“[...] the early adopters of the Internet, many of whom were technologists and scientists, strongly believed in the idea of sharing information for the advancement of technology.”
[Choi et al., 2007, p. 3]

Throughout the 1960s and 1970s software was usually open-source, meaning that the source-code was available to everyone capable of working on it and improving it for the sake of its use. No one until the likes of Microsoft, Novell and others arrived on the scene in the 1980s ever thought of making money out of it.

Piracy is in fact a by-product of these technologies, enabled by products and services that came along with it. So when looking for measures to stem the piracy problem, it is interesting to take a look at benefits that have come along with piracy, but also, more important, to investigate how piracy can actually have positive effects in future.

4.3.1 Innovation in distribution

Ever since Napster arrived on the scene in 1999, P2P (peer-to-peer) has been a buzz word on the Internet. Unlike in a client/server architecture, in a peer-to-peer architecture each user connects to another user directly. So the source of a media being downloaded is the local hard drive of anyone connected to the Internet possessing that media and not a central server. It is exactly this particular feature that makes the P2P system vulnerable for successful online piracy. While first generation P2P clients like Napster had centralised servers with indexes of the files being downloaded and the users involved in it, the next generations focused on decentralization, encryption and anonymity in order to avoid prosecution by various intellectual property rights keepers. This was in fact a direct response to the closure of Napster following litigation with the music industry.

Now the peer-to-peer technology itself is not illegal, because all it does is that it enables file sharing. But file sharing is not limited to music or movie files, but to any type of file. This is where the benefits of this system unwrap itself. Usually when a software vendor releases an update of his product or a completely new product itself, it will be uploaded onto a server, from where everyone else can download it. If the file is very big or/and if there is a big demand for that file, then naturally the downloading of the file by thousands or millions of users will cause a high bandwidth use, which can be costly for the vendor. Also, when the critical mass is reached, further downloading may not even be possible or extremely slow.

A typical example for this scenario can be seen in the software sector. BitTorrent, a popular file sharing protocol, is used by Linux distributors to make their open-source programs available for the public. Especially files with sizes over a gigabyte or more are suitable for downloading via BitTorrent, since offering them on a regular server may not be feasible. Red Hat, a company that offers a Linux distribution with the same name released version 9 of their product via BitTorrent. 21.15 terabyte of data was transferred at a bandwidth cost of merely 99\$. If they had hosted the file on a regular server, the cost would have been somewhere between \$60,000 and \$90,000 [Choi et al., 2007].

Another, though one time instance, of the BitTorrent technology being used for a legal matter was when the producers of the documentary “Outfoxed” distributed the movie for free via BitTorrent. 750 GB of data that was transferred to the interested viewer led only to an estimated 4 \$ bandwidth cost [Choi et al., 2006].

This opens a completely new way of distribution channel for entertainment products. The products such as music and movies are already available in a digitalized form and the prospective customers have almost completely equipped themselves with computers and broadband connections. Already millions of these people are spending a considerable amount of their time retrieving and exchanging information with other people all around the globe through the virtual world, with their notebooks, PCs and mobile devices. They would not do so if they were dissatisfied with what they experience there, which currently are mostly pirated goods. It is now the industry’s turn to utilize this promising distribution channel by offering customers proper services. It is an opportunity created by the same wave upon which online piracy is riding. The BitTorrent technology, popularly exploited by pirates to distribute music and movies very effectively, is a development which can prove useful to the entertainment Industry once used properly.

When taking a glimpse into the past, the innovation that Napster and other peer-to-peer clients brought was the realization of the music industry that music could actually be sold online in the first place. Even though some companies like eMusic started online stores in the late 1990s, it was only since Napster that the music industry had to consider this new distribution channel seriously because otherwise it would be losing customers to such free services. Shawn Fanning, the creator of Napster, needed a programme to share music, so he created one. When that programme became a huge success it clearly showed that there was an enor-

mous demand for online music; something which the music industry was unaware of.

4.3.2 Product innovation

We have seen that through the upcoming of online piracy new distribution channels have been introduced. A technology that came along with piracy has now the potential of improving the efficiency of distributing digital products on legal platforms. But this is not the only innovation that piracy behaviour has infused into the business world. When looking at the whole issue from a much broader perspective it becomes clear that unauthorised intrusion into a product is not always meant to cause harm but to rather improve it.

Before applying this thought on the music and movie domain, let us take a look at the adjacent software industry. For many years Microsoft's Internet Explorer 6 (IE6) had been the market leader in the browser market, especially due to its integration in another market leader, the operating system Windows. Since its introduction in 2001 there have been rarely any improvements added to the browser. The development in the browser market was stagnant. Then in 2004 the Mozilla Corporation released an open source browser called Mozilla Firefox, which was suddenly a direct competitor to IE6. The situation changed abruptly. Firefox incorporated a lot of new and innovative features like tabbed browsing and extensions into their browser so that Microsoft was confronted with a decline in IE6's market share and popularity. In October 2006, 5 years after the release of IE6, Microsoft introduced IE7, which dramatically caught up with most of the new features of Firefox. In an innovation-driven environment like the web, when new applications, technologies and developments are being released in a short period, 5 years of standstill was a unique situation.

The relevance of this story to piracy and product innovation is to be found in the reaction of Microsoft to the sudden upcoming of such a strong rival like Firefox. Certainly Firefox is in no way comparable to pirates, but the point here is, the Mozilla Corporation's aim with Firefox was not to harm Microsoft by being a fierce competitor or to make big money, but to bring a long overdue improvement to the most central gateway to the most exciting development of the past years, namely the Internet; something which Microsoft had ignored for years due to being a de-facto monopolist in the browser market. But Firefox was not just a usual competitor, but a combined effort by thousands of independent programmers all around the world, all following the same aim, namely to "promote choice and innovation on the Internet" [Mozilla05].

The product which needs an improvement in the movie domain could be the marketing of TV shows and more generally any programme on the TV that is interesting but not for sale. If one goes through a lot of the video clips on YouTube it is not difficult to notice that many of them are excerpts recorded from the television. Be it scenes from a comedy show, a fabulous goal in a soccer match or an

explosive music video. A look at the number of views of some of these videos clearly shows the demand for contents like these. Since there is not a legal way of obtaining them, they are being consumed for free.

Another domain where piracy is actually helping improve the product is the game industry. Ego shooters and role playing games often have a very dedicated community behind them analyzing, discussing and helping out fellow players on various aspects of the game. At some point it can happen that some players are not satisfied with certain things like the look of a character or a certain feature. If these players are motivated enough they go on and hack themselves into the game and change it according to their needs. Since they are part of the community, they will usually offer those changes to anyone interested. One such incident where the modification of a game by two players led into the development of a completely different game is the history of “Counter Strike”, a popular ego shooter which derived out of “Half Life” in 1999 [Choi et al., 2007].

4.3.3 Technical innovations

As assessed in chapter 3.1 a digital good is non-rival and non-excludable, making it almost to a public good. So once it is out of the hand of the creator, it can be consumed and copied by anyone anytime. This is where the content industry tries to step in for years now to come up with mechanisms that stop digital goods from being public goods. The less a digital good is public, the more it can be sold. The most frequent measure taken in this issue is copy protection of the media through which the digital good is being sold, be it a CD, DVD or mp3 file.

On the other side of interests but there are people who specialize in breaking every copy protection mechanism the content industry introduces. They are the ones who perform the pioneering task of making digital good to a public good again. This cat-and-mouse game between the industry and the hackers has in fact led to advanced developments of copy protection systems. CCS (Content Scrambling System) for DVDs and Cactus Data Shield for audio CDs are examples for technologies like these. With the introduction of new high definition media like HDDVD and Blu Ray Discs this development has gone even further. It might seem a bit paradox, but “piracy encourages innovation because firms need to innovate in order to prevent piracy.” [Rayna, 2004, p. 8].

In reality any copy protection system introduced by the industry will be cracked in a matter of weeks or months. Even the much anticipated and prominently supported⁵ copy protection system AACS (Advanced Access Content System) has been hacked into 3 months after its implementation in HDDVD and Blu Ray Discs [Falcone, 2007]. But the point here is that despite setbacks in the music and movie domain, the insights won from these newly developed systems can be adapted and used in other areas where the hackers might not be so motivated.

⁵ Among others by IBM, Microsoft, Intel and Panasonic, see [AACSLA09]

Since the development costs have already been made, there is no need to invest money to apply the same technology in other domains. The e-book market for example is an emerging one. Since Sony introduced its PRS-500 e-book reader in 2006, other producers have successfully started producing similar products⁶ based on the E-Ink display. It is yet to see if people are willing to abandon books in favour of these readers, but it has scope of supplying a niche market or serving as an alternative to paper books.

The role of piracy as a catalyst for compression technologies and hardware vendors is arguable. Without the introduction of CD and DVD-burners to the consumer market digital piracy in its physical form would not have been possible. The same vendors have produced mp3 players and divx certified DVD players, knowing very well that there is a profitable market for these devices. Ironically Sony is a company that on the one hand is a music label (called Sony BMG from 2004 onwards), but on the other side one of those vendors that produce mp3 players and divx certified DVD players that can play files that are shared on file sharing networks.

With compression technologies like the MPEG standards it is a different issue. They have existed long before the advent of file sharing programs, but have gained popularity in the public perception only through the break-through of mp3 (actually MPEG 1 – Layer 3) in the late 1990s. Since then they have been constantly improved allowing higher compression at near to CD quality.

In North America 44% of Internet traffic 2008 was attributed to peer-to-peer file sharing [Sandvine08]. In Germany in 2006 this figure varied between 30% (daytime) and 70% (night-time) [P2P06]. Broadband Internet is nowadays widely available in all parts of the world which enables this increased traffic in the first place. It is not by chance that the development of broadband Internet and the rise of p2p happened simultaneously. While the latter was stigmatized for being illegal, the former paid off for its investors due to the customer's demand for the latter.

4.4 Linking sales and piracy

The causality of events is a constantly misused construct in newspaper articles. Very often scientific researchers study the correlation between two variables by doing a regression analysis. The outcome is often that one variable correlates with the other variable to a certain extent, which is usually expressed in percentage. But it does not say anything about one variable being fully responsible for changes in another variable. Therefore, correlation should not be confused with causality.

Craigslist is a free advertisement listing service on the Internet, which has become immensely popular and successful over the years. But this success was said

⁶ Amazon recently launched the second version of its e-book reader Kindle.

to hurt the traditional newspaper classified advertisement business, who were complaining about declining revenues of up to \$326 million in 2006. But the revenues of craigslist for that same year were an estimated \$40 million. Despite of a certain correlation between craigslist's revenue and loss in revenue for classified advertisements, namely a 12% correlation, this does not mean that classified advertisements lost \$326 million in revenue because of craigslist [Doctorow, 2008].

When studying the effects of digital piracy on the music and movie industry the prevalent role of the former in the latter's decline in revenue has been brought forth very often. Common sense may let us jump into the conclusion that the music and movie industry may ultimately lose revenue if everyone obtained their songs and movies for free through file sharing. This is completely understandable and true to a certain extent. But the industry's claim that the decline in their sales is entirely because of digital piracy is a matter of dispute. The aim of this chapter is to find out how far declining sales figures are related to digital piracy and what other factors may play a significant role in this issue.

Music and movies are only two forms of entertainment. They have to fight with computer games, TV (especially those increasingly popular reality shows), the Internet (social networks among others), mobile applications and such for the money spent by people on entertainment goods. Since there are so many alternatives for people to spend their money on, their expenditure on music or movies may decline. Nowadays there are too many competitors.

The academic world measuring the exact impacts of digital piracy on declining sales figures is uneven in its conclusions. Some like [Liebowitz, 2003], [Liebowitz, 2005], [Liebowitz, 2006], [Hennig-Thurau et al., 2007] and [Zentner, 2006] argue with empirical data that file sharing is nearly alone responsible for the decline in sales. Others like [Oberholzer-Gee et al., 2007] and [Peitz et al., 2004] do not find any evidence for this claim and contend that other developments may explain the decline in record sales better than file sharing like the increasing competition from other forms of entertainment such as DVDs, video games and most prominently mobile phones. Another speculation is that the period of increased sales as customers were replacing older formats with CDs had come to an end.

In fact the disagreement in the academic circles regarding this topic is best seen in the "reply-paper" of Liebowitz to the findings of Oberholzer-Gee and Strumpf titled "How Reliable is the Oberholzer-Gee and Strumpf paper on File-Sharing?" in which he goes on to disprove with the former, also stating that "Since O/S [Oberholzer-Gee/Strumpf] have not made their data available to other researchers it is not possible to examine the empirical details of their main regression results" and in a footnote "O/S have refused my multiple requests for their data." [Liebowitz, 2007, p. 1].

It is understood that illegitimate downloading serves two purposes, either sampling or substitution. The former can have positive effects on record sales because it is merely used as a decision support tool before deciding on the purchase. The latter on the other hand is the real threat because it actively diminishes actual sales. Sampling can have two contradictory affects:

1. Consumers end up buying lesser music because by sampling they can filter out many songs they otherwise would have bought or
2. Consumers end up buying more music because the possibility to sample let them explore more of what is available.

It might be interesting to figure out which of these scenarios prevail. [Gopal et al., 2006, p. 27] find “[...] that decreasing sampling costs not only lead more potential consumers to sample unknown music items but also lead more consumers to buy the music items that they have sampled.” This supports scenario 2.

[Bounie et al., 2005, p. 16] conclude in their paper that “[...] file-sharing technologies have amplified consumption patterns in the sense that music fans have increased their legal consumption of music while people with low interest in music have reduced their CD consumption.”

This confirms the two effects that sampling can have, which despite being contradictory, still happen at the same time, because it is applied upon two different customer segments. Music fans – those who are seriously interested in music – will increase their legal consumptions of music and the rest – those for whom it is merely another form of entertainment – will reduce it. Which of these two groups are in the majority determines the overall effect of digital piracy.

The difficulty in assessing consumer behaviour and if this behaviour has lead to a decline in record sales boils down to the following question: Does the download of a song mean that if downloading was not possible, it would have been bought?

The answer to this question is quite simple: no, of course not. Simply multiplying the amount of files shared on file sharing networks with their retail price cannot produce convincing figures. File sharers often have thousands of song and movie files on their hard disc. The actual monetary value of those files would easily surpass their average income. It is one thing to consume something you get for free and another thing to pay for it before. The only way to know how much of the songs people downloaded they would have bought is by asking them directly. But then, it is quite unlikely that those answers would be reliable. Rob and Waldfogel derived their conclusion from a study conducted among college students [Rob et al., 2006]. [Zentner, 2006] claims to have worked with a more balanced sample from Europe at a time when the recording industry was not yet suing individual customers thus expecting those answers to be honest. It should be noted though that the sample was obtained in October 2001, just three months after Napster, the then prevalent file sharing network was forced to shut down following a court order.

The bottom line of this analysis is that measuring the effect of digital piracy on the sales figures of the content industry will be almost impossible to assess due to the complexity of the issue. There are too many variables to be considered and to single out the accurate effects of digital piracy alone is therefore not possible. It should be conceived though that there certainly is a correlation between these two figures, but the extent of it remains unclear.

4.5 Discussion on free music

A lot of things are free. Water is free. Advertisements are free to watch. You can watch scenes of a good movie for free in an electronic shop. You can watch funny video clips for free on YouTube. You can listen to online radio stations for free. Latterly with Couchsurfing.com you can sleep for free on someone's couch almost anywhere in the world. With Peterzahlt.de you can make telephone calls for free to various countries. E-mailing is completely free with various providers offering many services related to it. There are still a couple of sites like www.freesms.net who offer the possibility of sending SMS to anywhere in the world for free. You can upload up to 5 GB of data to various uploading sites like 4shared.com for free, or manage your photo album with Picasa or Flickr, completely for free. GIMP is a popular open source graphic art software for editing pictures. You have completely free access to more than 10 million articles on Wikipedia. Anyway, most of the information you get on the Internet, which has more than 150 million websites, are free to use. Theoretically you get food for free at an Indian Restaurant in Vienna named Wiener Diwan, where you are free to pay as much as you want.

There is a whole term associated with an economics where goods or services are given away free. It is called "freeconomics". This term was first coined by Chris Anderson in his article "Free! Why \$ 0.00 Is The Future Of Business" in Wired magazine [Anderson, 2008]. This idea has been nurtured heavily by the upcoming of the Internet with so much content in it available for free. Almost every service that Google offers is free. Be it their core business the search engine, their free email client Gmail, the free picture organising software Picasa, free maps or free video viewing website YouTube. Obviously Google is not the only company offering free services like these. In fact one gets the impression that there are far more free services on the Internet than paid ones. Chris Anderson and others try to explain why this is possible and also, how much of free is there in "free".

First of all, giving away something for free is not something that was invented on the Internet. Already one Mr. King Gillette had this idea of giving away his product. At the beginning of the 20th century he had invented razors with thin metal blades in it. As a means to increase sales he started giving away the razors for free with other items such as bubblegum or coffee. Since the blades in the razor became unsharp after several uses, they had to be replaced on a regular basis. To the customers it was still more convenient to spend some money on the blades than to sharpen their blunt razors at home. But to Mr. Gillette it meant a never-ending demand for blades. So his actual source of revenue was through the blades.

This type of business is called cross-subsidizing. You give away the phone for free, but make money on the plan. So the cost of the phone is already included in the plan. But it still gives the impression that the phone is given away for free. The situation on the Internet is slightly different though. Whereas with the razor and the phone, it is always the same customer paying the "free" good in one way or the other, the case with free online services is different. Here one segment of the

market is receiving something for free whereas another one is in effect paying for it. So to a given individual that service may really be free. The venture capitalist Fred Wilson (together with Jarid Lukin) calls this the “Freemium model” [Wilson, 2006]. Here is a description by Wilson himself:

Give your service away for free, possibly ad supported but maybe not, acquire a lot of customers very efficiently through word of mouth, referral networks, organic search marketing, etc, then offer premium priced value added services or an enhanced version of your service to your customer base. [Wilson, 2006]

So the point here is that you offer certain basic services for free to the public and finance it through premium services which you sell to (a usually smaller set of) customers who are willing to pay something for that extra feature. Most of the shareware programs on the Internet work this way. A prominent example is Skype, offering free calls from PC to PC, but charging you a small fee for calling to landline or mobile numbers.

But the point of this subchapter is not the introduction of business models like these, which will be pursued later on extensively from chapter 8.2 onwards. Here it is about the mere suggestion of looking at music as a public good. Something that is freely available to everyone. It is also worth examining the social mechanisms that enable free music.

4.5.1 Sharing

Once my uncle asked me how much I pay to get songs from the Internet. I told him I got them for free. He was quite reluctant to believe that, because it was not clear to him why anyone would put in effort to upload songs to the Internet so that someone else could have it for free. To him the uploader was not gaining anything from it, so why do it?

My uncle has a valid point there. The same question can be asked regarding freeware or open source software programs which you get for free and are free for personal use. Why are talented and capable programmers spending their precious time coding useful programmes and then giving it away for free to the public?

With open source, which is an interesting story of its own, this question can be answered like this: Open source programs are often a starting point for more complex and later commercial products. It can be very useful and cost effective not to invent the wheel again at the beginning of every project. When works in a field are already available freely, it makes the development of further programs or services based on these works easier. Also, a lot of the companies offering open source software make money on supplementary services like support and extra features. Red Hat, a Linux distributor, collected a whopping 523 million \$ revenue in fiscal year 2008 [Modine, 2008]. Mozilla Firefox, a free web browser, earns money through including the Google search field on the right corner of its application [Ubuntu08]. Also, the cooperation on open source programs can be a valuable addition in every programmer’s portfolio when looking for a job.

In the music domain though it is even easier to explain why people are uploading music for free. They are sharing. In contrast to a software programme which needs to be programmed using your brains, uploading a song to a website (like it was popular before the rise of the file sharing programs) requires only a fast Internet connection and some time. With P2P programs later it happened even automatically. All you had to do is mark your music folder as free to share. People seeking songs would download it from your machine even without you noticing it.

Sharing is a powerful desire [McGee et al., 2005]. Even though the reasons for doing so may vary, the result is mostly the same. Someone gets something for free. When looking for examples outside the music sharing domain, online communities all around the Internet provide a typical instance of this sharing culture. The usual playground for a community is a forum. Usually there are administrators, moderators and users, who come together from various parts of the world in an online forum and discuss and share any type of information with each other. It is particularly interesting that administrators often spend a lot of resources in setting up a forum and the moderators are extremely busy with running it. And the most crucial part of course: No one gets paid for anything. It is a completely money-free activity despite a considerable amount of information being exchanged. This is when other types of values seem to surpass pure monetary values. Sharing leaves money out of the equation. It is similar to exchanging goats for land in the old days. You give me what I need and I give you what you need. There is no need for money to act as a substitute.

The following are some of the motivations for sharing:

- 1) You are repaying your debts of having downloaded music from someone else by “paying it forward” to someone else, could be called the equity theory [Glass et al., 1996].
- 2) You are not losing anything when giving others a copy. That is the non-excludability power of digital goods. (See Chapter 3.1).
- 3) You are helping someone who due to whatever reason may not be able to get hold of the contents in another way; could be called social gifting. [McGee et al., 2005]
- 4) You have ideological reasons for sharing, for example the belief that the object shared should be freely available [McGee et al., 2005].
- 5) You have purely altruistic reasons, meaning that the “very act of giving is what provides the gain for the giver.” [McGee et al., 2005, p. 4].

Consider a situation where software programmers develop a music recording and editing tool and then distribute it for free on the Internet. Somewhere else upcoming musicians use exactly this tool to produce an album which they then distribute for free on the very same Internet. And finally, one of the programmers of that initial tool enjoys exactly this music. This is of course only a deliberate example demonstrating on a small scale how sharing knowledge can actually satisfy certain needs. The musician in this example doesn’t make any money to pay his

bills, but at least he doesn't have to invest a lot of money in buying expensive equipments to record his music.

Sharing is and always has been a powerful social mechanism that surpasses economical benefits in favour of personal recognition and helping-out-mentality.

4.5.2 Public good theory

Nowadays music can be consumed from so many sources without directly paying for it. Through radio, television, online-radio, commercials, computer games, in discos, restaurants and public places we are already exposed to a constant stream of music. We may be paying for it indirectly through buying drinks in the disco, eating food in the restaurant or paying radio licence fee for radio and television, but it never appears on a separate bill. It is lost somewhere between all the other bills.

A public service like the roads we travel on, the water we drink or the street lights that lighten up the roads in the night are at the end of the day financed through us paying taxes to our governments. Those are goods and services that are believed to be consumed by everyone in a country, thus it makes sense to let everyone pay a flat rate for it.

Paying a flat rate for music has been proposed by various authorities and researchers [Fisher III, 2004], [Morris, 2008], [Leonhard, 2008]. The idea is to pay a fixed monthly charge to any authority, for example your Internet service provider (ISP) and in return music is completely free to listen, download and share. Another issue though is the allocation of that accumulated monthly charge to the respective copyright owners. One way to carry this out in a fair manner is to track the downloaded content in order to decide how popular a given track by a given artist is, so that he/she receives an appropriate remuneration. But this again resembles a DRM which, even though not used to constrain usage of the content, can help monitor the customers. Also, this practice can lead to manipulation of the number of downloads, resulting in a distorted picture of the figures.

In the case of water or roads, it is the government (and the few companies who have taken the contract for water supply or road development) who is responsible for this service. But in the case of music, the producers are a multitudinous bunch of musicians scattered all around the world. A fair compensation model for them through music taxes is a tiresome undertaking. Another point of criticism for the public good theory in this manner is that even people who are not downloading anything, but rather wish to buy physical media to enjoy their music are discriminated by this model.

As Gerd Leonard formulates in his book *Music 2.0* it is not copyright anymore, but usage right. While he speaks about monitoring and tracking [Leonhard, 2008], the central concept more interesting here is the word "usage". The way in which music is consumed, or used nowadays has changed a lot. Through the over presence of music in everyday life as mentioned in the first paragraph, buying is in ef-

fect not a feasible option anymore. Ask any music lover with an enormous CD collection at home how often he/she listens to each one of them, especially over a certain time period. Same can be said about DVDs or the vast collection of MP3s on your hard disc.

It is the gathering instinct of humankind that stimulates the purchase of goods and not the actual need for it. With an enormous increase in availability of digital goods, a serious challenger of that instinct has arisen. The streaming culture, with a song accessible through various sources (like laptop and mobile devices) anytime and anywhere, the need to actually possess it becomes unnecessary. If I want to listen to a certain song, I open my player (on any device that is currently available to me), search for it and then play it. The moment I have heard it, I don't need it anymore till I want to hear it again, which may be immediately (with new or unknown songs), days, weeks, months or even years later. Even if I want to accumulate songs, instead of downloading them it will be possible to create personalized playlists on various sites⁷.

Old established customs are always defended by those who benefit by them. But as the present situation in the music industry shows us, with new opportunities coming up on a global scale, it is only a matter of time till new habits prevail.

4.6 Conclusion

In the past few subchapters various thoughts on the social background of digital piracy have been discussed. After unsuccessful years of threatening the customer and teasing them with more and more restrictive copy protection methods, the initial "shoot-and-ask" strategy of the content industry has proved to be ineffective. Hence it has become important to meet this challenge from a different perspective. The marketing departments of any company catering to their customers have always been keen on knowing what their customers want. The situation here is exactly the same. The only difference is that in this case the customers have already begun to act and the content industry still has no clue on what to do.

Unlike any of the previous technological developments (radio, home taping etc.) the Internet and file sharing networks are part of a phenomenon that needs to be addressed differently. One possible way is to study the factors that lead to this behaviour. A lot of misunderstandings have been communicated to the public by acting hastily and criminalizing the own customers. Another way may be by utilizing the long tail described in subchapter 4.1. Let the customers decide which song they should hear instead of limiting their choices to a pre-filtered hits-list. Music and movies have gone global with people exploring interest in exotic songs and movies from different parts of the world. File sharing networks have demonstrated a never-ending availability of any content one may seek. Thus is the energy of

⁷ See for example Last.fm

motivated listeners and viewers. This energy and determination of dedicated users waits to be exploited by legal services. Investing resources in a free platform for emerging artists to market themselves may let the long tail not only increase in length but also in thickness.

A longstanding conflict between those who make digital piracy wholly responsible for the recent losses of the content industry and those who minimize that responsibility was tackled. This conflict will not be resolved soon since interpreting the data available still lies within the judgement of the researcher. Therefore one can conclude that unless the effect of illegal file sharing can be observed separately there will be no final answer to this dispute.

This chapter has also shown us which social revolution digital piracy is capable of generating. Already a complete generation has grown up obtaining music and movies for free from the Internet. It is going to be very difficult to re-educate them about the necessity to pay for music, thus there is a need to break new ground with business models that seemed impossible until recently. Revenue has to be generated by adding more value to the basic product music, preferably something which a mere download cannot substitute.

The innovation power of digital piracy should not be underestimated. It may be true that network externalities like in the case with software [Katz, 2005] – that the usage of a particular software by a large amount of people will lead to its usage of a much larger amount – cannot be applied upon making profit through giving away digital music and movies for free [King et al., 2002], because in the former case more users mean more profit whereas in the latter case only the popularity may rise but not the profit. But as shown in this chapter, digital piracy has enabled a number of innovations, out of which some are obvious and others are not. The advantages that a peer-to-peer system can bring to content distribution in legal services are beyond doubt. Without doubt, digital piracy has shocked the industry, but it is also a clarion call not to rest on one's oars but to constantly pursue innovation.

5 Technical aspects of digital piracy

The main focus of this paper is not on possible technical solutions to the piracy problem, neither in terms of encryption algorithms, copy protection features nor on integrated digital rights management systems, both software-wise or incorporated into hardware devices. But still, when studying piracy in its various aspects it is impossible not to consider the attempts that have been made to bring in security features to digital contents on the Internet that are entirely of a technical nature. So, one of the objectives of this chapter is to introduce a standard digital rights management system, which was developed and used by the content industry. The basic architecture and components are explained and also the main requirements of a successful DRM system are discussed.

The second objective of this chapter is a closer look at various piracy systems which are utilized currently. This is useful as to see how this worldwide phenomenon actually operates in real life and what techniques are used to make it so popular among millions of people.

5.1 *DRM*

The sharing nature of the Internet originates in its academical roots. The Internet was designed as a means to share ideas, knowledge or simply information with each other scattered all around the world. This should be of benefits for research in every thinkable field. But once business set foot into this world, the paradigm shift was only a matter of time. Earning on free content is a somewhat difficult matter. Even though the business world has been creative enough to introduce business models enabling free consuming of entertainment goods with flashing back advertisements in return, it seems that usage fees are still the most preferable of the models. In order to make that possible the goods being sold have to be protected from being misused by the ones buying it. Since digital goods are extremely vulnerable for such misuses as already identified in subchapter 3.1, the licensing of the product can be controlled with corresponding systems either incorporated in the good itself or through devices or software programs necessary to use it.

The term DRM is in effect a subsumption of various methods used to protect digital content. More broadly it is defined as something that “covers the description, identification, trading, protection, monitoring and tracking of all forms of rights usages over both tangible and intangible assets [...]” [Iannella, 2001, p. 4].

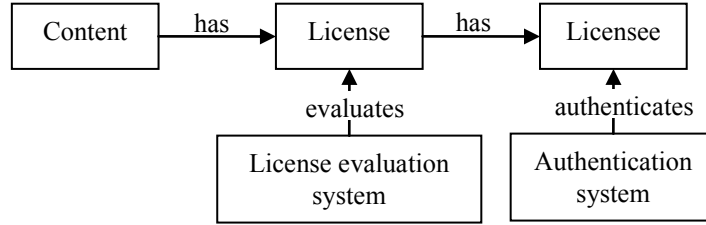


Fig. 5: Typical architecture of a DRM [Haber et al., 2003]

5.1.1 Components of a DRM system

The basic components of any DRM system are (1) encryption, (2) keys and (3) access conditions. Encryption is usually done with a cryptographic algorithm which is applied upon the multimedia content. In order to use the file a key is necessary, which can be the same with which the file was encrypted (symmetric) or another one (asymmetric). The encrypted files are attached with specific access conditions which determines under which circumstances (or after which action) the client is eligible of receiving the key to decrypt the file. In a subscription model environment this could be after payment of a certain amount.

(4) Identification and (5) authentication are two other main components of DRM systems. In order to assure secure transactions it is important that every multimedia file has a unique identifier. A simple form of an identifier for a book for example is the ISBN (International Standard Book Number). For a participant (for example client) of a DRM system it could be a unique username in the corresponding domain. Authentication deals with the important activity of verifying a certain identity. In case of a person this could be a password, for a file it could be a key agreed upon.

To prevent fraud and provide a more automatic way of identification two different methods have been developed, (6) watermarking and (7) fingerprinting. The former is an “invasive” approach meaning that the original content is extended with additional marks intended to identify a file. These marks are imperceptible to the client using the file. Advantages of this approach are “individual marking of multiple copies of the same work” [Herre, 2003, p. 7] and an independency of computational effort when identifying a large number of files. On the flipside it may decrease the quality of the file marked (since it is changing the structure through adding additional content) and an upgrade to a new watermarking scheme means that you have to re-mark all the files.

Fingerprinting uses a different approach to identify a file. It does not modify the content file, instead the file is analyzed to extract certain characteristics of that file which is then stored in a database. This is called a pattern recognition process. Once another file to be identified is compared with this database, the system finds the file that is most similar to the queried item. Main difference to watermarking is

that fingerprinting is lesser suited for forensic use (i.e. to find out to which customer a certain file was sold) but more for automatic identification of information goods, like to identify a song being played on the radio. Drawbacks of this concept are an increased effort of matching when the database already has a considerable size and training of the recognition engine (needed to find the similarities between two files) is quite ineffective.

Looking at DRM from a business perspective, an indispensable component is an (8) electronic payment system which takes care of the revenue stream from the users of a DRM-enabled service. Usually such a system is connected to a credit card service with users making payments through their credit cards. Since credit card companies charge a certain fee for transactions, it is not very efficient for so called micropayments. These are amounts less than a euro or just a couple of cents, which is popular when purchasing digital goods like a song, video or an article. For such payments often a pre-paid model is used. This means that the user purchases a certain amount of credit, which he/she can use for micropayments. Another way of doing it is to charge the credit card only on a weekly or monthly basis, when all micro transactions are cumulated to a single bill. In fact, there are a lot more systems like MilliCent, MiniPay, or MicroMint, which has experimented with electronic paying. Among the most successful company in this field is certainly PayPal, which provides a person-to-person paying functionality with PayPal acting as a broker assuring payment.

The following figure depicts the interaction of all 8 components described.

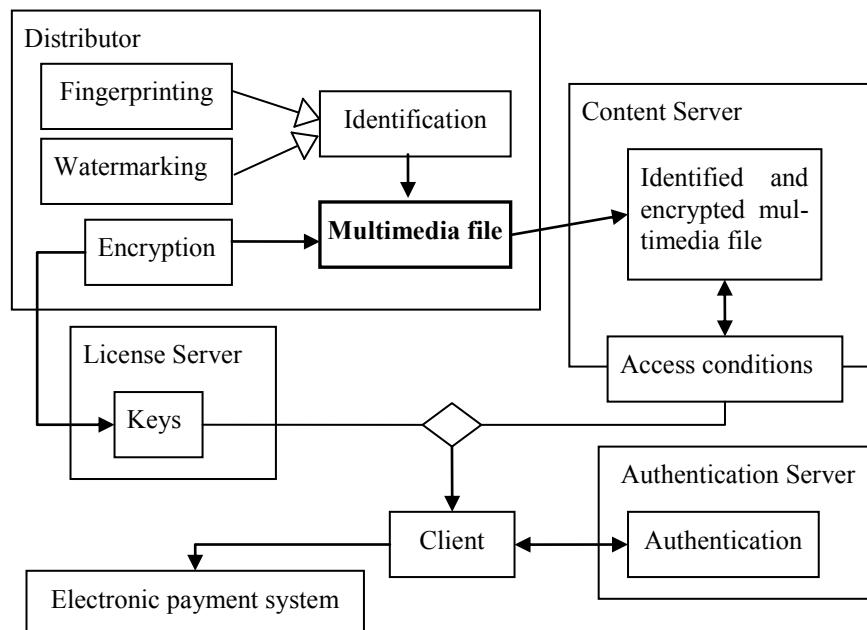


Fig. 6: Interaction between distributor, client and servers

The distributor denotes a multimedia file either through watermarking or fingerprinting. Then the file is encrypted using some encryption algorithm, which produces a key. This key is sent to the license server. The identified and encrypted multimedia file is sent to the content server. The separation of content and key here is an important security measure to avoid the risk of attacks. Every encrypted file is attached with certain access conditions. When the client wants to download the protected file, then it first needs the keys from the license server, which is sent only when the authentication process is successful. Secondly, the client needs to fulfil the access conditions, which in this case is a payment through the electronic payment system. Only if these conditions are met, the client can download the file.

5.1.2 Quality requirements for DRM

Implementing a DRM system with many stakeholders (artist, distributor, customer, credit card company etc.) requires a thorough analysis on the requirements of every party involved. Seldom do stakeholders in the value chain have the same objectives when it comes to the functionalities they like to see in the new system. Most of them are set against each other. One of the most common trade-offs is between usability and security, the former one important to the customer and the latter to the distributor.

Usability is in fact one of the key issues when it comes to a DRM system. Legitimate systems are competing with free (illegal) services that often offer an extremely user-friendly one-click downloading system. If DRM is supposed to have a chance against them, the user experience of downloading a song should not be much different. Same is the case with the usage of the song on different devices. Consumers tend to be sensitive on this issue as every action making them spend more time on the process of downloading or usage-related matter than on enjoying the content itself, is not attractive to them. So when designing a DRM system every aspect adding more complexity to the user side of transaction should be avoided.

Not only the user is interested in user friendliness, also the distributor should see an added value in using a DRM to distribute his/her products. Here it is more about efficiency (especially cost efficiency) than usability. If the costs of protecting the product is higher than the revenue generated by selling it, then something is wrong with the system altogether. Since the main attraction of the Internet as a distribution channel is the prospect to save costs on manufacturing and similar matters, the implementation and maintenance of a DRM system should not cause costs that undermine these benefits.

Cost is also an issue for the customer. New technologies are expected to offer better products for (relatively) lesser money. So when DRM is implemented, the costs should not be passed on to the customer, who certainly is not the party favouring this technology. Here also illegitimate systems offering free downloads are a serious threat since the customers tends to be very price sensitive.

Interoperability is closely related to usability as it concerns the usage of the content. Interoperability is needed to assure proper functioning of different file-types (mp3, wma, aac, mov, rm etc.) with different media players, be it software (Winamp, iTunes, Windows Media Player) or hardware (portable players like the iPod, Zen or Zune). From a more general point of view it is necessary for technologies of different stakeholders to interoperate with each other. Proprietary systems often cause vulnerabilities to interoperability as its often closed architecture does not work with another system. When considering all the different stakeholders involved in the sales of entertainment products a lack of interoperability ceases the chances of a successful DRM system. Thus it is necessary to agree upon a standard.

From an artist's or distributor's perspective security is an important issue for a DRM system. The Internet is an independent adequate distribution channel intended to generate equal amount of revenue as any other proper channel like physical CDs, so it requires the same level of protection from theft. Online music found on file-sharing networks can therefore either originate from a ripped tangible source like a CD or from legitimately bought versions from online stores. It is thus necessary to protect both versions. While the former is realized through implementing copy protection mechanisms, the latter is subject to "real" DRM methods. This includes measures introduced in the previous subchapter.

The delicate issue about DRM systems regarding security is that no system to date has proven to be unbreakable. As long as you are able to record an audio signal coming from the speakers of your hi-fi player no DRM can stop you from copying. So the basic concern is always to create a system where the effort to break it is higher than the benefit it brings. This not only refers to effort in time and technical skills, but also to the quality of the product. The version of a movie copied with a camcorder from the movie theatre has a big drawback in quality, which many may not be willing to adjust with.

To the customer the flipside of security is often privacy. This is again a typical trade-off issue. When implementing high security measures this also comes along with the possibility of collecting data about the customer and creating user profiles. Even though this creates chances for misuse, it is said to be the same as with any other technology. This perception should be communicated to the customers as well to increase acceptability of this technology.

5.1.3 Effectiveness of DRM

Putting DRM into the right picture is not an easy task. A lot has been invested into the research and a lot more has been written about it in the media. When summarizing the latest developments surrounding online stores it seems like DRM as a technology to protect mass media like songs and videos has failed to gain acceptance not only among the customers but also with vendors. Following a call by

Steve Jobs⁸ in an article titled “Thoughts on music” [Jobs, 2007] and many other online store operators to put an end to DRM-protected music, in April 2007 EMI announced to offer their songs without any DRM [EMI07]. Subsequently the other three major record companies followed this practice and by January 2008 Amazon was the first online retailer to offer DRM-free music by all four major labels [Gonsalves, 2008].

The shortcomings of DRM in short are the impossibility to guarantee an absolutely secure platform, extremely unpopular restrictions for the customers and an uneven support from hardware and software vendors.

It is understood that any copy protection measure can be broken by motivated adversaries, and if this is done by a small number of people, it is just a matter of time until the unprotected content gets distributed on the Internet, where it is available to anyone. The approach of this paper to concentrate on the economical perspective is exactly derived from this insight. Technical protection does not have the ability to invoke a sustained solution to the piracy problem as pirates breaking into systems tend to be on the same educational level as the creators of these systems and they are usually highly motivated. Napster was developed by a 19 year old college student. Jonathan James became famous for intruding into the computer systems of a “Defense Department agency that monitors threats to the United States from nuclear, biological and chemical weapons” as well as into the systems of NASA at an age of 16 [Stout, 2000]. Lot of hackers are highly talented juveniles with a bated sense for ethics. Breaking systems are a challenge to them and always will be. Apart from them, supporters of the open-source-concept or the free-software-idea are increasingly interested in preserving the Internet as an area of free information exchange, which means that they generally oppose any kind of restriction applied upon information goods.

Practically speaking, apart from a lack of absolutely secure systems, one of the main drawbacks of DRM systems is that the license evaluating engine is located on the user’s computer. This engine typically connects to a license server to evaluate the license conditions of a multimedia file. Since the user usually has full control over his/her computer, the evaluating engine has to be resistant against attacks. This can only be assured if the computer runs on a trusted platform. Even though attempts have been made to meet this problem with incorporating a Trusted Platform Module (TPM) into the computers assuring more security through hardware support for DRM, this approach by the Trusted Computing Platform Alliance (TCPA) has been widely criticized for opening doors for misuses, loss of privacy and a variety of security related issues [Kuhlmann et al., 2003].

Basically when acquiring a product the consumer is free to use it without any restrictions⁹. But when this basic right is circumscribed through measures considered

⁸ CEO of Apple Inc., the company behind iTunes music store.

⁹ At least to a certain extent. If you buy a car you certainly are not allowed to modify it in a way that would affect security on the road, but the basic usage of a car, namely to drive it anywhere anytime is usually never restricted.

as annoying then that product tends to become unpopular. This is especially the case when an attractive alternative is easily accessible, namely the pirated version of that good without any restrictions on it. Restrictions assumed annoying can be a song or a movie file not playing on one's portable player. Also when a song is not allowed to be burned on a CD to enjoy it in car or for backup reasons, then it restricts the usage in a way unknown till yet.

Mistakes have been made in communicating a somewhat negative image of DRM as a tool used to control users or make their computers vulnerable for attacks. The prominent case of Sony's DRM labelled as a rootkit in 2005 was just one such example [Halderman et al., 2006].

Finally, one should acknowledge that DRM did encourage innovation though. As already discussed in subchapter 4.3 controversial actions often result in creative reactions.

5.2 Piracy systems

The economics of digital piracy is based on the negligible cost for reproduction and distribution of digital goods. The perceived quality of a pirated good is in no way inferior to that of its original counterpart. Thus the incentive to pirate predominates the incentive to buy. Process-wise piracy is also much easier to handle than a commercial system, since the only concerns with the former are a) find a file and b) transfer the file from A to B. A commercial provider on the other hand has to acquire licenses from different labels, set up a pricing system, assure the availability and quality of files, take care of security issues and make profit at the end of the day. This complexity in the background has found its way to the customer through DRM, limitations in terms of copying and burning and incompatibility issues. A piracy system on the other hand lets you download a song or a movie and let you do whatever you want to do with it. No further complications involved. And, it is free.

The lessons to be learnt from piracy systems are the underlying simplicity in their approach in bringing content to the consumer. Their ingenuity in overcoming obstacles such as free riding or fake files deserves a more in-depth analysis of their architecture and way of functioning in everyday. The following subchapters introduce the most common forms of piracy models.

5.2.1 Peer-to-Peer

The most popular and successful way of pirating copyrighted content is achieved through peer-to-peer (P2P) networks. In contrast to content being downloaded from or uploaded to a server in a traditional client/server architecture, a P2P network is an overlay network that directly connects a client with another

(set of) client(s). By acting this way, content is directly transferred from one peer to another peer without anyone else (like an executive organization) neither effectively having the chance to know what files are being shared nor to prevent them from doing so. After the appearance of the first commercial P2P systems like Audiogalaxy and Napster in the late 1990s, developments in this sector are being pursued quite extensively. The below table is an overview of popular P2P networks, its clients and its characteristics.

Network	Characteristics	Clients
Audiogalaxy	Centralized P2P network with file discovery on websites → vulnerable to shutdown	Audiogalaxy Satellite
Napster	Centralized P2P network with a central server that handles discovering of files and users → vulnerable to shutdown	Official Napster client
Gnutella	Decentralized P2P network where every task is handled by peers → not very feasible as discovery was done through flooding which made the system not very scalable	LimeWire
Gnutella2	Hybrid architecture with supernodes handling most of the tasks. Multisource downloading possible	Among others Gnucleus
FastTrack	Encrypted P2P network with hybrid architecture similar to Gnutella2 (super-peers). Multisource downloading possible	KaZaA, Morpheus, Grokster
eDonkey2000	Hybrid architecture with a large number of servers handling the requests of the peers. Multisource downloading in arbitrary order	eDonkey, eMule, MLDonkey
BitTorrent	Hybrid architecture with	Official Client and a large

	.torrent files containing information about file lying on websites. Discovery of files happen on those sites. Multi-source downloading in arbitrary order effectively increases speed.	number of other clients like Azureus, BitComet, μ Torrent etc.
--	--	--

Tab. 2: Popular P2P Networks

Below is the basic structure of a peer-to-peer model as extracted from various file sharing networks.

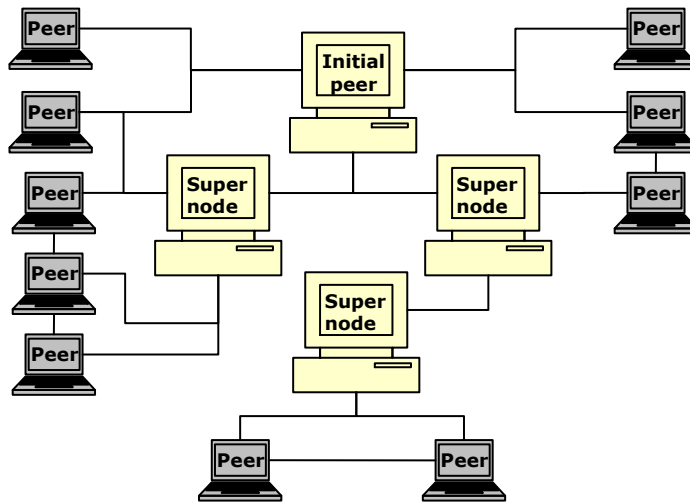


Fig. 7: Typical Peer-to-Peer Architecture

Basically any peer-to-peer network works similarly in terms of files being sent to each other. When a peer is found to have the requested file, it will be transferred directly from one peer to the other. The differences between the various protocols and generations lie merely in the way information about these files are distributed or found. While first generation peer-to-peer networks like Napster and Audio-Galaxy had a central server with information about the users and the files they were sharing, later decentralized peer-to-peer networks like Gnutella2 outsourced every task to its peers. Searching was realized through a flooding protocol. But this caused a huge overhead when the search was extended to more users resulting in enormous delays. So the next generation of P2P networks like Gnutella2 and FastTrack outsourced these tasks to so-called super nodes, which were peers with

better broadband connections. So this way they had hybrid architecture since they combined pure peer-to-peer paradigm¹⁰ with traditional client-server architecture¹¹ [Meshkova et al., 2008].

With increased availability of broadband internet downloading large files such as video files became feasible. Especially BitTorrent, a P2P system developed by Bram Cohen in 2001 to efficiently share large files, was discovered by the piracy community. BitTorrent uses tiny so called torrent files to store meta-data information about a file being shared. This includes the address of the tracker (which holds a list of users up/downloading this file), the file name, length and various other pieces of information to identify the file. These torrent files are stored on websites within a searchable environment. Once that file is downloaded and opened with the client software, the multisource download from other peers can start. Through slicing the file in pieces of usually 512 KB it can be downloaded in any order, which makes it very fast [BT09].

More recently, as a reaction to the pressure applied upon ISPs by representatives of the music and movie industry to reveal the identity of their users, more and more P2P networks are implementing mechanisms to disguise their users' identity. Freenet for example is such an anonymous P2P network. It adopted a routing mechanism that sends a file through a chain of nodes from the sender to the receiver where none of the nodes know who the original sender and who the final recipient is [Clarke et al., 2002].

Drawbacks and solutions

The whole principle of P2P file sharing is dependent on people sharing their files after downloading it. But due to various reasons it is more attractive to download something than to keep your computer open for uploads. One reason for this is that many have broadband connections with limited upload bandwidth¹². But heavy uploading can also lead to noticeable losses in speed while downloading or just surfing the Internet. Many other peers again are behind firewalls and NAT networks which often makes uploading difficult. Furthermore it is required to keep the files – often large movie files – on your hard disc for a long time, occupying space.

Someone who downloads but does not upload is called a leecher. This drawback of former P2P networks has been addressed in newer networks like BitTorrent, which implemented a tit-for-tat strategy to encourage users to upload while downloading, because only then their download will commence satisfactorily

¹⁰ sending files from one peer to the other without being stored on any server in between

¹¹ super nodes function as servers to normal nodes

¹² The A in ADSL stands for asynchronous, which means that the bandwidth for the download channel is much wider than for the upload channel.

quick [Li et al., 2008]. Free riding, which denominates the extension of the leeching problem when users decide to leave the network after successfully downloading, is another issue that affects the quality of the network. Some use access controlling mechanisms through demanding a minimum ratio – that is the ratio of downloaded amount to uploaded amount – of usually 1. That means that as long as you have not uploaded the same amount of data as you have downloaded, you are not allowed to download anymore. eMule has adopted a more permissive strategy by offering credits for uploaders. The more credits you have, the higher you will be located in the download queue of the next file [Kulbak et al., 2005]. The research on incentives to discourage free riding is continuing.

If the demand for a file decreases, then the amount of seeders – peers who have the complete file and are uploading it – also decrease with time. Hence rare files will not be available anymore and will be needed to be rereleased by someone again. This sort of disappearance of files from the network is a shortcoming of P2P networks because it is highly dependent on its users' contribution. The long tail of rare files may be listed on various networks, but their actual availability is again another issue.

Fake and/or malicious files have long been an issue on P2P networks like KaZaA or also BitTorrent. They have been circulated by affiliates of the music and movie industry to bring down the piracy networks. By uploading fake files with real sounding names the tactic was to annoy users so that they leave these networks. But various communities started addressing this problem by verifying the files uploaded. Again the mass phenomenon effect has proven to overcome such obstacles. KaZaA implemented a user voting system to determine if a given file was real or fake. Even though this was not very successful since the amount of people voting was not high enough [Liang et al., 2005], it utilized the users' cumulative power to address this problem. With BitTorrent this problem was more or less solved through volunteer moderators very effectively filtering out fake content before injecting it into the network [Pouwelse et al., 2005].

5.2.2 File Hosting Sites

Apart from P2P file sharing there are various other forms of file exchange. A popular way of sharing files, especially after trials against P2P networks, is through simply uploading them on file hosting websites, which usually offer a certain amount of data space for free (usually 1 to 5 GB).

Usually a user uploads files on one of these websites through a simple interface. Then, the link to that file is provided by the website. This link can then be shared among others, either through mails, instant messages, or as it is more commonly done, through forums. These forums are usually built around communities which have registered users who additionally engage in various discussions on that forum. To prevent users from simply taking the link to the file posted without contributing to the forum; these links are usually hidden in the first post in

a thread. The link will only be displayed upon posting a message in that thread. Sometimes it is also checked if the answer has a minimum number of characters (to avoid someone misusing this by posting just a couple of meaningless characters).

In the US these hosting sites are operating under the safe harbour created by the DMCA, which ensures that file hosting sites are not liable for the content uploaded to their servers by their users [Roettgers, 2007]. This will be explained more in detail in the next chapter.

There are a large number of services like this, the popular ones being RapidShare, Megaupload and Box.net. Their business model is based on the freemium model mentioned in subchapter 4.4, where basic services are free and for premium services you have to pay a fee. Box.net for example also offers an enterprise solution with document management features [Box09].

5.2.3 Usenet, IRC and private networks

File sharing is older than P2P networks or file uploading sites. Even before the Internet in its current form was proposed by Tim Berners Lee in the early 1990s there have been networks where people used to share their files. Usenet is one of them, developed in the early 1980s by students. It was mainly a newsgroup where people could post and read messages to various topics. But soon it was used to share pornographic pictures, software and later on mp3s and movie files. Today up to three terabyte of content is being traded on Usenet every single day [Roettgers, 2007]

Just like file hosting sites Usenet is also protected by the safe harbor granted by the DMCA in the US, so other than take down notices to which they have to comply, nothing much can be done against the files sharing happening here. In Europe, due to a lack of an equivalent to the safe harbor section of the DMCA in the US, there have been legal actions by the GEMA (Society for musical performing and mechanical reproduction rights) against Usenext, a commercial Usenet service operator [Roettgers, 2007].

IRC (Internet Relay Chat) was developed a couple of years before the Internet as a real time chat program for group communication in various channels. Later on various extensions were added, among which the direct client to client protocol enabled file sharing on IRC networks. The possibility of sending a file from one peer to the other was automated by the users through bots, which automatically sends the same file to thousands of users in a particular channel [Vamosi, 2002].

Since IRC differs from popular P2P networks in terms of user friendliness (very often the clients are just text based without a proper GUI) and a more geeky nature, it is by far not that popular with the mass, especially because many of those channels are exclusive and require a user to be invited. Still, currently there are around 800.000 IRC users worldwide [IRC09], out of which of course not everyone does file sharing. The actual number of files and their size is not known, but

it is suspected that many of the pirated content that land on torrent networks originate from IRC channels [Schliesel, 2004].

5.3 Conclusion

A basic overview of what DRM systems are and what they do was given here. After studying about their practical effectiveness one must come to the conclusion that *limiting* rights of consumers is not the ultimate solution to the piracy problem. History shows us that it rather motivates some of them to outperform in breaking the content industry's codes, no matter how advanced they are. One hacker with an Internet connection is enough to bring down any technical hindrance.

The second part of this chapter looked into the mechanisms of digital piracy. The peer to peer way of distributing content is the most prominent one. It is not only widely accepted by consumers, but it has a number of advantages compared to traditional client server architectures. You can share bandwidth costs and other resources like storage space and computing power with users. It ensures a high scalability and robustness in terms of redundant availability of files on client machines. Besides, a lot of research already has been conducted on this technology.

Even though P2P networks are the most known, studied and popular arm of the piracy community, the real drivers and leaders are sitting behind a less controllable and obscure part of the Internet in networks like Usenet or IRC, where the origins of many of the files distributed in P2P networks are to be found. This dark parallel universe of pirates has always existed, but it is only through the success of the Internet that it entered the mainstream. This may be an inconvenient side effect of the otherwise revolutionary concept of the Internet, but every obstacle that occurs is just another opportunity for innovation solutions.

The main lessons to be learned from the functionality of piracy systems like the ones described here are their simplicity approach (e.g. Napster with one system for searching, downloading and playing), cooperative development and maintenance (e.g. moderators in BitTorrent websites filtering out fake files; development of most file sharing programmes being a collaborative effort) and a passion in finding new ways of effectively sharing content across the world.

6 Legal aspects of copyright and piracy

The term “copyright” may convey the impression that it merely deals with the right to copy, but in effect it governs all rights of a creator over his/her works¹³. This includes the right to reproduce; to sell and make money out of it, to perform it in public or any other similar right. Any usage of the work requires permission from the copyright holder. The basic idea of granting copyright is to promote and acknowledge innovation and create an incentive to continue doing so. Usually copyrights are granted for a certain amount of years to allow the copyright holder to (financially) benefit from his/her creation. After that period it is transferred into a public good.

The first Copyright Act ever was the Statute of Anne [CH09], [Simons, 2003] passed in 1710 in the United Kingdom. It was the first time that creators of books, documents and similar works were granted rights regarding their works. Until then it was common practice to publish works of other people without obtaining their approval. The duration of the copyright was initially limited to 28 years (also depending upon if the copyright holder was still alive). In the United States the first Copyright Act was passed by the Congress in 1790 which was more or less identical to the one in UK. Even though it was extended regularly after that, the next major rework on it was passed in 1976, which represents the foundation of Copyright Law in the United States today.

The internationally most influential agreement on copyright was the Berne Convention signed 1886 in Berne, Switzerland, because it regulated copyright not only in one’s own country but also in other countries. This is of importance when works are published in other countries. Charles Dickens for example did not have any influence on the publication of his works in the United States prior to 1891, since there was no such bilateral agreement between the US and UK¹⁴. The organization administering the Berne Convention and several other internationally relevant treaties regarding copyright is the UN organization World Intellectual Property Organization (WIPO), founded in 1967.

The currently relevant Copyright Acts which will be looked into for the purpose of this work are the Digital Millennium Copyright Act (DMCA) 1998 of the United States and the EU Copyright Directive¹⁵ of the European Union from 2001. Unlike the DMCA the EU Copyright Directive itself is not a law but a guideline for its member states on implementing national Copyright Acts in accordance to this Directive.

¹³ The term “work” is used here for any type of creation, be it a song, movie, picture or any other copyrightable good

¹⁴ The United States joined the Berne Convention only in 1988.

¹⁵ Official name is Directive 2001/29/EC.

6.1 DMCA

An Act that created enormous attention in public was the Digital Millennium Copyright Act passed in 1998. It was an amendment of the existing Copyrights Act of 1976 to comply with the WIPO Copyright Treaty adopted in 1996. The two main parts of this Act relevant for his work are regarding

- (1) Circumvention of Copyright Protection Systems and
- (2) Online Service Provider (OSP) liabilities.

Since before the advent of online stores the origins of piracy lied in ripping of music CDs, lot of efforts had gone into implementing copy protection on CDs. Soon after their arrival CD ripping software available in the market were capable of bypassing this protection and allowing users to copy the contents of the CD to their computer. Later on, when digital files were sold, they were protected through various digital management systems discussed in the previous subchapter. This was an issue the DMCA decided to tackle and thus declared the circumvention of technological measures that effectively control access to a protected work as illegal [CL09a]. Secondly, the manufacturing or selling of a product primarily intended to circumvent technological measures that effectively control access to a protected work was prohibited [CL09b].

Now in effect there are a number of controversial arguments concerning these two statements. To begin with, there is a certain amount of ambiguity concerning the term “effectively”, which is not defined properly in § 1201 (3) (B), which says that

a technological measure “effectively controls access to a work” if the measure, in the ordinary course of its operation, requires the application of information, or a process or a treatment, with the authority of the copy-right owner, to gain access to the work. [CL09c]

This definition is merely a general statement to what access control means, but not to what “effectively” means in this context. So it can be speculated that a technological measure that can be circumvented by a widely available programme is not really effective [Simons, 2003]. Then, since according to the fair use section § 107 of the U.S. Copyright Law it is allowed to make copies of copyrighted material without requiring permission of the copyright holder for certain uses, the prohibition regarding circumvention is only applicable for technical measures controlling access to the work, but not for technical measures preventing copying of the work. So this means there is a difference between *accessing* and *copying*.

But this right regarding the circumvention itself is in effect abrogated through the extension of § 1201 (a) (2) with a more concrete definition of “circumvent a technological measure” in regard to the manufacturing of devices used to circumvent those technological measures in § 1201 (a) (3) which says that descrambling a scrambled work or decrypting an encrypted work also falls under circumvention. Since copying a copyright-protected work includes decrypting it, any device doing

this is prohibited. So even though copying itself is not prohibited, the use (or actually manufacturing or selling) of programs or devices which do the copying is prohibited, thus making copying in terms with fair use impossible. Thus, exemptions were included into the DMCA for purposes similar to those mentioned in the fair use section. Encryption researchers, law enforcement agencies, software developers seeking to achieve interoperability with other programs, non-profit libraries and various other people or institutions belong to the ones exempted from the restrictions.

Even though the U.S. Copyright Act grants a fair use “for purposes such as criticism, comment, news reporting, teaching [...], scholarship, or research [...]” [CL09d], the right to make a limited number of copies for personal, private use (i.e. to backup or to make a version for use in your car) is not mentioned anywhere explicitly¹⁶. The paragraph coming closest to this is § 1008. There it is written that “No action may be brought under this title alleging infringement of copyright [...] based on the non-commercial use by a consumer of such a device or medium for making digital musical recordings or analogue musical recordings.” [CL09e]. We will later see that this aspect is dealt with differently in other countries. In German Copyright Law for example it is explicitly mentioned that it is allowed to make a certain number of copies for private use [Juris09].

The second aspect of the DMCA interesting in the context of digital piracy concerns the liability of OSP regarding copyright-infringed material transferred using their networks. In the light of file-sharing networks being sued this section deals with circumstances when providers are not to be held liable for copyright infringement activities of its users.

Basically the DMCA creates a safe harbour for OSPs in a number of instances. This is necessary because due to the vast amount of data being transferred by millions of users through all kinds of networks, it is practically impossible for OSPs to monitor each and every file or action that happens on their networks. Thus, they need to be protected against allegations of copyright infringement from copyright holders as these things are beyond their control. First it is defined who is available for this exemption in liability and then the circumstances are detailed.

The circumstances mentioned include the transitory storage and transmission of material on or through the OSPs systems as well as routing and providing connections. So if for instance a file uploading site hosts copyright infringed material it is not legally liable. But of course the DMCA includes measures to protect copyright holders’ rights with the “Notice and Take-Down Provision” which states that the OSP is obliged to remove material from their system if they are noticed about that material being allegedly infringing. A prominent example for this practice is copyright holders asking YouTube to remove videos from their site that infringe their copyright. YouTube is in safe harbours according to § 512 (c) of the Copyright Act [CL09f]. Another case where this right was tried to use but not very success-

¹⁶ A corresponding entry is made for computer software though in § 117, Copyright Law of the United States

fully was when Napster referred to § 512 when RIAA sued them for copyright infringement. Napster claimed that they were not to be held responsible for the actions of their users. But a court ruled that § 512 was not applicable for Napster since the files transferred were not saved on their machines but instead were transferred directly from one user to the other. Even when Napster connects the users to each other, it occurs through the Internet. So subsequently Napster was found not to be an OSP as defined under § 512 [IL00].

6.2 EU Copyright Directive

Just like the DMCA, the EU Copyright Directive (EUCD)¹⁷ was enacted to comply with the WIPO Treaty of 1996. But unlike the DMCA the EUCD is a directive, which means that the member states that are bound to it are free to choose the means on how to exactly implement the directive into their respective national laws. Hence there are slight changes in the Copyright Laws of the member states.

Regardless of the various national implementations, the EUCD itself is an indicative set of directives worth examining in more detail. Especially compared to the DMCA it has been developed with more care to current issues such as technical copy protection measures and the right of a private copy.

The most relevant and discussed article in this directive is article 6. It makes remarks about the circumvention of effective technological measures. In article 6 (1) it says

Member States shall provide adequate legal protection against the circumvention of any effective technological measures, which the person concerned carries out in the knowledge, or with reasonable grounds to know, that he or she is pursuing that objective.
[Europa01]

Further in (3) the terms “technological measures” and “effective” are defined more in detail. According to that definition the speculation that was made in the case of the DMCA in the previous subchapter, namely whether a technological measure that can be circumvented by a widely available programme is effective or not, is obsolete. Article 6 (3) defines “effective” as *any* measure that is taken by the right holders to control access and copying of the protected work. This can be through encryption, scrambling or any other transformation.

Also the ambiguity that existed in the DMCA between “access control” and “copy control” is cleared here. Both are forbidden.

The most crucial point in copyright laws in regard to this work is the question about a private copy. The premise is the following: The right to make a copy of a work for a private and not commercially motivated purpose is allowed in the

¹⁷ Officially called “Directive 2001/29/EC of the European Parliament and of the council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society”

copyright laws of the member states of the EU. At the same time, as stated in the above paragraph, the circumvention of technological measures to make a copy is not allowed. So in effect, the right to make a private copy cannot be exercised because all ways to do so is prohibited by law. The EUCD therefore comes up with a list of exceptions, which are left to the member states to implement or not. In Article 6 (4) it says

A Member State may also take such measures in respect of a beneficiary of an exception or limitation provided for in accordance with Article 5 (2) (b), [...], without preventing rightholders from adopting adequate measures regarding the number of reproductions in accordance with these provisions. [Europa01]

Article 5 (2) (b) says so:

Member States may provide for exceptions or limitations to the reproduction right provided for in Article 2 in the following cases:
in respect of reproductions on any medium made by a natural person for private use and for ends that are neither directly nor indirectly commercial, on condition that the rightholders receive fair compensation which takes account of the application or non-application of technological measures referred to in Article 6 to the work or subject-matter concerned; [Europa01]

The right to circumvent technological measures and make a copy for private use is generally granted by this article, but it is left to the member states if they wish to grant this right to the beneficiaries or not. The German Copyright Law for example, which was adapted according to the EUCD in 2003, does not make use of this exception. In a press release of the German Justice Ministry in November 2007 it says that there is no right to have a private copy to the disadvantage of right holders [BMJ07].

The Austrian Copyright Law does not define any exceptions that shall allow the circumvention of technological measures to create a private copy [BKA09a] even though the private copy as such is very well allowed according to § 76 (4) [BKA09b].

6.3 Conclusion

This chapter dealt with legal issues concerning digital piracy. The two main foundations of copyright laws in the western world, namely the Digital Millennium Copyright Act and the European Union Copyright Directive were discussed in detail.

In contrary to the technical side, the legal side is a front where the content industry is fighting a much more prospective war. The introduction of the DMCA and the EUCD are indicators of strong lobbying activities that are able to change copyright laws in favour of the content industry. This is particularly alarming as in many cases this may undermine privacy protection. For example in France a “three strikes”-law is currently being discussed. If a user is found to have

downloaded copyright infringed material he/she will be warned three times, after that he/she will lose his/her Internet connection. A law like this requires a complete packet level monitoring of everyone's Internet traffic, which is not only a threat to privacy but also an immense organizational and technological challenge. Also, giving the right to an ISP to ban users without a court order is a violation of basic human rights of a fair litigation.

It is also yet to see how the lawsuit against The Pirate Bay, a torrent tracker website, in Sweden will affect future legislations regarding copyright. Despite being prosecuted the operators of The Pirate Bay have appealed against their conviction stating among other things that the judge was biased due to his membership in various organizations like the Swedish Copyright Association and Swedish Association for the Protection of Industrial Property [Kravets et al., 2009].

On the bottom-line, millions of people pirating despite legal threats may even be an indication for their wish for changes in law. A first step indicating this can be seen in the rise of the Pirate Party in Sweden which doubled its size after the verdict against The Pirate Bay [Sjoden, 2009].

7 Measures taken against piracy

When digital piracy started to arouse attention in the industry, it already had become a shadow world with a lot of members. Since the number of people involved in it rose exponentially, by 2002 there were already 4.5 million users in various file-sharing communities sharing their songs with each other [Gooch, 2003]. As already mentioned in chapter 4.1 it had become a mass phenomenon for which a cure was not easy to find. Especially the music industry, which was first affected, was overwhelmed by the sharp decline in sales in the beginning of the new century. Since the main organizations behind the music industry like the Recording Industry Association of America (RIAA), who represent the four major labels in the market, the Broadcast Music Incorporated (BMI) or the International Federation of the Phonographic Industry (IFPI) are established and powerful associations with strong influence in the politics through their lobbying, the initial reactions towards digital piracy were characterized through a tough line of legal measures against the culprits, who were soon identified. Only in a later stage the strategies seemed to broaden up and different ways of dealing with this problem were adopted. The following subchapters will give an insight into these strategies and discuss the effects and consequences of those measures the music industry applied.

The following timeline gives a chronological outline of the measures taken by the music industry to fight digital piracy.

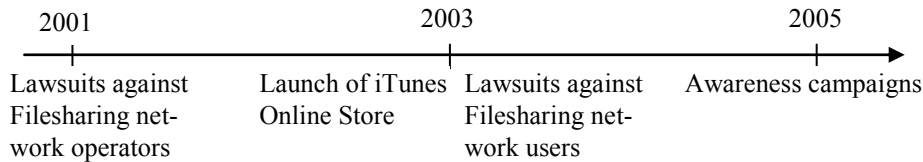


Fig. 8: Timeline of measures taken against piracy

7.1 Legal prosecution

One of the main instruments of action the music industry adopted against digital piracy was threatening with legal sanctions. These threats were initially pointed towards operators of file sharing networks, who in the first place facilitated the illegal exchange of copyrighted material through their programmes. Although the music industry was initially successful in suing these operators, they soon had to face defeat against more advanced file sharing networks. That was when they started suing individuals, who provided copyrighted material to the file sharing networks. It is interesting to note here, that in most countries, legally only the uploading of such files are forbidden, but not downloading.

The following subchapters refer to issues in the United States, which has taken up a leading role in fighting digital piracy. But most of the incidents described below have occurred in a similar manner in other countries too, like Germany, Austria or Sweden.

7.1.1 Campaign against file sharing operators

Like mentioned above, the first measures taken by the music industry to fight piracy were of an aggressive legal nature. The first prominent culprit to be sued was the operators of the then highly popular first generation file sharing network Napster. Napster was developed by a college student named Shawn Fanning and went online in June 1999. While studying computer science at the Boston University Fanning was in search of an easy way to find MP3s on the Internet. Since the results of the usual search engines were not satisfying enough, he decided to write a programme, which would enable anyone to access his hard drive, and vice versa to search for and download music files. This programme, named after his nickname Napster, was technically based on the peer-to-peer approach, where every computer or device connected to the network was a server and client at the same time. This approach, in contrast to the typical server/client network scenario, where the server provides the information for the requesting client, enabled a direct sharing of music files between millions of user all around the world.

Napster did have a weak point though, which was utilized by the RIAA to sue them. Even though Napster was programmed as a peer-to-peer system, it did have a centralized server, which was responsible for passing on the requests of the peers. When a user searched for a music file, that request was transported to the server, who looked up the IPs of the peers, which had this particular file and sent this to the client. Only the exchange of the file itself was in a peer-to-peer manner. So in effect, this central server had all the user account details, and more importantly, it also had a temporary index of the MP3 files being shared. Despite of Napster's claim that they were not responsible for the contents on their users' computers, RIAA was successful in their lawsuit, which led to the shutdown of Napster in July 2001.

The possibility to shut down a system like the one of Napster led to the music industries temporary success. The successors of Napster thus took care of that issue through implementing a decentralized peer-to-peer system, which was not possible to simply shut down. Also, there were no central servers, which hosted complete indexes or user details. This made it difficult for the lawyers of the music industry to successfully accuse these operators of copyright infringement. After all, the file sharing technology as such is not illegal. It is only accusable if copyrighted materials are illegally shared [Roettgers, 2003].

Since the sales were declining and legal sanctions against file-sharing operators were not fruitful anymore, the music industry had to change their strategy and

started legal campaigns against the end users. They were first threatened with prosecution and then officially sued [EFF07].

7.1.2 Campaign against individuals

The first declaration of the new policy, which intended the prosecution of individuals using file sharing networks to share copyrighted material, was announced by the RIAA in June 2003. Following a period of collecting evidence, the first lawsuits against private users started in September 2003. It was possible for the RIAA to collect information about these individuals on the basis of the Digital Millennium Copyright Act (DMCA)¹⁸, which had come into force in 1998 in the United States. RIAA used this act to issue subpoenas on Internet service providers (ISP), in order to get the names associated with the IP addresses they had collected. Since the issuing of subpoenas had been slipped into the DMCA in last minute, it had not been reviewed thoroughly under which circumstances it was applicable. The RIAA exploited this uncertainty when collecting the user data from the ISPs and could successfully start their suing process. The first 261 Americans to be sued from the RIAA from September 2003 onwards were not only college students, who were said to pirate extensively due to access to broadband internet, but also grandfathers and small children, who were accused of illegal use of file sharing networks.

In December 2003 a court decided that a subpoena under the DMCA was not applicable in the way it was now being utilized by the RIAA. Ultimately it was not possible anymore to match IP addresses with names from the ISPs. So the next move of the music industry was so called John Doe lawsuits starting from January 2004. “John Doe” is hereby associated to an IP address without a concrete name, which the investigators of the music industry had found to provide copyrighted material to file sharing networks. The difference of this practise to the one before is, that here a lawsuit is filed first in order to get the permission from the court to issue subpoenas to the ISPs, who only then had to provide the names of the individuals. Thereby the courts could function as a controlling organ.

In the course of their actions against individuals the RIAA in most of the cases followed a two-step strategy. The first step was an offer for an out-of-court settlement, which would cost the individual around 2.000 to 4.000 \$, sometimes even up to 11.000 \$ depending on the number of files he or she provided for sharing. If the concerned person agreed to the settlement, he/she had to pay the amount and approve to delete all the infringed material from his/her computer. If a settlement could not be reached, then the second step would be suing.

As one of the initial measures, RIAA had offered an amnesty programme called the Clean State programme, under which File sharers could come forward and admit their crime. If they signed a statement that they would refrain from further

¹⁸ See Subchapter 6.1

file sharing of copyrighted material, the RIAA promised not to sue them. The ironic part about this programme was that the RIAA was merely a representative of the real copyright holders (like the labels or musicians). So even if the RIAA desisted suing, their clients were not bound to this decision [EFF07], [Bhattacharjee et al., 2006].

7.2 Educational campaigns

Even though the timeline in figure 8 shows educational campaigns against piracy to have arisen around 2005, one of the earliest of such campaigns was the (in) famous “Home Taping is Killing Music” slogan of the anti-copyright infringement campaign by the British Phonographic Industry (BPI) in the 1980s. It was a reaction to the first tape recorders introduced by the end of the 1970s. For the first time in history it was possible for the end-consumer to record the music they had bought, copy it several times and listen to it whenever they wanted. When radio and television only enabled the “streaming” of music and film, which still bound the audience to certain times and restrictions, tape recorders in fact allowed it to use music completely free of any restrictions.

One of the first campaigns against digital piracy was launched by the German subsidiary of IFPI (International Federation of the Phonographic Industry) in 1999, titled “Das Ende vom Lied - copy kills music”. Since in summer 1999 file-sharing was not yet a big problem, this campaign was directed more at burning CDs on CD writers, which was said to have a shattering effect on CD sales in Germany [IFPI00]¹⁹.

Since then the music industry and the motion picture industry have launched one campaign after the other in various parts of the world. Most of them were accompanied by websites informing the public about the impact of digital piracy on sales and the future of this industry itself. Artists have been roped in to make statements about digital piracy and frequently asked questions sections about digital piracy have been published.

Listed below are some of the campaigns.

- **You wouldn’t steal a car:** This was a campaign by the Motion Picture Association of America (MPAA) launched in 2004.
- **Respect copyrights:** A campaign launched in 2003, again by the MPAA
- **Pro music:** A 2003 campaign launched by various coalitions and organisations like IFPI (International Federation of the Phonographic Industry), IMPA (International Music Publishers Organization) and FIM (International Federation of Musicians)

¹⁹ The original page is not available anymore. Retrieved from web.archive.org

- **Music united:** Launched in 2002 by various Associations related to the Music industry in the United States.
- **What's the download:** A campaign launched in 2004 by The National Academy of Recording Arts & Science (NARAS).
- **Respect our music:** A campaign launched in Japan in 2002 by the Recording Industry Association of Japan.

The various associations have made use of different strategies when creating these campaigns. The “You wouldn’t steal a car” commercial for example was of an aggressive nature. It showed, undermined with loud music and fast cuts, that one would not steal a car, a handbag or a DVD in a store, so therefore one should not steal movies from the Internet. It was also included at the beginning of DVDs sold to customers and could not be fast forwarded, which earned negative publicity. After all, people who had legitimately bought a DVD were forced to watch this commercial which was not targeted at them in the first place. Since the issue of file sharing is a passionately discussed one, this commercial also inspired several parodies on the Internet [YouTube07a], [YouTube07b].

On the other side, there are more subtle campaigns which combine the educative nature with information and pointers to legal sites and services, like the “What’s the download” campaign. Others like the Pro music campaign rely on constancy. Their website lists 39 campaigns for 15 countries aimed at schools as teaching material [ProMusic09].

7.3 Technical measures

Since the advent of the piracy problem the content industry has been trying to counter it on different fronts. One of them the industry concentrated on is the technical front, which was part of the reason for the enormous success of digital piracy. Even if it was the Internet – the creation of a network for everyone – that enabled large scale worldwide sharing of files, it was still the transformation of music and video to mp3s and avi files – the cost effective digitization of copyrighted content to free bits of data – that finally paved way for this online phenomenon. So, this is where the industry tried to put boundaries to digital piracy. They decided to protect their content from being transformed into free data streams.

In 1998 around 200 companies and organizations from various fields such as software, hardware, consumer electronics, ISPs and recording industry came together to develop a system to protect music from being pirated. This forum was named Secure Digital Music Initiative (SDMI). The main purpose of SDMI was to create a comprehensive protection system for digital content that should be implemented in every aspect of digital music, from production to distribution until playback. For this purpose they created a watermarking system that should be in-

corporated to every music file. When attempting to play a file like this with an SDMI certified player produced by those consumer electronics vendors participating in this effort, it would be examined if the file is a legal copy, only then it would be played.

To test this new system in September 2000 SDMI invited various hackers, cryptologists and anyone interested to a challenge. They were presented with four watermarking and two security related technologies. The challenge was to test the strength of these technologies by trying to successfully remove the watermark from the file, for which they had three weeks. Edward W. Felten from Princeton University and his group were able to defeat all four watermarking technologies though by doing so they supposedly damaged the quality of the audio file [Craver et al., 2001]. Still, under the constraints of having only 3 weeks and limited knowledge about the technology used, this effort proved beyond doubt that SDMI's protection system was vulnerable to attacks. In 2001 SDMI discontinued their work due to a lack of technological progress [Chiariglione03].

Nevertheless, efforts to incorporate a digital rights management (DRM) system into the digital music business were not suspended. But since vendors were not able to implement an industry wide accepted standard for DRM [Bremer et al., 2003], there have been at least three different popular DRM systems incompatible to each other among the online stores having over 1 million songs in their catalogue. The most widely used system is Microsoft's PlayForSure (which has been recently named into "Certified for Windows Vista" [Microsoft09]). Apple developed their own proprietary system named FairPlay refusing to license it to other vendors, and RealNetworks did their own research on Helix. Since the iPod grew to become one of the most popular portable players customers purchasing files encrypted with PlayForSure were certainly annoyed when those files were not playable on their iPods.

As already elaborated in subchapter 5.1.3 on the effectiveness of DRM, online music stores in agreement with the copyright holding record companies have already started abandoning DRM protected music from their stores, most prominently Apple in their iTunes Music Store and Amazon.

7.4 Conclusion

This chapter gave an overview of various measures taken by the content industry to fight digital piracy. This included both a "shoot and ask" strategy like the legal prosecution of file sharing operators and individual file sharers and various educational campaigns to raise awareness among people about the problems digital piracy is creating for the industry. At the same time another scene of battle was the technological aspect of the piracy problem, where copy protection producers and hackers were playing a cat-and-mouse game of creating/hacking the most effective digital rights management system.

Most of these measures taken by the content industry to fight digital piracy have not proven to be an effective one. While educational campaigns may still be a reliable means to at least raise awareness in the public, suing individuals as a form of deterrence has created more harm than benefit. Even if it might have threatened some individuals to refrain from digital piracy, due to the ridiculous way of its execution²⁰ it received a lot of negative publicity. Same is the case with the industry's attempt to implement digital rights management systems into the value chain of a digital product. Due to incompatibility among the various systems, the customer chose to pirate instead.

This being the case, it is increasingly necessary to adopt new strategies at a completely different level, namely at the business level. Business models that can seriously compete with piracy are to be found. Of course it lies in the nature of this subject that digital piracy cannot completely be wiped out, as it is like Pandora's Box: once opened, it is impossible to get back the contents back in the box. But just like hope lied at the bottom of that box²¹ there is hope that those customers who turned their back on purchasing music legally will eventually come back once the revolutionary changes that the Internet has brought have been adopted accordingly into legal services.

The reaction of the content industry to a threat like digital piracy was predictable and not very surprising. The same reaction was observed when the radio was introduced or recording of music and movies on tapes was introduced. Every technological development in the last century that meant a possible threat to existing business models was opposed vehemently. But the following chapter will show that the content industry is not totally resistant to learning. The advent of the Internet and file sharing networks certainly shocked them initially due to its magnitude which is at least theoretically not comparable with home taping. Since deterrence and limitations of rights have proven not to be successful the industry is constantly trying out new business models. Some of them will be discussed in the next chapter.

²⁰ Already dead people and minors were sued

²¹ Actually it was a jar

8 Economic perspective

The relationship between music and business in the modern sense goes back to the 19th century, when companies started selling music sheets for people to play music at home on their pianos. Even though a music playing device was absent in those days, it was the first time that music, which was formerly played only in churches and royal courtyards, was commercially brought into the private apartments. The industrialization had reached the entertainment field and the result was the addition of a business perspective to the artistic component in music. Along with the artist and his audience a third player entered the field: the distributor [Lyng, 2003].

When Edison invented his phonograph in 1877 the first thing he did was to acquire a patent on this technology. This allowed him to sell his invention for good money. Later on, when the equipments got standardized and easy to acquire, the demanding power of the manufacturers in the music business went back and the distributor, who took the responsibility of marketing and selling the music to a wide audience, gained more and more importance; even more than the artist himself. Since then it was said that “you [the artist] get the glory, we [the distributor] get the money” [Fisher III, 2004, p. 20].

The market segmentation in the early days was not much different from the oligopolistic structure today. After an initial phase of various companies coming up to produce and distribute music, by the end of the first decade of the new century, only four companies were capable of operating worldwide. Now, almost a century later, the music business is dominated by the “Big Four”, the major labels Sony BMG, Universal, Warner and EMI, who control 74,2% [Sabbagh, 2008] of the global recorded music market share.

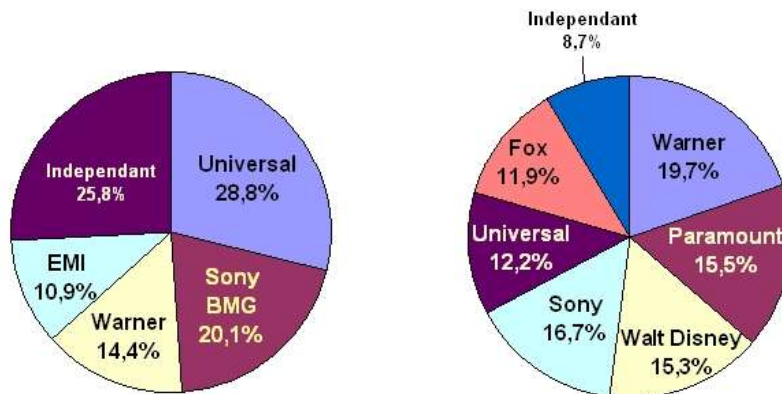


Fig. 9: Global recorded music market share 2007 [Sabbagh, 2008]

Fig. 10: US motion picture market share 2007, [Mojo07]

As already discussed in chapter 5, technical solutions such as DRM or any other type of copy protection systems have not proved to be an effective way out of the piracy dilemma. It is even encouraging piracy behaviour through the customer getting frustrated with copy protection allowing not to play a CD on the computer or through restrictions regarding the number of times an online bought music file is allowed to play on a certain player. Altogether it is a game of cat-and-mouse between the developers and the hackers.

The conclusion one can draw from this situation is that with the support of the findings from chapter 4, namely the motivation of the consumer to pirate, it has become necessary to look at the business side of the issue. If it is not possible to educate the customers through campaigns, if it is not possible to hinder them from sharing copyrighted media for free through technical solutions, then maybe it is time to rethink the way how business in the traditional sense is being run. It is time to find a new way of understanding customer needs and accessing them differently.

The following subchapters will try to give an insight into the business side of the music and the motion picture industry. This will help in understanding the different roles and practices in this industry and why it is not easy for them to change their business models within such a short period as the digital revolution took to shake the industry. After reviewing the business structure of both industries, the focus will shift to concrete business models. It will be shown how music was sold till now, which marketing instruments were used to promote singers, bands and movies and how an entertainment product went through the value chain until the end of its life cycle.

The next step will be an analysis and assessment of recently developed online business models. Since the introduction of the iTunes store by Apple in 2003 a number of similar online stores are available now on the Internet trying to gain importance in the customers' minds, thus shifting revenue shares more and more to this emerging digital market. According to the latest digital music report of the IFPI in 2008 already 20% of the total music market is digital (in 2007 it was 15%) [IFPI09], creating an estimated revenue of 2.9 billion dollars.

Since piracy is still going strong, existing online business models have not yet proven to be the final solution, even though they have been an important step in that direction. But there is still a lot more to come. Ongoing studies have identified a big potential in the digital market to increase sales and fight piracy. Therefore a number of the most promising business models soon emerging into the market will be introduced and discussed.

In the course of discussing business models trying to decrease piracy, the findings from chapter 5.2, namely that peer-to-peer technologies have predominantly enabled file sharing among pirates and still goes strong, will be taken into account. It has been an enormously successful channel of delivering digital media to potential customers, when looking upon it from a commercial perspective. Identifying the potential of this technology for legal online services will also be an emphasis of this chapter.

8.1 Business structure

The overall business structure of the music industry is way too complex to be treated here in detail due to an almost infinite number of participants starting from record labels to promoters to publishers through to radio stations, who all play different roles in the intricate world of the music industry. The situation in the motion picture industry is somewhat similar. One of the main reasons for this complexity is that these industries are historically grown. Many roles and processes have been implemented as workarounds to meet current challenges. For example record contracts still include a packaging fee which was first introduced in the 1960s when vinyl records were sold in cardboard slipcases. Even though jewel cases and booklets for CDs are a standard practise nowadays, the packaging fee still continues to exist [Roettgers, 2003], [Blanchette, 2004]. Same is the case with fees for new technologies such as the CD [Fink, 1996]. When it was introduced in the 1980s, it was argued that this fee was necessary due to the higher production costs of a CD, but these fees were never adjusted according to the negative inflation of CD production costs. Even today, when part of the sales is done online, musicians have to pay this additional fee.

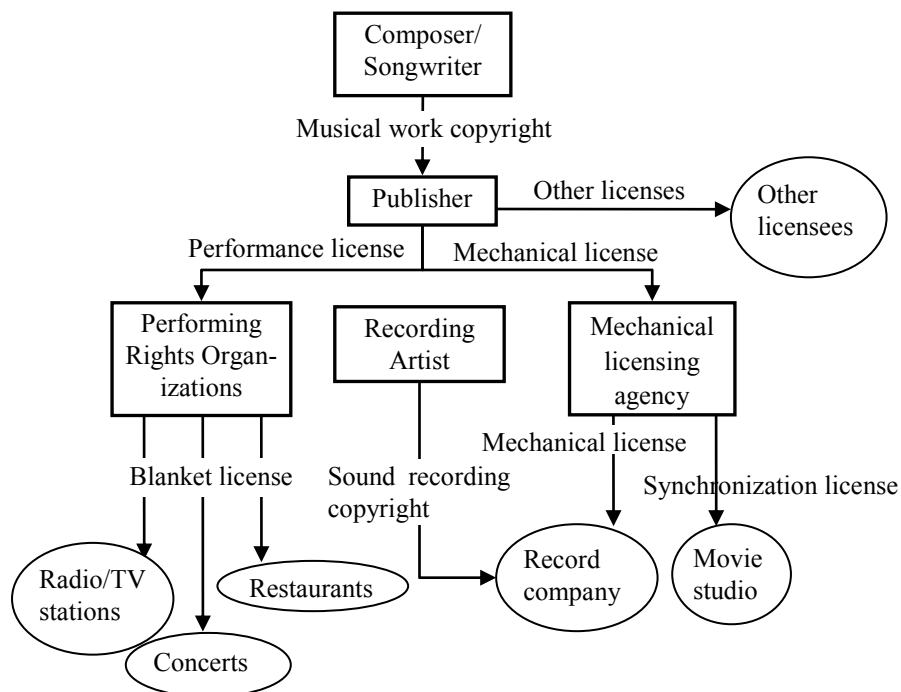


Fig. 11: Licensing system in the music industry [Fisher III, 2004], [Fink, 1996]

Another possible reason for the opacity of business practices in the recording industry is the variety of licensing channels. Music is very often used for many other purposes than to simply listening in the CD player or computer of the end consumer. It is used in movies, in jingles, in restaurants, aired on radio and TV stations, converted to ring tones for mobiles or written down on sheets for other artists to perform it. The right to assign these different licenses is in different hands. Fig. 11 gives an overview of the different licenses and licensors in the recording industry.

This is just a simplified depiction of the licensing system in the music industry. In effect, other licensees include any number of companies or organisations that seek to use a particular song or album for any purpose. When publishers are subsidiaries of record companies, this whole system of course changes according to that. Also, depending on the size and importance of various companies, negotiations can occur directly without middlemen agencies.

The performing license and the mechanical license are the two main channels of revenue for the publisher and the composer/songwriter. The latter usually gets 50% of the royalties the publisher gets from mechanical licenses. That makes up almost half of his revenues; the other half comes from the Performing Rights Organizations (PRO) for performance licenses. More or less same is the case with the Publisher [Fink, 1996].

Blanket licenses means that the licensees pay a flat amount for the complete catalogue of a PRO. PROs like the American Society of Composers, Authors and Publishers (ASCAP) or Broadcast Music Incorporated (BMI) in the USA charge around 1 – 2% of their gross income as blanket fee [Fink, 1996], [Fisher III, 2004].

Interesting to note is also the rights of the recording artist. For a long time in history, the recording artist was not assigned any copyright for his/her recording. After all, the creation of the song was done by the composer and songwriter; the artists were just rendering it. But later on they received their due recognition in the form of a sound recording copyright. Since this copyright is only limited to the recorded version of the artist on a “tangible medium of expression”, and not on the song itself, this copyright is usually handed over to the record company, which in exchange pays the artist royalties on sold copies of his recording. Chapter 8.2.1 looks into this matter in more detail.

The business structure of the motion picture industry is quite similar concerning the licenses. There are a lot more people involved in the process of producing a movie than recording a song, so this makes it quite a risky business, being the reason for ongoing bankruptcy and mergers. The overall structure is shown in the following illustration.

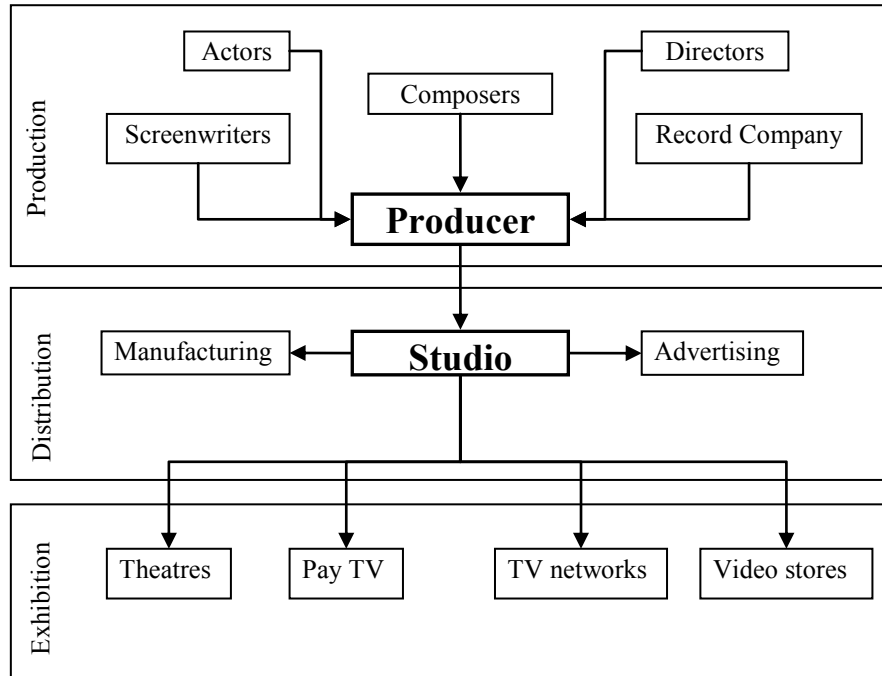


Fig. 12: Business structure of the motion picture industry [Fisher III, 2004], [Litman, 1998]

The main player in this structure is the studio that is responsible for producing and distributing a motion picture. While the producer deals with those, whose creativity is finally shown in a movie, the studio provides the financial backing while producing the movie and taking care of the business side, which is mainly manufacturing physical copies, promoting the movie and managing the revenues from various licensees. There are various revenue streams bringing in money at different time periods. Theatres are the first to exhibit a movie, thus they generate the first flow of income for the studio. Around half a year later the home video market is applied the license to release the movie on tangible media like a DVD. The next party to license the movie will most probably be Pay TV operators, who get the license around a year after the theatrical release. Again after a year only Free TV is allowed to show the movie on their channels. So altogether the exploitation period of a movie does not stop after its first release, but will continue for at last 2 years, generating revenue from different markets. Also, successful movies with potential for sequels and merchandizing possibilities again push further the level of income.

8.2 Business models

The term “business model” is a broadly used expression in the literature addressing a number of actions and processes of a company when doing business. Osterwalder defines a business model as “as an abstract conceptual model that represents the business and money earning logic of a company.” [Osterwalder, 2004, p. 15].

Simply put, a business model describes the activities of a company to attain revenue by selling a product or a service. It comprises of various dimensions, which put together, pretty well explains a business model. The following illustration is based on Osterwalder’s business model ontology. It outlines the basic structure of a business.

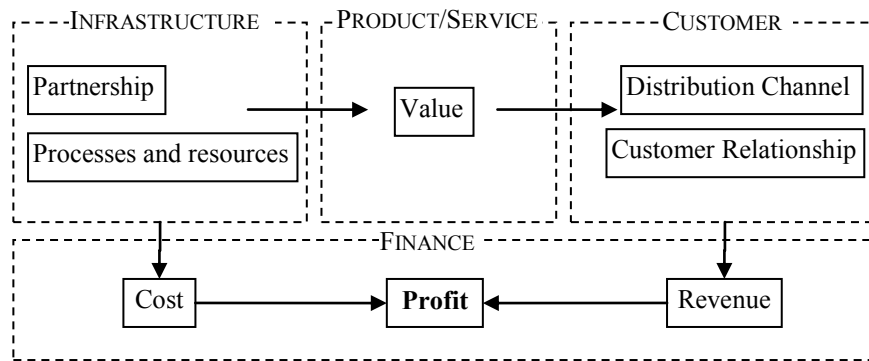


Fig. 13: Business Model Ontology [Osterwalder, 2004]

The above depicted ontology takes constructs into account which are relevant for a successful business model. The infrastructure block represents the processes, resources and partnerships which are needed to produce a certain product or service with a certain value. This product or service then has to be sold to customers, which includes activities to acquire, bind and satisfy customers. Marketing and distribution belong to this block as well as an effective customer relationship management. Revenue is collected from the customers and confronted with the costs that the production has caused. The balance between these figures represents the profit, and therefore the success of a company.

When producing and selling a certain product or service, the infrastructure plays an important role. Often a company is successful entirely because of its innovative processes, which may be their unique selling proposition. An example is Dell, who offers tailor-made computers and notebooks through direct-selling, without any retailers or physical shops in the supply chain. This helps them to concentrate entirely on the products and thus cut costs. Cooperation with other business partners also belongs to infrastructural benefits one can achieve when making the products competitive.

The right side of the model concentrates on the most important part of the business, the customer. Even if you have the best product, the success lies in the level of acceptance through the customer. When Apple introduced “Newton”, one of the first personal digital assistants in 1993, it was considered to be a quality product despite of some initial shortcomings. But apart from the core users of Apple Computers, the Newton was not entirely accepted by the majority of the consumers. It is said that Newton was ahead of its time, but fact is, if Apple had managed to convince the consumers of Newton’s extraordinary value, then they would have been the market leader in this segment. But instead, a couple of years later Palm took over that position with a device that was technically even behind Newton.

The value box in the middle of the model stands for the assortment and its quality. The importance here lies in the understanding of the market and its needs in order to produce exactly those products, which are successful. A product has a certain value, image and reputation attached to it, which can also help raise the appreciation level of the whole company.

The finance part at the bottom is equally crucial to the success of the business model. Profit, determined through the interaction of cost and revenue, is the ultimate goal of any business model. Cost is a variable which is addressed most when thrift matters. An often practiced cost saving method among software companies is outsourcing most of the testing phase to the customer. Especially when there is a dedicated community around a particular software, then it is not only reasonable to let them do the testing, it is also quite effective, in the sense that a big number of testers are more quickly able to find the mistakes in a software through thorough testing than a couple of software testers in the own company, who must be paid too.

Revenue addresses the key factor of earning money. Pricing strategies can be critical as well as revenue channels. When Google introduced their AdWord and AdSense programmes, the idea behind this system was to collect tiny amounts of money from a huge amount of people (companies). As already addressed in chapter 4.1, the mechanisms of a mass phenomenon is also applicable in this case. The revenue of Google with online advertisements is entirely dependent on the mere number of customers, who have found this model to be a lucrative business. Till today online advertisement is the core business of Google, which yields enough profit to finance all their other projects.

The following subchapters will try to assess traditional, existing and new business models for the music and motion picture industry.

8.2.1 Traditional business models

Even though music and movies are audiovisual experiences, until the advent of the digital revolution at the turn of the century in the music and motion picture industry, business was mainly done with physical goods. Creativity was recorded onto a physical media like cassette, CD, video cassette or DVD and sold to the

consumer. Of course performing artists often go on tour with their live concerts, which is another channel of earning. But the majority of revenue was collected through selling tangible media. The main characteristics of traditional business models in the entertainment industry²² are therefore mass production and distribution [Vaccaro et al., 2004].

This was accomplished through a set of partners, comprising of usually a publisher, a record company, media manufacturers, broadcasting companies and retailers. The traditional supply chain of a recorded song from the composer to the consumer with the typical roles associated to it is illustrated in the below depiction.

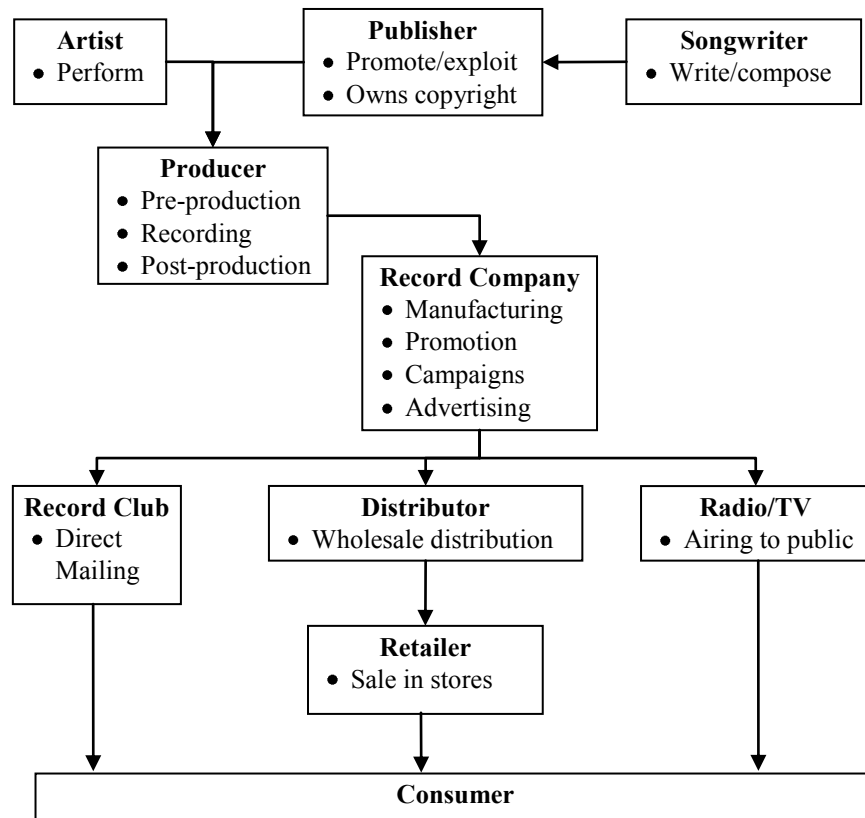


Fig. 14: Traditional supply chain in the music industry [Fink, 1996], [Vlachos et al., 2006]

The role of the record company here is more or less that of the wholesale producer and promoter. The first feature is inevitable when it comes to mass producing the CDs. The latter one is an often underestimated amount of work that a re-

²² Meaning the music and motion picture industry for the rest of this subchapter

cord company has to do in order to popularize an entertainment product. It should also be noted that in reality many of these different roles can be under the supervision of one company, mostly the record company, which has the resources to build up an own distribution subsidiary or publishing company. The producer also often works for the record company, even though still most of the records are produced by independent producers [Fink, 1996].

Radio and TV stations play an important role in marketing as they often function as street-hit makers through playing songs often in their channels, which helps boosting sales. Very often record companies have tried to influence radio jockeys through bribing them so that they play a certain song more often [Fisher III, 2004]. But in most cases they are described as lobby work.

When looking at such a business structure, the traditional business models associated to it become quite apparent. From a record company's point of view, their infrastructure is built upon rather costly equipments for disc mastering and CD pressing as well as on elaborate advertising campaigns to promote the product. Apart from that they depend on their business partners such as publishers, producers, distributors and broadcasting stations. It is a business of heavy interactions between a numbers of participants. Thus a lot of people are employed in this industry. They are often the first to lose their jobs when costs need to be cut due to losses in sales.

The product itself is partly intangible (song) and partly tangible (CD, booklet), whereby the intangible part is of superior importance. Creating value to a record involves a significant amount of creative work but also the right business instinct to recognize a sellable product. Typically 80% of the records which are sold in the market flop, but the remaining 20% that can be considered a "hit" bring in enough revenue to make music producing a profitable business [Anderson, 2006]. So, when the executives of record companies are offered demo tapes by producers or artists, he/she has to make sure that it has hit potential if they offer them a contract.

Marketing belongs to one of the major departments in a record company. As already mentioned in chapter 8.2 it is not only important to have a good product, but it should be communicated to the customer, who then decides to spend his/her money on it or not. Hence, a cleverly thought out marketing strategy is needed to achieve that goal. Since the music market is a multibillion industry with a lot of artists and bands, differentiation is a key word when it comes to the promotion of an artist. The Radio/TV block in the above illustration is only a simplified representative of the promotion part. Typically public relation works consists of various forms of advertising in print media, on radio and TV, arranging press meetings, shows and concerts, designing merchandising products and strategies and so on; so principally every activity that leads to a higher media coverage and thus popularity of the artist.

Other, more recent activities to raise the convenience of buying music was achieved through distributing free samplers of new songs or through facilitating free hearing in the store, so that the customer does not buy a pig in a poke [Fisher

III, 2004]. These initiatives were started by the record companies in the course of developing new strategies to meet the needs of their customers.

Not only campaigns to raise awareness of the product are deciding when it comes to sales figures, but also the way people can access it. The distribution channels are various as you can see in the depiction. For simplicity reason the retailer box was not further divided, because in effect there are various kinds of retailers that sell music CDs, not only the specialized music stores. Other than that concerts are another distribution channel which enables substantial revenue, even though it is not mainly the tangible CD being sold here²³ but a live performance. Even if the consumer does not directly pay for the music heard on radio or TV, the record company does earn their share here through giving away licenses to broadcasters. The benefit for the consumer in this case is (almost)²⁴ free access to music and movies. In fact, the music industry faced its first crisis when radios came up in the 1920s and threatened to run them out of the business. But eventually both compromised to co-exist with feeding different needs. While record companies still had the advantage of selling a big repertoire of products one could consume anytime, radios kept the consumers informed mainly about the latest hits and played mainstream music more often, which again stimulated more sales.

The revenue structure of such a ramified business model like this is naturally equally hard to see through. Still, there are some generally applicable figures available regarding this matter and this is shown in the following table.

Purpose	Percentage of revenue (~)	Price when total revenue is 18 \$
Retailer	39%	7 \$
Record company	53%	9.50 \$
• Salaries	• 14%	• 2.57 \$
• Artist & Repertoire expenses	• 5%	• 0.95 \$
• Marketing	• 8%	• 1.52 \$
• Manufacture, packaging	• 8%	• 1.42 \$
• Recording artist	• 12%	• 2.09 \$
• Publisher	• 4%	• 0.76 \$
• Profit	• 1%	• 0.19 \$
Distributor	8 %	1.50 \$

Tab. 3: Revenue structure [Fisher III, 2004], [Vaccaro et al., 2004]

²³ CDs are certainly offered for sale along with the concert

²⁴ Almost, because we have to pay a radio license fee, which is still low compared to purchasing records

Record companies often have an evil reputation because of the revenue allocation in their contracts. Generally they try to recoup most of their expenses on the royalties of the artist. So even if the recording artist in the above table is supposed to get 12% of every CD sold, after a series of deducting costs [Blanchette, 2004] for video production, manager's fee, legal advisor's fee, promotion costs and tour expenses (if applicable) then the net amount an artist receives is much less than someone working in the supermarket [Love, 2000], [Fisher III, 2004]. Very often it even turns out that at the end of the day you owe the record company money [Ian, 2002].

As we can see from the above analysis of traditional business models, it is very much dependent on a functioning partnership between a numbers of different roles, all pursuing their own objectives. Some are more powerful than others. Another characteristic feature is that this model is build upon selling a tangible good. It also assumes that, being the sole producer of these goods and through the mechanisms of scarcity, the producer is in full command of the price, and thus controls the offer. Also, the fact that the music industry is oligopolistic in its nature with a few powerful record companies dominating the market leads to an inflexibility and intransigence regarding the adoption of useful changes to the structures according to changing times.

It is not further surprising that the digital revolution, which paved the way for turmoil in the entertainment industry, will rearrange the power balance among the players in this field. Many old job profiles which were important earlier may become obsolete and others would come into the limelight more in the future.

8.2.2 Online business models

The title of this subchapter refers to the nature of the music and motion picture in the new century. The Internet has had a huge impact on entertainment goods, as it freed information from its physical body. It is not necessary anymore to manufacture tangible goods to transport information from the producer to the consumer. You can transfer the information as such in its purest form, in bits and bytes through wires or waves connected directly to the customer, wherever he/she may be situated. This demands for a rethink in the whole business strategy as the infrastructure of physical media and brick-and-mortar stores which the traditional way of doing business relied upon is more and more being replaced by the new possibilities of "faceless" transactions. On the producers part it should be assessed how to use the new technologies to reach your customer in a way which is most convenient for him/her. Convenience, or technically put, usability is a key issue when it comes to the rivalry between online stores and illegitimate filesharing programs. When it comes to acquiring something for free, then the user is willing to invest more time and patience in understanding the processes which enables him/her a

free consumption²⁵. But if he/she has to pay for it like for any other product or service in other markets, then it better offer at least the same level of usability as the filesharing programs or be even simpler.

As we will see later on in this chapter, changing from store to online store alone does not bring back the customer. It is important to utilize the potentialities of the Internet in a way that on the one hand it adds extra value to the customer and on the other hand saves cost for the producer. Business models in the online world should be flexible enough to change according to the technological developments which again influence the behaviour of the customers.

Basically, when looking at an ontology for online business models, the fundamental components are the same as with the traditional model described in the previous subchapter. There is still an infrastructure consisting of processes and partners, the product is still music and the customer needs to be wooed. The prime object of desire is still money making, and it still needs some money to be invested to make profit. The changes happen in the way these tasks are accomplished. Regarding infrastructure for example, process of mass manufacturing is dropped and the whole distribution system has entirely changed. The product is now almost entirely intangible even though one could add value with higher bitrates and booklets in some document format like PDF. Since the customer got exposed to a huge variety of different music through the upcoming of free music on the Internet, it has become more important than ever to offer services that meets the risen (quality) demands. Not only regarding the quality of the music, but also regarding the way it is made available to the public. Piracy is indeed a tough competitor here.

Apart from the fact that to sell music online you do not need to manufacture physical media, the main difference between a traditional and a current online business model lies almost entirely in the distribution and as a consequence of this also in pricing. The two most widely applied business models are the subscription model and the pay-per-track-or-album model (also called *à la carte* model). Various online stores found on the Internet today use one or both of these models with variations in the type of service that is offered. The following depiction outlines their distribution channels.

²⁵ For example, when using the BitTorrent technology to download a movie or any other files, one has to download a small torrent file from a tracker site and then open this file with the appropriate client installed on one's machine.

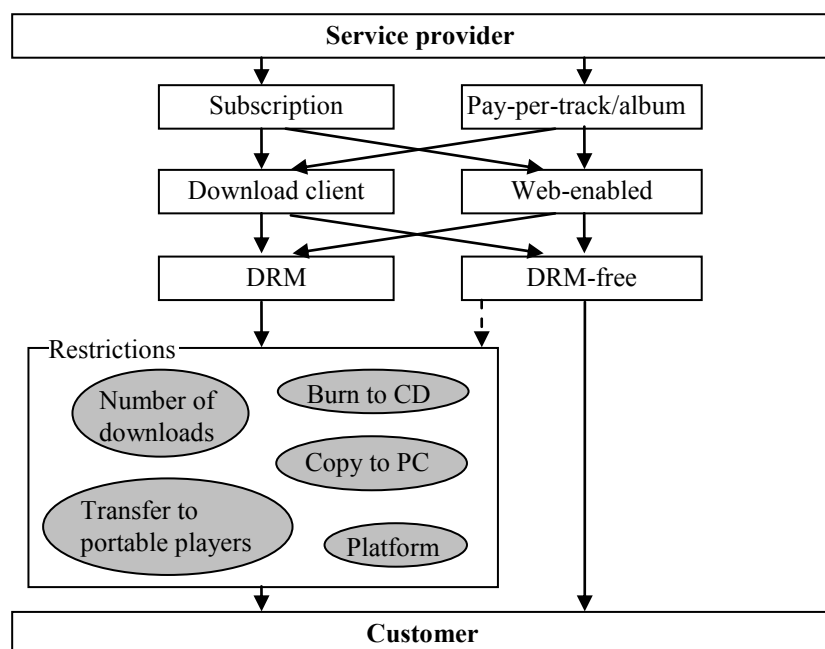


Fig. 15: Distribution part of current online business models

Current music online stores offering at least one million songs for download were analyzed to construct the above model. Most of them are only available in the United States and Canada. The situation in Europe is difficult for online music stores as licenses are usually sold country-wise. The European Union has not enabled a central licensing system for all its members, so stores seeking to offer its service in Europe have to negotiate with every member separately [Fisher III et al., 2004].

Subscription model

In the subscription model, which was the initial solution when online stores started coming up, the service provider collects a fixed fee from the users, usually per month. The service you receive in return can vary from unlimited access to the stores' catalog without any restrictions to limited online playing facility without the option to download the file to one's PC.

Most of the restrictions are enabled through the use of Digital Rights Management systems (DRM) such as PlaysForSure (developed by Microsoft and used by most of the stores), FairPlay (Apple's proprietary DRM) or Helix (by RealNetworks). These systems attach a license to every music file which then controls the activities of this file. The issuer of the license can restrict the number of times that particular file is allowed to copy or how often a certain compilation of songs is al-

lowed to be burned on a CD. Some stores couple the right to play a file with the membership period of the user [Spiralfrog08]. Other restrictions like the selection of a certain platform are often a consequence of the chosen DRM system. Buymusic.com for example requires the Windows platform, since it needs the Internet Explorer for users to download music from their store. Reason is that the DRM used needs Active-X controls to download the file, which is only available through the Internet Explorer. The latest version of this browser is only available to the Windows operating system.

Out of the analyzed online stores using the subscription model, only eMusic applies a restriction on the number of files allowed to be downloaded at a certain time period. This was installed in 2003, when eMusic had to realize that an all-you-can-eat model was not profitable anymore due to increasing costs and users downloading large numbers of songs [Borland, 2003].

Subscription fees vary from 5.99 \$ to 89.99 \$ per month, but most of the offers lie between 9.99 \$ and 14.99 \$. Customers can choose to pay via credit card or debit card.

Most of the stores require additional software to use their download service. It is supposed to simplify the downloading process, especially when any error should occur while downloading, for example a disruption in the Internet connection. In such cases, the software is able to resume the download. This software is supplied free of charge. The only web-enabled service from the ones tested was from Buymusic.com, which works only with the Internet Explorer though. Often such a client software functions as the license administrator like in the case with Apple's iTunes.

When it comes to pure subscription models, then chances are very high that the music offered will be secured through DRMs. Since subscription usually means unlimited number of downloads, securing the files from being offered on file sharing networks is a big concern of the stores and the music industry, represented by the record companies, who influence the models of the online stores when granting licenses.

À la carte model

Apple's iTunes store (iTMS) made this model highly popular when it was introduced in April 2003. Following its success, most of the online stores available today have implemented this system of paying solely for what you buy. The reason for the relative acceptance of this model can be seen as an answer of the music industry (even though it was Apple's idea) to the often voiced reproach that the customer is forced to buy a complete CD album containing only 2 or 3 good songs. So they had to pay the full price even though they did not want all the songs on the album. Singles being sold on the market however were massively overpriced compared to an album because its distribution cost was not much different from that of an album CD [Sprigman, 2006]. In the file sharing world on the other hand

mostly singles were predominantly available making it of course more attractive to the customer. Thus, when Apple introduced this model, it did draw a lot of attention among music fans, as they were now able to buy exactly those songs they wanted for a price of 99 cents per song. iTunes also offered full albums for 9.99 \$, which were cheaper than average CD prices in brick-and-mortar stores in those days.

The coup behind Apple's iTunes was that they managed to negotiate a different licensing model with the Big Four recording companies, namely a song based one. From each song sold for 99 cents Apple pays 75 cents to the record company and 5 cents to the credit card company, leaving 19 cents to them [Vaccaro et al., 2004]. Another source states that the credit card company receives 27 cents, leaving almost no profit to the service provider [Bockstedt et al., 2005]. Part of this deal was the implementation of a DRM system that restricted the use of the files downloaded. More recently however, online stores such as iTunes and Wal-Mart music have started offering DRM-free music, granting users full freedom in usage of the downloaded files. The effects on sale and the level of attraction for the user are yet to be found out.

Differences, benefits and shortcomings

The number of online stores on the Internet has grown significantly from less than 50 in 2003 to over 500 in 2007 [IFPI08] and the fraction of digital sales in overall sales is growing steadily over the past years. These developments are confirming the trend that a considerable portion of the music market is out there online. The currently available online stores are still in an experimental phase though, trying out different models to attract users to legitimate stores, away from piracy. The subscription model first introduced did not succeed well due to the restrictions associated with it, even though eMusic was quite successful initially when there were no restrictions on the number of downloads. The basic advantage of this model is quite evident though. For a fixed rate you are allowed to download as much songs as you wish, bringing down the cost per song far below the rate charged in the à la carte model.

The pay-per-track model on the other side managed to get popular despite having more or less the same restrictions as the subscription model. The idea of paying exactly for what you bought seemed to strike a spark with the customers. For a certain fraction of the pirating users 99 cents appeared to be an acceptable price for a song. But it loses when compared to an all-you-can-eat offer. Especially a fixed price for every song, regardless of its age and other aspects, appears to be inflexible and simply arbitrary. It does not match with the demand. Price discrimination would make sense here as evidently more people are willing to pay a smaller amount for an older song, but not the full 99 cents [Sprigman, 2006].

The success rate of the existing online stores is still modest, but not hopeless. According to the piracy report by IFPI an estimated figure of 20 billion music files

were downloaded illegally from the Internet in 2005 [IFPI06]. Irrespective of these and similar figures, the last boost to legal online music which reached the minds of millions was in 2003 with Apple's iTunes store generating sensational news of crossing more and more millions of downloads in lesser time periods. This indicates a lack in proper advertisement of the available services. On the other hand, file sharing networks always became popular through word-of-mouth recommendation rather than through lavish campaigns.

Another more reasonable explanation could be the still quite restrictive nature of these services. While file sharing users rarely bother about compatibility, usability and security of the files they download, paying customers of online stores need to check if the songs they buy will play on their portable player, how often they are allowed to copy a song to another PC (which is an extremely ridiculous thought to someone who is used to free music) or if they are allowed to share their songs with friends through burning them on CDs. There is high uncertainty regarding this matter, which is different from store to store. Until recently a song acquired from iTunes for example was only playable on iTunes or an iPod. Apple's proprietary DRM prevented the use of any other portable player. Similarly, songs from stores using Microsoft's PlayForSure DRM for their music files were not able to be enjoyed on iPods, the most popular portable player to this date. With more and more stores leaving the DRM model, these restrictions on usage are soon to fall.

Next issue is the pricing. According to a recent calculation by [Buxmann et al., 2007] upon an empirical survey the optimal pricing for a song would be at 37 cents. This price does not take into account the fees and licenses the music store owners have to pay to the record company and other organizations; nevertheless it is a strong indicator for the demand from the customers' side, who clearly asks for lower prices. The case of Allofmp3.com, a Russian online music store draws a similar picture. This store made it to the headlines for offering songs for a significantly lower price than its competitors. Since this site charged for the data being downloaded from their server and not specifically per song, the average price of a song was somewhere between 10 and 20 cents [Halpin, 2007]. But the crux of this offer was that Allofmp3.com was not paying any licenses to the (foreign) record companies. Instead, the Russian copyright law had installed collecting societies that gather the royalties from the store owners. But they did not mind to pass on that fee to the copyright holders. Hence, the music industry was not earning any money from this store. This loophole in Russian law was used by Allofmp3.com to legally do business in Russia. They explicitly cited on their site though that foreign users had to check with copyright law in their respective countries before using the Russian service [Crampton, 2006]. But this did not keep off foreign customers, especially from the United States to download vast amount of mp3s from this site and thus making it immensely popular. Ultimately though, it was a political decision to take the download service of Allofmp3.com off the net. The United States put pressure on Russia to close this site stating that it would otherwise be difficult for Russia to join the World Trade Organization (WTO) [Newton, 2007].

8.3 New framework and models

The previous two subchapters dealt with history and present. Both had their fair share of ideas and practices that served the purpose of making business with music and movies.

A completely different culture of consumption has arisen in a relatively short time period. Through the simplified access from so many different sources music today is almost a public good available in abundant supply. There is no need to search for it anymore extensively; you can hear it almost everywhere you are. Online radios, podcasts, social networks, online communities, online stores, file sharing networks, a vast amount of places and services are offering almost everything you desire to hear. Some of them are free, for some you have to pay, but the point is: you don't have to search for it long and you don't need to get out of your room to get it.

In a world like this business has to be highly flexible and far-seeing at the same time. It does not take much time for a new technology or a new service to gain popularity on the net. Again Apple's iTunes took only a single week to sell 800.000 songs [Apple04]. YouTube had more than 100 million videos being watched daily, just around a year after going online [USAToday06]. It took MySpace just three years to attract 100 million registered users to their network [Cashmore, 2006]. Most of these services owe their success to the enormously effective word-to-mouth publicity enabled through the strong networking power of the Internet.

8.3.1 Business model ontology as framework for new business models

The objective of this subchapter is to identify the lurking potentials of the Internet with new and innovative business models that could attract the attention of prospective customers.

But before thinking of a new business model for the music and movie industry, it appears to make more sense to first collect the requirements for such a model. These requirements will be added within the framework of the business model ontology by Osterwalder introduced in chapter 8.2. A particular business model will then be constructed with ideas taken from this framework using only those features that are applicable to it. The following depiction will include a methodological extension on Osterwalder's model by enabling it to be multi-party, meaning that the collected requirements belong to all stakeholders involved.

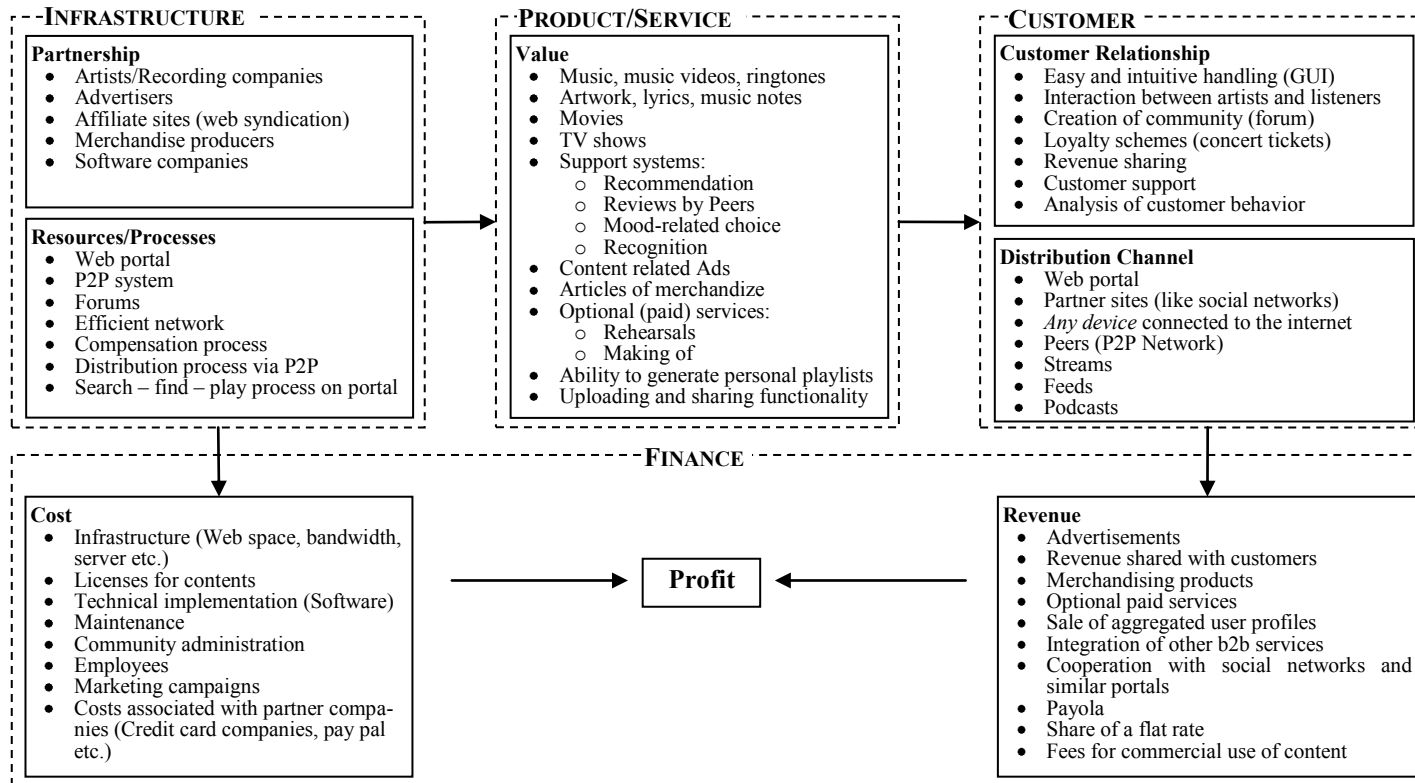


Fig. 16: A framework to construct new business model for the music and movie industry

8.3.2 e³value to model new business models

The e³value methodology was introduced by Jaap Gordijn and Hans Akkermans in their paper Design and Evaluation of e-Business models [Gordijn et al., 2001]. The focus of this methodology lies on the value transfer between stakeholders involved in a business case. The following depiction explains the notation.

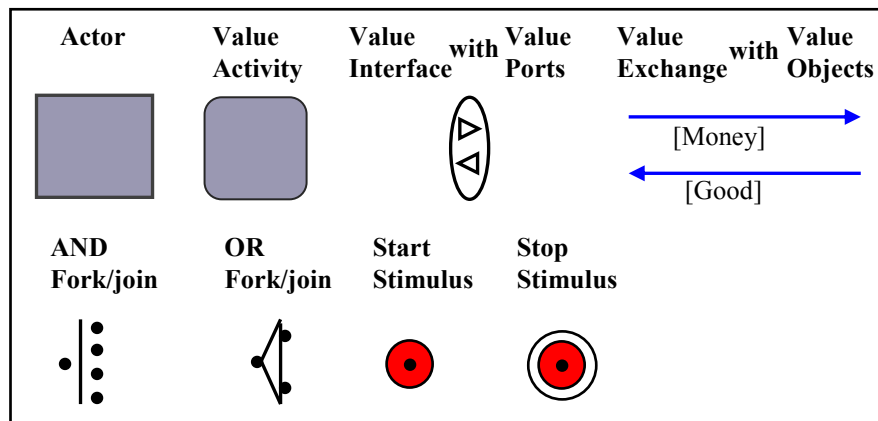


Fig. 17: The e³value notation

An actor is any stakeholder involved in the business case. A value activity is an activity that creates a certain value. Actors exchange value objects through their value interfaces, which at least have an ingoing port and an outgoing port. The AND/OR forks and joins are used to calculate different paths a value transfer can take. Every model has at least one start stimulus and one stop stimulus which is necessary to model a complete path.

All the models presented in the following subchapters will be modelled using the above presented e³value methodology so that an overall comparison is easily possible. It should be noted that many of these models are still quite experimental and need to be verified through empirical analysis and prototyping in the real world. Primarily it is intended as food for thought rather than tried and tested solutions.

8.4 Providing added value

The perceived value of a good determines its demand. If a product is perceived to have a superior value, then the customer is more likely to acknowledge this by compensating the effort. Mechanical production of non sustainable art is more likely to be rejected.

In order to successfully compete with free services it is necessary to offer products and services that offer more value. This value can be created through intangible experiences when using the service like an appealing interface, a better usability or a prompt responsiveness when selecting what to play. Also supplementary merchandizing goods like t-shirts, posters or price reduced concert tickets can add value. Any kind of annoying restriction on the consumption quality is to be avoided.

Assisting the consumer in discovering content is the next advancement which can be achieved more effectively through the possibilities of the online digital world. What retailers in other fields like Amazon or any review-based store has already implemented can be fruitful for the entertainment industry too. An intelligent recommendation system that suggests music or movies based on various factors like already consumed items, personal mood or recommendation by others helps reducing the time discovering the correct content. When the task of filtering out the right songs and movies, traditionally executed by record companies and movie producers, are to be replaced by a more independent consumer choosing from a vast amount of content available nowadays, then new mechanisms like the above mentioned systems are necessary and desired.

Again YouTube is a good example for how consumers remain stuck to the page when watching videos. After or even while watching a video, other videos, with similar content (realized through tags) are recommended. After watching a clip of a phenomenal goal by a football player, the user's interest to watch more similarly spectacular goals by that player is awoken. Thus it is more likely that he/she will stay at the site and watch more videos. Also, through a fuzzy matching algorithm, not only goals of that particular player but maybe spectacular goals by anyone will be recommended leading the user to spend more time with YouTube. The importance of marketing "low level" content like small clips, TV shows or serials efficiently to the customer is increasing. The Internet can be utilized as a means of secondary exploitation after broadcasting on TV [DCIA05]²⁶.

Musicoverly is a service started in 2006 offering streamed music according to the mood of the listener. Energetic, positive, calm and dark are possible moods to choose out of, and together with a classification according to release decades and genre, the probability of discovering unheard and exciting songs are pretty high. Furthermore it is possible to choose exclusively for dance numbers. Hereby it is even possible to choose for faster or slower dance numbers. Premium members (those who have made a free registration) have the possibility to generate personal playlists with favourite artists and songs [Musicoverly09].

Music discovery is related to similarities among titles. The more characteristics of a song are saved through a tag system or anything similar, the more accurate the similarity searching algorithm will be. For instance if in dance music the tempo, the type of beats and the continuity of beat-portions are captured, then finding similar titles will be more easy and precise. A service currently only available in

²⁶ NBC has already tried this partially

the US due to copyright constraints is Pandora, created by the Music Gnome Project. The technology behind Pandora is an ambitious music analyzing tool which is fed with more than 400 attributes (or genomes) of each and every song. These attributes are captured by humans in the first place and then added into a database. Equipped with this information the tool can then search for similar songs more accurately [Pandora09]. Apple's Genius tool incorporated in iTunes since version 8 does a similar job, but it only compares metadata saved in the files, which are less accurate.

Shazam is a service that helps identifying music through acoustic fingerprints. Users of this free service can capture music they hear anywhere with their mobile devices and Shazam delivers them the title, album, genre etc. of that song and/or links to stores where you can buy it. Meanwhile this service is available on various devices like the iPhone, Blackberry or Android [Shazam09].

All these systems mentioned here are relatively new developments meant to assist the consumer in finding the most suited content. They all can help add more value to the whole experience of consuming entertainment goods.

Interaction is an important feature for new age customers. It is one of the main reasons for the success of web 2.0 applications. When everywhere else content is created and consumed by everyone, with a commercial music and movie service this should not be different. This is not only a chance for new musicians and filmmakers to get a platform to exhibit their works but also to fill the service with more and more content which may not be available in the market anymore. Especially in third world countries the master versions of a lot of old recordings have been lost or are undiscoverable, therefore they cannot be bought from anywhere. On Gracenote, an online music database, there are almost 100 million tracks listed without claiming to have a complete collection of all songs in the world [Gracenote09]. The iTunes Store reportedly has around 10 millions songs, which would be just 10% of that incomplete collection listed on Gracenote. Therefore the sharing function is essential to raise the number of songs in the catalogue.

Now the following subchapters will take a detailed look into seven new business models that could be successful in the presence of existing technologies and consumer demands.

8.5 A superdistribution based peer-to-peer model

In 1990 Ryoichi Mori and Masaji Kawahara proposed a new system for selling software. It included distribution, digital rights management and payment for software. Here is their definition:

Superdistribution is an approach to distributing software in which software is made available freely and without restriction but is protected from modifications and modes of usage not authorized by its vendor. [Mori et al., 1990, p. 1]

Mori's prime strategy was to distribute the product for free by anyone without any restrictions, but control its usage through DRM by collecting a fee. For this he had proposed an extra digitally protected module, which would track the usage of the software and thus calculate the fee.

Now this idea of superdistribution has been picked up by researchers trying to apply it onto any digital content, especially with mobile devices. [Cattelan et al., 2006] came up with a prototype for a mobile digital content trading system that allowed users to buy and sell songs through their smart phones by engaging in a bargaining. There would be a minimum price that will go to the copyright holder, and everything above that would be negotiated by both parties.

[Kostamo et al., 2007] studied incentives for digital content superdistribution again in the mobile network domain. They identified a push and a pull type superdistribution, the former meaning that the song would be actively sent from the seller to the buyer while the latter type means that music is being downloaded by the buyer. The studied objects (a group of students from Finland) stated that music and video files were not attractive content to be consumed on mobile phones. Instead they preferred services like location or address finder and email. Note that this study was conducted in 2007, before the advent of iPhone and similar devices that incorporated the consumption of entertainment goods usefully into mobile phones.

Sophie Ahrens and Behrend Freese conducted a thorough study on superdistribution with a focus on social networks [Ahrens et al., 2008], [Küpper et al., 2007] – among people you personally know, friends and acquaintances. It was discovered that trade among friends was not a viable option, since friends are used to share their content without expecting (monetary) remuneration for that. Also any form of restricting DRM, like the limitation to play the songs only on one device was perceived to be a hindrance in enjoying the service. Furthermore a technical and business viewpoint of superdistribution was offered, which covered various scenarios of marketing methods and protocols and network types for the implementation.

The main two works though relevant for this paper are by [Schmidt, 2008] and [Quiring et al., 2008]. Both of them independently proposed ideas of how superdistribution could function for digital content on any platform. The ideas described here will be based upon those thoughts and further extended.

8.5.1 Motivation

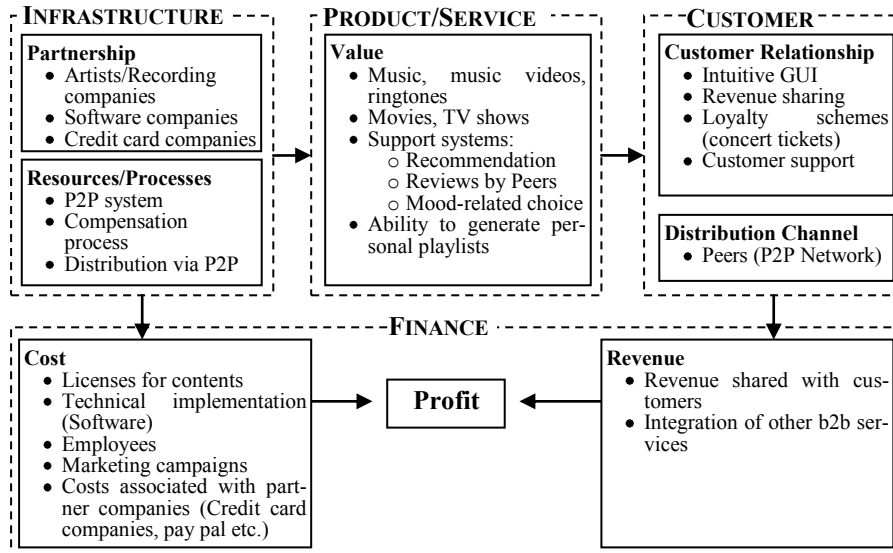


Fig. 18: Superdistribution based P2P model in the context of the BMO framework

In a nutshell, here is the proposed system: It will be a P2P application that offers digital content. There will be an original seeder²⁷, the provider, who releases a copy of a particular content (song, movie, TV show etc.). This file can be downloaded by the members of this application for a certain fee x , which also entitles them to resell that file for the same fee x to other members. The fee x which the uploading member receives from the downloading member will be split between the uploader and the original provider. By having the right to resell a file, every downloader automatically becomes a retailer. The contract between provider and member will produce a bill at the end of the month with a listing of bought and sold items. Depending on their activity the members can end the month with a surplus, which means that even though they paid for their content, by reselling it, they not only got that amount back but also made a profit.

²⁷ A seeder in a P2P Application is someone, who has the complete copy of a file and offers this to others.

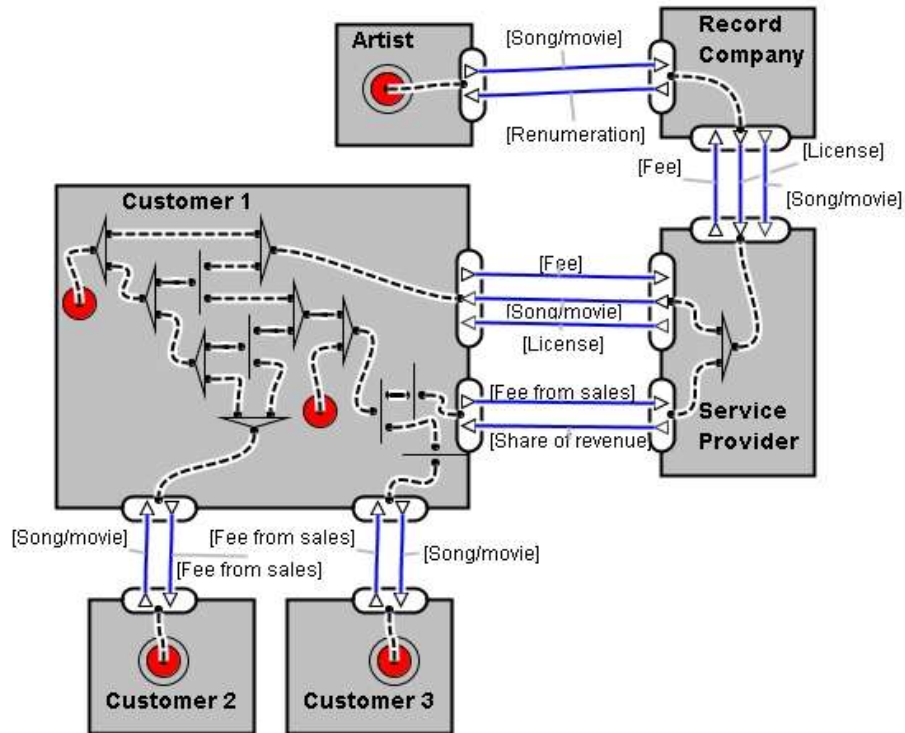


Fig. 19: The superdistribution based P2P model

The above depiction is an e³value model of the superdistribution based P2P model dealt with in this subchapter. It shows the interaction between the stakeholders involved. Customer 1 can buy a song or a movie from a service provider or from another customer (in this case from customer 2). Furthermore customer 1 is also entitled to resell a song or a movie to another customer (in this case to customer 3). The AND/OR forks/joins in the customer 1 block regulate the following 4 possible cases:

- 1) Customer 1 buys a song/movie from a service provider.
- 2) Customer 1 buys a song/movie from a service provider, sells it to customer 3 and receives a share of revenue from the service provider.
- 3) Customer 1 buys a song/movie from customer 2.
- 4) Customer 1 buys a song/movie from customer 2, sells it to customer 3 and receives a share of revenue from the service provider.

Furthermore it is also possible to bring in content from outside of the system, which can be CDs you bought earlier or mp3s downloaded from anywhere else. This is depicted by the second start stimulus joining the OR-join in the middle of the block.

Every value-path starts with a start stimulus and ends with a stop stimulus. In this case there are three value-paths, the main one going from customer 1 through service provider and record company to the artist. The other two paths end with customer 2 and 3. It should be noted that in reality customer 2 and 3 has the same possibilities as customer 1, but due to simplicity reasons in illustrating the model, only their seller and buyer roles respectively are modelled here.

The architecture of this system (Fig. 20) will be characterized through thin clients. The complete logic of file and transfer management and of course billing lies with the provider. The client has to be thin in order to avoid any type of manipulation on it. In subchapter 5.1.3 one of the main drawbacks of any DRM system was identified as the evaluating mechanism sitting on the client machine. Similarly if the client software in this system is alone responsible for the calculation of transferred files and their percentage, then this is a source for possible deception.

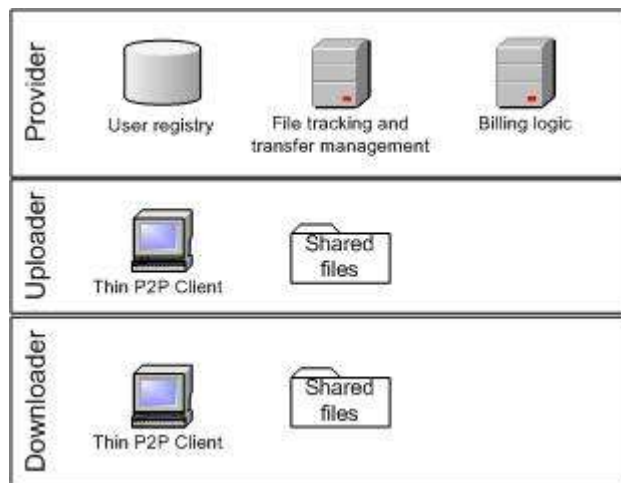


Fig. 20: Rudimentary architecture involving participants and systems

The motivation behind a system like this is to attract consumers to legitimate services with the possibility to earn money by doing so. Imagine buying a song, listening to it and ultimately not liking it. In that case, the feeling of having wasted money on it need not come up because by reselling it, you gain from it.

The following subchapters will look into more details.

8.5.2 Peer-to-Peer based distribution

The Internet auction company eBay accomplished the remarkable task of bringing together a selling party and a buying party directly on one online platform. They act as an intermediary to enable this transaction, but the communication between

both parties is left to themselves. eBay remains more in the background and let its users do the work (= create traffic).

When looking at peer to peer distribution, then the principle here is similar to the one with which eBay works. In a P2P network content is being sent from one peer to the other, from the one who has it to the one who needs it. The intermediary in this case is the software developer who enabled this by providing the software which everyone uses to share, comparable to the portal of eBay where everyone login to trade. The important difference though is that the tasks of finding, downloading and playing files are executed using the resources of the peers involved, and not of any intermediary. The collaborative effort of the peers ensures the proper functioning of this system.

Among the innovations that digital piracy has brought, the one in distribution was highlighted in chapter 4.3.1. The distribution of digital content through peer to peer networks brings along a number of significant advantages to both the content industry and the consumers, which makes it a highly considerable channel of distribution in future.

- A highly scalable architecture which makes it more efficient than client server architectures → better user experience
- Share costly resources like bandwidth, storage space and computing power with consumers → low costs, so lower prices for consumers
- Reproduction, distribution and to a certain extent even marketing is being outsourced to the consumers
- Content volume increases with everyone sharing their libraries → Long tail gets longer and available to everyone
- A lower barrier of entry for prospective online content providers through use of open source software → more competition
- Additional services like chat or voice and video chat can be added (Skype uses P2P) → user gets more services

Subchapter 5.2.1 has elaborated on the shortcomings of the P2P model such as the leeching problem or the free riding problem and what has been done to oppose them. This system provides monetary incentive for users to keep on uploading their files.

In the system proposed here, digital content will be distributed through a P2P system in a multisource download fashion like with BitTorrent (see Fig. 21). This means it is a many-to-many sort of distribution where the downloader downloads the same file from many uploaders and the uploader uploads the same file to many downloaders at the same time. So in order to calculate the revenue of the uploaders involved for a given transfer, the exact amount of their data uploaded should be tracked on a byte-level. With current P2P systems this is already partially possible. Vuze, a BitTorrent client, offers a piece map view of a file transfer, which shows which pieces of a file are being downloaded at the moment and which are missing. When this information is attached to the individual peers uploading the

file, you can get an exact picture of how much of a particular file you downloaded from how many uploaders.

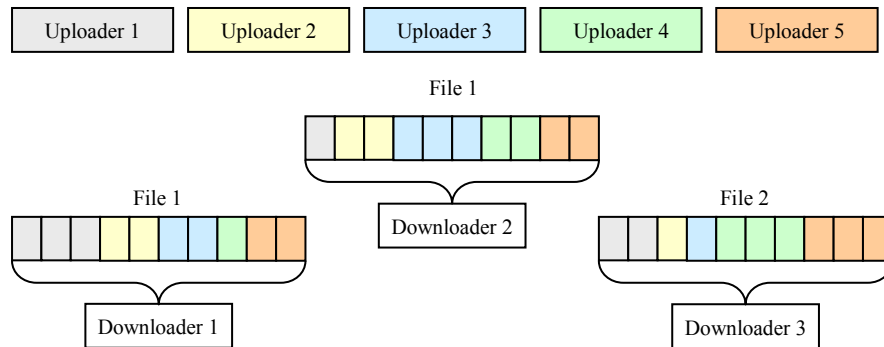


Fig. 21: Multisource download scenario of two different files

In order to track the downloads, every file should be identified with a marker. If a certain file is not marked – this means it cannot be read by the system – then revenue cannot be claimed for the transfer of that file. But, the motivation and intention behind this system is to capture every single file transferred, identify it, and to arrange it so that the legitimate copyright holder receives his/her share of revenue. With old and rare files copyright holders may experience an unexpected new wave of revenue and the collection of files in this system will be expanded regularly; especially files that are not available in the market anymore.

As detailed in subchapter 8.4 there are already systems available like Shazam that identifies a given track by analyzing it. By doing so, details like title, album, interpret and copyright holder can be detected and the song can be automatically marked with a unique identifier, thus enabling it to participate in the system. This can also be conducted as a community effort in carrying together information about any given song on the planet and thus enabling the preservation of the cultural heritage of mankind²⁸. Or as Fred von Lohmann puts it: “[...] if we want to build a Library of Alexandria for our global musical heritage, it’s the file sharing fans that will build it for us.” [Von Lohmann, 2008, p. 1]

The identifying markers in the files should not be mistaken with some sort of a DRM to control or limit usage. On the contrary, only with those markers will the remuneration system work, which is the main attraction of this model. It should not even be publicized as a marker to avoid resemblance with various watermarking technologies, but more as an embedded tag, which does not collide with the standard tags of a song file which are editable through most of the players. The files traded through this system are free of any limitations or restrictions concern-

²⁸ See www.malayalasangeetham.info for details about a cooperative project to collect and display relevant information about the film music industry in Kerala, India.

ing its playback, modification or any other action. Just like it is with the case of the free but illegal versions in current file sharing networks. As prioritized in 8.4 the perceived value of the legal good should in no case be below those of their illegal counterparts, instead even higher.

In the working environment then, the decision of who to download from should be taken differently according to two given scenarios.

- 1) When the file is widely available (say more than 100 seeds) then it should be allocated fairly among them. This is done so to avoid discrimination of peers with lesser bandwidth, who would otherwise shy away from the system due to a lack of prospect to generate revenue if peers automatically download from peers with a higher bandwidth and thus a shorter download time.
- 2) When the file is not so widely available anymore²⁹, and when allocating fairly would cause a reduction in quality of service (for example slow bitrates) then, those with the best upload capacity should be chosen. Possessing rare files leads to the prospect of getting a bigger share of revenue than with popular files, since you do not have to split it among many uploaders.

8.5.3 Revenue splitting through superdistribution

The main motivation or incentive for consumers to participate in this system is quite simply the prospect of earning money. Take eBay: After it started off as an auction portal for anyone with equal rights, as time passed on, smart businessmen realized the potential of eBay as a means for a full-time retailer job. These “PowerSellers” as they are called in eBay are often few-people-companies making \$1.000 to \$25.000 revenue per month [Holden, 2006]. They are quite important to eBay as they bring in most of the revenue and thus enjoy a priority position among other users.

Now drawing an analogy of this situation to a P2P system, the supernodes and super-peers that form the backbone of any hybrid P2P system like KaZaA or BitTorrent can be seen as the PowerSellers of eBay. They serve as mini-servers for hundreds of ordinary peers in their neighborhood and therefore bring in more resources to the system.

Focusing on the revenue made in a system like this, the following depiction gives an overview about the money flow in this proposed system for a rather simple scenario.

²⁹ either older or rare tracks, or high quality versions which are big in size and due to that may have a lower demand

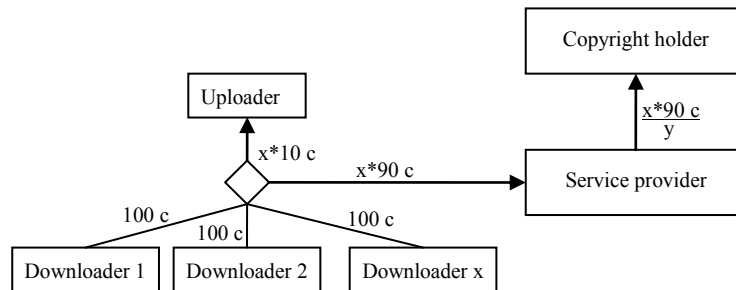


Fig. 22: Revenue model for single source download

The above model is quite simple in its approach. It is assumed that multiple downloaders download a file from one single uploader. Each downloader pays 100 cents³⁰ for the download. Out of this, 10% goes to the uploader, the rest to the service provider, who will then share it with the copyright holder according to the agreement in their contract.

In a torrent type multisource download system, where a file is downloaded from many uploaders, the revenue for a single uploader will be according to the amount of data he/she has transferred in that particular transaction. Say a file was downloaded from 10 different uploaders with each of them providing 10% of the file. This would mean in our above model that a single uploader will earn 1 cent from that transaction, while the total price for the downloader and the total gain for the service provider remains the same.

The actual price for a song and the percentage according to which the revenue will be shared with the uploader – in Fig. 22 10% – will be some of the instruments a service provider can vary to gain customers. Just like mobile phone network providers work with various packages of rates and included minutes, an entertainment provider in this system could offer packages with different revenue shares and homogeneous or varying prices. It is also possible to apply price discrimination in this system as it is already done by iTunes since recently. This can be useful when first releasing a song or an album. The provider could supply “early adopter”-fans with a different, higher price and then subsequently reduce it according to the demand. The incentive to be an early adopter is the prospect of being among the first uploaders for a certain song and therefore larger revenue.

The billing system will also be similar to the one of your mobile network provider. At the end of the month (or any other time period) a bill will be issued stating the money you spent for downloading and the money you earned through uploading. The balance can be either positive or negative, depending on your activities.

It should be noted that this system of calculating the revenue would run completely automatically without active involvement by the user. At registration you

³⁰ Price was chosen merely for demonstrative purpose.

either give your credit card details or a bank account for the money to be withdrawn by the provider. After that, there is no need to look into that matter anymore. You get a detailed regular bill, which displays your activities.

8.5.4 Challenges

Now this system of buying and reselling content and that too through different retailers on different systems may seem too complicated for the average citizen. But complexity is reduced through the automatic calculation system. So suppose I like popular music, classical music and Indian music. Then I will subscribe myself to 3 retailers by downloading their system or even using a standardized one (similar to Trillian, which is an application that connects to various other instant messengers. So you do not have to use multiple instant messengers. In this case a popular player like iTunes or Winamp could be extended with a peer-to-peer functionality). After registering with each retailer it will be possible to find any file I want on these three systems. A real-time billing system can also be implemented by the retailer like the mobile network provider Orange does it. When you log on to your account on their site, you can monitor your current activities like called minutes and their cost.

Superdistribution is not to be confused with a pyramid scheme, which is a non-sustainable and illegal business model popular in many countries. A pyramid scheme works with provisions paid for every participant who manages to recruit more participants into the game. By doing so, he/she will earn a share of his/her recruits' share. This can go up to many levels down the lane. This model will not work in the long run because those at the lower end of the tree will not have the chance to make money because there is no one left to recruit. In this system on the other hand, if you are at the last receiving end of a file and have no prospect of selling it and making money (because everyone else on the planet already has it), there are still a lot of other files in the market where you can get into the chain earlier. So the losses you make on one file can be compensated through the profits on another file. In other words, every file is a pyramid of its own and there are millions of pyramids out there.

Imagine a scenario where power users will try to benefit from this system by just downloading popular songs en masse because they know that it has a high demand. So that would mean that they download it not because they wanted to listen to it, but just for making money. This practice will be relativized by the system itself because the more people do this, the less money each individual can make at the end.

Manipulation

One of the central requirements for this system to work is that the file transfer management system cannot be manipulated by ill-affected consumers. Since there is a chance of making money through this system, the probability that someone may try it is quite high. This is the reason why the P2P client software on the consumer's machine has to be as thin as possible leaving no room for deception.

You have a peer-to-peer network with the provider having a server for the file transfer management and for the billing. Now what the file transfer management server does is the following. As soon as the downloader and the uploader login in to the system, establish a contact and start transferring a file, both clients send information about the transfer to the provider's server. The downloader clients inform the server about how much he downloaded a certain file from which uploader, and the uploader client does the same.

Assuming that no one hacks the server of the provider, the weakness of this system would then be the client machines itself, because someone could modify the client to send the server wrong information about the transfer. Say the uploader claims to have uploaded more than what really was the case. Then, for everything the uploader claims there has to be another side, which is the downloader's side. So if both numbers don't match, then someone is cheating.

Now let us assume the downloader modifies his client to tell the server that he did not download anything or much less than what the other side, the uploader, claims. In that way he would get a particular file for free and can then sell it through the system. By doing this he does not have any initial investment and the first cent he gets from his first downloader is already a profit. Now the server checks both sides, notices a discrepancy but does not know who cheats. Now when looking further at this case, the downloader will most probably offer the same file to others to make money. If someone downloads that particular file from him, he actually reveals to the system that he has this file, which he first claimed to have not downloaded from the uploader before. This of course does not prove that he cheated because he can still claim that he got that file from outside of the system, which can and will not be verified. But when he keeps on doing the same for multiple files, then the suspicion that he is cheating will naturally get more substantiated which can lead to the provider warning him or even banning him from the system altogether.

Now if it is the other way round, if the uploader modifies his client and claims more than what he has sold to his downloaders, then the server will try to find out who is cheating through checking the downloader first. If the downloader actually has acquired a full copy of that file and this can be verified through the file transfer management system and the payments he has made, then he is not guilty, which means that in this case the uploader must be the cheater.

Of course we can think of more complicated scenarios where a group of up and downloaders work together to cheat the system. But here too, by monitoring the cases long enough the server should be able to track down the cheaters.

A completely different issue is the risk of creating a parallel piracy world which would adopt the same monetary mechanisms of this system but excluding the copyright holder or any other retailer. By doing so, users of this system would have the possibility of earning more money than in legal systems. So this could actually enable a hardcopy-type piracy in the online world, which would be quite a disaster.

This illegal counterpart would have a weakness though. Since people have to transfer money to each other, this could be easily traceable by an executive authority since such money transfers will have to involve banking institutions. It can be safely assumed that trying to participate in a system like this would be too risky and not feasible enough for the majority of users.

Free content

A not negligible factor in this model is that in contrast to many existing systems like Last.fm or YouTube there is no free content available for the consumer, which can be a drawback. Despite having money as an attraction to participate money also has a flipside. The free culture on the Internet has been existing too long to draw people away from it. So it may be useful to adopt a freemium model into this model, comparable with iTunes' new app store for the iPhone. There you have apps that are free, which draws the customers and then apps where you pay a little. So people who actually are already there and using the free apps, might think every now and then to buy a nice app if it costs only less (like 2 or 3 \$). So in our system then user generated content like offered on YouTube could be exchanged free if the user that generated that content wishes to do so. Same could be even the case with content where the copyright holder was unable to locate.

People can share whatever they feel like, not just copyrighted content. As long as no one claims copyright for a given content, it is free to share. And through bringing in content that they did not acquire legally they are actually making it legal because if someone downloads that illegal copy of yours the copyright holder gets his due and this makes that copy legal. Of course if someone does this one a regular basis, namely getting thousands of songs for free from a free file sharing network and then bringing them into this system, that would again reduce the system to absurdity because as soon as more people start doing this there would not be anyone to generate the revenue by actually buying the content. So again, the mechanisms of this system would again eliminate or at least reduce such scenarios

8.5.5 Discussion

In its organizational structure this system will not be any different from the existing one. The content industry (= music and movie industry) will provide retailers with the license to distribute music to their customers. These retailers will be those

who offer the customer their system, a peer-to-peer system for example. Let's say Vuze (formerly Azureus) is a retailer now. They offer their software to the customers with a certain price and percentage scheme. Those interested will acquire it, install it and start using it. It would be like some mobile phone contract. So Vuze will have a certain catalogue, which they will get from the industry to certain prices. Now me as a customer can conclude various contracts like this with as many retailers I want. Because not every retailer will be having every song I need in their catalogue. Some retailers may diversify themselves through offering specialized content, like classical music only, but then the depth of their catalogue will be deeper, and thus serving a completely different market.

But no matter if a certain song is available from different retailers; it will have the same identifying marker everywhere, so that it is ensured that the appropriate rights holder will get his remuneration.

The preservation of the current system with the record labels and their representatives re-strengthening their power and position may seem like a step backward because the same dinosaurs that have ruled the industry with an iron fist until now will continue to do so and most of the artists will remain stuck in their adhesion contracts. But then, it need not be like that. The artists can gain back their power by becoming independently active in this system. Just like with any online forum, he/she will have an audience of millions waiting to listen to new music or watch new movies or video clips. If the artist is able to market himself effectively, then success is assured.

It is important to note that this system does not actively prevent illegitimate file sharing by making non-marked files vanish. Creative minds will find a way to remove the marker from the file and freely offer it for download in other P2P networks (or even with the marker). This would then be piracy as it is currently being done. Now the point here is that a parallel file sharing world with songs and other contents being shared for free can and most probably will always co-exist with legal alternatives; just like it has always existed, even before the advent of the Internet and file sharing networks. As long as there are people who believe in altruism and free music, there will be a platform for them to engage themselves in free exchange. But the systems like the one discussed here are rather meant to create incentives for non-ideological file sharers to re-integrate back to the legal market by offering them ways to minimize their expenses for entertainment products or to even earn something through acting as micro-retailers. From a macro perspective, for a system like this to function, at any given time one portion of the users will pay and the other portion will earn. But the good news is: Anyone can earn.

To again stress a point, it is similar to the eBay scenario. You make money on eBay by selling your old belongings, which you otherwise would have thrown away or given to the charity. In most of the cases you will not make more money than what it cost you to buy it in the first place. So it is merely a loss-minimizing strategy. In effect this is also the case with this system. Depending on the price strategy it is yet to see how many customers will end up effectively earning money. But the point here is to keep the spending as low as possible and determin-

ing this lies alone in the decision power of every individual customer. Also, for those buying on eBay the incentive is to get something cheaper than what it cost in the market. But then, usually they are buying second hand goods. And even if it is new, while auctioning for it, it happens often that at the end of the day you buy it for a couple of Euros more than what you would have paid for it in the market.

This system is also in alignment with the trend of Web 2.0 with an actively interacting consumer at the same time providing and consuming entertainment goods. Therefore it is conceivable to allow users to upload their own content, which could be used by new bands and artists to directly distribute their music among the people. To what extent this potential can be utilized in a platform like this, needs to be examined further in a more detailed work in future.

To conclude, in this system there won't be any restrictions on what you do with the file. Just like in the old cassette days you still have the possibility to make copies of it, for your car, your mp3 player, for your friends or for whatever reasons. This means that the ability to pirate is still there, it has not vanished, you could even do it like you did it until now, by choosing a file sharing system where you get it for free and where you give it away for free. But now, with this new system, an incentive has been created for these people to participate in a system where

- Artists get paid for their effort
- You can earn money on it (or lose only little)
- And it is completely legal

8.6 A peer-to-peer streaming model

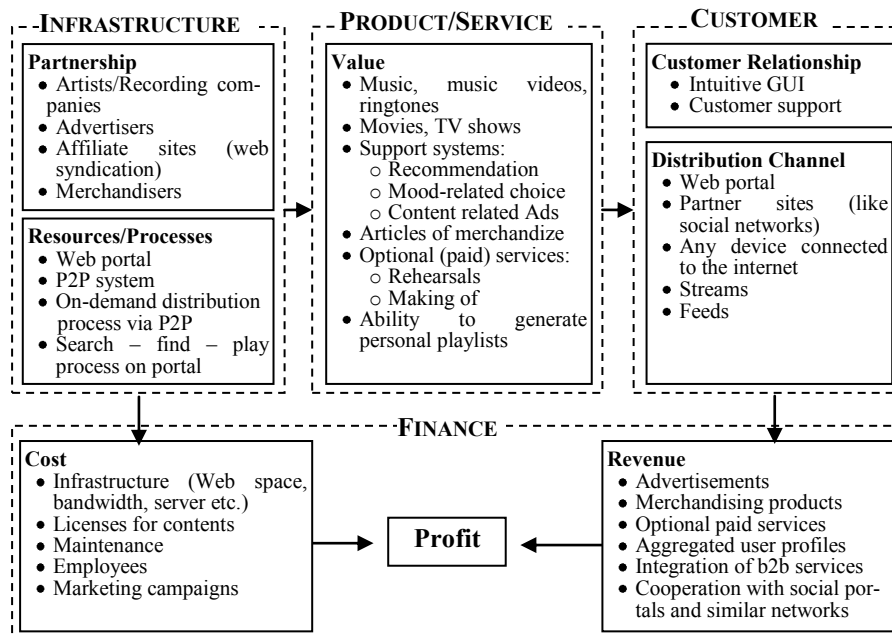


Fig. 23: P2P streaming model in the context of the BMO framework

After the revolution of the music and movie industry through peer-to-peer systems many consumers have already moved on to other ways of consumption. With the availability of faster broadband connections real time streaming has become an attractive option especially for movie consumption. For music this model has already been widely used by various online radios and podcasts. For videos user generated content started off attracting interest and investors³¹. Soon various sites started offering full fledged movies for streaming in acceptable quality³².

In the light of an increased range of songs and movies available nowadays downloading them all congests the hard disc with content which may not be worth preserving. If it was rentals that traditionally served this market, now with the possibilities of broadband internet on-demand services are becoming more attractive. But contrary to the existing (paid) services in this sector the new model should take a broader approach in delivering content to the consumers. The picture of a group of people sitting in front of the television set in the evening to watch a movie may not have disappeared, but it has definitely been supplemented with

³¹ In 2006 Google bought YouTube for \$1.65 billion.

³² Meanwhile with www.otvguide.com there is already a meta search engine for hundreds of sites that offer streaming content

kids watching comedy shows on their multimedia player while sitting in the bus on their way to school.

One of the central ideas behind the streaming model introduced here is the following. First and foremost a computer is not the only device we use to communicate with nowadays. We call each other with mobile phones, take pictures with them, share them on online platforms, organize our meetings with them, send text messages, navigate with them through the traffic, listen to music, and watch videos and many other things. If it is not just one device, the mobile phone, then these activities will be spread among various devices. A digital camera, a navigation system, a multimedia player or a PDA are devices with an advanced hardware and complex embedded programs in it. When all these devices are connected to the Internet through an IP address, then they all will be used in our daily life for various tasks. If I do not have my notebook with me, I will want to access music through my mobile phone, or my videos through my multimedia player. This level of convenience requires the availability of these content from anywhere with one single login. That must be one of the main aspects of a streaming model in future.

In Fig. 24 the P2P streaming model is modelled in e³value. The most striking difference to the one in the previous subchapter is the amount of stakeholders involved. In a system where money is not transferred directly from the customer to the provider, this is not further surprising. Revenue is mainly generated from advertising companies and merchandisers, who cooperate with record companies and web portals. Web syndication as practised nowadays by many content providers like YouTube and news sites helps widely spreading the content to users of various platforms.

Hardware vendors, usually taken for granted in scenarios like these, are explicitly modelled here since they play a significant role in popularizing diverse types of devices to consume contents. Apple's iPhone is a textbook example as its intuitive multi-touch interface has simplified the interaction with websites and other services on smaller mobile devices. The more companies are innovative in this field, the more customers can be attracted to buy such devices to consume content in various ways.

As this streaming model is based on peer-to-peer, in most cases the content will be delivered from one customer to the other. This is depicted by customer B transferring the song/movie from the web portal to customer A. It should be noted thought that only the actual transfer of the content takes place between the peers, but they still need to visit the portal in order to search for content. Only so it is guaranteed that they create enough traffic for the web portal, which is dependent on customers viewing and clicking on the advertisements.

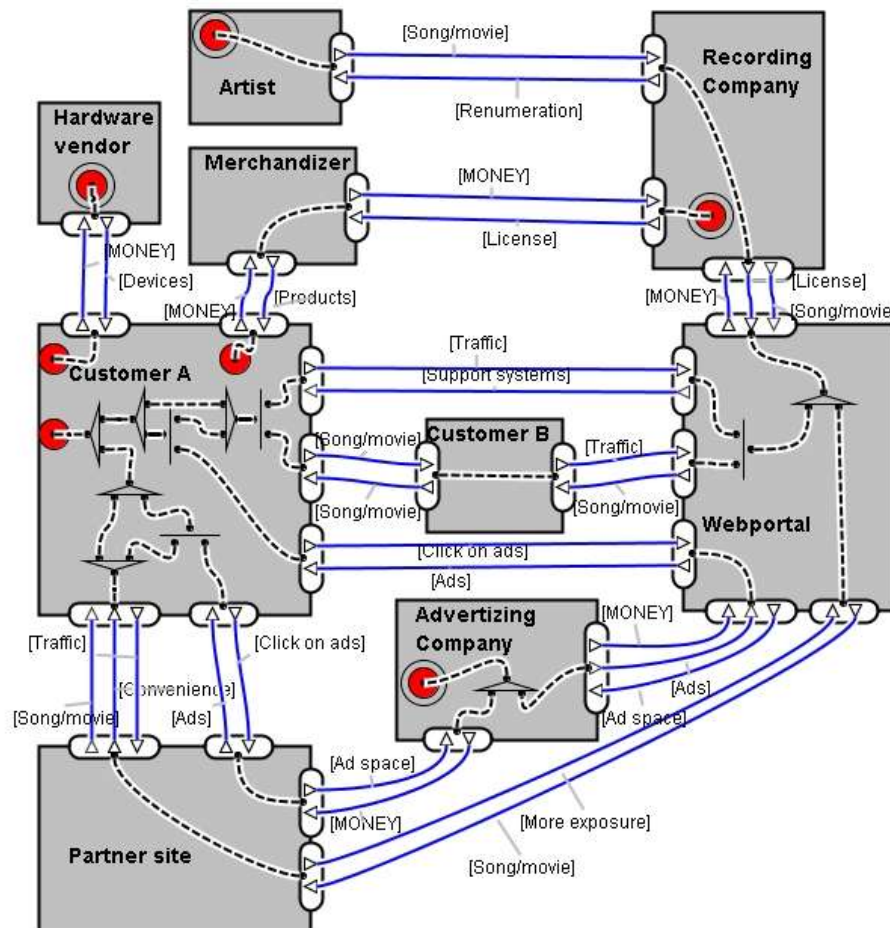


Fig. 24: The P2P streaming model

Wireless streaming technologies for mobile devices itself are widely available. The most prominent technologies are WiFi and 3G mobile communication protocols, with the latter one getting immensely popular and widespread in Europe through the introduction of 3G capable smart-phones like the iPhone, which has enabled a more intuitive handling through its multi-touch display, something that has immensely helped the usage of Internet services on mobile devices. Also the network providers have realized the demand for 3G services and are thus introducing attractive mobile broadband offers allowing users to download up to 15 GB a month from 17 € upwards [BE09]. So the premises for a successful streaming model are in the course of being created through dense network availability, proper devices as well as affordable network packages.

8.6.1 Possible types of distribution

The following depiction based on Thouin and Coates' paper [Thouin et al., 2007] visualizes the possible ways of streaming content to the customer.

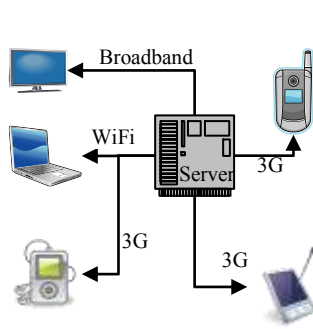


Fig. 25: Centralized distribution

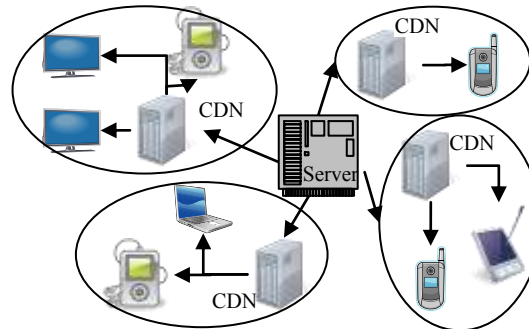


Fig. 26: Distribution through Content delivery networks

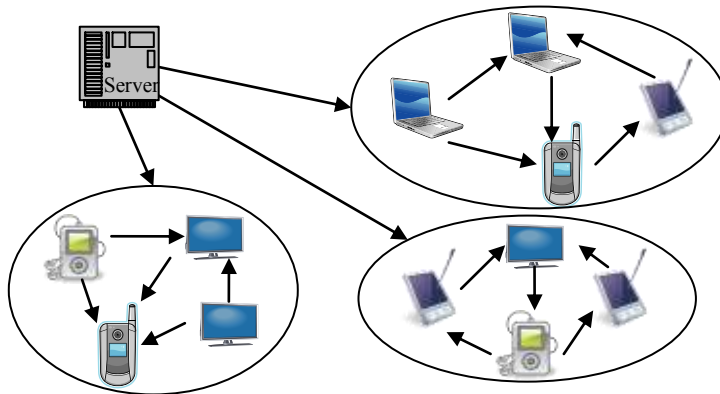


Fig. 27: Peer to Peer distribution [Thouin et al., 2007]

The scenario described in Fig. 27 appears to be the most promising one since it utilizes peer-to-peer networks, which has already proven to be popular and successful with customers. P2P streaming is a well researched topic among scholars. Since the upcoming of Napster, there have been numerous publications regarding the possibilities and challenges of a P2P streaming system. There have been a lot of scientific papers on this subject, all dealing with various (mostly technical) aspects of P2P streaming like resilience, scalability, creating incentive for peers, mesh based, multiple-tree based and distributed hash table based distribution methods, scheduling strategy and many other similar topics. A comprehensive study of this material is beyond the scope of this work; therefore only the major and immediate findings concerning the real-time distribution of multimedia content will be discussed here.

Streaming large video files over a peer-to-peer network is a different issue than the mere offering to download, especially in terms of quality of service. An instant viewing of a complete movie, possibly with standard control functions like fast forwarding and pausing requires a constant availability of peers and a latency rate that lets you seamlessly jump to any point of the video.

The main requirements for an efficient peer-to-peer streaming system are:

- Bandwidth utilization of all peers available
- Scheduling algorithms to reduce latency
- Creating incentives for peers to seed

In a BitTorrent type P2P system, the success of its quick and effective way of file-sharing lies in its style of distribution. Every file is split into equal parts of smaller files and numbered consecutively. These files are then distributed to the peers in no specific order. The rarest pieces are downloaded first to ensure that they do not remain rare for long, which increases the speed of the download gradually and then sustains at a high level. Here it is not of any importance for the later file consumption which piece arrived first. In a streaming environment though, the correct order of the pieces is essential. Therefore superior peer upload capacity utilization is needed to ensure sustained availability of a stream.

For the music field this may not play a big role because of the comparably smaller size of audio files, but in the video domain it is relevant all the more. Here it would make sense to alter the BitTorrent strategy of rarest-first download to nearest-to-miss-the-playback-deadline-first [Tewari et al., 2007]. If the bandwidth allows it, one could also download the rarest pieces and keep it in cache even if it may be a later part of the video. This depends on the available bandwidth and the quality of the stream. Along with P2P, server assistance is also an option, with service providers providing local proxies like in Fig. 21 as an emergency backup in cases of files not meeting the playback deadline [Tu et al., 2005].

CoolStreaming is an internet-based implementation of DONet (Data-driven overlay network) developed by [Zhang et al., 2005]. It was one of the first popular and successful P2P based streaming technology with over 1 million users [Gigstreams08]. Due to copyright issue it had to discontinue its service though. DONet, the underlying network behind CoolStreaming “adaptively forwards data according to data availability and demanding information [...] It has a partnership management algorithm together with an intelligent scheduling algorithm, which enables efficient streaming for medium- to high-bandwidth contents with low control overhead.” [Zhang et al., 2005, p. 13]

An incentive mechanism is essential for peers to keep seeding content after having downloaded it. Climber, a P2P system for live streaming introduced by [Park et al., 2008] offers resilience as an incentive for peers to contribute their resources to the system. The more a peer contributes – the more paths go out from that peer to other peers – the more paths to the source of the file that the peer is downloading will be granted. Climber uses a tree structure, where there are various paths for a child to a parent situated in a higher level. So if a peer is willing to

allow many other peers to download from it through various paths, then it will be allowed to do the same while downloading.

Another form of incentive proposed by Tan and Jarvis is a credits based system similar to the one deployed by eMule. You earn points for forwarding data to others, points that you can use to bid against competing peers for “good parents” – peers you download from [Tan et al., 2008]. A distributed algorithm makes sure that you bid for parent-peers that are nearest to you.

Other suggestions for incentives include a system where the video is encoded into layers and the more you contribute the more layers of the video you get – meaning that the quality of the file gets better with each layer you receive, which depends on your contribution [Liu et al., 2007]. A more complicated method of creating incentive while streaming is through offering your provider peer information about other peers that you are downloading from. By doing this the provider peer may get more parts of the file from these other peers who may be ahead of him/her in playback. By providing your provider peer more peers in your neighbourhood you gain guaranteed and sustained connection with your provider peer [Silverston et al., 2008].

8.6.2 Financing through advertisements

The first threat to the music industry was in the early 1920s when radios started playing music for free. A particular feature of the radio was that with one radio station one could reach millions of listeners. Thus, the cost of a program, when divided by its listeners was negligible. Also, listening to the radio was free of any charges. You once bought a radio and then could listen to the content for free. The radio stations made their revenue through advertisements. It is a source of revenue that started with newspapers selling space for advertisements and thus reducing the cost for the readers. Nowadays advertisements are prevalently utilized on TV, radio, cinema and billboards everywhere in the city. It is an integral part of any business model and a multibillion dollar industry.

In the online world its potential as a cash cow was most efficiently recognized by Google, which is a textbook example of a company relying almost solely on selling advertisements. When implementing it into the music and film industry, then the salient point of such a service would be that the actual content – music, movies, TV shows - will be a free by-product; merely an incentive to visit a site or service, which actually offers other products and services that may not necessarily be related to the entertainment industry. So the actual value in this model for those interested in making money lies with the customer, not with the music being offered. Or like Fox put it: “the audience is the product that is delivered to the marketers” [Fox et al., 2001, p. 3].

Even though from the perspective of the retailer the entertainment content is merely a free by-product, the customers should perceive it is as the main product – after all, they visit a particular site for the music and movies it offers and not to

buy the latest shaving set. But even if it is likely that at a certain point, through the free availability of music and movies, they may be degraded to an abundantly available public good, one need not fear that the artists may not get the appreciation they deserve, because quality will prevail, no matter how it is treated.

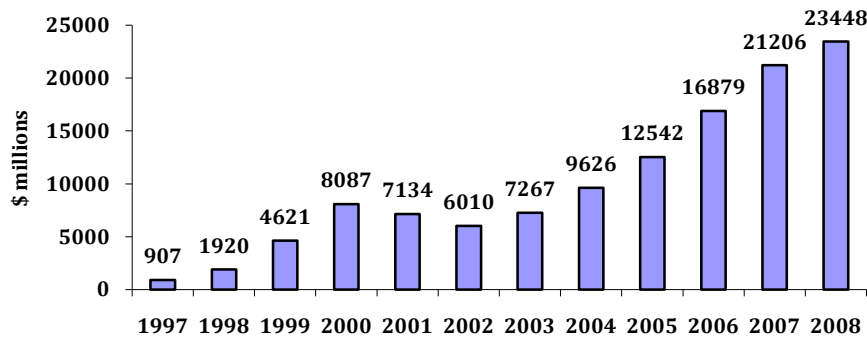


Fig. 28: Annual revenue of online advertisement in the US from 1997 to 2008

In 2008 the total revenue made from Internet advertising in the US alone was \$23.5 billion [IAB09], rising for the sixth time in a row. Around 4% (that is \$940 million) of this amount was spent by companies in the entertainment industry, which includes film, music, TV and video games. According to the BIA Advisory Services online radio revenue increased from \$67 million in 2007 to \$247 million in 2008, and it is expected to rise steadily [FMQB09]. These are indications for a healthy online advertisement market which can be relied upon.

Online advertising methods have also evolved in the course of time. There has been an effort made to get together the correct user with the correct advertisement. The more relevant an advertisement is to a user, the more will he/she react to it. So, content and especially user-related ads are increasingly gaining popularity. The ads for example appearing near to mails on various free mail accounts are already associated to the contents of the mails. This is achieved through keyword matching. Requirements for user related ads are generally information about a particular user. The more complete a user profile is, the more appropriate will an ad be to this user.

Social networks like Facebook or Orkut, who heavily rely upon advertisements, have recently adopted an interesting way of getting more and more personal information about its users more subtly, since asking for them directly has been perceived to be a breaching of privacy³³. Users are prompted to take part in a quiz, like for example a “What country type are you?”-quiz. They will be asked a certain number of easy questions about their preferences like what they do in their

³³ When Facebook openly announced that the data in users’ profile will be shared with its partners, there was a huge wave of protest among the users and in the media. Following this, Facebook changed their terms and conditions.

free time; drink a beer, go for a movie or go to the gym and at the end a “result” is presented, for example that you are an Italy-type person or a Hawaii-type. The idea behind a game like this is simple. Bored or naïve users may participate since it doesn’t take much time and effort and the questions are easy to answer. At the end you get a result which may be amusing and can be shared with others. The provider on the other hand can gather information about you in a profile and sell your personal preferences to interested advertising companies without revealing your identity, and these companies can provide you with targeted ads which may suit your interests [Vara, 2007].

Like with the case of radio, this model can only work if you have a large audience, a wide range of people listening to it and spending their time with the service. Only then it can happen that at least a fraction of these people click at the ads and banners and thus generate revenue for the service provider. Unlike in the radio or television world, online advertising often operates in a rigid form which means that companies pay only per click and not per site visit. Thus the number of your audience is crucial.

8.6.3 Further sources of revenue

Revenue can also be made through partnerships with companies with overlapping interests. iLike, Imeem and Last.fm are music related services that work as external applications for social network sites like Facebook, Hi5 or Orkut or for desktop programmes such as iTunes or Windows Media Player. It lets you share your playlists with others, upload songs and listen to (sometimes) full songs for free. Apart from being ad financed the most distinctive feature of these new sites is their cooperation with established social networks, which will assure them more popularity and customers since these networks already have a huge customer base. Both services have a clientele with similarities in age, affinity to technology and connectivity. Positive synergies like this will only result in more satisfaction for the customers since it increases the convenience of listening to music considerably.

Synergies can also be created through the integration of partner services into your own service. YouTube allows it explicitly to embed their videos in other sites [YouTube09]. As long as these videos are not the prime source of revenue for the sites embedding them, this is allowed. Similarly, as mentioned in subchapter 4.5.1, Firefox earns money through embedding the Google search field in their browser.

The freemium model too is an option in generating revenue through streaming services. It can be compared with mobile network provider contracts. Say you buy a package with 100 free minutes to call to foreign networks. A contract like this will definitely charge you more for a minute to foreign networks after the consumption of those 100 free minutes than a similar offer without free minutes. The reason is pretty simple: The provision of granting 100 free minutes to all customers has to be cross financed through a small minority of people who are expected

to exceed that 100 free minute limit. Similarly, it can be expected that a small minority of die-hard fans of a certain group or artist will spend extra money for additional products and services like video clips of rehearsals, an extensive “making of” of a movie and diverse other extras now offered on DVDs.

8.6.4 Usability

To offer a streaming service on all possible devices is not only a technological challenge but also one at the “soft” level of usability. User acceptance in terms of user experience is crucial to this model. A mobile device has completely different hardware specifications and therefore limitations than standard computers. Therefore it is essential to design the service flexible enough to satisfy consumers on any device.

YouTube on iPhone is a good example for incorporating the main functions of a successful portal into the relatively small display of a mobile phone. Similarly various mobile versions of popular sites such as Gmail or Yahoo have proven to have acceptable usability to be used regularly.

The Web portal will remain the main point of entry for anyone to listen to music or watch a movie, be it from a computer or a mobile device. So the design of this gateway is crucial. Simplicity, good overview and usability belong to the key factors. The focus should lie on the main activities from a user’s perspective and that is to search for particular content and then play it or play suggested or recommended content. Ads should be placed discreetly and in a less annoying way.

The process of finding music, video clips or movies should be different from finding information on the Internet through a search engine. A song or a movie should be identifiable through a set of certain tags like title, album, artists, genre or year of release. So a search over these criteria should usually lead to quality results.

Searching for content is a task which differs dependent on the domain. Seen over a certain time period like say a week or a month, searching music is usually a one-time task. You do not keep searching for something, play it, and then search for the next one, because it is extremely time consuming to do so. Instead people search for a bulk of songs and compile different playlists according to certain criteria like mood, genre, decade or artists. Every now and then these playlists are extended by single songs they stumble upon. These playlists are then the source from where they play it, either on their computers, on mp3 players or on written CDs. Therefore the creation of personal playlists is an important factor when transferring music consumption from local hard disc based Players to just-in time streaming. Services like Last.fm already offer the possibility of compiling playlists, which can even be shared with others.

Finally through linking every tag in the result set the searching process is further accelerated. If a particular song of a particular artist is liked, then by clicking

on that artist his/her personal page with information and discography should appear to help exploring that artist more in depth.

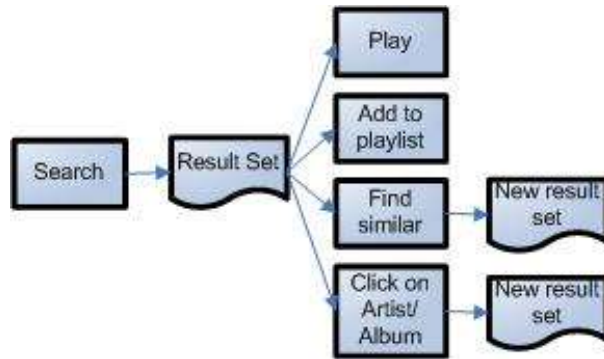


Fig. 29: The search-find-play process for music

For video clips YouTube has already shown how a proper user interface could look like and also how the user interaction can be satisfying. The space on the page is used quite effectively for a number of functions without appearing to be overloaded and there is even space for advertising on the ride side next to the video. Currently they are also experimenting with discrete ad overlays at the bottom of the video.

8.7 A flat rate model

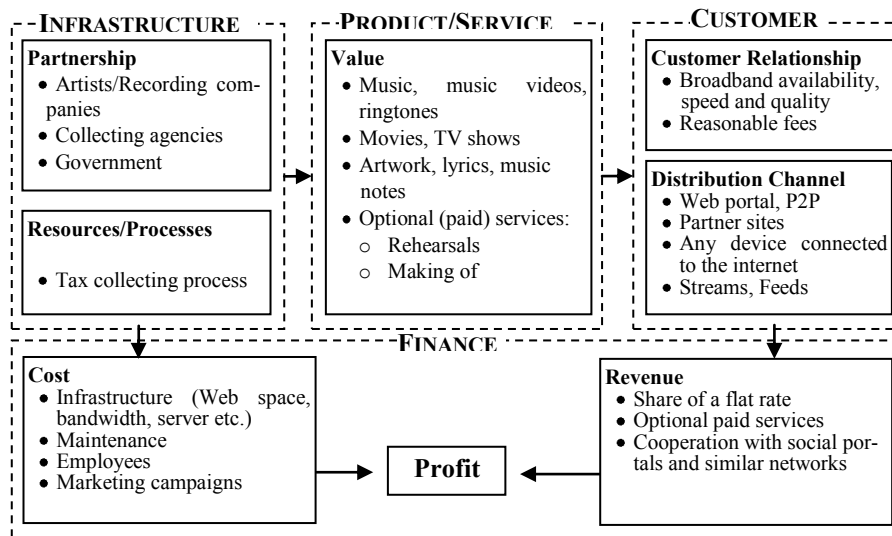


Fig. 30: Flatrate model in the context of the BMO framework

The public good theory in subchapter 4.5.2 speculates about the possibility of collecting a flat rate to finance the music and movie industry, but dismisses it due to various reasons such as the difficulty in distributing the money effectively among the artists or the discrimination of users wishing to buy their music through traditional channels. But in this chapter this model is revised again by looking deeper into the matter and analyzing different possibilities.

The current situation of the music and movie industry as explained here is that people are downloading or consuming any content that can be digitalized through the Internet without paying anything back. The only cost for them to do all this, apart from energy costs and time, is presented to them on the bill from the Internet service provider. Now some think that increasing that bill by 5 \$ or so could mean the end of all problems for the content industry.

When radio came up back in the 1930s it was seen as a threat to the music industry. This threat was then finally dealt with the issue of a blanket license, which allowed the radio stations to play copyrighted music. The same was the case with TV stations later on. In both cases it was agreed upon that the music industry got its share from the earnings of radio and TV stations who broadcasted music and movies for free to the public³⁴.

³⁴ Even though there is actually a broadcast receiver license in many countries in the European Union, but none in the United States. But that money usually goes to the public sector broadcaster and not to the content industry

Now applying that system to the current situation would mean that P2P network providers paid a license to the content industry and in return could distribute all content legally and free to everyone. Now P2P networks are usually non-commercial. That means this license would be paid by all the users of the P2P network. When thinking this idea further it comes down to a flat rate model where people pay some sort of a digital content sharing tax which enables them to freely download and share music and movies through the Internet.

When CD burners were introduced in the late 1990s, the effect this could have on the content industry was cushioned through the inclusion of a small fee on every blank CD sold in the market. Since the fee did not affect the retail prices for CDs perceptibly it was soon accepted (or not even noticed by most of the customers). So it sounds quite reasonable to propose something similar for file sharing on the Internet.

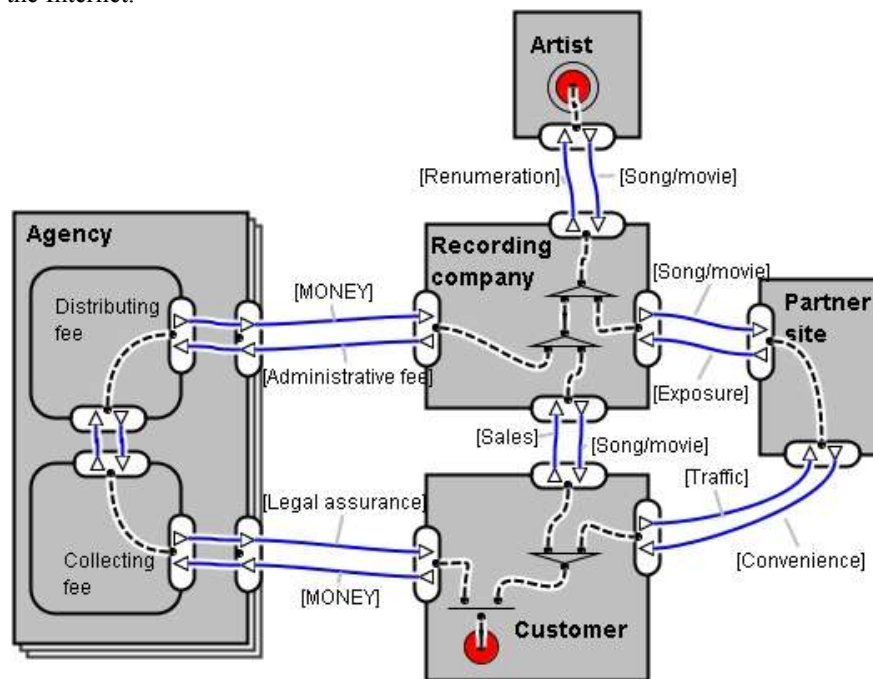


Fig. 31: The flat rate model

The above e3value model illustrates the main stakeholders of the flat rate model and their interaction. The actor titled Agency functions as the collector and distributor of the flat rate. Record companies can register themselves for a small administrative fee with this agency and this assures them a certain part of the flat rate collected from all customers. The customer on the other hand can legally obtain content from any source they wish.

Actually the idea is quite exciting due to its simplicity. People could continue downloading and sharing just as it is being done now through their preferred channels such as P2P networks, websites or file swapping. This system will be financed by everyone paying a relatively small fee per month which would be allocated among the artists according to the popularity of their works. No need to adopt any new measures in the copyright law to restrict usage, no need of going after customers who pirate. On contrary, everything would “seem” free and both sides will be happy.

Fisher III actually proposes a concrete and comprehensive plan for an alternative compensation system in his book “Promises to keep” [Fisher III, 2004] which goes from taxing the Internet service providers’ subscriptions and the purchase of electronic equipment by a central collecting society to fairly distributing it among the artists, who will be registered at a central institution with their works. In a system like this consumers would be allowed to download and share music freely without any restrictions. The artist on the other hand would have a reliable source of revenue with various ways of distributing and marketing his music.

The following subchapters will look into the details of a system like this.

8.7.1 Source of income

The premise of this model is the collection of a regular fee which should be divided fairly among the artists. This poses a number of questions regarding the way of collecting this fee. Should there be a new entertainment tax? Or should the fee be included in any other fee already collected by the government, or is it even better to derive it from other sources?

Fisher III proposes some sources of income for this fee in the alternative compensation system he describes in his book. One of them is the taxing of the subscription fees customers pay to their Internet service provider (ISP). This would mean that the ISPs would serve as a collecting agency that carries together the fee from its customers to forward it to the appropriate society that distributes the money to the artists. A minor rise in the subscription fee paid by the customers would mean endless and unrestricted access for them to entertainment products.

Another way of taking in the fee is through taxing the electronic equipments used to consume digital products like mp3 players or DVD players, similar to the fee paid on blank CDs. This would lead to an increase in the prices of these equipments, but if the fee is held low enough this could be perceived by the customers similarly negligible as in the case with blank CDs.

Fischer III also speculates about collecting the fee by raising the income tax accordingly, even though this might not be a popular solution since income tax is a sensible issue in the United States. The inclusion of this fee in the income tax would make music and other entertainment goods to public goods, like thought about in subchapter 4.5.2. This means that the government would have to take care of the distribution of that money to the artists. This is also the main weakness of

this solution because it not only abrogates competition between providers of the goods leading to less innovation in that field, but it also puts the artists in a less favourable position when they have to depend on the government for their remuneration. It is also traditionally difficult to assign income tax to a certain party.

Taxing the ISP subscriptions or electronic equipments is not the only way of including the fee into other payments. Universities could offer students access to the entertainment products as part of their role as network provider. This could be included in the fee paid by students to study at the university or it could be financed by the university itself through other means. Software vendors like P2P software producers could take the role of the collecting agency just like an employer or any society with a certain number of members [Von Lohmann, 2004].

The Electronic Frontier Foundation (EFF) suggests a similar way of obtaining income though with an important difference. Voluntary collective licensing (VCL) as it is called would make the collecting of fees a voluntary task. This means that internet users who are not interested in downloading music or movies from the Internet also need not pay any tax. The same would be the case with artists who do not want to participate in this system.

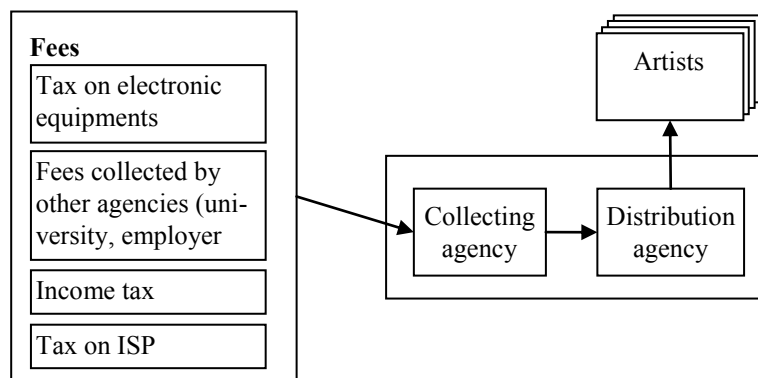


Fig. 32: Types of fees in a flat fee model environment

8.7.2 Allocation among artists

As much as there are different ways of collecting a fee from the customers, there are also various ways of how to decide upon the allocation of this fee among the artists involved. It would only seem fair to give the artist exactly the share of the fees according to the popularity of his/her work. Except in communist countries it is a standard way of thinking that those who have more success also deserve more compensation.

In a digital environment with the possibility of actually tracking the activities of users the first impulse in a situation like this may be to adopt a mechanism to track the download behaviour of users to determine the popularity of a given

work. A more detailed look at this scenario though will make clear that it is actually neither viable nor a secure method to assess success this way. First of all tracking downloads will not be complete due to users sitting behind NATs and, thus, not revealing their IPs. Even if this problem is solved, IP masquerading belongs to one of the easiest tasks for anyone familiar with network topologies. It may even be the case that instructions on how to do it would be available to everyone on the Internet in no time. Furthermore, it is not at all tamper-proof since bots could be programmed to download a certain file automatically and repeatedly, or it could be even done manually causing enough distortion to the system.

There is an easier and better tried-and-tested way of determining the reach of the artists' files. In the television industry the audience rate is measured by tracking the usage of a small portion of representative voluntary viewers and then extrapolated to the whole population. In the United States and many other countries this is done by AGB Nielsen Media Research, in Austria this is done by Teletest. Through years of experience in this field, the measurements are quite accurate. So this system could be also used in the flat rate model to determine file popularity. It may be necessary to find more volunteers to increase accuracy. To ensure this it will be important to guarantee maximum privacy concerning the data collected. Also, the system should be as automatic as possible avoiding any unnecessary user involvement, which would only be a source for distortion.

To improve accuracy of determining attractiveness of a file it is also essential to include more criteria than merely the amount of downloads. Duration of a work could be included as a criterion because a piece of classical music for example may last longer than 10 minutes involving more effort in producing it compared to a regular pop song. Usually listeners of classical music pay more for a CD than their counterparts for popular music. Just like a play usually costs more than a movie ticket at the cinema theatre [Fisher III, 2004], [Von Lohmann, 2004].

8.7.3 Discussion

It is hard to say what consequences a flat rate model would have on the content industry, the consumers and their consumption behaviour. Despite its simplicity – after all it is just an extension of the subscription model à la all-you-can-eat-for-a-fixed-price idea already in use by various content providers (See 8.2.2) – it is quite tricky in the details. For example it is not yet clear where the trade-off point is between setting a price low enough not to annoy the customers but high enough to still make it profitable for the artists. Also, the digital content to be financed through the flat fee is not just music as it is the case in Fisher III's proposal but also movies and TV shows. This decreases the chances of finding a price that manages the previously mentioned trade-off.

The Voluntary Collective Licensing proposed by EFF is quite similar to the Creative Commons way of licensing music discussed more in detail in 8.8.4. Therefore it may be a reasonable strategy for a certain part of the market, but quite

certainly not for the mass market, even though it is almost impossible to predict how internet users will react to developments like these. The least restrictive licensing scheme is likely to be favoured by most ideologically coloured users with strong sympathies for artists and an equally strong empathy towards the content industry. But the majority of the rest is already tightly embedded in the free culture of the Internet. So a system which would “seem” free to them could by all means stand a chance.

8.8 Niche models

The Internet has enabled a never been there before level of globalization among individuals. In the online world, local boundaries lose their relevance, instead the consolidation of common interests drive the people to build communities where they are among like-minded and can follow their interests irrespective of geographical, cultural or socio-political differences. Such a high level of diversity means that individual solutions are often more conducive than generic ones. Especially the music and movie industry is a field with extremely diverse forces among the consumers. Therefore it is not further surprising that there is a huge variety of niche markets with a considerable amount of members in them.

Take movies or cartoons based on the Japanese Manga comics for example. This in Japan popular art form has found its way to many other countries all around the world. Since Mangas have certain distinctive features that separate it from other comics its tradition is held high among its followers. Despite having quite a dedicated followership compared to the total amount of movie or comics consumers they are still somewhat a niche group. Catering for them may require completely different methods than catering for the mass market.

Similarly among consumers of entertainment goods there will always be groups which are unresponsive to the models suggested in the previous subchapters. The following subchapters will therefore look into models which may be effective to some of these niche groups.

8.8.1 Community based model

Following the prevalent trend of community building on the Internet it occurred to the author that there maybe in fact a niche group out there that takes music or movies more important and serious than the average listener/viewer. Those fans, who are actually happy to pay some money to support their heroes, be it a local band or the filmmaker of the latest underground cult movie.

The premise for the targeted customer taken in 8.5 was that of the money-loving “business-fan”, the one in 8.6 was the budget-constrained busy person who listens to music while doing thousand other things, whereas the customer in 8.7 is

ready to donate a low tax for unlimited consumption of everything possible. But in this section we look at people who spend hours in shops reading the back cover of a CD or a DVD, who spend hours and energy in online forums discussing the latest Harry Potter movie or the excessive use of acoustic guitar in the latest chart-buster, simply people who are dedicated fans and who value the creations of the artists up to the monetary level.

For these people what counts more than money or convenience is the quality of the delivered product, the people and the processes behind the creation. As long as that is guaranteed they don't mind paying a fair price. Therefore from an artists' perspective it is important to establish a relationship between them and their fans. This is especially needed for upcoming artists as a means of gaining popularity and exposure. The word-to-mouth publicity is for example easily observable when new movies or albums are released. Despite having a bankable star in the movie or being an established performer, if word has it that the latest release is a flop, then this word will definitely spread out to have a negative response.

This effect can be utilized in a useful way by engaging fans in various aspects of production, like letting them vote which songs to be on the forthcoming album, or like Michael Herbing, a popular comedian in Germany, did it: After the enormous success of his feature film "Der Schuh des Manitu" he let his fans vote which story he should choose next to direct in his distinctive style. 34% of more than 900.000 fans voted for a parody of Star Trek, "(T)Raumschiff Surprise" [Spiegel02], which then consequently was a box office hit as well. For his latest movie he did the casting as a reality show on TV where anyone could appear and prove his/her talent. This type of customer relationship which involves the fans can prove to be excellent public relations stunts. It is important to remain innovative in this field.

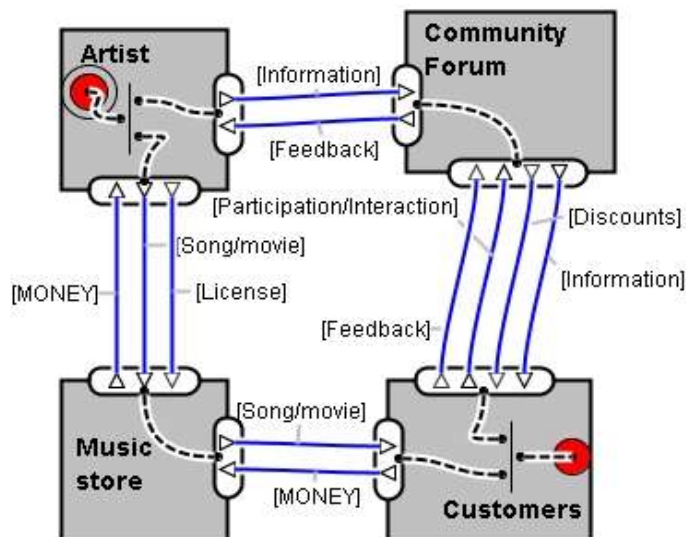


Fig. 33: The community based model

The backbone of this model is the community forum, where the consumers and the artists come together as close as possible. On this interface artists can sense the pulse of their dedicated audience more precisely and for the consumer the experience in actively interacting and participating with the artists gives them more satisfaction. Goodies like discounts on concert tickets can be earned through increased loyalty. On the other hand the artists get a more intense and accurate feedback from its audience.

The success of YouTube does not just rely upon good user interface or their partnership with the big content deliverers. What made this service successful is the passionate community of users who delivered the content themselves. In a sense they are partners of the site, because without their combined effort there would be nothing to watch on YouTube. An interested community will keep a service alive by creatively participating in it. Thus, creating a fan following for artists and giving them a space to have a good romp is essential.

A dedicated fan following can even become an ally in fighting piracy. The author has personal experience with a bunch of fans in an online community regarding this matter. There is an official fan group for the Indian composer A.R. Rahman on Yahoo [ARR09], which was founded in January 1999, just months before the advent of Napster and right in time for the mp3 revolution on the Internet. In the first couple of years it was common practice for fans on this group to post links to mp3s of this artist's releases, even the latest ones. But then as the members started getting more involved with the artist and his music, when some members even had the opportunity to meet him in person and maintain a friendly relationship with him, then the group slowly started disregarding postings of mp3s to the site stating that one should buy originals to support the artist. Finally the administrated group completely abandoned any practice of supporting piracy. Some members even openly discussed taking actions against sites that offered the songs illegally.

The story of the band Arctic Monkeys is a modern day fable of a band getting popular only due to their fans. They used to record demos, burn them on CD and give it away for free to fans during their gigs. Some of these fans ripped the CD and started sharing these songs with their friends. Soon there was a page on MySpace where the songs were uploaded. Soon Arctic Monkeys got so popular that they started recording albums and going on tours. Never was a major record label involved in their activities [Park, 2005].

The concept of creating own channels on YouTube for example is a good example of how artists could interact directly with consumers. The usage of social networks to directly address fans has been utilized by many artists [Lily09], [Kingston09].

8.8.2 Focus on the concert industry

In the past, people would tour to promote their albums; today they put out albums to promote their tours. [Miller, 2008]³⁵

The title says it all. While the recording industry suffered losses in sales through digital piracy, the concert industry remained unaffected by it. The reason for this is quite simple: A digital copy cannot substitute the experience of a live concert. Unlike its digital counterpart in the recording industry every concert is a “unique, excludable, non-duplicable product” [Schultz, 2009, p. 1]. Just like the broadcast of a football match will not drive away the fans from the stadiums. This may also be the reason why cinema theatres will exist in future too because a certain portion of the consumers will always value the presentation grandeur of enjoying a movie on a huge screen. In a concert this effect is even maximized through the live experience. The personal physical presence is altogether another level of enjoyment than the consumption of pre-recorded content through speakers at home.

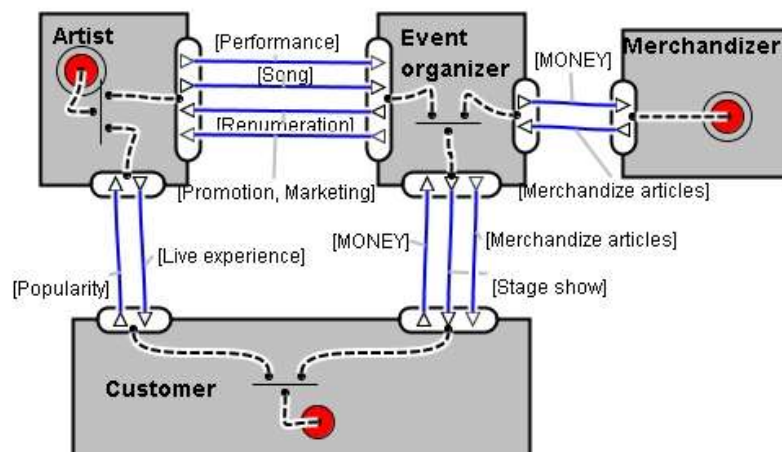


Fig. 34: The concert model

The event organizer takes over the role of the record company, which held the responsibility of promoting and marketing the artist in other models. The main focus here though is the live experience on stage. Instead of the artist simply performing in the front of the audience, this can be expanded to a more rewarding experience by combining various show effects to make the event more memorable. This lies in the responsibility of the event organizer.

The concert industry targets mainly on the type of fans mentioned in 8.8.1, but in contrast to the digital nature of the community based model, here the innovation

³⁵ As quoted from Madonna’s manager regarding her deal with Live Nation

must happen with the product itself, or the presentation on stage. Everything else is secondary. In a scenario where top musicians make up to 7.5 times more money through concerts than through CD sales [Connolly et al., 2006]³⁶ it is definitely worth giving a try.

In the year 2000 the concert industry had revenues of 1.9 billion \$ in the US alone [Koster, 2008] and 2007 was yet another record year with 3.9 billion \$ [Hau, 2008]. The buzz word in the music industry is the so called 360° deal, which means that the company that signs a deal with an artist is involved in every aspect of marketing that particular artist, which goes from record sales to merchandising sales to revenue from any public appearance. Madonna is the most popular example of an artist having signed a 120 million \$ deal with the live events company Live Nation ensuring them revenues from various new albums, concert tours and such over a time period of 10 years.

In the early days of music performing was the only source of revenue and publicity an artist could gain. With the advent of recording technology this main source suddenly shifted to sales units of LPs, cassettes and CDs. It was much easier to conveniently produce an album gradually over a longer time period and then do a tour to promote record sales. The success of an artist was measured on sold units. But this era, which lasted nearly a century, has inevitable come to an end through the digitization of music and movies and its independence from physical media. Now the artists are urged to go back to their roots and give exhausting and lively live performances in front of a paying audience.

The concert industry may not be able to replace the recording industry, but it definitely will be part of a number of new and exciting developments in winning back the customer.

8.8.3 Artist to customer

The idea of artists directly selling their music to their customers is not entirely new. Since the upcoming of the Internet and the associated fall in distribution cost it has been speculated that artists should give direct selling a chance. Contracts with traditional record labels ensure a rather low income compared to the same amount of sales on an online platform without having to share a considerable part of the revenue with middlemen. The crucial role of the record label, namely the marketing work which increases the popularity of the artist and thus leads to higher sales figures is meant to be replaced by viral marketing and word-of-mouth publicity.

³⁶ In 2002 Paul McCartney even made 64.9 million \$ revenue from concerts compared to the 4.4 million \$ he earned from record sales and copyright revenues.

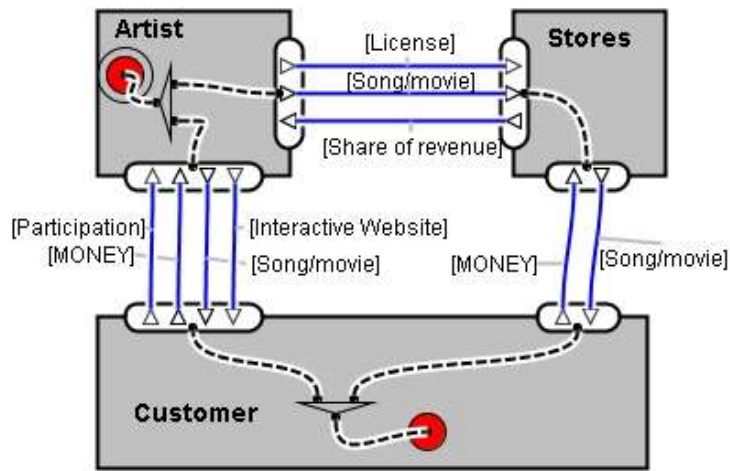


Fig. 35: The artist to customer model

The main attraction of this model is how an artist communicates with his/her customer. It is all about meeting your prospective customer in his/her world. Nowadays a lot of people spend time in social networks, others have their blogs. An interactive website where the user has the chance to engage himself in various activities concerning the artist and his/her art, can in fact create a certain value.

In recent times popular artists have started making themselves independent from labels and searching for new distribution channels which guarantees them a major share of the revenue. When Paul McCartney chose Starbucks to distribute his latest album, the Eagles chose Wal-Mart for theirs. Prince gave away his album together with a newspaper in United Kingdom and earned 2 million dollars [Gordon, 2008]. Radiohead, a band from England, even went a step further and released their album "In Rainbows" in October 2007 on their website for free and let the listeners decide if and how much they wanted to pay for it [Morrow, 2009]. The common factor in all these examples is the already established status of these artists. They all have earned a certain reputation which allows them to experiment with new distribution methods. But to what extent this is applicable for newcomers or not-yet established artists is yet to be seen.

MySpace was among the first popular platforms that were utilized for an artist to consumer type of business. It was mainly used as a promotion platform by new artists to gain popularity in this large online community. Social networks like MySpace or Facebook attract a lot of prospective customers, especially in the younger age group, which is the main target audience of entertainment products. So marketing your music exactly there is the best thing to do. MySpace claims to have more than 8 million artists and bands on their portal [Techradar08].

In 2006 a German group called Grup Tekkan with Turkish migration background published their self recorded song and video on YouTube and landed a big hit. Even though the high popularity of this song was mainly due to its amateurish characteristics, this group soon attracted the attention of record labels. They were soon offered a contract and recorded their single in a professional studio. Currently they are busy with works on their next single [GT09].

The Internet has offered a variety of new ways to do business with entertainment products. Many of these ways are under constant testing by innovative artists and businessmen. The outcome of these experiments and their consequences are yet to be seen.

8.8.4 Creative Commons

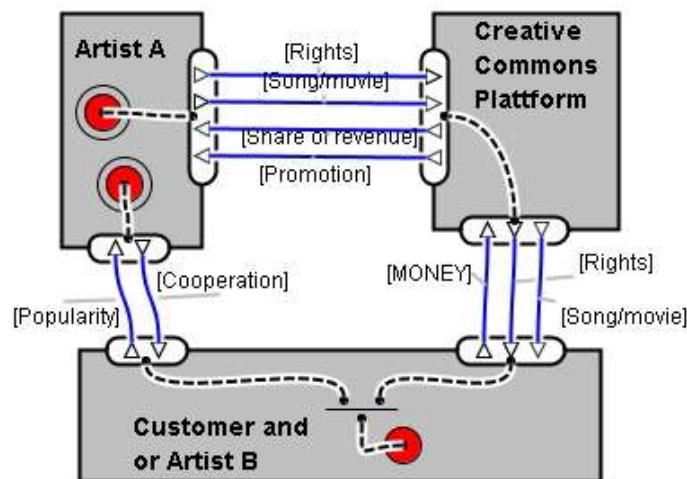


Fig. 36: The Creative Commons model

What works quite well for the software industry can also work at least partially in the music and movie industry too. Creative Commons is a non-profit organization that offers artists various licensing schemes for their works. The traditional copyright is understood as an “all rights reserved” scheme, whereas creative commons changes that too “some rights reserved”.

The idea behind this project is to facilitate collaboration between artists and fans with a creative vein or just anyone who wants to use parts of a certain work to create a totally different work. Currently this is only possible if the artist explicitly allows this and in most cases this is also bound to a monetary compensation. With a creative commons license anyone could use the work without having to ask for

permission. But the credit to the original creator must be included in any new work.

There are various forms of common creative licenses, like one which also allows the commercial use of another work. In this case a musician for example could sample another song and make a new song out of it, which he could then sell. The original creator would be given credit for his part of the new song. Credit may not be the same as money but it can be utilized very well for popularity and exposure, which is an important factor in every artist's career. By letting others extend upon your work this can be useful to both parties.

Magnatune is an Internet recording label that releases all its music under creative commons license and thus encourages people to "take it apart, improve on it, use it to make something new [...]" [Maney, 2004]. It is possible to listen to all the songs through streaming it, but to download it you need to pay a fee between 5 and 18 \$ which the customer can choose. 50% of all revenues go directly to the artist. Magnatune also sub-licenses music for commercial use like the addition of a song into the soundtrack of a movie or their usage in television shows.

Jamendo [Jamendo09], an official partner of Creative Commons, is a community that enables free and legal sharing of music that is licensed under creative commons. Almost 20.000 albums have been released here and the community has over a half a million users. The two main sources of revenue are advertising, which is equally shared with the artists and donations, which almost entirely goes to the artist [Nagle, 2007].

These example services show that this model does work though it might not be applicable to the mass market. The main target audience is more or less the same as with the community based model, namely dedicated fans deeply interested in the content and in their creators, those who see an ideological reason to support artists for creating art that moves them. Additionally art itself is being promoted by sweeping out hindrances in collaborating between different artists.

8.9 Conclusion

The economic perspective of the digital piracy issue was set forth in this chapter. The business structure of the music and movie industry and how they derived value by selling content was shown. Then the first steps of the online avatar of their business was studied, mainly the subscription model and the a-la-carte model, both with their benefits and shortcomings. The main objective of this chapter was to understand the demands of all the stakeholders in this business, above all the consumers' and then to come up with grounded solutions based on latest researches in this field.

The formation of the meta business model was necessary to collect ideas in various sections of a business model such as product, distribution channel and revenue stream. The combination and composition of these ideas finally resulted in the proposed models.

Peer-to-peer is without doubt one of the most researched distribution channels in recent times. Since Napster demonstrated the potential of this technology the development in this field has been enormous. Starting from completely decentralized versions to anonymous versions and to applying game theory strategies the full potential of the technology is steadily being explored. Nevertheless combining this technology with a proper business model has not been very successful until now. Part of the reason is that since P2P was born out of a free environment the monetization of this technology has to be carefully designed without curtailing it of its free aura. The most important aspect hereby is how to market it to the potential users, how to let the users perceive the value of a service like this, or to put it more simply, to create the right image. Until now only few legal services in this field, though not using P2P, have achieved this sensitive task, among them Apple's iTunes store, Last.fm or Pandora in the United States.

A further trend in the consumption of digital media incorporated into a business model was the streaming technology. Also here P2P was identified as a promising delivery channel. That streaming itself can be successful with the consumers is best proven by the immense popularity of YouTube or Last.fm. These services already have a strong user base; the challenge though is the generation of a sustained revenue stream. The advertisement model is currently being deployed predominantly. Ways of increasing efficiency for this model have been pursued by services in other fields with a focus on user and content related ads. Also other possible sources of revenue were discussed.

The flat rate model proposed in 8.7 tackles the whole issue from another viewpoint. It is discussed how file sharing or piracy as it is labelled in public can be legalized by simply leaving everything as it is and just attaching a blanket fee on it, to be paid by the collective of consumers. The challenges of this system lie in determining who and how to derive the fee from and how to distribute it most fairly among the artists. A voluntary collective licensing scheme applying a fee only on those involved in this system bares similarity to the creative commons licensing

model discussed in the next set of models. Here the objective lies more in the creative re-use of bought content giving the owner of a record or a movie clip more rights to exploit the works of others by creating own derivative works.

The importance of customer relationship was emphasized with the community based model. Community is the key word of Web 2.0. Content on the Internet is being created and consumed by the same people. So giving this community a more active role in the creation of art will be paid back by more sincere feedback and investment, be it time, energy or even money. This basic idea is also used as a background for the scenario where artists engage themselves more directly in delivering their works to the customers or when focusing more intensively at the performing part of their career.

9 Conclusion and forecast

Digital piracy is an issue covering various facets of economic and social life. In the course of this work a number of points were discussed. The social aspects of digital piracy included various behavioural models of piracy, dealing with a mass phenomenon and other similar questions. It was found that the tendency to pirate is quite high among the people. One of the reasons for this is the belief that since everyone is doing it, it cannot be that wrong. Also, the ease of doing it adds to this belief. This of course sounds like a naïve explanation, but human behaviour is very often built upon simple thoughts. Usually most of the people never think 3 steps ahead. This means that the consequence of piracy to them seems way too ahead of their intellectual reach. The perception that rock stars earn a lot of money just for being what they are is a belief hard to shake.

Another reason is that people think that the music or movies produced today have sunk in quality. So they are not willing to pay an amount of 15\$ for an album.

The technical and legal aspects of digital piracy were handled in the subsequent chapters. The role of DRM was outlined in its details and its questionable alliance with the content industry to protect its contents was found to be ineffective. Technology can only be an associate, rarely a definite solution. Just like it assists in distributing content to millions it also assists in breaking any DRM applied upon the content. Again the central point of attention should lie with the people using technology. Therefore a solution to this problem should address the people, not the files.

The DMCA and the copyright directive of the European Union have been created to protect intellectual property and at the same time handle its fair use. The safe harbour clause in the DMCA has protected many online providers from getting sued by the content industry, but the ambiguity concerning fair use in both legislatures have lead to complications and trouble for the consumer. This has to be revised and changed accordingly. Otherwise random suing of individuals will

drive the customers away forever into the hands of illegitimate file sharers. All such measures taken by the content industry to tackle the piracy issues have been rejected by the consumers, except to a certain extent the educational campaigns meant to raise awareness. Despite being satirized by parts of the online communities these campaigns, when executed lesser aggressive, may actually let some of the free riders re-think the matter.

The main focus of this work lied on the economic angle. The business models discussed in chapter 8 have all their advantages and shortcomings, but the main tenor is that rethinking old-established business practices is inevitable to assure the survival of this industry.

Digital piracy is not invincible. It is only a matter of time until the solutions proposed are put into practice. It should be noted that in any case, the market is quite diversified. There are people who want to buy CDs with artwork and extra material, they like to store these physical goods in their shelves and enjoy their collection. They like to watch the behind the scenes section of a DVD or supplementary information about the recording artist on the CD inlay. Others want to save space and prefer to carry their songs on their computer or mobile devices. They may like to maintain a database of their songs on their computer. Every song they possess is ready to be found and played in a matter of seconds. For them these devices are already part of their everyday life and not a burden or a means to enjoy music and movies. Again others prefer going to live concerts or to the cinema theatre to enjoy their songs and movies. They like to meet up with likeminded people and have a good time while listening to their favourite music band or watching a movie of their favourite film stars on the big screen. Then again there are some who have a somewhat mixed interest. Sometimes they buy CDs which they think are worth buying, sometimes they may be satisfied with an mp3 file because at that moment they may not have the money to buy it, or they may not think that it is worth buying or due to any other reasons like continued availability of that song on radio. Later these same people may meet up for a movie at the cinema theatre or go for a concert. So this indicates that a generic solution to this problem might never exist, but a combination of the ones proposed here fitted on the various segments of the market can ultimately lead to happy faces among both consumers and the industry.

New technologies need not be looked upon as a threat always, but rather as yet another way of enjoying something; an alternative, just one more brand name for a product. It is in fact good for the market as new industries are born, competition gets tougher and that leads to consumers finally getting more value for their money.

A new environment asks for new functions. The traditional business model of the industry with binding the art to a physical media has worked for almost a century, but the digital revolution combined with the enormous networking power of the Internet has ultimately set an end to this.

10 List of figures and tables

Fig. 1: Typical partitioning of a producers projects in terms of wins and losses ..	20
Fig. 2: The long tail [Anderson, 2006].....	20
Fig. 3: Factors leading to behaviour	22
Fig. 4: Antecedents, attitudes and their impact on piracy behaviour	23
Fig. 5: Typical architecture of a DRM [Haber et al., 2003]	42
Fig. 6: Interaction between distributor, client and servers	43
Fig. 7: Typical Peer-to-Peer Architecture	49
Fig. 8: Timeline of measures taken against piracy	60
Fig. 9: Global recorded music market share 2007 [Sabbagh, 2008]	67
Fig. 10: US motion picture market share 2007, [Mojo07]	67
Fig. 11: Licensing system in the music industry [Fisher III, 2004], [Fink, 1996].	69
Fig. 12: Business structure of the motion picture industry [Fisher III, 2004], [Litman, 1998].....	71
Fig. 13: Business Model Ontology [Osterwalder, 2004].....	72
Fig. 14: Traditional supply chain in the music industry [Fink, 1996], [Vlachos et al., 2006].....	74
Fig. 15: Distribution part of current online business models	79
Fig. 16: A framework to construct new business model for the music and movie industry.....	84
Fig. 17: The e ³ value notation	85
Fig. 18: Superdistribution based P2P model in the context of the BMO framework	89
Fig. 19: The superdistribution based P2P model.....	90
Fig. 20: Rudimentary architecture involving participants and systems.....	91
Fig. 21: Multisource download scenario of two different files	93
Fig. 22: Revenue model for single source download	95
Fig. 23: P2P streaming model in the context of the BMO framework	101
Fig. 24: The P2P streaming model	103
Fig. 25: Centralized distribution	104
Fig. 26: Distribution through Content delivery networks	104
Fig. 27: Peer to Peer distribution [Thouin et al., 2007].....	104
Fig. 28: Annual revenue of online advertisement in the US from 1997 to 2008.	107
Fig. 29: The search-find-play process for music.....	110
Fig. 30: Flatrate model in the context of the BMO framework.....	111
Fig. 31: The flat rate model.....	112
Fig. 32: Types of fees in a flat fee model environment.....	114
Fig. 33: The community based model	117
Fig. 34: The concert model	119
Fig. 35: The artist to customer model	121
Fig. 36: The Creative Commons model	122

Tab. 1: Antecedents/Attitudes and their meanings	26
Tab. 2: Popular P2P Networks	49
Tab. 3: Revenue structure [Fisher III, 2004], [Vaccaro et al., 2004].....	76

11 References

Publications

[**IAB09, 2009**] (2009). *IAB Internet Advertising Revenue Report*. An Industry Survey, Sponsored by the Interactive Advertising Bureau, Conducted by PricewaterhouseCoopers.

[**Adams, 1963**] Adams, Stacy J. (1963). *Towards an understanding of inequity*. Journal of Abnormal Psychology, 67(5): 422-436.

[**Ahrens et al., 2008**] Ahrens, Sophie, Pfister, Tanja, Freese, Behrend (2008). *Critical Assumptions in Superdistribution based Business Models – Empirical Evidence from the User Perspective*. Proceedings of the 41st Hawaii International Conference on System Sciences, Waikoloa, Big Island, Hawaii, USA, 302.

[**Ajzen, 1991**] Ajzen, Icek (1991). *The Theory of Planned Behavior*. Organizational Behavior and Human Decision Process, 50: 179-211.

[**Albanese, 2006**] Albanese, Jay S. (2006). *Combating Piracy: Intellectual Property Theft and Fraud*. Transaction Publishers.

[**Anderson, 2006**] Anderson, Chris (2006). *The Long Tail: Why the Future of Business is Selling Less of More*. Hyperion.

[**Bauckhage, 2003**] Bauckhage, Tobias (2003). *The Basic Economic Theory of Copying*. In Eberhard, Becker. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.

[**Bhattacharjee et al., 2006**] Bhattacharjee, Sudip, Gopal, Ram D., Lertwachara, Kaveepan, Marsden, James R. (2006). *Impact of Legal Threats on Online Music Sharing Activity: An Analysis of Music Industry Legal Actions*. Journal of Law and Economics, 49(1): 91-114.

[**Blanchette, 2004**] Blanchette, Kasie (2004). *Effects of MP3 Technology on the Music Industry: An Examination of Market Structure and Apple iTunes*. The Holy Cross Academic Conference, New England.

- [**Bockstedt et al., 2005**] Bockstedt, Jesse C., Kauffman, Robert J., Riggins, Frederick J. (2005). *The Move to Artist Led Online Music Distribution*. Proceedings of the 38th Annual Hawaii International Conference on System Sciences, Hawaii.
- [**Bounie et al., 2005**] Bounie, David, Bourreau, Marc, Waelbroeck, Pat (2005). *Pirates or Explorers? Analysis of Music Consumption in French Graduate Schools*. Working Paper No. EC-05-01, Telecom Paris Economics.
- [**Bremer et al., 2003**] Bremer, Oliver, Buhse, Willms (2003). *Standardization in DRM – Trends and Recommendations*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.
- [**Buxmann et al., 2007**] Buxmann, Peter, Strube, Jochen, Phol, Gerrit (2007). *Cooperative Pricing in Digital Value Chains*. Journal of Electronic Commerce Research, 8(1): 32-40.
- [**Cattelan et al., 2006**] Cattelan, Renan G., He, Shan, Kirovski, Darko (2006). *Prototyping a Novel Platform for the Free-Trade of Digital Content*. Proceedings of the 12th Brazilian Symposium on Multimedia and the Web, New York, 79–88.
- [**Chiang et al., 2002**] Chiang, Eric, Assane, Djeto (2002). *Copyright Piracy on the University Campus: Trends and Lessons from the Software and Music Industries*. JMM - The International Journal on Media Management, 4(3): 145-149.
- [**Chiou et al., 2005**] Chiou, Jyh-Shen, Huang, Chien-yi, Lee, Hsin-hui (2005). *The Antecedents of Music Piracy Attitudes and Intentions*. Journal of Business Ethics, 57: 161-174.
- [**Choi et al., 2007**] Choi, David Y., Perez, Arturo (2007). *Online piracy, innovation, and legitimate business models*. Technovation, 27(4): 168-178.
- [**Clarke et al., 2002**] Clarke, Ian, Miller, Scott G., Hong, Theodore W., Sandberg, Oskar, Wiley, Brandon (2002). *Protecting Free Expression Online with Freenet*. IEEE Internet Computing, 6(1): 40–49.
- [**Connolly et al., 2006**] Connolly, Marie, Krueger, Alan B. (2006). *Rockonomics: The Economics of Popular Music*. In Ginsburgh, Victor A., Throsby, David. Handbook of the Economics of Art and Culture. Elsevier.
- [**Craver et al., 2001**] Craver, Scott A., McGregor, John P., Wu, Min, Liu, Bede, Stubblefield, Adam, Swartzlander, Ben, Wallach, Dan S., Dean, Draw, Felten, Edward W. (2001). *Reading between the lines: Lessons from the SDMI challenge*. Proceedings of the 10th USENIX Security Symposium, Washington D.C..

[**Fink, 1996**] Fink, Michael (1996). *Inside the Music Industry: Creativity, Process, and Business*. Schirmer Books.

[**Fisher III, 2004**] Fisher III, William W. (2004). *Promises to keep: technology, law and future of entertainment*. Stanford University Press.

[**Fisher III et al., 2004**] Fisher III, William W., Gasser, Urs, Bambauer, Derek, Bragin, Andrew, Harlow, Jacqueline, Hoffmann, Charles, Hwang, Renny, Jackson, Joseph, Krog, Georg, Locke, Edward, Mohr, Stephen, Reidl, Ivan, Slater, Derek, Wilson, Lee C., Palfrey, John (2004). *iTunes – How Copyright, Contract and Technology Shape the Business of Digital Media – A Case Study*. Berkman Publication Series No. 2004-07, The Berkman Centre for Internet & Society, Harvard Law School.

[**Fox et al., 2001**] Fox, Mark, Wrenn, Bruce (2001). *A Broadcasting Model for the Music Industry*. JMM: The International Journal on Media Management, 3(2): 112-119.

[**Glass et al., 1996**] Glass, Richard S., Wood, Wallace A. (1996). *Situational Determinants of Software Piracy: An Equity Theory Perspective*. Journal of Business Ethics, 15(11): 1189-1198.

[**Gooch, 2003**] Gooch, Richard (2003). *Requirements for DRM Systems*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.

[**Gopal et al., 2006**] Gopal, Ram D., Bhattacharjee, Sudip, Sanders, Lawrence G. (2006). *Do Artists Benefit from Online Music Sharing?*. Journal of Business, 79(3): 1503-1533.

[**Gopal et al., 1997**] Gopal, Ram D., Sanders, Lawrence G. (1997). *Preventive and Deterrent Controls for Software Piracy*. Journal of Management Information Systems, 13(4): 29-47.

[**Gopal et al., 2004**] Gopal, Ram D., Sanders, Lawrence G., Bhattacharjee, Sudeep, Agrawal, Manish, Wagner, Suzanne C. (2004). *A Behavioral Model of Digital Music Piracy*. Journal of Organizational Computing and Electronic Commerce, 14(2): 89-105.

[**Gordijn et al., 2001**] Gordijn, Jaap, Akkermans, Hans (2001). *Designing and Evaluating E-Business Models*. IEEE Intelligent Systems, 16(4): 11-17.

[**Gordon, 2008**] Gordon, Steve (2008). *The Future of the Music Business: How to Succeed with the New Digital Technologies*. Music Dispatch.

[Haber et al., 2003] Haber, Stuart, Horne, Bill, Pato, Joe, Sander, Tomas, Tarjan, Robert E. (2003). *If Piracy Is the Problem, Is DRM the Answer?*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.

[Halderman et al., 2006] Halderman, Alex J., Felten, Edward W. (2006). *Lessons from the Sony CD DRM Episode*. Proceedings of the 15th USENIX Security Symposium, Vancouver, B.C., Canada, 77-92.

[Hennig-Thurau et al., 2007] Hennig-Thurau, Thorsten, Henning, Victor, Sattler, Henrik (2007). *Consumer File Sharing of Motion Pictures*. Journal of Marketing, 71(4): 1-18.

[Herre, 2003] Herre, Jürgen (2003). *Content Based Identification (Fingerprinting)*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.

[Hill, 2007] Hill, Charles W. L. (2007). *Digital piracy: Causes, Consequences, and Strategic Responses*. Asia Pacific Journal of Management, 24(1): 9-25.

[Holden, 2006] Holden, Greg (2006). *Selling beyond eBay: foolproof ways to reach more customers and make big money on rival online marketplaces*. AMACOM Div American Management Association.

[Iannella, 2001] Iannella, Renato (2001). *Digital Rights Management (DRM) Architectures*. D-Lib Magazine, 7(6): Article 2.

[Katz, 2005] Katz, Ariel (2005). *A Network Effects Perspective on Software Piracy*. University of Toronto Law Journal, 55: 155-216.

[King et al., 2002] King, Stephen P., Lampe, Ryan (2002). *Network externalities and the myth of profitable piracy*. Working Paper No. 03/02, Intellectual Property Research Institute of Australia (IPRIA), University of Melbourne.

[Kostamo et al., 2007] Kostamo, Nonna, Kassinen, Otso, Koskela, Timo, Ylianttila, Mika (2007). *Analysis of Concept and Incentives for Digital Content Superdistribution*. 6th Conference on Telecommunication Techno-Economics, Helsinki, Finland, 1-6.

[Koster, 2008] Koster, Alexis (2008). *The Emerging Music Business Model: Back to the Future?*. Journal of Business Case Studies, 4(10): Article 4.

[Kuhlmann et al., 2003] Kuhlmann, Dirk, Gehring, Robert A. (2003). *Trusted Platforms, DRM, and Beyond*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.

[Kulbak et al., 2005] Kulbak, Yoram, Bickson, Danny (2005). *The eMule Protocol Specification*. , DANSS (Distributed Algorithms, Networking and Secure Systems) Lab, School of Computer Science and Engineering, The Hebrew University of Jerusalem.

[Küpper et al., 2007] Küpper, Alex, Ahrens, Sophie, Hess, Thomas, Freese, Behrend (2007). *Superdistribution of Digital Content - Overview, Opportunities and Challenges*. ITI 5th International Conference on Information and Communications Technology, Cairo, Egypt, 173-179.

[Kwong et al., 2002] Kwong, Timothy C. H., Lee, Matthew K. O. (2002). *Behavioral Intention Model for the Exchange Mode Internet Music Piracy*. 35th Hawaii International Conference on System Sciences - HICSS'02, Big Island, Hawaii, 191-201.

[Kwong et al., 2004] Kwong, Timothy C. H., Lee, Matthew K. O. (2004). *Understanding the Behavioral Intention to Digital Piracy in Virtual Communities - A Propose Model*. Proceedings of the 2004 IEEE International Conference on e-Technology, e-Commerce and e-Service, Taipei.

[Laing, 1999] Laing, Dave (1999). *World Record Sales 1998*. Popular Music, 18(3): 415-416.

[Lesk, 2003] Lesk, Michael (2003). *Chicken Little and the recorded music crises*. IEEE Security & Privacy, 1(5): 73-75.

[Liang et al., 2005] Liang, Jian, Kumar, Rakesh, Xi, Yongjian, Ross, Keith W. (2005). *Pollution in P2P File Sharing Systems*. INFOCOM 2005 24th Annual Joint Conference of the IEEE Computer and Communications Societies, , 1174-1185.

[Liebowitz, 2006] Liebowitz, Stan J. (2006). *File-sharing: Creative destruction or plain destruction?*. Journal of Law and Economics, 49(1): 1-28.

[Liebowitz, 2005] Liebowitz, Stan J. (2005). *Pitfalls in measuring the impact of file-sharing on the sound recording market*. CESifo Economic Studies, 51(2-3): 435-473.

[Liebowitz, 2007] Liebowitz, Stan J. (2007). *How Reliable is the Oberholzer-Gee and Strumpf paper on File-Sharing?*. Working paper, Center for the Analysis of Property Rights and Innovation.

[Liebowitz, 2003] Liebowitz, Stan J. (2003). *Will MP3 Downloads Annihilate the Record Industry? The Evidence so Far*. In Liebecap, Gary. *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*. JAI Press.

[Li et al., 2008] Li, Minglu, Yu, Jiadi, Wu, Jie (2008). *Free-Riding on BitTorrent-like Peer-to-Peer File Sharing Systems: Modeling Analysis and Improvement*. *IEEE Transactions on Distributed Systems*, 19(7): 954–966.

[Litman, 1998] Litman, Barry R. (1998). *The motion picture mega-industry*. Allyn and Bacon.

[Liu et al., 2007] Liu, Zhengye, Shen, Yanming, Panwar, Shivendra S., Ross, Keith W., Wang, Yao (2007). *Using Layered Video to Provide Incentives in P2P Live Streaming*. *Proceedings of the 2007 workshop on Peer-to-peer streaming and IP-TV*, Kyoto, Japan, 311-316.

[Lyng, 2003] Lyng, Robert (2003). *Die Praxis im Musikbusiness*. PPVMedien GmbH.

[McGee et al., 2005] McGee, Kevin, Skågeby, Jorgen (2005). *Gifting Technologies*. *First Monday*, 9(12): 1-15.

[Meshkova et al., 2008] Meshkova, Elena, Riihijärvi, Janne, Petrova, Marina, Mähönen, Petri (2008). *A Survey on Resource Discovery Mechanisms, Peer-to-Peer and Service Discovery Frameworks*. *Computer Networks*, 52(11): 2097-2128.

[Mori et al., 1990] Mori, Ryoichi, Kawahara, Masaji (1990). *Superdistribution: The Concept and the Architecture*. *Transaction of the Institute of Electronic, Information, and Communication Engineers*, E73-E(7): 1133-1146.

[Morrow, 2009] Morrow, Guy (2009). *Radiohead's Managerial Creativity*. *Convergence: The International Journal of Research into New Media Technologies*, 15(2): 161-176.

[Oberholzer-Gee et al., 2007] Oberholzer-Gee, Felix, Strumpf, Koleman (2007). *The Effect of File Sharing on Record Sales: An Empirical Analysis*. *Journal of Political Economy*, 115(1): 1-42.

[Oksanen et al., 2007] Oksanen, Ville, Välimäki, Mikko (2007). *Theory of Deterrence and Individual Behavior. Can Lawsuits Control File Sharing on the Internet?*. Review of Law and Economics, 3(3): Article 4.

[Osterwalder, 2004] Osterwalder, Alexander (2004). *The Business Model Ontology: A Proposition in a Design Science Approach*. Thesis, Licencié en Sciences Politiques, l'Université de Lausanne.

[Park et al., 2008] Park, Kunwoo, Pack, Sangheon, Kwon, Taekyoung (2008). *Climber: An Incentive-based Resilient Peer-to-Peer System for Live Streaming Services*. Proceedings of the 7th International Workshop on Peer-to-Peer Systems, Tampa Bay, Florida, USA.

[Peitz et al., 2004] Peitz, Martin, Waelbroeck, Patrick (2004). *The Effect of Internet Piracy on CD Sales: Cross-Section Evidence*. Working Paper No. 1122, Category 9: Industrial Organisation, CESifo.

[Perugini et al., 2001] Perugini, Marco, Bagozzi, Richard P. (2001). *The role of desires and anticipated emotions in goal-directed behaviours: Broadening and deepening the theory of planned behaviour*. British Journal of Social Psychology, 40(1): 79-98.

[Polinsky et al., 1992] Polinsky, Mitchell A., Schavell, Steven (1992). *Enforcement costs and the optimal magnitude and probability of fines*. Journal of Law and Economics, 35: 133-148.

[Pouwelse et al., 2005] Pouwelse, Johan, Garbacki, Pawel, Epema, Dick, Sips, Henk (2005). *The BitTorrent P2P File-Sharing System: Measurements and Analysis*. Proceedings of the 4th International Workshop on Peer-to-Peer Systems (IPTPS'05), Ithaca, New York, USA, 205-216.

[Proserpio et al., 2005] Proserpio, Luigi, Salvemini, Severino, Ghiringhelli, Valerio (2005). *Entertainment Pirates: Understanding Piracy Determinants in the Movie, Music and Software Industries*. International Journal of Arts Management, 8(1): 1-19.

[Quiring et al., 2008] Quiring, Oliver, Von Walter, Benedikt, Atterer, Richard, Hess, Thomas (2008). *Decentralized Electronic Markets: Exploring the Effects of Revenue Splitting Inside File Sharing Systems*. Electronic Markets, 18(2): 175-186.

[Rayna, 2004] Rayna, Thierry (2004). *Piracy and innovation: does piracy restore competition?*. DRUID Summer Conference on Industrial Dynamics, Innovation and Development, Elsinore, Denmark.

- [Rob et al., 2006]** Rob, Rafael, Waldfogel, Joel (2006). *Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students*. Journal of Law and Economics, 49(1): 29-62.
- [Roettgers, 2003]** Roettgers, Janko (2003). *Mix, Burn & R.I.P. Das Ende der Musikindustrie*. Heise Zeitschriften.
- [Schmidt, 2008]** Schmidt, Andreas U. (2008). *On the Superdistribution of Digital Goods*. , Fraunhofer Institute for Secure Information Technology SIT.
- [Schultz, 2009]** Schultz, Mark F. (2009). *Live Performance, Copyright and the Future of the Music Business*. University of Richmond Law Review, 43(2): 685-764.
- [Silverston et al., 2008]** Silverston, Thomas, Fourmaux, Olivier, Crowcroft, Jon (2008). *Towards an Incentive Mechanism for Peer-to-Peer Multimedia Live Streaming Systems*. 8th International Conference on Peer-to-Peer Computing, Aachen, Germany, 125-128.
- [Simons, 2003]** Simons, Barbara (2003). *The Copyright Wars – A Computer Scientist's View of Copyright in the U.S.*. In Becker, Eberhard. Digital Rights Management: Technological, Economic, Legal and Political Aspects. Springer.
- [Sprigman, 2006]** Sprigman, Christopher (2006). *The 99 cents question*. Journal on Telecommunications & High Technology Law, 5(1): 87-124.
- [Tan et al., 2008]** Tan, Guang, Jarvis, Stephen A. (2008). *A Payment-Based Incentive and Service Differentiation Scheme for Peer-to-Peer Streaming Broadcast*. IEEE Transactions on Parallel and Distributed Systems, 19(7): 940-953.
- [Taylor et al., 2009]** Taylor, Steven A., Ishida, Chiharu, Wallace, David W. (2009). *Intention to Engage in Digital Piracy: A Conceptual Model and Empirical Test*. Journal of Service Research, 11(3): 246-262.
- [Tewari et al., 2007]** Tewari, Saurabh, Kleinrock, Leonard (2007). *Analytical model for BitTorrent based live video streaming*. 4th IEEE Consumer Communications and Networking Conference, Las Vegas, USA, 976-980.
- [Thouin et al., 2007]** Thouin, Frederic, Coates, Mark (2007). *Video-on-Demand Networks: Design Approaches and Future Challenges*. IEEE Network, 21(2): 42-48.

[**Tu et al., 2005**] Tu, Yi-Cheng, Sun, Jianzhong, Hefeeda, Mohamed, Prabhakar, Sunil (2005). *An analytical study of peer-to-peer media streaming systems*. ACM Transactions on Multimedia Computing, Communications, and Applications, 1(4): 354-376.

[**Vaccaro et al., 2004**] Vaccaro, Valerie L., Cohn, Deborah Y. (2004). *The Evolution of Business Models and Marketing Strategies in the Music Industry*. The International Journal on Media Management, 61(1&2): 46-58.

[**Vlachos et al., 2006**] Vlachos, Pavlos, Vrechopoulos, Adam, Pateli, Adamantia (2006). *Drawing Emerging Business Models for the Mobile Music Industry*. Electronic Markets, 16(2): 154-168.

[**Von Lohmann, 2004**] Von Lohmann, Fred (2004). *Voluntary Collective Licensing for Music File Sharing*. Communications of the ACM, 47(10): 21-24.

[**Zentner, 2006**] Zentner, Alejandro (2006). *Measuring the Effect of File Sharing on Music Purchases*. Journal of Law and Economics, 49(1): 63-90.

[**Zhang et al., 2005**] Zhang, Xinyan, Liu, Jiangchuan, Li, Bo, Yum, Tak-Shing P. (2005). *CoolStreaming/DONet: A Data-Driven Overlay Network for Efficient Live Media Streaming*. Proceedings of the 24th Annual Joint Conference of the IEEE Computer and Communications Societies, Miami, USA.

Online sources

[**AACSLA09**] *Who are the founders?*. Retrieved May 20, 2009, from Advanced Access Content System:
[<http://www.aacsla.com/founders>]

[**Anderson, 2008**] Anderson, Chris (2008). *Free! Why \$0.00 Is the Future of Business*. Retrieved May 20, 2009, from Wired:
[http://www.wired.com/techbiz/it/magazine/16-03/ff_free]

[**Apple04**] (2004). *iTunes Music Store in Europe Sells 800,000 Songs in First Week*. Retrieved May 20, 2009, from Apple:
[<http://www.apple.com/pr/library/2004/jun/23itunes.html>]

[**ARR09**] *AR Rahman Fangroup*. Retrieved May 20, 2009, from Yahoo Groups:
[<http://groups.yahoo.com/group/arrahmanfans>]

[**BE09**] *Broadband Experts*. Retrieved May 20, 2009, from :
[<http://www.broadband-expert.co.uk/3g-broadband>]

[BKA09a] (2009). § 90c - *Bundesrecht: Gesamte Rechtsvorschrift für Urheberrechtsgesetz*. Retrieved May 20, 2009, from RIS:
[<http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10001848>]

[BKA09b] § 76 (4) - *Bundesrecht: Gesamte Rechtsvorschrift für Urheberrechtsgesetz*. Retrieved May 20, 2009, from RIS:
[<http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10001848>]

[BMJ07] (2007). *Neues Urheberrecht tritt zum 1. Januar 2008 in Kraft*. Retrieved May 20, 2009, from BMJ:
[http://www.bmj.bund.de/enid/Pressestelle/Pressemitteilungen_58.html?druck=1&pmc_id=4788]

[Borland, 2003] Borland, John (2003). *eMusic sold; unlimited MP3 downloads nixed*. Retrieved May 20, 2009, from CNET:
[http://news.cnet.com/eMusic-sold-unlimited-MP3-downloads-nixed/2100-1027_3-5089830.html]

[Box09] *Box*. Retrieved May 20, 2009, from :
[<http://www.box.net>]

[BT09] *Protocol Specification v1.0*. Retrieved May 20, 2009, from :
[<http://wiki.theory.org/index.php/BitTorrentSpecification>]

[Cashmore, 2006] Cashmore, Pete (2006). *MySpace Hits 100 Million Accounts*. Retrieved May 20, 2009, from Mashable:
[<http://mashable.com/2006/08/09/myspace-hits-100-million-accounts>]

[CH09] *The Statute of Anne, 1710*. Retrieved May 20, 2009, from Copyright History:
[<http://www.copyrighthistory.com/anne.html>]

[Chiariglione03] (2003). *Riding the Media Bits Opening content protection*. Retrieved May 20, 2009, from :
[http://www.chiariglione.org/ride/opening_content_protection/opening_content_protection.htm]

[CL09a] § 1201 (a) (1) (A) - *Circumvention of copyright protection systems*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap12.pdf>]

[**CL09b**] § 1201 (a) (2) - *Circumvention of copyright protection systems*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap12.pdf>]

[**CL09c**] § 1201 (3) (B) - *Circumvention of copyright protection systems*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap12.pdf>]

[**CL09d**] § 107 - *Limitations on exclusive rights: Fair use*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap1.pdf>]

[**CL09e**] § 1008 - *Prohibition on certain infringement actions*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap10.pdf>]

[**CL09f**] § 512 - *Limitations on liability relating to material online*. Retrieved May 20, 2009, from Copyright Law of the United States:
[<http://www.copyright.gov/title17/92chap5.pdf>]

[**Choi et al., 2006**] Choi, David Y., Perez, Arturo (2006). *Online Piracy and the Emergence of New Business Models*. Retrieved May 20, 2009, from Small Business Advancement National Center:
[<http://www.sbaer.uca.edu/research/usasbe/2006/pdf/papers/cases/016.pdf>]

[**Crampton, 2006**] Crampton, Thomas (2006). *Russian Download Site Is Popular and Possibly Illegal*. Retrieved May 20, 2009, from New York Times:
[<http://www.nytimes.com/2006/06/01/world/europe/01cnd-mp3.html?ex=1306814400&en=4c9bcba30952e86b&ei=5090&partner=rssuserland&emc=rss>]

[**DCIA05**] (2005). *Must P2P TV: NBC File Sharing*. Retrieved May 20, 2009, from Distributed Computing Industry Association:
[http://www.dcia.info/news/newsletter_2005-11-21.htm#NBC]

[**Doctorow, 2008**] Doctorow, Cory (2008). *FREE: Wired's Chris Anderson explores the Divide-By-Zero problem in the Long Tail*. Retrieved May 20, 2009, from :
[<http://www.boingboing.net/2008/02/24/free-wireds-chris-an.html>]

[**Duke09**] *The History of Recorded Music*. Retrieved May 20, 2009, from Sociology at Duke:
[<http://www.soc.duke.edu/~s142tm01/history4.html>]

[EFF07] (2007). *RIAA v. The People: Four Years Later*. Retrieved May 20, 2009, from Electronic Frontier Foundation:
[http://w2.eff.org/IP/P2P/riaa_at_four.pdf]

[EMI07] (2007). *EMI Music launches DRM-free superior sound quality downloads across its entire digital repertoire*. Retrieved May 20, 2009, from Emigroup:
[<http://www.emigroup.com/Press/2007/press18.htm>]

[EMR07] (2007). *Digital Music Survey 2007*. Retrieved May 20, 2009, from Entertainment Media Research:
[http://web.archive.org/web/20071105194109/http://www.entertainmentmediaresearch.com/reports/EMR_Digital_Music_Survey2007.pdf]

[EMR08] (2008). *Digital Music Survey 2008*. Retrieved May 20, 2009, from Entertainment Media Research:
[http://www.entertainmentmediaresearch.com/reports/DigitalEntertainmentSurvey2008_FullReport.pdf]

[Europa01] (2001). *Directive 2001/29/EC of the European Parliament and of the Council*. Retrieved May 20, 2009, from Europa:
[<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:167:0010:0019:EN:PDF>]

[Falcone, 2007] Falcone, John P. (2007). *Blu-ray and HD DVD encryption cracked?*. Retrieved May 20, 2009, from CNET:
[http://news.cnet.com/8301-17938_105-9686911-1.html]

[FMQB09] (2009). *BIA: Radio Revenue Recovery Coming In '11*. Retrieved May 20, 2009, from Friday Morning Quarterback:
[<http://www.fmqb.com/Article.asp?id=1239436>]

[Gigstreams08] (2008). *Coolstreaming Download*. Retrieved May 20, 2009, from :
[<http://www.gigstreams.com/coolstreaming-download>]

[Gonsalves, 2008] Gonsalves, Antone (2008). *Amazon Adds Fourth Major Record Label To DRM-Free Music Store*. Retrieved May 20, 2009, from Information Week:
[<http://www.informationweek.com/news/global-cio/showArticle.jhtml?articleID=205602334>]

[Gracnote09] *Gracnote*. Retrieved May 20, 2009, from :
[<http://www.gracnote.com>]

[GT09] *Grup Tekkan*. Retrieved May 20, 2009, from :
[<http://www.grup-tekkkan.com>]

[Halpin, 2007] Halpin, Tony (2007). *Russia shuts down Allofmp3.com*. Retrieved May 20, 2009, from :
[<http://www.timesonline.co.uk/tol/news/world/europe/article2016297.ece>]

[Hau, 2008] Hau, Loius (2008). *Another Record Year For The Concert Industry*. Retrieved May 20, 2009, from Forbes:
[http://www.forbes.com/2008/01/04/concert-revenues-2007-biz-media-cx_lh_0104bizconcert.html]

[Ian, 2002] Ian, Janis (2002). *The Internet Debacle – An Alternative View*. Retrieved May 20, 2009, from Janis Ian:
[http://www.janisian.com/article-internet_debacle.html]

[IFPI00] (2000). *Die Tonträgerwirtschaft in Deutschland: Bundesverband Phono und IFPI Deutschland*. Retrieved May 20, 2009, from IFPI:
[<http://web.archive.org/web/20001214003100/http://ifpi.de>]

[IFPI06] (2006). *The Recording Industry 2006 Piracy Report*. Retrieved May 20, 2009, from IFPI:
[<http://www.ifpi.org/content/library/piracy-report2006.pdf>]

[IFPI07] *Recorded Music Sales 2007*. Retrieved May 20, 2009, from IFPI:
[<http://www.ifpi.org/content/library/Recorded-music-sales-2007.pdf>]

[IFPI08] *Digital Music Report 2008, Music market statistics*. Retrieved May 20, 2009, from IFPI:
[http://www.ifpi.org/content/section_statistics/index.html]

[IFPI09] *Digital Music Report 2008 and 2009, Music market statistics*. Retrieved May 20, 2009, from IFPI:
[http://www.ifpi.org/content/section_statistics/index.html]

[IL00] (2000). *A&M Records, Inc., et al. v. Napster, Inc.*. Retrieved May 20, 2009, from Internet Library:
[http://www.internetlibrary.com/cases/lib_case42.cfm]

[IMDB09] (2006-2008). . Retrieved May 20, 2009, from Internet Movie Database:
[<http://www.imdb.com/Sections/Years>]

[IRC09] (2009). *Internet Relay Chat*. Retrieved May 20, 2009, from Netsplit:
[<http://irc.netsplit.de>]

[Jamendo09] *Jamendo*. Retrieved May 20, 2009, from :
[<http://www.jamendo.com>]

[Jobs, 2007] Jobs, Steve (2007). *Thoughts on Music*. Retrieved May 20, 2009, from Apple:
[<http://www.apple.com/hotnews/thoughtsonmusic>]

[Juris09] § 53 (1) - *Gesetz über Urheberrecht und verwandte Schutzrechte*. Retrieved May 20, 2009, from Juris:
[http://bundesrecht.juris.de/urhg/__53.html]

[Kingston09] *Kingston Sean*. Retrieved May 20, 2009, from MySpace:
[<http://www.myspace.com/seankingston>]

[Kravets et al., 2009] Kravets, David, Sjoden, Kerstin (2009). *Pirate Bay Bias Charge: 'Random' Judge Assignment Wasn't*. Retrieved May 20, 2009, from Wired:
[<http://www.wired.com/threatlevel/2009/05/pirate-bay-defendants-add-new-bias-charges>]

[Leonhard, 2008] Leonhard, Gerd (2008). *Music 2.0: Essays by Gerd Leonhard*. Retrieved May 20, 2009, from Music 2.0 Book:
[<http://www.music20book.com>]

[Lily09] *Allen Lily*. Retrieved May 20, 2009, from MySpace:
[<http://www.myspace.com/lilymusic>]

[Love, 2000] Love, Courtney (2000). *Courtney Love does the math*. Retrieved May 20, 2009, from Salon:
[<http://archive.salon.com/tech/feature/2000/06/14/love>]

[Maney, 2004] Maney, Kevin (2004). *Apple's iTunes might not be the only answer to ending piracy*. Retrieved May 20, 2009, from :
[http://magnatune.com/info/press/coverage/usa_today]

[**Microsoft09**] *Play for sure*. Retrieved May 20, 2009, from Microsoft:
[<http://www.microsoft.com/windows/windowsmedia/playsforsure>]

[**Miller, 2008**] Miller, Zack (2008). *Live Nation: A key player with music players*. Retrieved May 20, 2009, from Blogging Stocks:
[<http://www.bloggingstocks.com/2008/01/22/live-nation-a-key-player-with-music-players>]

[**Modine, 2008**] Modine, Austin (2008). *Red Hat cheerleading purges Q4 profits: Momentum isn't cheap*. Retrieved May 20, 2009, from The Register:
[http://www.theregister.co.uk/2008/03/27/red_hat_q4_2008_earnings]

[**Mojo07**] (2007). *Studio Market Share*. Retrieved May 20, 2009, from Box Office Mojo:
[<http://www.boxofficemojo.com/studio/?view=company&view2=yearly&yr=2007&p=.htm>]

[**Morris, 2008**] Morris, Nigel (2008). *Music industry to tax downloaders*. Retrieved May 20, 2009, from Independent:
[<http://www.independent.co.uk/arts-entertainment/music/news/music-industry-to-tax-downloaders-875757.html>]

[**Mozilla05**] (2005). *Mozilla Foundation Forms New Organization to Further the Creation of Free, Open Source Internet Software, Including the Award-Winning Mozilla Firefox Browser*. Retrieved May 20, 2009, from Mozilla:
[<http://www.mozilla.org/press/mozilla-2005-08-03.html>]

[**MPA06**] (2006). *The Cost of Movie Piracy*. Retrieved May 20, 2009, from Motion Picture Association:
[<http://motionpictureassociation.org/leksummaryMPA%20revised.pdf>]

[**Musicover09**] *Musicover*. Retrieved May 20, 2009, from :
[<http://musicover.com>]

[**Nagle, 2007**] Nagle, Robert (2007). *Jamendo: A business model that works! (Maybe)*. Retrieved May 20, 2009, from :
[<http://www.teleread.org/2007/01/30/jamendo-a-business-model-that-works>]

[**Newton, 2007**] Newton, John (2007). *p2pnet talks to AllofMP3.com*. Retrieved May 20, 2009, from P2Pnet:
[<http://www.p2pnet.net/story/12348>]

[Numbers07] (2007). *Top-Selling DVDs of 2007*. Retrieved May 5, 2009, from The Numbers:
[<http://www.the-numbers.com/dvd/charts/annual/r2007.php>]

[P2P06] (2006). *P2P Survey 2006*. Retrieved May 20, 2009, from Ipoque:
[http://www.ipoque.com/userfiles/file/p2p_survey_2006.pdf]

[Pandora09] *Frequently Asked Questions*. Retrieved May 20, 2009, from Pandora:
[<http://blog.pandora.com/faq/>]

[Park, 2005] Park, Dave (2005). *Arctic Monkeys Aren't fooling around*. Retrieved May 20, 2009, from Prefix Magazine:
[<http://www.prefixmag.com/features/arctic-monkeys/arent-fooling-around-part-1-of-2/12565>]

[ProMusic09] *School Materials*. Retrieved May 20, 2009, from Pro-Music:
[<http://www.pro-music.org/content/guidesandresources/school-material.php>]

[Roettgers07a] Roettgers, Janko (2007). *Essay: Usenet, the Original Piracy Hotbed*. Retrieved May 20, 2009, from New Tee Vee:
[<http://newteevee.com/2007/06/02/usenet>]

[Roettgers07b] Roettgers, Janko (2007). *Piracy Beyond P2P: One-Click Hosters*. Retrieved May 20, 2009, from New Tee Vee:
[<http://newteevee.com/2007/06/17/one-click-hosters>]

[Roettgers07c] Roettgers, Janko (2007). *YouTube, MySpace Face European Copyright Clash*. Retrieved May 20, 2009, from New Tee Vee:
[<http://newteevee.com/2007/02/01/youtube-myspace-face-european-copyright-clash>]

[Romow08] (2008). *Average Hollywood Movie Now Costs over \$106 Million*. Retrieved May 20, 2009, from Romow:
[<http://www.romow.com/entertainment-blog/average-hollywood-movie-now-costs-over-106-million>]

[Sabbagh, 2008] Sabbagh, Dan (2008). *Tough year leaves EMI trailing the music majors*. Retrieved May 20, 2009, from Times Online:
[http://business.timesonline.co.uk/tol/business/industry_sectors/media/article3683398.ece]

[Sandvine08] (2008). *2008 Analysis of Traffic Demographics in North-American Broadband Networks*. Retrieved May 20, 2009, from Sandvine:

[http://www.sandvine.com/general/documents/Traffic_Demographics_NA_Broadband_Networks.pdf]

[**Schliesel, 2004**] Schliesel, Seth (2004). *The Internet's Wilder Side*. Retrieved May 20, 2009, from New York Times:
[<http://www.nytimes.com/2004/05/06/technology/circuits/06chat.html?scp=1&sq=the internet's wilder side&st=cse>]

[**Shazam09**] *Shazam*. Retrieved May 20, 2009, from :
[<http://www.shazam.com>,]

[**Sjoden, 2009**] Sjoden, Kerstin (2009). *Swedish Pirate Party Doubles in Size After Bay Verdict*. Retrieved May 20, 2009, from Wired:
[<http://www.wired.com/threatlevel/2009/04/swedish-pirate>]

[**Spiegel02**] (2002). *Das Publikum schickt Bully in den Weltraum*. Retrieved May 20, 2009, from Spiegel:
[<http://www.spiegel.de/kultur/kino/0,1518,200313,00.html>]

[**Spiralfrog08**] (2008). *Frequently Asked Questions: Membership to Spiralfrog*. Retrieved May 20, 2009, from Spiralfrog:
[<http://web.archive.org/web/20080213025146/http://www.spiralfrog.com/pages/frequently.aspx>]

[**Stout, 2000**] Stout, David (2000). *Youth Sentenced in Government Hacking Case*. Retrieved May 20, 2009, from New York Times:
[<http://www.nytimes.com/2000/09/23/us/youth-sentenced-in-government-hacking-case.html>]

[**Techradar08**] (2008). *Facebook, Myspace Statistics*. Retrieved May 20, 2009, from Techradar:
[<http://techradar1.wordpress.com/2008/01/11/facebookmyspace-statistics>]

[**Ubuntu08**] (2008). *How does Open Source make money?*. Retrieved May 20, 2009, from Ubuntucat:
[<http://ubuntucat.wordpress.com/2008/05/30/how-does-open-source-make-money>]

[**USAToday06**] (2006). *YouTube serves up 100 million videos a day online*. Retrieved May 20, 2009, from USA Today:
[http://www.usatoday.com/tech/news/2006-07-16-youtube-views_x.htm]

[**Vamosi, 2002**] Vamosi, Robert (2002). *Pirated movies: Now playing on a server near you*. Retrieved May 20, 2009, from ZDNET:
[http://news.zdnet.com/2100-9595_22-122663.html]

[Vara, 2007] Vara, Vauhini (2007). *Facebook Gets Personal With Ad Targeting Plan*. Retrieved May 20, 2009, from Wall Street Journal:
[http://online.wsj.com/article/SB118783296519606151.html?mod=e-commerce_primary_hs]

[Von Lohmann, 2008] Von Lohmann, Fred (2008). *A Better Way Forward: Voluntary Collective Licensing of Music File Sharing*. Retrieved May 20, 2009, from Electronic Frontier Foundation:
[<http://www.eff.org/wp/better-way-forward-voluntary-collective-licensing-music-file-sharing>]

[Wikimedia09] *List of Wikipedias*. Retrieved May 20, 2009, from Wikimedia:
[http://meta.wikimedia.org/wiki/List_of_Wikipedias]

[Wilson06a] Wilson, Fred (2006). *My Favorite Business Model*. Retrieved May 20, 2009, from AVC:
[http://www.avc.com/a_vc/2006/03/my_favorite_bus.html]

[Wilson06b] Wilson, Fred (2006). *The Freemium Business Model*. Retrieved May 20, 2009, from AVC:
[http://www.avc.com/a_vc/2006/03/the_freemium_bu.html]

[YouTube07a] (2007). *Anti-Piracy Parody - The IT Crowd*. Retrieved May 20, 2009, from YouTube:
[<http://www.youtube.com/watch?v=KjGQ1wX5W0g>]

[YouTube07b] (2007). *Anti-Piracy Parody Ad*. Retrieved May 20, 2009, from YouTube:
[http://www.youtube.com/watch?v=AlZo4x_p4ug]

[YouTube09] *YouTube on Your Site*. Retrieved May 20, 2009, from YouTube:
[<http://www.youtube.com/youtubeonyoursite?gl=US&hl=en-GB>]

Appendix I – English abstract

This master thesis deals with the issue of online digital piracy of commercial audio and video works in a comprehensive way by analyzing the social, technical, legal and economic perspective of this delicate matter with a detailed focus on the latter.

Since at least a decade the worldwide music and movie industry is facing its most crucial challenge. The development of the internet and its deployment in almost every household in the world has brought negative side effects for the content industry. Every song and every movie can be digitalized and transported to the computers of every household in no time and with little resources. The incentive to actually spend money on a record or a DVD has to be re-created from the beginning. A whole generation is growing up under the perception that music and films are free like public goods.

The objective of this master thesis is not merely an analysis of the present status, but rather a compilation of fresh ideas and innovative business models, sometimes in favor of the producing side (artists, record companies), sometimes of the receiving side (listeners, viewers, fans) and ideally, for all stakeholders involved. Therefore the author thinks that useful solutions can only be derived by studying the matter in its whole.

This begins with the people, the consumers who generate revenue, which is essential for the artist to continue producing art. The chapter dealing with the social angle of this issue looks at the motivation and needs of consumers, boiling down to the question: Why do they pirate?

Piracy as exercised by millions all over the world is a phenomenon which is more complex than simple shoplifting. The unlawful act of acquiring an entertainment product without paying for it is merely the surface of the whole issue, more of a result than the cause. Technology may be one reason, but various other factors such as social justice, perceived value of the industry and deindividuation also play a significant role in this phenomenon. The fact that pirates are not distinguishable merely by usual characteristic features such as age, sex, income level or social status adds to the complexity. In that context this chapter also initiates a discussion on the status of music as such in the modern world, especially in the light of technical innovations, which cannot be revoked anymore. Rather than to sell music, can it be merely shared? Or even changed into a public good?

Technical innovations such as the internet and peer to peer protocols have definitely smoothened the way to online piracy, but it is equally interesting to observe the reciprocal influence that piracy has on innovation. Actions to prevent piracy have led to a number of innovations in the security sector. What if piracy has led people to think of new ways how to reach their customer?

Finally a dispute about the influence of piracy on current sales figures is addressed. It may seem natural that millions of illegitimate downloads will lead to a

decrease in the sales of CDs and DVDs, but the question is whether piracy is solely responsible for that decline and to which extent.

Piracy has always been tried to be fought technically. That lies in the nature of the issue. If the hardware and software industry is capable of producing devices and programs to help pirates, it should also be possible to at least keep away the end user from illegitimately copying the industry's products by restricting them technically. DRM has always been the term to subsume this practice. The chapter dealing with technical issues looks into the most common DRM practices and its effectiveness. On the other side, customary systems used to pirate will also be examined.

There is no legitimate and illegitimate downloading and uploading without knowing the legal grounds. These will be presented in the chapter dealing with the legal aspects of copyright and piracy. Based on the popular Digital Millennium Copyright Act published under the Clinton administration in the US and the EU Copyright Directive valid in the EU countries, the ambiguity and shortsightedness surrounding these laws will be shown.

After covering the various measures taken to get hold of piracy, the main part of this thesis then deals with the economic perspective. The reason for this being the crucial part lies in the belief of the author that piracy can only be effectively prevented by alternatives, by offering pirates attractive options to lead them back the way of being a legitimate customer. This chapter begins with a study of the current structure of the industry with its prevalent business models, both offline and online. Then soon a framework is constructed to identify new business models, more suitable for the needs of the modern consumers. The following new business models suggested derive its components from this framework.

Some of the ideas presented are already being practiced in real world, more on an experimental level. The objective of this thesis is to throw more light upon these models, analyze its potentials and derive possible practical scenarios. The superdistribution based peer-to-peer model for example tries to combine the reselling mentality of eBay-users with the efficiency and popularity of P2P systems used to pirate. The P2P streaming model on the other side picks up the prevalent trend of on demand streaming of music and video, popularized by YouTube and similar services. Some of the models presented here may only work in parts of the market, like a community based model where fans adopt a more active role in marketing the artist. Nevertheless also these models are worth discussing since the prospect of finding a solution for everyone is not realistic due to the high diversity of art itself.

Finally the master thesis concludes with a short forecast and a general recommendation for the content industry.

Appendix II – German abstract - Zusammenfassung

Diese Masterarbeit behandelt die digitale Piraterie von Musik und Filmen über das Internet in seiner Gesamtheit durch die Analyse der sozialen, technischen, rechtlichen und ökonomischen Perspektive dieser heiklen Thematik. Der Fokus liegt dabei auf das Letztere.

Seit mindestens einem Jahrzehnt sieht sich die Musik und Filmindustrie mit einer existenziellen Krise konfrontiert. Die Entwicklung von Internet und der Zugang dazu für fast jeden Haushalt hatten negative Auswirkungen für die Unterhaltungsbranche. Jedes Lied und jeder Film kann digitalisiert und an jeden beliebigen Rechner weltweit verschickt werden. Dazu bedarf es weder viel Zeit noch Ressourcen. Der Anreiz, für den Erwerb von Musik und Film Geld auszugeben, muss erst wieder vom Neuen geboten werden, denn eine ganze Generation wächst heran im Glauben, dass Lieder und Filme kostenlose, frei erhältliche Güter sind.

Das Ziel dieser Arbeit beschränkt sich nicht bloß auf die Analyse der Ist-Situation, sondern es ist eher ein Versuch dieser Industrie frische Ideen und neue Geschäftsmodelle zu liefern. Manche werden zu Gunsten der Werkschaffenden sein (Musiker, Filmemacher), manche dagegen zu Gunsten der Nutznießer der Kunst (Konsumenten, Musikliebhaber). Doch idealerweise werden alle Beteiligten ihre Vorteile aus der Angelegenheit ziehen. Daher glaubt der Autor, dass sinnvolle Lösungsansätze nur durch das Studium der Gesamtproblematik abgeleitet werden können.

Der Anfang wird bei den Menschen, den Konsumenten gemacht. Denn dieser hält das System erst am Leben durch den ständigen Konsum der Unterhaltungsgüter. Das Kapitel welches die soziale Perspektive behandelt beschäftigt sich vor allem mit der Motivation und den Anforderungen des Konsumenten, welches in der zentralen Frage mündet: Warum begehen sie Piraterie?

Piraterie wie sie von Millionen von Menschen weltweit begangen wird ist ein viel komplexeres Phänomen als der bloße Diebstahl eines Gutes. Diese illegale Handlung des unrechtmäßigen Herunterladens eines Musikstückes oder Films ist wenn, dann bloß die Oberfläche eines viel tiefer liegenden Uneinigkeit zwischen dem Konsumenten und dem Produzenten. Es ist vielmehr das Resultat als der Grund für den gegenwärtigen Missstand. Die rasante Entwicklung der Technologie mag ein Grund sein, doch ebenso sind soziale Gerechtigkeit, tatsächlich wahrgenommener Wert der Unterhaltungsindustrie und der Wunsch des Menschen nach Anonymisierung in der heutigen Welt Anlass für eine differenzierte und gründliche Untersuchung dieser Thematik. In diesem Zusammenhang wird auch die Grundsatzfrage nach der Behandlung von Musik als solches in der modernen Welt diskutiert. Denn technologische Fortschritte werden nicht rückgängig gemacht und daher ist womöglich ein Umdenken besonders jetzt notwendig.

Technische Innovation wie zum Beispiel das Internet oder das Peer-to-Peer Protokoll haben sicherlich dazu beigetragen, dass Piraterie im Allgemeinen erleichtert wurde. Doch wie sieht es aus mit dem Einfluss der Piraterie auf die Inno-

vationsfähigkeit? Immerhin haben die Bemühungen die Piraterie einzudämmen bereits zu Innovationen in der Sicherheitsbranche geführt. Was wenn die Online Piraterie Menschen dazu bringt sich zu überlegen wie man den heutigen Konsumenten, der viel Zeit und Mühe im Internet investiert, am Besten erreichen kann.

Zu guter Letzt wird noch ein Disput über den Einfluss von Piraterie auf den Umsatz von CDs und DVDs untersucht. Es mag relativ einleuchtend klingen, dass dieser Einfluss sehr wohl gegeben ist, allerdings geht es hier um die Frage ob die Piraterie alleine dafür verantwortlich ist und wenn ja, zu welchem Ausmaß.

Es wurde immer versucht mit technischen Schranken gegen Piraterie vorzugehen. Das liegt in der Natur der Sache. Geräte und Programme die ein Lied oder einen Film abspielen können sollten auch dazu fähig sein dieses gegeben falls nicht zu tun, nämlich im Falle einer Raubkopie. Der übliche Terminus dafür ist DRM (Digital Rights Management – Digitale Rechteverwaltung). Das Kapitel das die technische Perspektive behandelt setzt sich gründlich mit DRM auseinander. Ebenso aber wird auch die Gegenseite durchleuchtet. Das sind die Systeme mit denen Piraterie in erster Linie betrieben wird.

Ob eine Datei rechtmäßig oder unrechtmäßig heruntergeladen wurde obliegt der entsprechenden Rechtsprechung. Anhand des populären Digital Millennium Copyright Act in den Vereinigten Staaten und der EU Copyright Richtlinie für die EU Länder wird die schwammige rechtliche Grundlage dieser Thematik erörtert.





Nach einer Darlegung der zahlreichen Maßnahmen die bislang ergriffen wurden um die Piraterie in den Griff zu bekommen beschäftigt sich das letzte Kapitel mit dem Kern der Arbeit, nämlich die ökonomische Perspektive. Der Autor glaubt, dass die Piraterie nur durch das Aufzeigen von attraktiven Alternativen eingedämmt werden kann. Den Internet-Piraten muss etwas geboten werden das sie wieder zu rechtmäßigen Konsumenten macht.

Dieses Kapitel zeigt zunächst die gegenwärtige Struktur und die vorherrschenden Geschäftsmodelle der Musik und der Filmindustrie. Dann wird ein Framework geschaffen um neue Geschäftsmodelle zu kreieren, die mehr den Anforderungen des modernen Konsumenten gerecht werden. Die in weiterer Folge vorgeschlagenen Geschäftsmodelle entstammen dann diesem Framework.

Manche der Ideen die da vorgeschlagen werden sind bereits in der realen Welt in Anwendung, wenn auch eher beschränkt. Bei dieser Arbeit geht es darum diese experimentellen Geschäftsmodelle näher zu beleuchten und ihr wahres Potenzial in einem praktischen Umfeld zu erkennen. Das Superdistribution based P2P Modell zum Beispiel vereint die Mentalität der eBay-User mit der Effizienz und Popularität von P2P Systemen. Das P2P streaming Modell dagegen greift den Trend der Übertragung von Inhalten bei Bedarf auf, den YouTube und Co. begründet haben. Manche Modelle dagegen werden nur für einen Teil des Marktes interessant sein, wie zum Beispiel das Community based Modell, wo die Fans mehr in der Vermarktung der Künstler miteinbezogen werden. Nichtsdestotrotz werden auch diese Modelle diskutiert, da eine einzige Lösung für alle Fälle nicht realistisch ist.

Die Masterarbeit wird schließlich mit einer Vorschau und einer generellen Empfehlung für die Unterhaltungsindustrie abgeschlossen.

Appendix III – Curriculum Vitae

Marcel Parakkal	 Soldanellenweg 4/11/4, 1220 Vienna, Austria  +43 699 19 222 503  marcel@parakkal.net			
Born on	4 th of June, 1981 in Thiruvalla, Kerala, India			
Citizenship	Austrian			
Education	2007 – now	Masters Degree in Business Informatics, University of Vienna	<ul style="list-style-type: none">• Advanced Software Eng.• Knowledge Management• E-Business and E-Commerce• Advanced Statistics• Tax law	
	Winter term 2006	Exchange semester, Dublin City University - ERASMUS programme (Master of Business Informatics)	<ul style="list-style-type: none">• BPM• IS Architecture• Strategic Management of IS• Organisational Behaviour	
	2003 – 2007	Bachelors Degree in Business Informatics, University of Vienna and Technical University of Vienna	<ul style="list-style-type: none">• Economics, business studies• Discrete mathematics, statistics• Software Engineering• Semantic Web• Database management• Business process modelling	
	Title awarded	Bakkalaureus der Sozial- und Wirtschaftswissenschaften (Bakk. rer. soc. Oec.) equivalent to a “Bachelor of Social- and Business-Sciences”		
IT Knowledge	<ul style="list-style-type: none">• Operating System: Windows, Linux• Office: Microsoft Office XP & 2007, Google Docs & Spreadsheet, OpenOffice• Software: Eclipse, MS Visio, various CMS, Adobe Audition, ADONIS, SAP R/3 (basic knowledge)• Programming languages: VBA (Macros in Excel, Access), Java• Script languages: Javascript, PHP, XML related• Databases: Access, MySQL, Oracle, Xindice• Miscellaneous: Web Services, Apache, Tomcat, Axis, UML• Networking: CCNA Certificate 2nd semester			

Languages	<ul style="list-style-type: none"> ✓ German in speech and writing ✓ English in speech and writing ✓ Malayalam (mother tongue) ✓ Spanish (basic level) 		
Miscellaneous	<ul style="list-style-type: none"> • Military service (October 2000 – May 2001) • Basic knowledge of accounting • Around the world trip: August 2008 – January 2009 		
Job experience	Dates	Employer	Responsibilities
	08.2007 – 06.2008	Siemens AG Österreich 1030 Vienna, working student	<ul style="list-style-type: none"> • Technical project controlling • VBA programming in MS Excel – automation of controlling processes • Development of a MS Access based controlling tool • User support
	07.2006 – 08.2006	Siemens AG Österreich 1030 Vienna, internship	<ul style="list-style-type: none"> • Modifications on the intranet page of the department • Generation of diagrams in MS Excel with VBA • Preparation of presentations • Assistance in strategic negotiations
	12.2005 – 06.2006	IBM Österreich, 1020 Vienna, working student	<ul style="list-style-type: none"> • Programming of a Java based tool for data migration into a enterprise-wide tool
	07.2005 – 11.2005	Meta Communication, 1010 Vienna, Part time	<ul style="list-style-type: none"> • Processing of digitalised media using a software • Extraction of relevant articles
Hobbies	<ul style="list-style-type: none"> • Sports – badminton, go-cart • Cultural – writing (short stories, poems), singing, acting, travelling, cooking 		
Areas of interest	<ul style="list-style-type: none"> • Innovative IT services • Process- and project management, quality management • (SAP/IT) Consulting • Strategic planning and analysis 		