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From digital music to digital video

A study of the MP3 revolution
and the future of online video

Thorarinn Stefansson

thorarinn@itu.dk

Instructor:

Peter Olaf Looms

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Introduction

There have been many interesting developments in our use of media and technology in the last few years, and evolution in this field just seems to speed up more and more. The combination of the MP3 format and the Internet appears to be permanently changing the way consumers approach music and the Apple iPod is changing how they listen to it. In the world of video and television changes on an even larger scale seem to be imminent with the emergence of digital television and as the options for broadband connections to the home open up.

These developments pose many questions. Is this simply a linear evolution from the days of the vinyl record and black and white television, or are the changes more dramatic than that? Is the iPod really changing our lifestyles or is it just a marketing ploy to sell us a new toy? Is it possible to predict how we will use the Internet to distribute video, based on the experience from music files? Is the Internet just a jungle without rules or are there business opportunities for sales of digital content in spite of content being available for free?

Questions of this kind are the background for this paper, leading to the following problem statement.

Problem statement

In the last few years the combination of digitized music and increased use of the Internet has dramatically changed the way consumers acquire and use music (and other audio). What elements/characteristics of this “music revolution” can be described as most important from the end user perspective, and what can be deduced from these about the development of consumers’ use of digital video in the next few years?

More specifically I will try to answer the following questions:

- The Apple iPod has been called “the Walkman of the 21st century”, is it possible to describe it as a direct descendant of the Sony Walkman or has some evolutionary leap taken place?
- Can the fascination of having an iPod be rationally explained, and what elements are underlying the apparent affection of iPod owners towards their digital music player?

- What new opportunities are there for distributing music on the Internet that were not available before, and is there money to be made on music online despite peer-to-peer file sharing?
- What are the similarities and differences between a handheld device for playing music and one for playing video?
- What parallels can be drawn between the sharing and marketing of music online, and doing the same for video content?
- Is the handheld digital video player likely to become as popular as the MP3 player?

Methodology

This paper is based on desktop research of existing research and business literature, including news stories and press releases.

An attempt is made to detect patterns and present a holistic description of the research area with focus on answering the questions presented in the problem statement.

Structure

The paper starts with a brief history of portable music players, from the Walkman to the CD player and the MP3 player. A part of this is the effect that a combination of digitalized music and the Internet have had on the distribution of recorded music. This is described with selected scenarios to show typical usage of MP3 players like the Apple iPod.

I then present the argument that the essence of the MP3 “revolution” and music consumption has been to immaterialize it, that is to say that consumers increasingly see music as a non-tangible commodity. The effects and opportunities online marketing and distribution have had for music publishers and musicians are briefly discussed, although the aim of this paper is not to provide solutions to the challenges facing the music industry.

Based on the discussion about MP3 players I then describe the similarities and differences between music and video content. To narrow the vast field of digital video I primarily focus on portable (handheld) video players, which are becoming more common and affordable (e.g. 3G mobile phones, the PlayStation Portable and forthcoming

datacast terminals). After defining the common characteristics of portable video players I describe two scenarios for the likely use of portable video and the corresponding demands and opportunities for content providers.

Finally there is a brief discussion about datacasting and the changes that are likely to occur when wireless technology makes it possible for the consumer to have an “always on” broadband Internet connection while on the move.

The evolution of mobile music

The world of recorded music changed dramatically in the late seventies, not only due to events in the music industry itself, but also as the result of the emergence of a new consumer electronics technology; the portable cassette player.

The compact cassette had been on the market for a few years, competing with the reel-to-reel tape and the 8-track cartridge, but with iterative improvements in quality and availability it was slowly taking the lead. The cassette had a clear advantage over the reel-to-reel tape in being much more compact and robust (but somewhat inferior in sound quality) and although the 8-track cartridge had been heavily promoted in certain markets, it was a very problematic distribution format and quickly vanished when the audio cassette took off.¹

When Sony introduced the Walkman in 1979 and the “ghetto blaster” appeared at around the same time, music became really mobile for the first time. Until then, recorded music had either been listened to in the home or in the car, the “portable” record/reel-to-reel/8-track players were too bulky to be considered truly mobile (at least by our modern standards). Although portable transistor radios existed at the time, the Walkman freed the listener from fixed radio programming schedules, as people either bought tapes with their favourite music or recorded their own compilations.²

The Walkman was undoubtedly portable; it fitted in a pocket, its main function being to serve music to just one person at a time.

Interestingly, the first Walkmans had two headphone jacks and an orange “talk button” which turned down the volume of the music and activated a microphone, to enable

¹ Produce, A (1990)

² Phil Patton (date missing)

people to carry on a conversation while wearing the headphones. This was added to the design by request of the Chairman of Sony, Akio Morita, who feared that the device would otherwise be too isolating.³ The market turned out to have no problems with this isolation and the extra jack and orange button disappeared from later models.

Sony marketed the Walkman primarily to younger people and emphasized the freedom that it brought; at the first presentation to the press, a group of young people demonstrated cycling and roller skating while listening to Walkmans. In the US the marketing of Walkman coincided with another fad, jogging, and listening to personal music while exercising is still popular today (although tiny radios and MP3 players have now taken over as the audio source of choice).

Several sources have described the sensation of bringing music on the Walkman wherever one went as a cinematic soundtrack to life:

“The Walkman for the first time provided ordinary people with a cinematic soundtrack for their daily lives. One result was that it brought a kind of spectacle to daily life and made humdrum activities feel cinematic.”⁴

“But what the Walkman really changed was the culture of music: you could now listen to what was effectively the soundtrack of your own life, starring you as yourself.”⁵

Not everyone shares these positive views on the success of the Walkman, with some even claiming that it ruined the musical taste of society:

Beyond hearing loss, the sonic opacity of the Walkman attacked our musical taste. Instead of seeking melody, listeners grew satisfied with crump-crump rhythm. The decline in classical concert going may be partly ascribed to the Walkman, which devalued magnificence and rendered its utilitarian. A Bruckner symphony buzzing away while you brush your teeth is an altogether different experience from attending a Vienna Philharmonic concert in the Musikvereinsaal.

The social pleasure of sharing music was terminated when people clamped plugs in their ears and tuned into a selfish sound. Music in the Walkman era ceased to connect us one to another. It promoted autism and isolation, with consequences yet untold.⁶

³ *Sony History*

⁴ Stephen Holt, quoted in Phil Patton (date missing)

⁵ Liz Bailey, quoted in BBC News, Stephen Dowling (2004)

⁶ Norman Lebrecht (2004)

The mobile, sealed environment that the Walkman introduced has been described as ushering in the “me generation”,⁷ with each occupying his or her little sound bubble:

*[...] note how the mobile Walkman user boldly makes eye contact with other pedestrians, as if somehow unconsciously reasoning that because you cannot hear what he is listening to you also cannot see what he is looking at. And arriving at the beginning of the 80s, the Walkman seems to have signalled the beginning of a time of introspection, even narcissism.*⁸

In his book “Sounding Out the City. Personal Stereos and the Management of Everyday Life” (2000), Dr. Michael Bull describes the effect of the personal stereos as allowing their users control of their auditory environment by blocking out undesirable city sounds. In an interview he has described the control that portable music allows users:

*So, for example, music allows people to use their eyes when they're listening in public. I call it nonreciprocal looking. Listening to music lets you look at someone but don't look at them when they look back. The earplugs tell them you're otherwise engaged. It's a great urban strategy for controlling interaction.*⁹

Music turns digital

The Walkman and its rival versions took the world by storm, with Sony selling some 100 million devices, and they dominated this newfound market for personal portable audio until the portable CD player (and later the Mini Disc) took over.

With the advent of the CD, music was distributed in digital form for the first time, which later led to what would become the music industry's nightmare; sharing music on the Internet. In 1983 the first compact disks appeared in music stores, but it was not until a few years later, when the music industry made an effort to shift sales from LP's to CD's, that sales of compact discs really took off.¹⁰

Besides the obvious changes from the vinyl recording (the physical form and audio quality), the digital CD players soon introduced the shuffle option. For the first time listeners could choose to listen to the songs on a record either in random order or to pre-program the order of the songs, even from multiple discs in some players. Although the shuffle can hardly be described as playing a big role in the shift towards CD's, it was nevertheless the first glimpse of what was later to come.

⁷ Prasad Boradkar (date missing)

⁸ Phil Patton (date missing)

⁹ Michael Bull, interviewed by Wired (2004)

¹⁰ NN: Shiny, Aluminium, Plastic and Digital (date missing)

Soon CD drives were included in personal computers and it became common to use the computer as a music player while working. At this time the technology to record to CDs was far too expensive for copying music and the audio files took up a lot of space when copied to the hard disc. Therefore the music that was brought to work stayed on the original CDs beside the computer, at least until the MP3 format appeared.

The MP3 compression format, which can provide near-CD quality at approximately 1/11th of the original file size¹¹, became popular on the Internet in the mid-nineties. When the Winamp music player for PC was released in 1997, the MP3 format gained real momentum and music files became easily available on the Internet.

Several factors contributed to the exponential growth of MP3 files available online; increased access to the Internet, cheaper storage allowing users to “rip” whole CD collections to hard discs, and the emergence of the first peer-to-peer programs – with the Napster file sharing service released in 1999.

In 1998 the first portable digital audio players, commonly referred to as MP3 players, were introduced. These players were based on flash memory, the first generation with 32MB of memory (allowing for between 10 and 20 songs) – with each new version of the players the memory capacity slowly expanded. Late in 1999 the first hard disc based MP3 player, “Personal Jukebox”, became available. Based on a laptop hard drive it provided 4.86 GB of storage space, but never reached a high market share.¹²

Enter the iPod

The first hard disc based digital audio player to ship in large quantities and change the image of the MP3 player from a toy to a mainstream commodity was the Apple iPod, introduced in 2001.

When Steve Jobs first announced the iPod, it was a bold change in strategy for Apple Computers and met with some scepticism. When Apple launched the iTunes Music Store in April 2003 and at the same time made the iPod compatible for Windows, the true ambition of Apple’s music strategy became clear.

The iTunes Music Store is not the first attempt to legally sell downloadable music on the Internet, but it was the first time that content from all the major labels was available in

¹¹ The standard includes various compression rates with varying audio quality and file size

¹² Wikipedia: Personal Jukebox

one place and with digital rights restrictions that the market seemed to approve of. The store originally contained about 200,000 files, today it has a catalogue of over a million songs and in May 2005 announced that customers have purchased and downloaded over 400 million songs worldwide.

Apple reports to have sold over 15 million iPods, of which 5.3 million were sold in the first quarter of 2005.¹³ The company claims to have around a 90% market share in hard disc based players and the low-cost iPod Shuffle that has only been available for less than 6 months is claimed by the same source to have reached 58% of the flash based market.¹⁴

Although the iPod is still far from the 100 million Walkmans sold, it has become a fashionable cultural icon and the tell-tale white earplugs have become a familiar sight.

Is the iPod just a digital version of the Walkman?

The question remains whether the MP3 player (of which the iPod is the epitome) can be seen as just an advanced version of the portable cassette player, or if its popularity has consequences that are in some way revolutionary?

In the days of cassette tape the quality of copies rapidly diminished with each copying, therefore copying from a tape was usually only done from a first copy. Friends taped records for each other and then swapped or borrowed tapes from their acquaintances. This in turn meant that for each cassette copy the owner of the original recording (on CD or vinyl) usually was within the social group of the holder of the cassette. With the option of file swapping on the Internet this social segregation has disappeared and it is now possible to copy a file from a person you have never met, who in return may have copied it from someone else, quite possibly on a whole other continent.

In less time than it previously took to copy a friends' record to a cassette, it is now possible to copy his or her whole music collection from a computer to an iPod or vice versa. (The iTunes Music Store DRM¹⁵ system allows copying songs to an unlimited number of iPods and up to 5 computers – unprotected audio files of course have no

¹³ BBC News (2005)

¹⁴ MacNewsWorld, Brad Gibson (2005)

¹⁵ DRM: Digital-rights management

restrictions. There are restrictions on copying music *from* the iPod, but these can be circumvented.) As the price of data storage continues to fall, there are now almost no limits to how much music can be collected and stored on a computer.

The Walkman made it possible to choose music for journeys out in the world, but the choice had to be made beforehand. It was cumbersome to carry more than a few cassettes, and for options outside the chosen tapes, radio was the only options (if the Walkman had a built in radio, that is). With hard disc based music players (often with capacity in the range of 5,000 to 15,000 songs) one can now fit a whole music collection in a pocket and choose whatever music fits the mood.

The user becomes free from the limited capacity and the prearranged order of songs on the cassette tapes, instead he or she can freely create a totally individual experience: “While the Walkman privatized the auditory experience, the MP3 player has privatized and heavily individualized it”.¹⁶

Music becomes immaterial

The following scenarios give some insight into how users acquire and listen to digital music files.

“**A**” is a male in his mid-thirties. He is an avid music collector and has ripped all his CD collection to MP3 files. He also uses a peer-to-peer network to search for music he is interested in. A is scrupulous in his collection and only downloads complete albums and only in MP3 format. After downloading he checks the quality of the files and the associated metadata. Currently he has a backlog close to 50GB of files that he hasn’t had time to organize, compared to approximately 70GB of ordered music. A owns an iPod which he listens to both at work and in his car, where he has connected the iPod to the car stereo and can control the player from the steering wheel.

“**B**” is a female in her late twenties. She has recently gotten an iPod and has ripped her favourite CDs to it. She has discovered podcasts¹⁷ and subscribes to several of them, which she then listens to on her way to school. She hasn’t used peer-to-peer

¹⁶ Prasad Boradkar (date missing)

¹⁷ Podcasts: Automatically downloadable audio files, often similar to radio programs

networks, but swaps files with her friends that have unprotected audio files on their computers and/or iPods.

“C” is a male in his early thirties. He does not (yet) own an MP3 player, but has ripped the majority of his CD collection to his laptop computer. He usually plays music while working on his laptop, be it at home or at his workplace. C uses the iTunes program and at work he sometimes streams music from his colleagues’ playlists over the wireless LAN. C has neither bought music over the Internet nor used peer-to-peer networks. The last CD he bought he has actually never listened to as such, as he immediately ripped it to his hard disc and has only played it from there.

These scenarios are not intended to provide a complete overview of users’ behaviour, rather to demonstrate how the MP3 format is increasingly taking over from the CD as the storage medium of music, and the growing importance of the MP3 player in the music experience. With this shift from the physical form of the record, music is becoming at least partially invisible:

And, [the MP3 file] is invisible. It is ephemeral not corporeal, it can but need not be attached to a physical body such as a CD, it cannot be seen or touched but it can be heard. Being binary in its construction it never degrades, and it has eroded the difference between original and copy, making the term high fidelity meaningless.¹⁸

With this trend the concept of *owning* a record is clearly changing. Previously the difference between having a cassette copy or owning the original record was quite clear, now the iPod does not differentiate between playing files that have been ripped from ones own CDs, legally purchased online or copied from friends or strangers.

The physical form associated with recorded music is no longer the storage medium, but the player itself. As Boradkar puts it:

[T]he device + media collective (the Walkman and all the cassettes) has been replaced by just the device; we have moved from miniaturization to dematerialization.¹⁹

¹⁸ Prasad Boradkar (date missing)

¹⁹ Prasad Boradkar (date missing)

This is mirrored in Michael Bull's comment about how the aesthetics of a record cover now has been substituted for aesthetic of the artefact, the iPod: "The aesthetic has moved from the disc to what you play it on." ²⁰

Changes in the music world

According to reports from the music industry, the sales of CDs and records have gone down in the past few years and increased file sharing is claimed to be the culprit. However, although file sharing on the Internet may be rising, so are the sales of DVDs and computer games.²¹ Since there obviously are limits to how much spending power consumers have, the CD is not only competing with sharing of music files, but also with other forms of entertainment. Other factors might be that with customers having updated their collections from LPs to CDs, sales of CDs were bound to drop²² – or simply that the quality of the published music has declined.²³ There are even studies that suggest that file sharing has no negative effects on CD sales and may in fact boost them.²⁴

It appears that the music industry will have to accept the fact that sales of music in physical form might continue to decline. This does not necessarily mean reduced revenues as the sale of downloadable music keeps on rising, Forrester estimates that the online music business will grow to \$4.4 billion in 2008.²⁵ Other types of income for artists, like touring and sponsorship are unaffected.²⁶ In China where heavy pirating has all but banished legitimate CDs, artists regard them as promotional tools for other sources of income; concerts, endorsement deals and appearing in commercials.²⁷ Although such an extreme situation is unlikely to arise in the western hemisphere, it shows that the artists may be less dependent on the sales of recorded music than the recording industry itself.

Can piracy be overcome by making it impossible to copy music?

The music industry's answer to online sharing of music has been to attempt to create copy-protection for CDs, digital rights management systems for files available online and

²⁰ Michael Bull, interviewed by Wired (2004)

²¹ BBC News, Mark Ward (2003)

²² Jón Heiðar Þorsteinsson (2003)

²³ The Economist, October 2004

²⁴ Oberholzer & Strumpf (2004) / Harvard University Gazette (2004)

²⁵ www.itfacts.biz/index.php?id=P1111

²⁶ The Economist, October 2004

²⁷ USA Today, Kevin Maney (2005)

to fight file swappers in court. However, the success of the iTunes store has showed that it is possible to sell music online and still allow some copying of the downloaded files.

A factor in getting customers to purchase music online is their perception of fair use for purchased goods. A CD can be played in any CD player in the household, in the car, brought to a friend's party or copied to a cassette. This is the freedom customers are used to and expect from music files bought online for nearly the same price.

Sony has been notoriously strict in their attempts to limit copying. The first generations of digital Walkmans only played audio files in Sony's proprietary compression standard, and in their first attempt at making music available for sale on the Internet the purchased files expired at a certain point and had to be repurchased.²⁸ On the other hand the iPod has always played ordinary MP3 files as well as the AAC format that Apple sells in the iTunes stores. As previously mentioned, the files sold in the iTunes store allow for copying within some limits, which the market seems to have accepted. This is not to say that Apple has no usage restrictions; the iPods do not play files in the competing WMA format sold in most other online stores, and the digital files bought from iTunes can only be played on an iPod or using Apple software on a computer (although they can be burned to an ordinary CD).

It seems unrealistic to put an end to file-sharing of copyrighted music with extensive DRM schemes. The cat is out of the bag and there will always be those willing to take the effort to circumvent DRM systems and share files. Many analysts therefore suggest that the music industry should rather aim for the large segment of mainstream customers and provide them with services that they are willing to pay for.

Why pay for "free" content?

The question remains why does anyone pay to download music, when it can be done for free? Apart from the most obvious response, not participating in a potentially illegal activity, the key to online sales is *convenience*.

In peer-to-peer networks the users have to browse through (and understand) various users' file hierarchy, the file quality can vary greatly and so does the quality of the registered metadata. (Without uniform metadata the music player of choice is likely unaware that e.g. "R.E.M." and "REM" are in fact the same band.) This leads to the need

²⁸ Wikipedia: Online music store

to process the downloaded files, as described in scenario “A”. In an online music store the quality of the files and the uniformity of data records is guaranteed, and it can be assumed that the store has an extensive catalogue and a decent search function.

The challenge for the online stores is therefore to find a balance between the quality of the services they provide, and the price the customers are willing to pay for it.

As Þorsteinsson²⁹ points out customers have showed that they are willing to eliminate CD packaging and accept the somewhat reduced audio quality of MP3 files in return for a lower price, increased flexibility in use, and the option to purchase only the songs they want. Although this trend has been driven by consumers rather than the music industry itself, this should be perceived as providing new opportunities for the industry rather than as a threat.

What opportunities does online selling of music bring?

Among the new options available with online sales of downloadable files is the fact that there are practically no storage costs. Unlike in a traditional store selling physical goods, online it is possible to offer a seemingly endless selection of digital files.

Sales of records (as well as books and other commodities) follow a so-called “power-law” statistical distribution. Analogies can be drawn with languages; with a few common words that are used a great deal, and a long tail of increasingly obscure words that are used less often. Even if each item outside the most popular is only sold a few times, these sales quickly add up. For instance the streaming music service Rhapsody, streams more tracks ranked below the top 10,000 than within.³⁰

This “long tail effect” can be seen as shifting focus from mass consumption to focusing on a mass of niches:

[...] in an era of almost limitless choice, many consumers will gravitate toward the most popular mass-market items, but just as many will move toward items that only a few, niche-market people want.³¹

²⁹ Jón Heiðar Þorsteinsson (2003)

³⁰ The Economist, May 2005

³¹ USA Today, May 2005

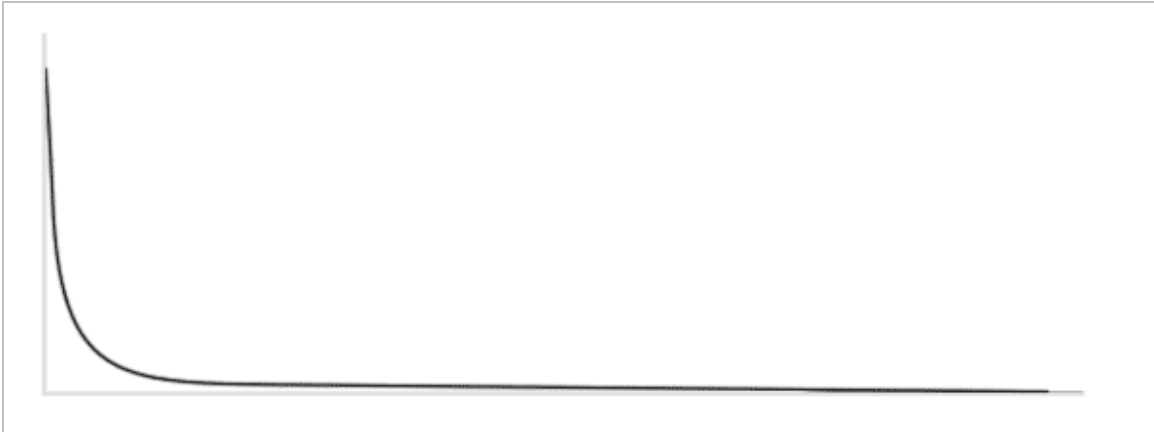


Figure 1: A power-law distribution graph, displaying the long tail concept

In an online store it is possible to cater to the needs of consumers that may have no interest in Britney Spears but are willing to pay for recordings with a particular 20th century opera singer. The music industry has vast amounts of back catalogues with old recordings, demos and live recordings that may not have been marketable before but now only require the one-off cost of digitizing and meta-tagging to become a potential source of future income.

Digital evolution has also opened up possibilities for independent artists that have not been promoted by the traditional music industry. With advances in technology it is now possible to record music in professional quality on low cost equipment and distribute the music on the Internet. Since these artists have no income of CD sales, they are usually willing to distribute their music free of charge in order to get publicity and aim for other means of income. The problem still remains; how to become visible on the Internet? As the saying goes: If you can't find it – it doesn't exist.

How do customers know which music to listen to and buy?

A *content aggregator* is traditionally an organization that combines content from various sources and makes it available to its customers. A typical example would be a radio or TV station, collecting content and publishing it on one or more channels (with varying aggregation strategies for each channel).

In recorded music, stores can be described as aggregators of sorts; choosing which music to offer and to promote. Further up the ladder would be the recording industry; choosing artists to represent and market to stores, radio stations and the public. Lately, both the

recording industry and radio have been criticized for their emphasis on formulaic hits at the cost of diversity and creativity.³²

With the increased use of MP3 players and online sales of music, it seems likely that the role of radio and music stores in aggregating and promoting music will decrease. This will probably shift some of the marketing power away from the recording industry, which in turn leads to the question whether this might signal the end of popular music as we know it?

“The people in the middle have tried to be arbiters of what we could be entertained by. They’ve been the determinants of what’s a hit, what’s not a hit. The great thing about the long tail is the consumers get to decide for themselves. They don’t need somebody in the middle.

“At the margin, what I think you’ll see is a more direct relationship between content creators, artists of one kind or another and their fans.”³³

Chris Anderson, credited for coining the term “Long Tail” claims that the idea of a shared popular culture is a relatively recent phenomenon, brought on by radio and television. He says that with market fragmentation, such as the rise of cable television, the shared culture is already in decline: “There will still be blockbuster movies, albums and books, but there will be fewer of them.”³⁴

It is of course difficult to conclude about future behaviour, but at least for teenagers, traditionally one of the strongest groups of music buyers, group culture is very important. Part of this group culture is the need to follow a general consensus about what is acceptable when it comes to clothing, music, various gadgets and fads. If the influence of mass media on the music tastes of the youth culture lessens, it seems likely that teenagers will look to other sources to shape a common consensus on music tastes.

Who will take the role of online aggregators for music?

Teenagers will of course continue to swap music as they always have, with the MP3 format enabling them to swap in bulk. But the new aggregators of music, both for youths and more mature customers are most likely to be found online.

³² The Economist, October 2004

³³ Roger McNamee, quoted in USA Today, May 2005

³⁴ The Economist, May 2005

For a model as to how consumers can find interesting music online without the aid of radio or music stores it is possible to examine how information is found on the World Wide Web today:

- When searching for specific information, search engines can offer suggestions based on automatic analysis of metadata (primarily by searching the content itself).
- For more casual browsing or general knowledge there are websites with collections of links to interesting content, often collected by a “champion” of sorts, that is a person or organisation that has a good reputation for being trustworthy and/or having interests similar to the user.

In the former case the user knows beforehand what he or she is looking for, in the latter the champion might provide links to information that the user didn’t know existed.

Similarly, when searching for specific music there is the possibility of using search engines to search in an online store, on a P2P network or on the Web. As machines have difficulties in analysing the content of music files, such a search is dependent on good metadata. It is easy for a search function to find files from a specific U2 album, but more difficult to find “French musicians sounding like Joan Baez”.

When looking for music similar to something else, an aggregator is preferable; either a human champion or an automatic collection. Pattern analysis or *collaborative filtering*³⁵ is probably a better candidate for automatic aggregation than metadata searching as it can detect patterns like “users who like the same music as you do, also like these songs...”

Whether a trusted aggregator is human or automatic, it provides an entry point to a specific niche, both for those looking for music and the advertisers looking to get in touch with customers interested in the niche. Targeted advertisement of this kind is likely to take over at least a portion of today’s mass media advertising.³⁶

³⁵ The Economist, May 2005

³⁶ USA Today, May 2005

To be pushed, pulled or even podcast

One way of categorizing information and content distribution is to distinguish between pushing and pulling; that is whether the content is being pushed out to the customer or if he or she has to pull it in.

Traditionally mass media has been pushed to the customer; the content of radio and television is sent out for a passive user to receive. Subscription to written media can also be regarded as pushing. Online the best known example of having content pushed is probably receiving e-mail, while web browsing or using P2P networks are examples of pulling.

The recent phenomenon of *podcasting* is an example of a concept blurring the lines between pushing and pulling. As mentioned before, in podcasting audio files are made available for downloading, rather than being streamed as in *webcasting*, listening to a podcast is therefore an example of time shifting. The name “podcast” is clearly influenced by the iPod, but podcasting is in no way limited to the use of an iPod as the downloaded file can be played on any device that can play MP3 files.

Typically subscribing to a podcast consists of the following steps:

1. The user finds an interesting podcast on the web, possibly downloading an old file as a preview.
2. The user instructs a client program to check the podcast for new content.
3. The client then regularly checks a XML file published on the podcast website, and when it signifies that new content is available the client automatically downloads the content (as a MP3 file) to the user’s computer. The file is then available for use.
4. Depending on the user’s configuration, the client program might also copy the file from the computer to an attached MP3 player.

What is interesting in this process is that, although technically all the individual steps are instances of pulling, the end result is the same as targeted pushing. From the user’s point of view the behaviour is similar to an automatic recording of broadcasted material, but the publisher of the podcast actually never sends anything except on request. This also means that older material is usually available on the site, further supporting the inherent time-shift character differentiating the podcast from a more typical broadcast.

Nowadays podcasts are published free of charge, but it is likely that the same model could be adopted for an aggregator publishing music files in a paid-for subscription, by requesting that the client provides some sort of authentication before allowing it to download the files. The relatively simple model of podcasting is undoubtedly adaptable to various uses, and is in fact similar to options becoming available with digital TV, where available programmes can be stored centrally and the viewer can then choose to download or stream them at will.

A scenario for using the podcast model to distribute video content on the Internet will be presented later in this paper.

Where audio goes, video follows

As far more data is needed to record and play video than audio-only content, video technology has always been a step behind audio, with some interesting parallels in the evolution of both technologies; the television set took the role that the radio previously held in the home, video tapes followed cassette tapes, DVDs followed CDs (with the Laser Disc as an intermediary). With improved compression standards, increased Internet bandwidth and cheaper storage, video files are now shared online in a similar fashion as audio files. And as with the audio files before them, the majority of available content is unsolicited, the copyright owners debating how to counter pirating and to create revenue online.

The remainder of this paper will focus on the similarities and differences between the uses of digital video content and previously discussed uses of audio.

The building blocks of audio and video

The cornerstone of popular music has traditionally been *the song*. Songs have been sold on various media formats as singles or records, played on radio or performed live and can now be bought as audio files on the Internet.

Other audio “units” are e.g. talk-show radio programmes, audiobooks and ringtones for mobile phones. Audiobooks have become more popular with the advent of digital audio, as they are less cumbersome in digital form than on several cassettes or CDs. (The iTunes store currently carries more than 11,000 audiobooks.) Ringtones for mobile

phones have proved (somewhat surprisingly) to be a popular selling item, the mobile ringtone market has grown to one-tenth the size of the recorded music business.³⁷

In video the range of content is more complex with overlapping categories. Among categories of video content are films of varying length, television series, news, sports, other television programme genre, music videos, commercials and home made recordings.

Accurately defining prime content can prove rather difficult. Traditional prime content categories are films and television series that can remain popular for decades. On the other hand news and sports are undoubtedly popular and in high demand, but generally tend to have a short shelf life.

Clearly outside the definitions of prime content are “clips”; short excerpts from television shows, films, commercials or home recordings. Clips have been popular on the Internet, often distributed virally as e-mail attachments or by linking to websites. Examples of the contents of these clips are “wardrobe malfunctions” and other embarrassing moments, humorous commercials and short film segments or sketches specially made for Internet distribution.

These clips, or “viral videos”, have proved so popular that IFilm, a website that provides streaming video content and reportedly delivers around a million downloads a day,³⁸ has over 50 viral videos that have been downloaded 500,000 times or more, with a beer commercial topping the list at close to 4.5 million downloads.³⁹

A factor in the online popularity of clips (as opposed to longer video content) is undoubtedly that short video files are more manageable for downloading or streaming. The nature of the clips, with short segments boiled down to their essence, also appears fitting for short pauses or distractions when working on a computer – the environment where they are typically viewed today.

Portable video players

As it is outside the scope of this paper to discuss all the various changes eminent in digital video distribution and consumption, the focus will be on technology comparable

³⁷ The Economist, October 2004

³⁸ Wired, March 2005

³⁹ <http://www.ifilm.com/top100/mostpopular/viralvideos/alltime>

to the digital portable music player. There are several types of portable devices that are capable of displaying video content, so some narrowing is necessary.

In the following it can be assumed that a portable video player (PVP) is a portable – rather than luggable - device that can play video content, has a hard disc or flash storage and is able to import essence and metadata either by connecting to the Internet or to a computer. Included in this definition are devices like portable hard disc based video viewers, 3G/4G mobile phones, PDAs with video possibilities, datacast terminals and some game consoles. This does *not* include laptop computers or portable DVD players without storage options.

Currently most of these devices are capable of wireless networking, but only the 3G networks provide Internet connections outside the range of Wi-Fi hotspots. With the imminent permeable wireless Internet, all of these devices will likely be able to connect to the Internet on the go, providing a truly mobile connection (at least in urban areas). Until then, most video players are dependent on a computer connection in order to receive content (similarly to the MP3 players). Exceptions to this are video enabled mobile phones and datacast terminals, who are not necessarily dependent on preloaded content.

New options in video content distribution

As it is foreseeable that the Internet will be increasingly used to distribute video, it is tempting to refer to the previous discussion about new opportunities in distribution of music online and see if there are any apparent similarities. Here the range of video content complicates the picture, but looking aside from the classic “prime content” there are clear similarities to music distribution in the growing category of shorter videos (clips).

What options are opening for creation and distribution of video?

The amount of video content available online is rapidly growing. Not only is pre-recorded material (often pirated) becoming available, but content is also being made especially for online distribution.

Following the popularity of text based weblogs (blogs) and audio podcasting, more and more are experimenting with publishing independent (and often informal) video content online, in a format similar to the before mentioned clips. This phenomenon has been

called many names, such as “vblogs”, “videoblogging” and “vodcast” (for video-on-demand-cast), but as its popularity grows the nomenclature is bound to become better defined.

With the option of publishing the videos using peer-to-peer technologies, such as BitTorrent, the bandwidth demands are lessened and with it the danger that sudden popularity might ruin the creators’ economy in bandwidth costs. There are currently several open source projects aiming to make these distribution options simpler,⁴⁰ and as the technique becomes more popular there is little doubt that the amount of video content available online will increase. With the growing popularity of digital cameras and mobile phones capable of recording videos, many users already have the tools for recording short videos and a user friendly method of publishing them on the Internet might have a similar effect as the simple blogging tools had on the popularity of weblogs.

Is there money to be made on video clips?

Until now the majority of content created for publication of this kind is by amateurs, but artists and marketers are starting to look to these distribution methods to create interest. Given the nature of these methods (with downloaded files rather than streamed content) it is difficult to create income by charging users for watching the content, but sponsorship is clearly an option. As with music, it can be assumed that aggregators will provide access to certain genres and thereby also the options for advertisers to target specific interest groups (for a glimpse of this trend see IFilm.com, although they currently distribute by streaming).

The following scenario demonstrates how such a model might work:

“Peca Cola” has launched a project to harness the possibilities of clip-distribution for marketing purposes. They have arranged a competition for amateur filmmakers in two categories; short comic sketches and music videos to songs that the company owns the distribution rights to and are available for download. The most promising entries receive support to finalise the production and the clips are then published by Peca Cola, branded with their logo, and distributed free of charge on the Internet using a variety of methods. The competition has proved popular with independent filmmakers and film students, looking for a stepping stone, and

⁴⁰ See for instance: <http://www.participatoryculture.org/>

some participants have been commissioned to produce full-budget advertisements for Peca Cola.

In the same way as music files, these video-clips can of course be played on a variety of products, including computers and mobile players.

Commuting with a Portable Video Player

While it is possible to listen to music during activities such as jogging or riding a bike, watching video in these circumstances is difficult or even impossible. Our dependence on vision clearly limits the possible uses of portable video players compared to audio players. It is therefore likely that portable video players will primarily be used in situations like passive commuting (e.g. riding a bus or train) or during periods of inactivity (e.g. a lunch break).

It is tempting to compare using a PVP while commuting to the use of “metro” newspapers freely available in most European cities: A commuter can grab a copy of the paper without any commitment, browse through it at leisure and read the items that are of interest. At the end of the journey the commuter has the option of keeping the paper, leaving it for another person to read or throwing it away. A very similar situation is conceivable for PVPs, assuming an Internet aggregator of content and a podcast-like subscription model as described in the following scenario:

“**D**” takes a half-hour trip by bus to work every morning. He has a PlayStation Portable that he uses as a PVP on his commute. D has subscribed to a few content “channels” on the Internet that aggregate video content and make it available for downloading with the previously described podcast model. Any new videos fitting his choices of content are automatically downloaded each day to his computer and transferred over to his PlayStation, ready to be brought along the next morning. On average the downloaded content is between one and two hours, more than enough to cover the round trip.

This particular morning the new content includes a few Peca Cola sponsored videos, some short pieces of video art, a video-blog entry from his friend in Germany and a quarter-long Star Wars fan film. D usually plays the videos in a random order on the trip, without checking beforehand what is available and then skips the content that does not catch his interest. He watches with one finger on the play/pause button as experience has taught him that there are many

distractions on the bus ride with people coming and going. Unlike a newspaper that stays the same even if he glances in another direction, the video keeps playing and he would then have to rewind not to miss out on anything. D skims through the videos, watches the video-blog and fan film in full and makes a mental note to store them permanently on his computer when he returns home.

An interesting side note is that while users that listen to MP3 players when commuting often have a playlist of a few songs that they listen to each day, giving each part of the journey its own tune,⁴¹ video content is more likely to be watched either just once or at least infrequently.

What about digital distribution of television?

The previous chapters have discussed PVPs being used to view video content stored on the devices, but one technology that is becoming actual right now is mobile TV; broadcasting television programmes to mobile viewers (other distribution methods than classic broadcasting are also possible). The technology is commonly referred to as *datacasting*⁴² and is either distributed by satellite or using existing digital television or digital radio networks. Mobile TV via satellite has recently become available in South Korea, and even though sales of enabled handsets have reportedly been below expectations, 20,000 customers have subscribed to the service in the first few weeks.⁴³

Most manufacturers of mobile phones are planning to add TV possibilities to their future models, although some analysts are very sceptical about mobile TV being the gold mine that others claim.⁴⁴

The questions regarding the popularity of video enabled mobile phones seem to be whether customers buying them will prefer to watch broadcasted television or time-shifted content, and perhaps more importantly for mobile operators and distributors of content, what are they willing to pay for?

It might be argued that portable televisions have been available for decades without ever becoming really popular, but that is not sufficient evidence to predict the doom of mobile TV. The modern datacasting offers much more possibilities when it comes to delivering

⁴¹ Wired, February 2005

⁴² In full: *IP data broadcasting*

⁴³ Mike Masnick (2005)

⁴⁴ David Haskin (2005)

video on demand, and thereby a time-shift effect portable televisions are not capable of. And whereas the portable televisions only do one thing, mobile TV is generally seen as an added option to devices that consumers are already used to carry – devices that are frequently updated and where new features have generally been well received.

Similarly it should be pointed out that although this paper has compared portable music players to the options of portable video players, that comparison should be considered with care. The MP3 player is only designed to do one thing, play music, and especially in the case of the Apple iPod seems to do that quite well. On the other hand, a video option in portable devices is almost inevitably bundled with other functionality; a mobile phone, a PDA or a game console. Even if there are more situations where it is possible to listen to music than it is to watch video, that alone can not be considered proof that the devices including video options will be less used or less popular than MP3 players.

Being online all the time, everywhere

The evolution of wireless technology has been to expand the range and efficiency of wireless access points with the aim to provide, after a few years, a network of permeable Internet connections (at least in urban areas). Such networks will give users the possibility to have a reliable “always on” Internet connection while on the move.

By always being connected, portable devices will be capable of options that today are limited to stationary computers and television sets, including the option to download or stream content at will. The datacast consoles and mobile phone networks are already capable of at least mimicking many of the possibilities the permeable Internet will bring, with techniques like background downloading and “Near Video on Demand”.⁴⁵

As these long range Internet connections become more reliable, the physical location of files becomes irrelevant, with a mobile player not differentiating between files stored locally or available on the Internet. This gives the option to build “virtual” online file collections where the files are streamed over the Internet on request, rather than “owned” and stored by the user. Examples of this type of collections already exist in music streaming services, but are limited by available internet connections and therefore

⁴⁵ By starting streams with short intervals, it is possible to provide Video on Demand to several customers simultaneously with only a short latency before the video starts.

not mobile. This evolution is likely to cause music and video to become even more dematerialized than today.

Conclusions

In this paper I have briefly described the evolution of portable music from the Walkman to the iPod and posed the question whether the modern MP3 player can be described as simply a digital version of the cassette based Walkman. To me the essence of both players' popularity is *freedom* and *convenience*;

- The freedom to choose what music to listen to, when and where, the freedom to isolate oneself from the surroundings with the music of choice and freedom from the pre-programmed nature of the record or radio stations.

Convenience is another big factor, and it is here that the MP3 format and digital options differentiate the modern players from the Walkman;

- The convenience of having “all” of ones music accessible at will, easily acquiring new music, being able to create playlists for various occasions and having the option of automatic recommendations.

Added to this is the non-tangible character of the MP3 file, with the option to swap hundreds and thousands of songs at will. While copies and original recordings lived in a balance in the Walkman era, the iPod and the Internet seem to be permanently shifting that balance, changing the way future generations will think of and listen to music.

While the first MP3 players, with their limited storage, might resemble a digital Walkman, I believe that the option to carry a whole collection of music on a hard disc based player and literally never run out of options is such a radical change that the iPod and kind are something quite different from the Walkman and its descendants.

There appear to be many exciting options for distributing music and other audio on the Internet, both for large distributors, individual artists and the amateurs. The doom and gloom picture the recording industry has drawn of the effects of peer-to-peer file sharing seems to be exaggerated. If the industry is willing to give up holding on to a status quo situation and instead listen to the wishes of consumers, it appears that several revenue models are plausible. Customers are willing to pay for service and the technology makes it possible to provide that service in ways that were impossible before.

With regard to the similarities and differences between a digital audio and a music player, in my mind the biggest difference lays in the fact that listening to music is far more versatile than watching video. A portable device only capable of playing video would therefore have a much more limited use than an audio player. However, the video players emerging are part of multifunctional devices and their popularity will therefore be dependent both on the video option and other functions.

Personally I doubt that traditional broadcasting to mobile devices is what the users are most interested in. On the other hand I believe that providing the options of video-on-demand, about to become the norm in digital TVs, to mobile devices will prove popular as the technological hindrances are cleared.

In the meantime there are many interesting options for distributing video content over the Internet to either portable video players or computers. I think that this development will mirror pretty closely that of music on the Internet, but will probably happen faster since there are models and experiences from music that can be drawn upon. It will be interesting to see if the copyright owners will make the same mistakes as with music, or if they are willing to embrace new options and listen to their customers.

The advent of the permeable Internet has the potential to change the whole picture, but it remains to be seen if the new options that it brings will have a revolutionary effect on the users' behaviour, or if it will seem more like a gradual evolution.

The broader scope

Putting the subject of this paper into a broader perspective, it appears to me that the world of recorded music has been irreversibly changed – with challenges to the traditional producers and marketers of music, but these changes also bring new opportunities to the whole value chain of music, all the way from the consumer and up.

Digital video is of course a much broader field than this paper can cover, but nevertheless there are some aspects of digital video that can be compared to the evolution of digital music. One likely assumption is that customers will show similar preferences in their use of video as they have for use of music. The challenge for the whole value chain of video is therefore to use the applicable experiences from digital music in the imminent evolution of digital video.

With any new technology it is difficult to accurately predict what changes it will bring, whether users will accept it (or adopt it to their needs), if the technology is not yet available. Many of the ideas and conclusions discussed in this paper are of that nature; that is they are difficult to prove or reject without either building an elaborate testing environment or by waiting for the mentioned technology to become a reality.

There are though at least two assumptions made in this paper that could be empirically studied with the available technology.

One is the assumption that without mass media influencing their music tastes, users are likely to look elsewhere for aggregators of music (page 15). This could be verified with qualitative studies, e.g. with interviewing users that may have replaced listening to radio in favour of their iPod, and finding out how and where they get information about new and interesting music.

Another assumption made in this paper is that commuters are more likely to prefer watching shorter content like clips rather than e.g. feature films on their PVPs (page 22). This could be researched by providing users with PVPs and various types of content to watch on their way to work, studying what choices they make and why. This kind of experiment could be broadened to include users watching the same types of content, either on a PVP in other situations or on other media, such as a stationary or laptop computer.

I have not found any studies directly dealing with these issues, although a forthcoming book from Dr. Michael Bull about mobile sound devices, including the MP3 player and iPod, is likely to shed at least some light on the first one.

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