A Model for a Better Understanding
of the Digital Distribution of Music in a Peer-to-Peer Environment

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Abstract

Emergence of P2P systems had an unquestionable impact on data and media interchange over the internet, to the point of seriously challenging traditional actors of the music business field. Technical issues concerning the deployment of P2P networks are more or less well described, they rely on well-known transmission protocols and benefit from the mass-effect of Internet. But for the moment, the question of business viability of P2P chains of media diffusion is still open. This paper proposes a model to better understand and compare the different actors confronted to or exploiting this important technological change. The final objective of this model is to provide a better characterization of each actor's abilities, along with the impact of new technological opportunities (like P2P systems) on their respective activities. The proposed model is directly derived from the e-Business Model Ontology developed by Osterwalder & Pigneur for characterization of value-chains in e-Business fields.

1. Introduction

The Peer-to-Peer phenomenon had a major impact on data and media interchange over the Internet and on different businesses in the last two years to the point to call it a disruptive technology. While this phenomenon has been frequently described, few major business strategies exploiting this technology have viably emerged and even less frameworks and models explain why this is so.

After describing the typical actor field for the digital distribution of music in section two, this paper introduces a new model. It helps to understand and compare activities of Peer-to-Peer systems and networks used for the digital distribution of music (may it be free of charge, exchanged or sold). This model describes Peer-to-Peer actors (system promoters, media producers, media authors, software providers, etc) using a comparable set of characteristics. These characteristics address both the value chain proposition which motivates the actors' involvement, and the technological environment used. The value chain characterization is directly derived from the e-Business Model Ontology developed by *A. Osterwalder & Y. Pigneur* in [1]. The technological factors describe essentially the ability to master and deploy technology (like P2P platforms) to enhance media diffusion. This model covers the following aspects: product innovation, technology ability and infrastructure management.

Our model contains many components of a business model. While Business Models [2] [3] generally insist more on how profitability is attained (commercial success), we focus more on how each actor deploys his activity, thus leaving out financial considerations. This choice was oriented by the lack of a real "business motivation" for some actors in the business field, so that several important components of a business model (cost structure, margin elaboration, etc.) do not apply to these actors. The scope of this paper is more centered on ability to deploy an innovative technology and the fact that this may influence or change the relative position of actors in digital music distribution.

The fourth section of this paper illustrates Model with four major recent cases. The aim is to use success and failure stories in order to show the reasons of such outcomes. The paper concludes with possible directions of future research in this area.

2. The impact of a Disruptive Technology and independency on the well-established distribution of music

In this section, we try to describe the actor field for the distribution of music, mostly digital, as we see it. The rest of the paper will mainly focus on the digital distribution of music. In this domain, the fact that (audio-)media content is digital is now common since the emergence of CD's. The real technological difference is made by the possibility to very easily exchange and diffuse this digital content (essentially via Internet), by opposition to the traditional distribution and diffusion of audio content, might it be digital or not (CD's or LP's). Diffusion mechanisms proposed by P2P systems not only propose a new channel of distribution but considerably change the diffusion and distribution process. The emergence of these new processes challenges strongly well established actors in the field of music.

2.1. A well-established value-chain

The *Record Industry Association of America* (*RIAA*) [4] was founded in 1952 and among the items in its stated mission is "the promotion of strong intellectual property protection and the prevention of music piracy" [5]. The value-chain of the music distribution that has been built and well-protected during many years, can be represented by the five clear boxes in figure 1. Artists, record companies and the distribution together form the *RIAA*, which tries to preserve interests of the five majors (*Vivendi Universal SA*, *Sony Corp.*, *AOL Time Warner Inc.*, *EMI Group PLC* and *Bertelsmann AG*) and many other companies and labels with a total of over eight hundred members (804 according to [6]).

This value-chain, as presented by Hunter [7], is one way of putting it. Some authors, like Durlacher [8], add wholesale before the traditional retailer and make a distinction between media production (music producers) and sales activities (music labels).

With the explosion of the Internet in the last seven years, this value-chain already saw some major changes that affected its way of dealing with the business. First, some online retailers, like *Amazon.com*, joined the sequence but without causing trouble to the *RIAA*. It was more of a new competition for the traditional retailers than anything else. A true threat came from the advent of broadband connections and the use of the MP3 format. Thus some online sources like *MP3.com* came out from nowhere and started the distribution of songs through their website. This new way of seeing music, not anymore like a material good (CD, tape, etc.), but as a digital file, was the start of a mentality change.

To those observations, we can add another value chain in the industry. The production of equipment used to play the music (be it a CD player, MP3 player or a computer) also have a big influence on the way music is seen. You cannot omit this side of the thinking, because by facilitating the way of playing digital music, the change of mentality by the consumers is accelerated.

This brings us to the complete value chain as seen by Hunter [7] which already includes some impacts of the Internet with the advent of online retailers and online sources (figure 1).

It has to be noted that only in this figure the terms "consumer" and "customer" are totally interchangeable. But with the advent of new technologies and users not paying for digital music anymore, we cannot call them customers anymore. They are only consumers of a service provided. And, as said in the introduction, we will not include any financial aspects in what follows as it is not meant to be a business model, but rather a subset of the latter.

2.2. A disruptive technology called Peer-to-Peer

Since around October 1999 [10], this representation of the music industry has been shaken in a much bigger magnitude than how it has been by *MP3.com*. The phenomena that disrupted this well-established position had the name *Napster*, or for some people *Peer-to-Peer*.

Napster is the work of a nineteen-year-old university student, Shawn Fanning, who was tired of loosing time finding songs on the web. So he decided
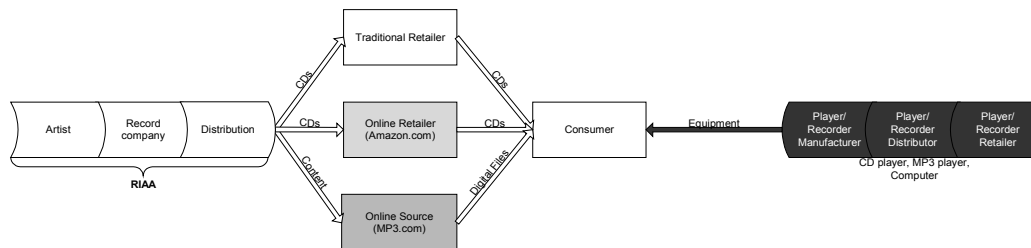

Figure 1: The value-chain before Napster - Source: Hunter [5]

to combine a music-search function with a file-sharing system that would let individuals directly trade music files with each other over the Internet. He combined the file-sharing functions of *Microsoft Windows* with the advanced searching/filtering capabilities of traditional search engines [10]. At the end of May 1999, with the help of his uncle, the *Napster* software was completed, and it took only a few days to more than 3'000 people to be convinced.

During the following summer, Shawn's uncle built the *Napster* business and in October, when the *RIAA* started feeling nervous, the company already had 15 employees. As the phenomena went to the point to break down entire university networks, eighteen labels, including the five majors, filed suit against the Californian company with the legal representation provided by the *RIAA*.

This affair had a major impact on the value-chain presented earlier. With the possibility of being able to download as much music as you wish, from any artist and at no cost, it didn't take long to consumers to try out this music heaven. This resulted in a shift of the value appropriation from the left side of the diagram (artists, recording companies, distributors) toward consumers. And at the same time, it added a new way of acquiring audio content that changed the value chain. This can be seen in figure 2 with the addition of the so-called "Peer-to-Peer" retailers (Peer-to-Peer has been used in the broad sense as some could argue that *Napster* wasn't pure Peer-to-Peer – for more information, please refer to [11]).

As related in [5], the music industry has always been adverse to new technologies, and then, they eventually evolve into a mutually beneficial interdependence within the technology. In the last years, they were opposed to Peer-to-Peer technology like they were in the 1970s with the dual tape decks.

Nowadays, record companies try to use a Peer-to-Peer retailer in order to distribute digital files. But this sets some big problems as will be shown in section 3. The aim of using a Peer-to-Peer network is to push the storage and bandwidth costs to the customers as they provide them. This explains the symetric relationship between Peer-to-Peer retailers and the consumer. Another link that has been identified is the one going from the record companies or their distributors to Peer-to-Peer retailers. With the example of *BMG* buying *Napster* [12], this record company will sooner or later have to inject the content it wants to sell in a digital form to customers.

2.3. "Never better served than by yourself"

This adage has also an impact on the music-market value-chain. As almost all artists are not the legal owners of their work due to contracts with the music industry, but also because some artists want to produce more than what the norm is, disintermediation – a fear confirmed in [9] – emerged (explanations about disintermediation can be found in [13]). This new threat for the record industry does not only come from unknown artists, but even often big stars: Prince [14] and David Bowie [15] are just two examples. The idea is to produce the music by themselves and directly sell it in a digital format (like MP3 or WMA), often with a subscription system, on their web page.

This wish of being their own boss draws, in this case, the following advantages: choice of the mixing; absence of bottleneck in the production (see 4.4 below); become the copyright holder; choice of the distribution means.

This adds a new actor at the retailer level, which is called "Direct Sales/Promotion" in [8], and has been represented in figure 2.
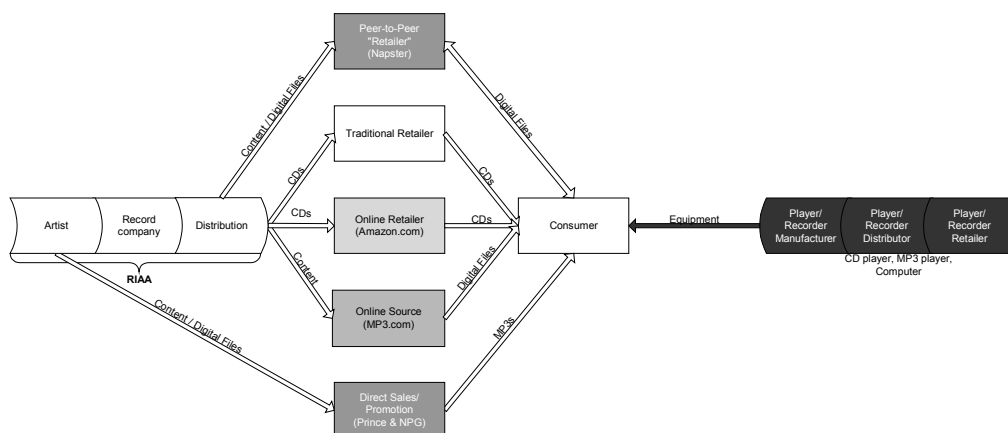

Figure 2: The value-chain after major digital impacts

2.4. A shift in the distribution field

Some new actors could benefit from the shifting presented above. One important change that has been noticed since about beginning of 2000 are online sources that never see any digital file. They are called "e-tailers" (this term has been borrowed from OD2 [16]) and are almost the same as online sources. The only difference is that the latter one does not integrate the distribution. The role of an e-tailer is the same as *amazon.com* in the book business: referencing. This is the result of a new distribution actor. We will call it "Direct Online Distribution" (DOD). Their activity can be shown with figure 3.
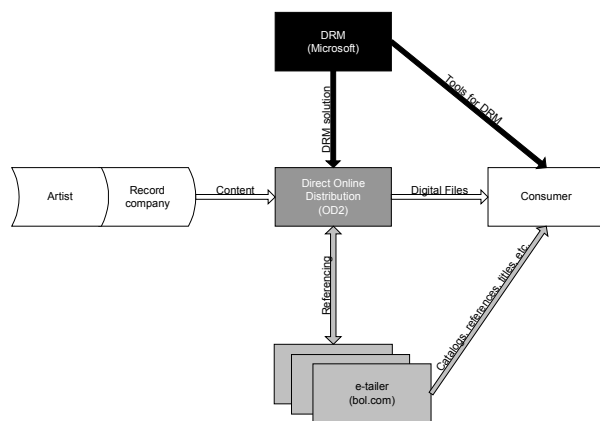

Figure 3: A new distribution actor

This new actor, for instance *OD2* (see section 4 for more details), gets content through deals with record companies or directly with artists. Then, it uses a wide range of e-tailers to reference its service. But he remains completely invisible for consumers as the subscription or payment for each song is made to the e-tailer even though the digital file is directly delivered by the distributor. The added value that is provided is the implementation of a DRM (see below) mechanism in order to guarantee the retribution of royalties to artists and record companies.

2.5. Digital Rights Management and incentives

DRM stands for Digital Rights Management and we define as it has been done in [17]. With the growing concern of copyright payments, this sector has a lot of work ahead, especially in a Peer-to-Peer environment. A separate DRM box has been added to our complete actor field, even if it is often an internalized concern.

When the digital distribution of music is meant to be made through Peer-to-Peer networks, incentives mechanism are often cited. Golle & al. [18] consider the free-rider problem in Peer-to-Peer sharing networks. They build a formal game theoretic model of the system and analyse the equilibria of user strategies under several novel payment mechanisms.

Horne & al. [19] propose a system architecture that uses economic incentives to motivate users to keep the content within the subscription community. Their key technical contribution is to integrate a Peer-to-Peer file sharing service with a so-called "escrow service" that reliably "pays" the party that is serving up the content. This Trusted Third Party mechanism - TTP being our second actor that could benefit from the above-cited shifting - has not yet been implemented in an existing Peer-to-Peer network, but it could be part of the future evolution of Peer-to-Peer solutions. In their solution, the authors implemented Digital Rights Management with encryption, hashing and error correcting codes.

When you look at a Peer-to-Peer network, it can be seen as distributed DOD (Direct Online Distribution) actors. This is the case because every member of the community serves some content and is therefore a distributor. Sure, he does not give out the whole catalogue, but he still contributes to it. And he also provides storage and bandwidth capacity, just like OD2 does.

2.6. Some added actors and the complete actor field

One group of actors has to be added as it had a major impact in the last three years. We think of the developers of Peer-to-Peer solutions coupled with the portals, for instance *download.com*, which help to promote and to distribute the resulting software. When we say developers, it is not always one single person, but even often a whole community that helps make an idea grow, become more robust and especially adopted by more and more people. But also companies are built around a Peer-to-Peer idea, like *Napster* or *FastTrack Inc.* and now *Sharman Networks* for *KaZaA* [20]. We added them with a direct link to consumers as shown in the appendix.

The other actors that have been added are the "Government" – through their Justice Department and their decisive role like in the Napster affair – "ISPs" – that had to deal with the pressure of different associations and cut access to some services like Gnutella – and also "advertisement companies" – which are a revenue mechanism often used.

The complete actor field for the distribution of digital music can be found in the appendix. The next section will provide the elaboration of our model. This model helps to understand and compare

activities of systems and Peer-to-Peer networks used for the digital distribution of music.

3. A Model for the digital distribution of Music

In this section, we describe a model that will help to better understand and compare the digital distribution of music. This means that it does not refer to the distribution of tangible goods. LPs, CDs or tapes for instance are therefore not targeted. Our model is built with nine different elements and the value-chain characterization is directly derived form the e-Business Model Ontology proposed by Osterwalder & Pigneur [1].

Our model contains many components of a business model. While Business Models [2] [3] generally insist more on how profitability is attained (commercial success), we focus more on how each actor deploys his activity, thus leaving out financial considerations. This choice was oriented by the lack of a real "business motivation" for some actors in the business field, so that several important components of a business model (cost structure, margin elaboration, etc.) do not apply to these actors. The scope of this paper is more centered on ability to deploy an innovative technology and the fact that this may influence or change the relative position of actors in digital music distribution.
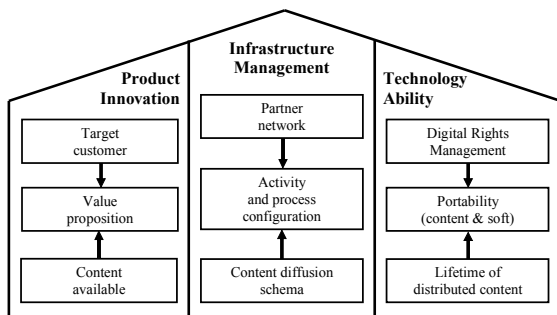

Figure 4: The Model for the digital distribution of Music

The model consists of three building blocks. The first building block, consisting of three elements, is the Product Innovation. Then, the Technology Ability of a particular solution is reviewed before finally working on the Infrastructure Management. This evolution is used as well in this section as in the examples of our fourth section. Figure 4 shows the model. We will now go through all the elements in more details.

3.1. Product Innovation

The first building block of our model covers the aspects related to the product. The elements are the targeted customers, the value proposition a firm wants to offer and the content availability. The value proposition depends on the content availability and it is intended to be offered to a specific target customer.

Target customer. This aim of this element is to identify on what market segment the company will compete or not. This means which customers, which geographical areas, and what product segment(s) are aimed.

Value proposition. This element refers to the value the firm offers to a specific target customer segment. The aim is to show the differentiation from the competition and there are three trajectories of doing so. The first one is innovation through new, complementary or customized offerings. The second one is to provide a lower price than the competition. And finally there is a first class customer service level and an excellent customer relationship.

Content available. The ideal solution for any customer would be "availability of the whole world music production through one single solution". Napster tended to that, but the solution which will be able to do it legally, remains to be found. Analysts believe this is the main ingredient for a successful online paid music service [21]. This element positively influences the value proposition, as the more content available, the better the value. If other competitors provide the same content, the value diminishes with a simple competition game.

3.2. Technology Ability

This building block refers to the ability to master and display the content technology. This block centres itself on the capacity to excel in the digital distribution of content. The three elements used are DRM, lifetime of distributed content and portability.

DRM. As already said earlier in this paper, certain actors already internalized this component. The existence of a Digital Rights Management schema is there to prevent mass copying and piracy, also to secure the firm from being shut down by the justice because of an infringement. But the most important side is to secure the royalty payments.

Portability of the content and the software. Ranging from the mobile player for jogging to the car system, other devices than computers can read digital content (PDA, HiFi systems, etc.). But some solutions limit this type of portability, although it is one of the main focus to have according to analysts [21]. In this element, we are also confronted with the same problem as any software developer is: on what

platform will it run. As not every customer has a PC with the latest operating system, it can be an expensive bet to count only on the majority. For instance, Java has been a solution already used by some Peer-to-Peer developers (for example *Limewire* for the *Gnutella* network [22]) to overcome the software portability issue.

Lifetime of distributed content. To be or not to be the owner of a particular music file is a hot topic lately in the industry [23]. Some solutions let you "use" the digital content only during a limited time. It is even hard sometimes to talk about "distribution of digital content" as it looks more like a "rental of songs". In comparison, other actors let people have a true ownership of what they paid for. This factor might determine many people's choice, at least in a near future.

3.3. Infrastructure Management

Our third and last block, Infrastructure Management, describes value system configuration that is necessary to deliver the value proposition. The partner network, the activity to create and deliver value and the content diffusion schema are the three elements constituting this building block.

Partner network. Certain elements of the activities can be distributed among partners of the firm. They may take the form of strategic alliances, joint-ventures, long-term buyer-supplier partnerships and other ties.

Activity and process configuration. The main purpose of a company is the creation of value that customers are willing to pay for. This value is the outcome of a configuration of inside and outside activities and processes.

Content diffusion schema. We based this component on the Peer-to-Peer classification provided by Rupp [11] that characterizes Peer-to-Peer applications. The aim is to show the underlying foundations of a particular solution that can be completely, partly or not at all built in a distributed manner. *Napster* for instance has a hybrid centralized architecture as all searches went through a central repository. But as no single transfer went through this repository, it is not the traditional client/server architecture we all know. *Gnutella* on the other side, is completely decentralized as every client is at the same time a server. In between, you find *eDonkey2000* which decentralizes the central repositories. This way of doing it has been called a hybrid decentralized architecture. These different possibilities give to a particular solution different advantages but also certain drawbacks.

It is only with an appropriate content diffusion schema and a strong partner network that the inside and outside activities and processes will be efficient.

In the next section, we will illustrate the model with four major recent cases and give a brief analyses of them.

4. Examples illustrating the model

Four examples are presented here in order to show the use of the model. We start with maybe the most well-known online source on the Internet, not because of its success, but because of its domain name. Buying *MP3.com* was an amazing marketing move as we will see. Then, we analyse the oldest legal Peer-to-Peer solution. It has the name of *Wippit* and could have good times ahead if they manage to settle interesting deals with the majors and therefore impose themselves as the distributed solution. After that, we go through a new distributing actor called *On Demand Distribution*. Our last case study is someone who was tired of being bound to a record company. His actual name, as he already changed twice, is Prince. We will then conclude this section with some final thoughts.

4.1. Online Source: MP3.com

The story of *MP3.com* did not start with this domain name, but with another company named the *Z Company*. It was founded by Michael Robertson and its primary focus was merging search technology and commerce [24]. In 1997, Robertson went through the logs of *Filez.com* (the net's largest and fastest file search engine established by Robertson and part of the *Z Company*) and noticed that the term "MP3" was incredibly popular [25]. A little research convinced him that this was something he should check out. In November, he launched the *MP3.com* Web site and tried to make a business out of it.

MP3.com had a major impact on the digital distribution of music as it became, mostly due to its domain name, the gathering post for people interested in online music. It had a description of the format in order for newcomers to easily jump in, the latest software tools were reviewed and linked to, and a database of songs available from any bands who wanted to offer their music was posted to show that MP3 was not just for musical pirates [25].
The site was undoubtedly popular as a survey in January 2001 [24] revealed that there were 135,100 approved artists with 862,500 available songs and audio, but also with an average of 830,000 daily unique visitors with 168,000,000 page viewed each month. At the beginning, *MP3.com* did not have the money to buy copyrighted songs from the labels, so it

started hosting songs for artists who were willing to. This was legally OK. What was not and upset some major labels was that the site copied thousands of copyrighted CDs onto its file servers to create its *My.MP3.com* "locker" service. This resulted in a $53.4 million fine awarded to the *Universal Music Group* (UMG).

Table 1: The example of MP3.com

Product Innovation	
Target customer	End users with computer and Internet connexion. Worldwide.
Value proposition	Offers music to individuals in order to satisfy their ease of finding digital music online. With their software. Possibility to burn MP3s and transfer them to mobile devices. Also: store a personal catalogue online.
Content available	Deals signed with labels.
Technology Ability	
DRM	- *PressPlay*: protected WMA. - *MP3.com*: nothing → MP3s without additional protection.
Portability	*Content*: *Pressplay* one other computer; *MP3.com* complete *Software*: Pressplay onlw Windows 98, Me, 2000 and XP - nothing else planned; *MP3.com* any.
Lifetime of distributed file	- *Pressplay*: only during subscription, except burned songs - *MP3.com*: unlimited as they are MP3s without additional protection
Infrastructure Management	
Partner network	Independent Labels and one of the Majors: *Vivendi Universal,* but also the following online services: *Pressplay, EMusic.com, RollingStones.com, GetMusic*
Activity and process configuration	Storage, delivery and search functions on songs.
Content diffusion schema	Pure Client/Server.

In August 2001, *Vivendi* acquired *MP3.com* in a deal worth $372 million in cash and stock [26]. But this was not it. The goal for *Vivendi* was to power the technology behind *Pressplay* [27] – its online joint venture with *Sony Music Entertainment* to respond to *MusicNet* [28] – in order to have a big name in the young online distribution of music.

Table 1 illustrates our model with *MP3.com*, our Online Source example. You will find in it the different elements with their content.

What we can see is that what has been once the booster of a non-proprietary format called MP3 now turns to some protected WMA format with the *PressPlay* deal.

4.2. Peer-to-Peer retailer: Wippit

Wippit is a UK-based company that was founded by Paul Myers, the creator of the UK's first free ISP, *The X-Stream Network* (the X-Stream Network has been sold in March 2000 to French listed company LibertySurf for $75 million and is now part of Europe's biggest ISP *Tiscali*). It released an alpha version in November 2000 [29] that has been tested by willing users before finally launching their subscription service on October 4th 2001 [30].

Table 2: The example of Wippit

Product Innovation	
Target customer	End users with computer and Internet connexion. Worldwide.
Value proposition	Uses a Napster-like infrastructure in order to increase the download possibilities. Let's people only share MP3s that are licensed. Those MP3s are legally owned by the subscriber. Ringtones for mobile phones and searches with a mobile phone are also available.
Content available	White List.
Technology Ability	
DRM	MusicDNA (analyser) that lets users only share files among *Wippit*'s WhiteList.
Portability	*Content*: Unlimited. *Software*: Windows 98, Me, 2000 and XP. Mac and Linux in development.
Lifetime of distributed file	Unlimited (pure MP3s).
Infrastructure Management	
Partner network	Association of Independent Musicians (AIM - UK), *edelNET Gmbh*.
Activity and process configuration	Provides the central index and an updated White List.
Content diffusion schema	Hybrid centralized.

This solution uses the same architecture as *Napster* did. This means that the company provides a central repository with all the music files that are shared by users. But then the downloads are made through a direct connection between users. So what is the difference with the California based company that has been shut down ? *Wippit* uses the so-called *MusicDNA* analyser developed by *Cantametrix* (this company has been bought by Gracenote, a provider of music infrastructure technologies well known for its CDDB service [31]). MusicDNA's use of DSP (Digital Signal Processing) technology and psychoacoustic modeling allow it to analyse MP3 and

immediately tell what song it is, and so also recognize who, if anyone, owns its copyright. As all *Wippit* file transfers are recorded, the company knows the royalty payment that each record company should receive, thus preventing the company from probable lawsuits.

The company has several deals with some labels among the most important are the *Association of Independent Musicians* (AIM) and a big outsider of the five majors with the name of *edel GMBH*, the big German label. Table 2 shows the example of *Wippit*, our Peer-to-Peer retailer.

4.3. Distribution: OD2

OD2 stands for *On Demand Distribution*. The company was set up in 1999 by a number of leading recording and IT industry figures. Peter Gabriel, co-founder of *OD2* and Genesis, is a well-known musician, writer and video maker.

Table 3: The example of OD2

Product Innovation	
Target customer	e-tailers. Worldwide.
Value proposition	Sells and rents music to online retailers under the "wholesale model".
Content available	Deals with labels.
Technology Ability	
DRM	Digital Rights Management (DRM) based on Microsoft Version 7 Rights Manager.
Portability	*Content*: Depends on choice made by e-tailer and/or label. *Software*: Depends on DRM choice.
Lifetime of distributed file	Depends on choice made by e-tailer and/or label.
Infrastructure Management	
Partner network	*EMI, Virgin, Warner Music, BMG, Zomba, Sony, AIM, Telstar, Edel, V2, Mute, Beggers Banquet, One Little Indian, Setanta, Real World, Dynamik Music, Mushroom.*
Activity and process configuration	Stores the content, distributes it (streaming and download) directly to customers, provides a custom built e-commerce site selling music downloads (« shop-in-a-box »), offers a content management interface for control of diffusion by labels, supports a bonus track mechanism, promotes e-tailers, etc.
Content diffusion schema	Pure Client/Server.

The objective of the company is to sell and promote the music they manage through a diverse set of online retailers called e-tailers. *OD2* provides a complete solution for artists, record labels as well as e-tailers. The different services are encoding and encryption of songs, hosting of the digital files, secure delivery for promotional and paid for downloads, complete e-commerce system and royalty management. It should be noted that no single file is hosted by an e-tailer. Everything remains on *OD2*'s servers. This results in a triangular relationship between the consumer, the e-tailer and *OD2* as has been shown earlier in figure 4. More details are given in the model presented in table 3.

4.4. Direct Sales and Promotion: Prince & The NPG

Prince, the well-known musician named after his father's jazz band, signed with Warner Bros. as a 19-year-old prodigy and thus became the labels youngest producer ever. One year after forming The New Power Generation, "the best and most talented band that has ever been assembled" [32], Prince released an album titled with a strange symbol. The year after, he legally renamed himself to the combined symbols for male and female. These were the first signals of a revolution on its way as the next year, in 1994, he became embroiled in contract disagreements with Warner Bros., scribed the word "Slave" on his cheek when he performed in public and started releasing songs independently.

Why did he do all this ? Because "Warner didn't want to oversaturate the market by releasing all of Prince's works at the pace The Artist wanted. [Indeed], he was writing upwards of three to four albums' worth a year" [33]. This way, he showed the major what he was able to do alone.

After the death of his son, he released material independently (through his own NPG Records) at a rapid-fire pace starting with the three-CD set "Emancipation" and the four-CD set "Crystal Ball". With the advent of the Internet, he started to sell his work through his official website, but also discovered that "it is much more difficult to get records to an audience than it seems" [32]. He then continued to release albums independently and through the Internet. In May 2000, Prince announced: "On December 31, 1999, my publishing contract with Warner-Chappel expired, thus emancipating the name I was given before birth – Prince – from a long-term restrictive documents" [33].

Always watching what was going on on the Internet, but also trying to find new ways to reaching an audience, Prince decided in April 2001 to promote a new song on the Napster Featured Music Program [34]. He did this because just two months earlier he launched the NPG Music Club [14], a monthly subscription based service. With this service, costing

$100.- for a whole year, members get new Prince songs, videos and an hour-long radio show every month, but also VIP access to concerts and new CDs in the mail.

Table 4: The example of the NPG Music Club

Product Innovation	
Target customer	Prince fans. Worldwide.
Value proposition	Distribution of songs which copyrights he owns.
Content available	Prince music.
Technology Ability	
DRM	No DRM.
Portability	*Content*: Unlimited. *Software*: Any platform as only a browser is necessary.
Lifetime of distributed file	Unlimited (pure MP3s).
Infrastructure Management	
Partner network	*Napster* form April to July 2001, *Infinetivity* (Web site [35]).
Activity and process configuration	Writing, recording, distribution and promotion.
Content diffusion schema	Pure Client/Server.

By starting his own platform over a year ago now, Prince wanted to be free from a record contract that, according to him, made him a slave of some big company. What frustrated him most before was the lack of control on the pace to release songs and albums. Prince has always been known as a workaholic who had at all time an immense reservoir of unreleased songs. With his Web site he can now produce as much as he wishes and has a total control of the result of his sound. But this has also its downsides. As we saw above, it is hard to reach an audience when you have to do all the promotion and marketing. This is certainly why Prince decided to make a tour in 2002. This way, he will certainly be able to promote his platform to older fans who do not know it actually exists.

In table 4 you will find the model for the NPG Music Club. We should add that the distributed files are pure MP3s without any DRM feature.

4.5. Comparison and conclusion

Through the use of our model it is possible to compare different actors among the complete actor field presented in the appendix. As said earlier, it does not pretend to be a business model as we focus more on how each actor deploys his activity, thus leaving out financial considerations. This choice was oriented by the lack of a real "business motivation" for some actors in the business field, for instance

Gnutella-based solutions [22] or *KaZaA* [20].This model helps also to point out the main aspects that should drive a wide adoption of a solution. We believe that the appropriate content diffusion schema and use of DRM features are the most important.

5. Conclusion

In this paper, we gave a new representation of the actor field in the digital distribution of music business. This helped us to give a detailed representation of the battle field we are interested in. To better understand the actors constituting our map, we needed a model to describe them. It resulted in our model presented in section 3. Finally, in order to better understand it, we depicted in section 4 a couple of examples. Even though they are very different, it is possible, through the use of our model, to compare them on the many aspects they are built.

In future research, we intend to build a tool that will help to predict the evolution of the digital distribution of music business. It will use the input provided by the model, but also a second model, that characterizes the interactions between actors. This tool will give the opportunity to users to change some aspects and simulate what the impacts will be on the whole battle field.

6. Acknowledgement

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