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THE TABLES ARE TURNED

**A study of developments in mainstream audio replay
and the emergence of a vinyl subculture**

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Table of content

Introduction 3

1. Research question 5

1.1 Theoretical framework 5

1.2 Defining the research question 6

1.3 Chapters 7

2.A new Aramis - what really killed the LP? 8

2.1 From Phonograph to vinyl record 8

2.2 How CD sales surpassed LP sales 10

2.3 The rise of compact cassettes 12

3. Developments in mainstream replay 15

3.1 Recording music 15

3.2 Recording from TV 16

3.3.The missing link:The Video Disc Player 17

3.4 CD - The digital audio revolution 19

3.5 Digital tape for home use 22

3.6 DVD - The digital video revolution 24

3.7 Welcome to the 21st century: MP3 25

3.8 A new CD for the 21st century: DVD-A and SACD 27

3.9 A new DVD for the 21st century: Blue-Ray and HD-DVD 29

4.Value systems in the mainstream 31

4.1 The electronics manufacturers 31

4.2 The entertainment industry 32

4.3 The consumers 35

5.Another Aramis - who is killing off the CD today? 37

6. Developments in vinyl replay 41

6.1 The emergence of a vinyl subculture 41

6.2 The emergence of a new musical paradigm 42

6.3 Dance saves vinyl 44

6.4 Vinyl is back in the (youth) mainstream 45

7.Value systems in vinyl replay 47

7.1 Sound quality 47

7.2 Operation and artwork 48

7.3 Buying vinyl records 49

7.4 Authenticity 50

Conclusion 53

References 56

Acknowledgments 61

Introduction

I worked in the music biz in the early to mid-1990s. Later I moved on to the emerging Internet biz. By the definition in this thesis I am an audiophile, I listen more carefully to music and I spend more money on its replay than average.

At some point I bought a turntable again. That didn't strike me as strange, for being a forty-year old I didn't buy CDs until I was in college. Actually I bought the turntable after having seen Stephen Frears' movie *High Fidelity*. What did strike me as strange was to find out that a whole new generation of music lovers is discovering vinyl. After my generation had moved to CDs, the dance music people stepped in to save the life of the turntable. Then another generation, the children of the generation before me started taking on the experience. Not en masse, but as a nice, vibrant subculture together with audiophiles, collectors and casual "vinylists". In 2007 vinyl replay even entered the mainstream again because of its retro appeal, when the youngest generations started buying vinyl to complement their downloads.

Music replay is fascinating stuff. It is interesting technology, used to handle cultural content that we all value: Music. Various studies have researched how important music is, how it helps shape identities or how it evokes emotions in general. In 2007 the music replay landscape is more interesting than ever before. Consumers feel music transcends beyond the music industry, which is increasingly seen as an annoying, greedy stand-in-the-way. Vinyl replay today goes without much agency of the major music industry, even less than with downloads. A turntable unlocks a wealth of cultural material, released in almost 60 years of stereo records. CD sales are falling and the CD turned out to be a transitional format, like so many other things from the 1980s turned out to be. Downloads start being offered in higher quality somewhere halfway of CDs. It is enough for most people. And vinyl seems to cater for the smaller group of people that do want a different experience.

I loved studying this subject and writing my MSc thesis on it. It is a historic account, based on documentary research. To minimize bias I placed great value on constructing validity, following the recommendations of Yin (2003). This thesis is built up as a comparison between two case studies, on one side developments in mainstream music (and video) replay, on the other side the development of a vinyl subculture and today's status as a niche within the mainstream rather than a subculture.

I used triangulation of data, obtaining data from three different sources. This way sources may reflect as many different angles as possible and can internally confirm or refute one another.

First I created a database with 22 secondary sources, to provide the theoretical framework for this thesis. The secondary sources consist on one part of "classic" STS literature and on the other part of literature specific to music, the music industry and/or its users.

Secondly I created a primary sources database with 110 articles from both more general sources - such as *The Guardian*, *Wired*, and *BBC News* - and in depth articles from hi-fi sources and dedicated blogs on many of the aspects of music replay and industry.

This selection provided much information to understand the various aspects of the subject. However, as it was so diverse, it made for difficult analysis. The selection also included several results from The New York Times, and a search there on "vinyl" and "vinyl records" provided a wealth of information. At this point I decided to do another phase in the data collection using the archives of The New York Times.

So, thirdly, I created another primary sources database with 80 documents from The New York Times. The main advantage of this source is that the online archives of The New York Times span the period 1981 up to the present, from just before the arrival of the CD to its demise today. With one source spanning this whole era it was possible to see the shifts in perception, the rise and demise of new trends and the various attitudes in the various periods.

The sheer width of the topics covered, the multitude of authors, and the spread in years published convinced me I had sufficiently constructed validity and now had a data-set suitable for analysis. All sources were included in their respective case study databases, after which the texts were studied, classified and highlights extracted. Comparison of the diverse sources database and the New York Times source database showed matching patterns of content.

Running both against the secondary sources database from phase I provided both triangulation and the final insights to write this thesis. Along the way some additional references were needed to zoom in. All in all this thesis now includes 89 references which are available online (with the proper subscription).

In this thesis I have constantly balanced between giving enough information for nuances to shine through and keeping the accounts to the point. It is by no means complete, there is so much more to tell about every aspect of music replay systems.

STS is wonderful in that it actually has an eye for how technology is used in society. With this thesis I hope to have contributed some understanding on the technologies we use for music replay and their meaning.

I. Research question

I.1 Theoretical framework

Everyone is familiar with the tale of how the CD made the LP record obsolete. In fact, a quick search in the New York Times even shows this has become a popular standard quote to express the rise of any new consumer technology.

If we look closely however, the story is a bit different. Vinyl replay really never did go away, but continued life in a subculture of music replay, a niche if you wish. If we look at evolutionary economics, this is rare but not unheard of, an example in case being the propeller plane which continues life after the jets have taken over mainstream aviation. For this thesis I could have left it at that, a rarity, an interesting subject for study in itself. What is the appeal of the turntable and of vinyl records?

However, something strange is happening. 2007 is the strangest of years for vinyl and for music replay in general. It is the year where that other popular analog medium, the compact cassette, will cease to be sold in stores. Did you think it had gone already? You are not alone, the role of the compact cassette is much underestimated as this study will show. CD sales have been falling for years and are plummeting now. Hi-definition music formats have flopped. The music industry has become the entertainment industry after integration with the movie industry. Together they try to cope with the biggest challenge yet: downloading.

At the same time, 2007 is the year where vinyl, after years of steady growth, is now booming. More and more LP records are released or reissued, 2nd hand stores flourish and the singles charts in the UK are made up by 70% of vinyl 7"s. The turntable industry is alive and kicking, trying to meet up with demand for replay systems. To put things in perspective, it is not that mainstream music listeners are en masse switching back to vinyl records. A comparison of sales figures of players and carriers for both CD and vinyl records shows the latter to be a small percentage of the first. Nevertheless, with its declining sales to give way to downloads, CD starts to look like an intermediate format in the evolution of music reproduction, whereas vinyl replay seems to be more alive than ever.

I argue that one cannot study these developments independently, they are interconnected and the results of patterns in history. A study of vinyl replay in 2007 will therefore have to take into account this wider context and the meaning it has for the parties involved.

How to capture this context in scientific research? This thesis will build on the argument that music replay is a product with:

- Power (in the corporate and enthusiast allocation of resources),
- Structure (institutionalized patterns of interaction),
- Meaning (semiotic valences).

I combine these three elements into "value systems" of the parties involved.

My argument stems from the Structuration framework as laid out by Giddens, later applied to technology by Orlikowski (1992). She views technology as an occasion for structural change. Since actors and institutions involved in this (what is a classic Giddens structuration) processes are historically and socially situated. I have used this framework to pursue my research design from a historical base and develop the story from there.

1.2 Defining the research question

I decided to research a context for the present vinyl subculture in the post-war developments in music replay. Developments in video replay are included as well for two reasons. Firstly, the technical innovations stemmed from combined R&D. Secondly, over the years music and movie companies have merged into entertainment conglomerates, thus agency also now stems from the same source.

The research question is then as follows: *What value systems have developed in mainstream music and video replay and how do the value systems in vinyl replay differ?*

I argue that the mainstream developments are characterized by a constant ménage-à-trois of the major electronics manufacturers, the major entertainment industry and consumers. The value system of consumers is based on functional criteria such as convenience, affordability and creative freedom over sound and picture quality.

Vinyl replay distinguishes itself from an absence of the major electronics manufacturers and the major entertainment industry. The value system of consumers is triggered by cultural meanings transcending functional criteria. These meanings include artwork, handling records and the players, collecting content and a notion of authenticity.

I also argue that if the record industry could have foreseen in the early eighties that moving to a digital carrier-based format, which seemed perfectly logical at the time, at one point would intersect with PCs and internet - both systems designed to take the digital music off the carrier and make it work in cyberspace - they would have probably stuck with vinyl replay.

Yet vinyl has managed to survive on its own, away from the music industry. It survived on a basis of audiophiles, collectors and always the hippest music propagating it. This century it intersected with a general retro-cool wave and boomed.

The world moves on and the technology and developments of the past have helped to bring music where it is today, on iPods. CDs are slowly being phased out by consumers. In the 1990s a vibrant vinyl subculture developed and vinyl is now re-emerging into the mainstream as a “classic experience”.

I.3 Chapters

Chapter 2 is set up as a prologue, where we trace the reasons for vinyl's disappearance from the mainstream.

Chapters 3 & 4 form part 1 of this thesis and consists of a case study on developments in music and video replay in the mainstream.

Chapter 3 describes post-war developments in mainstream music and video replay formats. Chapter 4 takes the patterns that emerge from the previous chapters and constructs the value systems involved.

Chapter 5 is set up as an intermediary chapter, where we trace the reason's for CD's declining sales in the mainstream.

Chapters 6 & 7 form part 2 of this thesis and consist of a case study of developments in vinyl replay after it dropped out of mainstream music replay.

Chapter 6 sees vinyl re-emerging as a subculture, to which I will add developments, backgrounds and an introduction to the musical paradigm shift that brought vinyl back to life. In chapter 7 I will lay down the value system of vinyl replay.

Finally, the conclusions chapter will revisit the research question and the results.

Note: The Aramis in the title of chapters 2 and 5 refers to the book by Latour (1993): "Aramis, ou l'amour des techniques" (or the English translation by Porter, 2003: "Aramis, or the love of technology"), which has become a classic in STS literature.

2. A new Aramis - what really killed the LP?

By a general account the vinyl record has been pushed out by the CD. Five years after its introduction in 1983, CD sales overtook vinyl sales. An often overlooked fact in this general account is that in 1983 the LP was already being outsold by pre-recorded compact cassettes. This chapter will show that the disappearance of vinyl replay from the mainstream at the end of the 1980s was as much the work of deliberate agency by the music industry, as the result of an already weakened position due to the popularity of compact cassettes.

In order to find out what really killed of the LP in the mainstream, this chapter consists of three parts. First up is a historic account of the invention of the format. The second part describes the period 1983 - 1988, when LPs were pushed out of the mainstream. Thirdly we will look at how in the preceding period the LPs supremacy was already challenged.

2.1 From Phonograph to vinyl record

Emile Berliner's invention of the Gramophone in 1887, 120 years ago, was both the start of the music industry and of the flat, lateral-cut / spiral-grooved stamped records that we know today.

The vinyl record, introduced in 1948, was the mainstream music format for forty years.

The historic description draws upon the excellent overviews by Schoenherr (2005) and Morton (2006) and the accounts by Jones (1990), Browne (1991) and Hinman (1994).

The first era in the history of records runs from the invention of the Phonograph in 1877 to just after WW2. The invention of records and players gave birth to the music industry.

In 1877 Thomas Edison made the first recording of a human voice on his invention called the Phonograph, which used a tinfoil cylinder. 1885 saw the invention of a second type of phonograph by Chichester Bell and Charles Tainter, called the Graphophone. It used wax-coated cylinders incised with vertical-cut grooves. The Graphophone became the basis of the Columbia company. Both inventions used a cylinder record which captured sound in a groove.

The predecessor of today's turntables arrived in 1887 when Emile Berliner invented a third type of phonograph, called the Gramophone. It used hard rubber discs with a lateral-cut groove. Berliner had opted for a disc instead rather than a cylinder, because this made it possible to mass produce them in a stamping process. In 1896 Emile Berliner and Eldridge Johnson - who had designed an improved gramophone player for the Berliner company - together founded the Victor Talking Machine Co. in 1901 with the "little nipper" dog as trademark. This dog and the HMV label Victor used in Europe have become synonymous for old records. A year later Victor switched to shellac discs.

In 1906 Victor introduced the first all-enclosed cabinet phonograph with enclosed tapered horn. Called the "Victrola" upright, it managed to become the generic name for all phonograph players designed as furniture. By this time the music industry was born, selling 3 million records annually in the US alone. Edison, Victor, and Columbia were the first major record companies in the US. Victor's HMV and the subsidiaries of Edison and Columbia also dominated the market in Europe.

The industry started to standardize on the Victor technology. In 1919 outsider Gennett began to make lateral-cut records. They were immediately sued by Victor for patent infringement. Other smaller labels such as Okeh, Vocalian, Compo joined Gennett's claim that lateral-cut was in the public domain. They won the case and lateral-cut and flat records soon became the prevalent technology.

Then the record industry received a big blow from radio broadcasting, which had started around 1922. After a while radio networks developed special programming beyond what was available on records. The shows caught on to such an extent that consumers bought fewer records, with the result that half of the record industry didn't survive.

The remaining companies were too weak to survive the Great Depression on their own. Edison's phonograph division was the first to go in 1929. Victor was bought by the Radio Corporation of America (RCA), and Columbia was purchased, appropriately enough, by the Columbia Broadcasting System (CBS). These companies still exist today.

Almost a decade later, sales of record discs sold began to climb back to the level before the Great Depression. At the end of the 1930s the US economy was gradually improving. Furthermore, a growing number of jukeboxes was replacing coin-operated pianos. Owners of jukeboxes bought records to change the content of the machines on a weekly basis, spurring sales.

WW2 brought about important technical developments in the form of the technology of tape recording. It was pioneered and perfected by the Nazis before and during WW2. In 1945 the Allies brought this technology to the US, where it was further developed into military applications but also into studio tape recorders. These recorders enabled a new recording process for records, the possibility to record movie soundtracks and the introduction of tape playback for consumers.

With better recording technology now available, the music industry started looking for a way to reproduce symphonies and jazz pieces on a single record and to improve the sound quality. The pre-war 10" or 12" brittle 78 rpm "shellac" disc could play for at most 4 1/2 minutes per side. In 1948, Columbia brought out the first LP (long-playing) 12 inch 33 1/3 rpm "vinylite" albums. The LP both sounded much better and offered 23 minutes playing time per side. A year later, RCA unveiled the first "vinylite" 7" 45 rpm records as a competing format. At first they were not a commercial success because they held no more music than 78s. However, later they became the standard format for pop music singles.

These new high fidelity discs marked a new era in the home record player and are still used today. LPs are made of polyvinyl chloride (PVC), and hence are referred to as vinyl records or simply vinyl. There was one more technical revolution in 1958, when a world standard for stereo records was established and the first stereo LPs were sold. A new generation of stereo hi-fi components emerged.

As to the music, in 1953 both Elvis Presley and Bill Haley recorded their first hits. The first pop albums were essentially an artist's major hit, with added filler. In the emerging rock culture of the mid-1960s, however, the album became a serious art form in itself. Albums of, for example, the Beatles and the Beach Boys, were based on a theme rather than a random collection of songs. The LP album became a symbol of artistic expression and album cover art gained an ever more important place. A new musical paradigm - rock music - was born to the vinyl format. At the same time, the LP album was also the home of classical, jazz, folk, country and mainstream pop music. All in all, the LP became the primary way we listened to music for more than 40 years. (Jones 1990, Browne 1991, Hinman 1994, Schoenherr 2005, Morton 2006).

2.2 How CD sales surpassed LP sales

As we will see in the next chapter, the compact cassette started competing with the LP in a mobile revolution. However, vinyl managed to coexist with tape - albeit in a less prominent spot - even after it had been surpassed by compact cassettes as early as 1983. That same year, however, the CD was introduced and - after a few years of hesitation - the music industry actively started to phase out vinyl.

Browne (1991), Plasketes (1992), Liversidge (1995) and Hayes (2006) all offer unflattering accounts of hasty marketing moves as consumers began to buy CDs and the industry realized the profit margins in the new digital format.

Until that time the acceptance of CDs by consumers was gradual. The format was attractive, yet also more expensive and met its design goal of a premium format for music replay. Vinyl records still seemed to have plenty of life in them until the CD format would have matured and prices would have come down. The music industry quickly and systematically moved to change consumer behavior, which had been shaped by decades of vinyl record buying.

Hayes (2006) lists the following systematic efforts to force a transition from LPs to vinyl:

- limiting the production of LPs;
- sales programs that encourage retailers not to buy heavily into vinyl albums;
- artificially inflating the wholesale cost of CDs to guarantee increasing profits.

Record companies began pressing fewer LPs as soon as consumers began taking to the CD. In 1989 Arista stopped pressing vinyl copies of Milli Vanilli's debut album, then in the top 10.

By 1991 a number of best-selling albums in all genres never even made it to vinyl. Furthermore, CD releases of an album usually featured bonus tracks which were not included on the LP. (Browne, 1991)

In the mean time, record companies increased return penalties, by charging retailers more when they returned unsold LPs than when they return unsold units of other formats. Furthermore, stores were offered special deals for CD and compact cassette orders. By 1991, the record companies refused retailers their option of returning unsold vinyl stock completely. (Plasketes, 1992)

It helped that retailers in fact preferred the advantages of the small compact disc, taking up less display space. Furthermore, it had become impossible to fit three different formats into their stores.

As a result, stores first became hesitant to order LPs and later were happy to drop the one format that was not compact and certainly not readily available anymore. With less and less inventory of LPs, consumers were "gently manipulated" into buying CDs. With the higher profit margin on CDs, record companies could recover costs of a release much more quickly. (Browne 1991)

Because of the enforced consumer demand, production of CDs could be ramped up. A few years after the introduction of the format, manufacturing costs had fallen to about \$1.50. LPs manufacturing costs on the other hand had been about \$1 but were rising due to less production. Yet the retail price of CDs remained at \$15 whereas LPs usually retailed for \$10. The manufacturing costs of compact cassettes were the lowest at \$ 0.50. (Browne, 1991)

These tactics finally brought about the format shift that the music industry desired: In 1988 CD sales for the first time overtook LP sales. In stores, CDs outnumbered records by as much as 6 to 1; cassettes outnumbered vinyl by 12 to 1. (Plasketes 1992)

In 1990, only 11.7 million LPs were sold, compared with 286 million CDs. Smaller labels continued to release 7" and 12" vinyl records but mainstream retail outlets didn't stock LPs any more. (Hayes, 2006)

With record companies limiting editions of albums and deleting their vinyl catalogs, many pressing plants were forced to close down. In addition, the mainstream electronics industry ceased production of turntables and moved entirely to manufacturing CD players. Smaller turntable and cartridge manufacturers trimmed their product lines or vanished from the market completely. (Plasketes 1992)

For the larger part, vinyl records had disappeared from mainstream music replay when the 1990s started. Undoubtedly this process was accelerated by the agency of the music industry. Liversedge (1995) argued that "The LP was not so much dethroned by consumers as assassinated by a record industry unwilling to market two formats at the same time."

However, as we will see in the next chapter, this should actually read "three formats". A socio-technical-cultural movement towards portable music had already put the LP in a different light.

2.3 The rise of compact cassettes

At the heart of the success of the compact cassette lies a portable music revolution, which started around 1955 with small, efficient transistor radios. Cheap enough for youngsters, transistor radios became a success in cars and as portable devices. However, the essence of the portable music revolution lies in tape.

As we saw in the previous chapter, the Allies had brought German tape recording technology to the US after WW2. With this technology studio tape recorders were developed that revolutionized the making of records and movie soundtracks. The 1950s saw the introduction of the first prerecorded tape format offered to the consumer: reel-to-reel. Direct copying from the studio mastering process enabled a very good audio quality. Many record companies introduced prerecorded reel-to-reel tapes but it was never a commercial success. However, it remained for sale on the market through record clubs until the introduction of the CD. (Hinman 1994, Jones, 1990, Morton 2006)

The first mobile tape replay system was 8-track, devised for use in cars. The 8-track format was endorsed by Ford, who offered 8-track players as an option in all 1966 cars. The car culture in the US had inspired the possibility of listening to the music of the drivers choice, rather than listening to the radio. So far this had only been possible with playing records or reel-to-reel at home. 8-track was very popular in the late 1960s and early 1970s, at which time it accounted for a third of the market for pre-recorded music. What further contributed to 8-track's success were the home players, introduced shortly after the first car players. Like reel-to-reel decks and turntables, the home players could be hooked up to the sound system. Prerecorded tapes now offered more versatility than vinyl records, as they could be played at home as well as in the car. Yet, music could only be played, not recorded. (ibid)

In the beginning of 8-track, prerecorded tapes were considered merely auxiliary to vinyl records and not part of a hi-fi ecosystem. Marketed to appeal different customers, vinyl records were sold in record shops, reel-to-reel tapes in hi-fi stores, and 8-tracks in auto supply outlets. Owing to the enormous success of 8-track, however, the music industry moved to treating tape releases as the equal of vinyl releases, rather than auxiliary. The typical one month delay between an album's release on record and on tape was hurting sales of tapes, by now an important market. To promote 8-track's image as a viable alternative, all record companies moved to a new policy of simultaneous vinyl and tape releases of new album titles. Ultimately the 8-track would fail, but with these developments it paved the way for music on compact cassettes. (ibid)

The compact cassette format was designed by Philips from The Netherlands in the 1960s. In contrast to 8-track, it was not inspired by car culture, but more by the portable transistor radio. The compact cassette was designed for small, portable, battery operated devices. This was a novel approach in an era of home turntables and reel-to-reel decks. The compact cassette format was revolutionary in that it enabled both playback and recording (on blank tapes). (ibid)

As a remarkable feat, Philips waived licensing fees to anyone wanting to produce compact cassettes and its players, provided they used Philips' specifications. In hindsight this proved a sound business decision, as it ensured standardization of the compact cassette format and thus its quick acceptance as a new format. At its introduction in Europe in 1965 and the US a year later, several major electronic manufacturers were producing the tapes and the devices. (ibid)

Audio critics didn't think much of compact cassettes. The audio tracks on the tape were only half as wide as those on 8-tracks, and speed was also half of the US format. This was perceived as lo-fi technology with limited potential for decent sound quality. Consumers, on the other hand, were more interested in convenience and versatility than high-end sound reproduction. They loved the new format for a variety of reasons: Pre-recorded compact cassettes were about the same price as vinyl records. Blank tapes, however, were inexpensive. The players were portable and could record as well as play. The tapes were smaller than 8-track and yet could hold more music. Finally, the devices were very easy to operate. (ibid)

Compact cassettes actually caught on even more quickly in the US than in Europe, in spite of the 8-track format, which was made obsolete by 1970. As cassette technology improved, it graduated from being a mobile gadget to being part of the home stereo system. In 1969, the Dolby noise reduction system was adapted for use with cassettes, reducing tape hiss and improving dynamic range. Furthermore, "chrome" and even "metal" tape were created to come closer to the quality of the LP. (Morton, 2006)

By 1970 vinyl records were still cheaper to mass produce than pre-recorded cassettes. Also their sound quality was superior, since cassettes were duplicated at high speeds. High Fidelity magazine noted that compact cassettes would not kill off LPs. Rather they predicted "*some fantastic technological breakthrough which - if it occurs - will make all present forms of recorded material obsolete.*" (Jones 1990)

As we will see in the next section, the advent of the CD was indeed such a breakthrough, yet, compact cassettes did manage to take a large dent out of vinyl record sales.

The main innovation for compact cassettes was not improved sound quality, although that was much welcomed. What really made compact cassettes take off as an audio format was the introduction of the Sony Walkman in 1978. Along with the "ghetto-blaster" radio/cassette combination, the Walkman helped the cassette displace the LP as the dominant form of music technology. (Morton, 2006)

The Walkman provided consumers with an all new audio experience. Small headphone sets were developed, making the Walkman the companion of that other emerging trend - joggers. Later Walkman models also had AM/FM stereo radio components. (Produce, 1990)

Whereas the Walkman was intended to shut out the outside world, the Ghetto-blaster aimed at exactly the opposite. The bigger the speakers, the louder they were played, the hipper it was to walk down the street with increasingly larger machines on one's shoulder. It was the start of yet another contemporary phenomenon: Breakdancing. (ibid)

According to Produce (2003), the Walkman and the ghetto-blaster "*allowed people to create their own real-life soundtracks*"

In view of this mobile revolution record companies began cutting back on their LP releases to concentrate on the compact cassette format, making only the most popular releases available on LP.

In 1983, compact cassettes (236 million) for the first time outsold LP records.

In the mid-80s peak, pre-recorded compact cassettes even sold 900 million units a year, 54% of total global music sales. In the US only, between 1978 and 1988, the number of vinyl units (not singles) shipped by manufacturers dropped nearly 80%, from 341 million to 72 million. The number of CDs shipped went from zero in 1978 to 149.7 million in 1988. In the same period, compact cassette shipments rose to 450 million. As we saw earlier, during the 1980s, in stores, CDs outnumbered records by as much as 6 to 1 but cassettes outnumbered vinyl by 12 to 1. (Plasketes 1992)

Later in the CD era a Warner Brothers official said: *"You want to know what really killed the LP? I think the cassette started the demise, the whole mobile music thing - the boom box, the car cassette player. The CD just basically delivered the knockout punch."* (ibid)

In 1993 the CD managed to take over music sales from pre-recorded compact cassettes for the first time. The decline continued such that in 2001 they accounted for only 4% of all music sold in the US. Since then, the pre-recorded market has undergone further decline, with few retailers stocking them. (Paul 2003)

With these accounts we can now create a timeline of pre-recorded analog music formats:

1958 introduction of stereo LPs

1965 introduction of compact cassettes

1983 pre-recorded compact cassette sales overtake LP sales

1983 introduction of the CD

1988 CD sales overtake LP sales

1993 CD sales overtake pre-recorded compact cassette sales

In the next chapter we will look more closely at these and other developments in the mainstream.

3. Developments in mainstream replay

The previous chapter aimed to provide insight in the triple-format situation of the 1980s: Vinyl records, compact cassettes and compact discs (CDs). Yet the two formats that challenged vinyl records were only two in a sea of new formats that arrived in the 20th century - albeit very successful ones. In this chapter we will see how - in a series of interlinked technological paradigm shifts - many new formats in audio and video came to market. The account of each format will highlight the agency involved by the three main parties: The electronics manufacturers, the entertainment industry and the consumers. With these accounts we will later be able to construct the value systems of the parties in the mainstream.

3.1 Recording music

The previous chapter focussed on pre-recorded compact cassettes. However, the compact cassette revolution was twofold: Making music truly portable and being able to select either pre-recorded music or record one's own music at home. As we saw earlier, the compact cassette was not inspired by car culture. It did manage to create a culture of its own: The mix tape.

Paul (2003) explains that *"By the early 1970s, we were voraciously recording music onto blank cassettes: LPs, concerts, tunes from the radio"*, a phenomenon known as "home taping". One of the cultural revolutions brought about by home taping allowed was the creation of the mix tape. Often it was a compilation of songs put together as a present for a loved one, as immortalized in the the movie "High Fidelity", based on the novel by Nick Hornby. (BBC News, 2005)

The ability of consumers to record music themselves greatly worried the music industry, fearing piracy and lost sales. The music industry launched the infamous "Home taping is killing music" campaign, with little effect on consumers but annoyance at the industry. (BBC News, 2005).

In 2000, Phillips ceased production of blank tapes, but the compact cassette has refused to go away. Some parts of the world never did take to the CD. In Africa, the Indian sub-continent and parts of the Middle East, the cassette is still king. (Paul 2003)

According to Paul (2003), *"The compact cassettes revolution was such that its operating denominators - Stop. Pause. Fast-forward. Rewind - have become part of our vocabulary."*

3.2 Recording from TV

The tape revolution was not limited to music - a similar development occurred in video. The situation on the video market was in a way comparable that of music. The equivalent of LP records as the original format were the movies in the cinema. Radio had its equivalent in television. And there was even a form of video reel-to-reel: The Ampex video recorder which was aimed at TV studios, unveiled in 1956.

In the 1960 the consumer electronic manufacturers were anticipating a possible saturation of the TV sets market. They saw there the necessity of giving to the public a system capable of playing pre-recorded video programs on their screens. (Waneque, 2003)

Inspired by the commercial success of the compact cassette and the technological breakthrough and success that the Ampex presented, the video (cassette) recorder was developed. The machines could play pre-recorded content, but could also record audio and video from a television broadcast so it could be played back later. Most VCRs had their own tuner and a programmable timer.

At the beginning of the 1970s, the video cassette was part of a wider scale societal change from open reel systems to cartridge consumer items. Earlier examples include the Instamatic film cartridge (1963), the Super 8 home movie cartridge (1966) and, of course, 8-track and the compact cassette (1965).

This time not Philips but Sony arrived to market first. In 1971 Sony introduced the U-matic system, the world's first commercial video cassette format. A year later, Philips introduced its VCR format. Although at first glance the two might appear to have been competing formats, they were aimed at very different markets. U-matic was introduced as a professional format, whilst VCR was targeted particularly at educational but also at home users. VCR was the first successful home system and its name has become the generic term to denominate a video (cassette) recorder. To compete in the home user market Sony went on to release its Betamax format in 1975. Finally the VHS format was introduced by JVC in 1976. Philips also introduced Video 2000 or VCC in 1979. Unsurprisingly, with this selection of formats a true video tape format war developed, a classic case in economic science.

Time line of video cassette recorders/players:

1971 U-Matic (Sony)

1972 Video Cassette Recorder or VCR (Philips)

1975 Betamax (Sony)

1976 VHS (JVC)

1979 Video 2000 or VCC (Philips)

1990 VHS wins formats war

Regardless of the format war, video (cassette) recorders were a huge success. The compact cassette had prepared consumers for the concept and the operation of the machines, except for the timer function - which even became a subject of academic research in gender studies. (Faruggia, 2004)

The picture quality of pre-recorded material was reasonable and improved over the years. Picture quality was not essential to its success, however. In fact, consumers showed more interest in LP (Long Play) modes that reduce the picture quality to provide longer recording time. (Glasser, 2007)

The mere fact that consumers could watch movies at home at their discretion without having to go to the cinema or being dependable on what television would broadcast, was a liberating experience comparable to the compact cassette's mobile revolution.

The movie industry shared the music industry's concern over piracy threats and loss of sales by the new popular consumer oriented recordable tape form. The industry proclaimed the death of movies and went as far as to sue Sony in the now famous and still important "Betamax case" on copyright (and lost).

The arrival of the DVD meant the end for the video (cassette) recorder, especially when DVD recording and hard-drive video recording came to market. (O'Neil 2006)

3.3. The missing link: The Video Disc Player

In order to understand the digital revolution of the 1980s onwards it is important to include a description of a perhaps overlooked analog format that preceded it: The Video Disc Player or VDP. The VDP format never caught on in Europe, but reached 2% of the US market and even 10% of the Japanese market for video replay systems. The system was aimed at movie enthusiasts who were willing to pay a premium for "*the best analog video replay system available without a projector.*" (Flaherty 1999).

As stated previously, in the 1960 the consumer electronic manufacturers saw there the necessity of giving to the public a system capable of playing pre-recorded video programs on their screens. (Waneque, 2003)

The development of the VCR was part of a different development track similar to that of the compact cassette. VCR's turned recordable tape reel-to-reel systems into consumer grade cartridge systems.

The movie industry was as concerned with VCR's recording facility as the music industry was with compact cassettes recording facility. Combined with the low quality of tape systems, electronics manufacturers and movie industry saw room for a high-quality video playback-only system. The new format would oppose VCR's in much the same way as the LP record opposed the compact cassette. In 1968 the Philips educational products department asked for a system that would enable an instant access to any part of an audiovisual program. At that time, the Super-8 film strip and photo-slides were the only technologies available for large distribution.

A solution was quickly found in optical disc reading technology, which had been invented as early as 1958, albeit using transparent discs which posed many design difficulties. Overcoming these would create huge development costs. The only way to justify this development program economically was to find a mass market application for this product, which meant aiming at the consumer market. (Waneque, 2003)

The design goal was therefore a high-quality random-access video playback format next to the video cassette. Philips started a Video Long Play disc (VLP) development program and by 1969 had developed a reflective video disc, which solved the disadvantages of the transparent discs. As with CD and DVD, the data for the picture image recorded as a spiral series of pits on a reflective layer (usually aluminum) in the disk. Decoding of the information, however, is done with an analog system. (ibid)

At the time MCA owned the rights to the largest catalog of films in the world during this time. MCA and Philips joined their efforts and first publicly demonstrated the video disc in 1972. Video disc became first available in 1978, two years after VHS and five years before the CD. Philips produced the players called LaserVision and MCA the discs called DiscoVision. The Philips/MCA cooperation was not successful, and was discontinued after a few years when Philips stepped out of the market. Pioneer also entered the optical disc market in 1978, manufacturing players and printing discs under the name Laser Videodisc, which was soon changed into LaserDisc and finally into Laserdisc. For standardization purposes MCA dropped the DiscoVision name, and released MCA Laserdiscs. VDP or Video Disc Player was a somewhat more common and more correct name for players in general. (Doolen, 1995)

The size of the video disc was 30 cm (11.81 inch) in diameter, almost identical to the LP record's 12 inch. (Philips being a European company explains a round figure in metric cm rather than in US inches) VDP was mostly an entirely analog system with composite video, but it did feature the random access properties similar to CD and DVD. Picture quality was excellent and was matched only 17 years later by DVD. Random access made it possible to go directly to a scene of interest, a feature greatly appreciated by consumers. (Doolen, 1995 and Flaherty, 1999)

For the first time consumers could also watch movies in the theatrical aspect ratio called "Letterbox" or later "Widescreen". Video disc also contained bonus material, in the form of directors' commentaries and behind-the-scenes footage. Furthermore, the studios considered VDP a premium format and went out of their way to remaster the films and enhance picture and sound quality. (ibid)

The first laserdiscs had entirely analog sound reproduction, but the format evolved to incorporate simple digital stereo sound to full-quality CD sound after the introduction of the CD in 1983. Support for multi-channel formats as Dolby Digital and DTS came shortly after. (ibid)

Then there was the cover art made possible by the LP-sized discs. Glossy packaging with lavish cover art and liner notes made video discs "look like an LP gone platinum" according to one video disc collector. All in all video discs provided a high quality movie experience at home. They were the start of what is now called Home Theatre systems. However, the reason that consumers in the mainstream didn't embrace the format were the a number of significant drawbacks. (ibid)

Compared to VHS both discs and players were significantly more expensive. Secondly, as with an LP record, the disc had to be flipped-over during a movie as the discs could only hold 60 minutes per side. Thirdly, the discs were big and a bit hard to handle. Finally, VDPs were for playback only, it was not possible to use them for recording. (ibid)

CDs and DVDs (at their introduction) were for also for playback only but apparently these new formats did offer enough new features and compactness for consumers to embrace the respective formats. The first VDP title marketed in the US was “Jaws” in 1978. The last titles were released in the US in 2000 and in Japan a year later. At that time DVD, introduced in 1996, had completely replaced VDPs.

3.4 CD - The digital audio revolution

In 1983 the Compact Disc or CD came to market. It was a revolution in music replay and grew to become the music industries biggest commercial success. Furthermore, it was the start of a digital revolution which enabled replay & recording of music & movies to intertwine with personal computing. CD has been the standard for digital audio for decades.

Development of the CD started out as a by-product of the video disc development work at Philips in the 1970s. The idea formed that the same optical laser pickup technology could be used to make a new type of superior audio disc format. The design objective was to offer to the public a disc that would not be sensitive anymore to wear, scratches and dust. Furthermore, in theory, it should have a sound quality far superior to that of vinyl records, combined with random access to the program. Philips had the same premium target group in mind as with video disc: people who were willing to pay extra for these features. (Varenque, 2003)

It turned out that trying to use VDP technology was actually handicapping the development of a new audio disc. In order to not fall behind with the competition a separate design program was set up. The first problem was the video disc’s size. An audio disc with the same size as the video disc would be able to hold dozens of hours of music. It was perceived that no consumer would want that, or that no record company would want to sell so much music on just one disc. Lou Ottens, engineering manager of the audio division at Philips who had been responsible for the development of the compact cassette, proposed to focus on a compact format that would allow for one hour of playback. The result can be seen in the picture below, the size of the new audio disc would be 11.5 cm, the same as the diagonal size of the compact cassette’s case.



Disc size was eventually enlarged to 12 cm to enable a playing time of 74 minutes, the length of the longest record in the Philips music catalogue (Beethoven's 5th). To mark the new audio disc's development as a separate program from the video disc and to underline its new dimensions the new format was called Compact Disc or CD. (Philips.com)

The second problem was the VDP's analogue approach, which had been excellent for video. Manufacturing errors in the disc causing laser tracking errors were hard to notice on video yet clearly audible in sound reproduction. The result was the same amount of noise as with a LP record, which was unacceptable. Consequently it was decided that further development should use digital coding. (ibid)

Philips was not the only electronics company exploring the possibility of a digital audio. The whole of the electronics industry was turning to digital in the 1970s, moving from transistors to chips in cars, computers and consumer electronics. Digital recording had been pioneered by Tom Stockham in the early 1970s. A few years later he founded the Soundstream company to develop a system for the home that would play back digital recordings. To solve a chicken and egg problem, he started out by creating the professional equipment that would be needed to create the recordings themselves. (Levetin 2004).

The idea of a digital audio disc was a vision shared by all major electronics manufacturers. At the Tokyo Audio Fair HI-FI trade show of 1977, Mitsubishi, Sony and others presented their prototypes. In Japan the idea of a digital audio disc was taken very seriously by the MITI (Ministry of International Trade and Industry). In 1978 the MITI created the Digital Audio Disc committee (DAD), which counted thirty manufacturers with over ten competing systems. (Warenque, 2003)

The compact cassette had proven Philips right in pursuing standardization when launching a new product for the consumer market. For a European company to achieve a worldwide standard this had inevitably to go through Japan, where 90% of all consumer electronics were made at the time. Philips joined the DAD as a road show to demonstrate the CD prototype to the Japanese electronic manufacturers. In 1979 Philips and Sony reached a cooperation agreement to develop a common solution. Together they submitted their "Red Book" standard and CD name to the DAD committee, who selected it as the proposed new industry standard. (ibid)

Sony was very advanced in the digital encoding process and in the error correction process. Soundstream had used computer tape, then the only way of storing one hour of sound. However, in 1976 Sony presented a prototype of a digital audio recorder using a video tape: the PCM-I system. Most video-based PCM adapters record audio at 16 bits quantization with a sampling frequency of 44.1 kHz and both these parameters were adopted for the CD standard as well. (Levetin 2004)

Due to video disc Philips had the lead in the optical pick-up & reading process and in the manufacturing process of the discs. The contributions were thus complementary: The video disc physics were provided by Philips and the digital audio experience by Sony. (Immink 1998)

The end result of the development was a hybrid design, with the compactness of the compact cassette and with a sound quality arguably similar or better than LP. Durability of the carrier was better than both. Its operational principle resembled that of a turntable, with a spinning disc and pick up mechanism tracking a spiral groove pattern, yet it provided random access. Most of all, it was digital, a magic word in the 1980s when society was moving from transistors to chips.

The consumer electronics industry jumped on the bandwagon as they recognized the potential to reinvigorate sales of new products for years to come. The music industry on the other hand actually opposed the new format. Turning to CDs meant turning their current operation upside down and they were actually quite happy selling LPs and compact cassettes at a great profit. Record companies had their own manufacturing facilities. Releasing CDs would make them dependent on Philips and Sony or make them spend considerable amounts of money to open new plants themselves. Even then manufacturing costs would be much higher and there were license fees to be paid. Most of all, video disc players had not exactly been a huge success and the industry saw no reason for endorsing another format in the premium segment of the market.

This resistance was foreseen and Philips used its subsidiary record company - Polygram - to set up production of CDs and gain momentum for the new format. The new format was marketed at buyers of classical music, who would be most likely to buy a format with enhanced sound quality without pops, cracks or hiss. Polygram had a substantial catalog of classical music and went ahead to release as much catalog as possible on CD. Marketing people invented the infamous slogan "Perfect sound forever". Polygram's artists, such as Von Karajan and Abba, enthusiastically endorsed and promoted the CD. (Philips.com, Warenque, 2003, BBC News 2003, BBC News 2005)

The CD was introduced to the public in 1983. Reviews were very positive, despite the high initial cost of both players and discs. In 1984 prices were coming down and portable players were introduced. More titles became available, although CDs remained in limited supply until 1985. Manufacturing capacity was still building up and record companies were only pressing small amounts of CDs out of fear they would disturb their lucrative compact cassette and vinyl markets. (BBC News, 2003)

In 1985 the release of new Dire Straits and Bruce Springsteen albums on CD inspired the general public to try the new format. To the astonishment of the record companies consumers not only bought new releases but actually replaced LPs with CDs. With the continuing high price of CDs and falling manufacturing costs at this point also the music industry became convinced of the commercial potential of the CD. It moved to make more material available for release quickly and to restrict LP releases, as shown earlier. (ibid)

In 1988 for the first time since its arrival in the market in 1983, CD sales surpassed vinyl revenues. Also for the first time, all 200 records on the charts were available on CD. (Plasketes, 1992)
From a starting-point of 5.5 million units sold in 1983, CD had reached 400 million units in 1988. In addition, these figures were reached in relatively few markets (notably Japan, the US, UK, Netherlands and Germany) and with a fairly small percentage of people owning a CD player (Laing, 1990)

With the arrival of the CD the digital revolution had started and would turn into the biggest money maker of the music industry for two decades. A minority of the audiophile press, the original target group, critiqued the sound quality of the new format, compared to LP. It was the start of a controversy of whether digital could capture music in the way analog could. (Sterne, 2006)

However, the mainstream of the consumers adopted the format happily. Besides sound quality, the CD offered convenience (random access and programmable selection) and well as the compact cassettes combination of home use and portable use.

In 1985 Sony and Philips produced the standard for CD-ROM computer discs. This new format for the first time married music and computers by turning the latter into so-called "multimedia PCs" for games, music, and image.

The high price of CDs made copying them to tape even more attractive than had been the case with LP records, to great concern of the music industry. Worse, lurking around the corner was digital tape.

3.5 Digital tape for home use

In the mid 1980s CDs became a huge success and LP records had been pushed out of the stores. The electronics industry was booming with increasing sales of CD players. Compact cassette sales were still stable, yet after 20 years of the format and the digital success it made perfect sense for the electronics manufacturers to reinvigorate that market too with a new digital format.

In 1987 Sony introduced such a new cassette-based format for digital audio recording called DAT (Digital Audio Tape). The format was quickly endorsed by the whole of the Japanese electronics industry. The technical creation of the format was actually quite simple too. As we saw earlier, Sony marketed digital audio recording devices aimed at musicians and studios, using a video tape recorder: the PCM adapter systems. The PCM-F1 was very popular for its affordability and relative compactness. In essence, DAT was a modernized and miniaturized version of a PCM adapter-based system. It no longer relied on a separate video cassette recorder. Instead, DAT recorders had their own built-in transport using a small cassette unique to the format. The audio data was recorded to the tape in the same fashion that a VCR connected to a PCM adapter would record to a videotape. (Bashour, 2000)

DAT came as a shock to the music industry. Home taping on compact cassettes was bad enough, but with DAT consumers would gain the ability to create perfect digital clones of the new profitable CD products, rather than copies. (Dworetzky, 1987) Consequently the music industry, represented by the RIAA, took action to prevent the introduction of DAT machines, arguing that these would destroy the market for commercial audio recordings. The RIAA demanded from the electronics manufacturers that a SCMS (Serial Copy Management System) should be installed in the machines before they were sold in the US. It also lobbied with Congress for legislation forbidding digital recording devices without SCMS. (ibid)

An agreement was reached as late as 1992, when the manufacturers included SCMS and Congress passed the infamous Audio Home Recording Act. The new legislation enforced SCMS for all digital recording devices and imposed a tax on DAT devices and blank media. However, the SCMS was detrimental to the sound quality of the new devices, their main selling point. Furthermore, the quarrels delayed introduction for almost three years. Without the US market, DAT was not pushed in other markets and prices for machines and tapes remained very high. The record companies never supported the format and what had been perceived by consumers and the audio press as a desired next digital format had effectively been killed off. (Rohstein, 1993)

Sony re-marketed DAT machines from consumer to professional use and DAT was widely used in the professional audio recording industry in the 1990s. In 2005 Sony discontinued the final DAT machines. (Morgan, 2005)

The problems with DAT still left the electronics manufacturers with the desire for a new digital format to replace the compact cassette. In order not to confront the music industry again, in 1992, Philips and Sony both came up with a new format different from DAT. The new DCC and MiniDisc formats both used compression digital coding and could not make the perfect CD copies like DAT. Furthermore, they were marketed for portability rather than home use, although home decks could be had. (Hinman, 1994)

Philips DCC used the compact cassette's format and its players were designed to play both DCC and traditional compact cassettes. The Sony MiniDisc (MD) was a kind of cartridge mini-CD. To the surprise of the electronics industry, neither DCC nor MiniDisc were being embraced by consumers, who failed to see a justification to invest (again) in another pre-recorded format and players. Both players and pre-recorded music were sold at prices comparable to the CD format. However, unlike the CD, neither format presented a major breakthrough. (Rohstein, 1993)

To the consumer who had just switched to the CD format, their shiny discs were portable and convenient enough. As to recording, in 1992 the first recordable CDs (CD-R) were shown to the public. Consumers had been so convinced by the CD format for music and computers that the digital discs seemed the only way to go. (Morton, 2006)

It took until 2000 for the price of a CD burner and blank discs compete with a compact cassette deck. For the first time the electronics manufacturers were into competition with PCs. Although the manufacturers released CD-recorders for the home stereo, most consumers preferred to use their computers to burn discs. Fortunately these burners were also manufactured by the electronics industry, albeit at lesser margins than the home audio products. (ibid)

By 2000, next to copying CDs directly to CD-R, home computer users could also "rip" CDs in the MP3 format, either burning it to CD-R, sharing it online or taking it with them on MP3 players (Markoff, 1999)

3.6 DVD - The digital video revolution

To complete the digital revolution, 1997 saw the arrival to market of digital video in the DVD format. Development of the DVD followed the electronics industry's 20 year cycle, after which a product had matured and competitive advantage was sought by introducing a new format. The VCR and VDP were up for replacement with a digital optical disc like the CD format, which customers had embraced. This time recordable R versions and computer ROM versions were developed at the same time, to mimic the complete CD development.

In the 1980s electronic companies had started to merge with record companies. Also in the 1980s, Music Television (MTV) had emerged, linking TV and music through music videos. In the 1990s entertainment conglomerates formed that included both movie and music companies. Increasingly music and movie industry complemented each other due to technical and societal changes. (Taylor, 2007)

From 1995 to 1997 the entertainment and the electronics industry sat together in the DVD consortium to agree on a common standard, which had proved instrumental to the success of CD. At the time there were already two competing formats. The MMCD format was backed by Sony & Philips. The SD format was backed by Toshiba, Matsushita and Time Warner. A group of computer (!) companies led by IBM insisted that a single standard would emerge. This goes to show the increasing convergence of the computer and the entertainment industry, both for multimedia (games) and storage purposes. An agreement was reached whereby the Toshiba SD format was enhanced with the encoding of the Sony / Philips standard. The combined DVD format avoided a confusing and costly repeat of the video cassette format war. (ibid)

The entertainment industry was satisfied with a basic copy protection mechanism and provision for region coding. The latter is a prime example of the structural design mode principle, where current practices or power structures become embedded in the design of a technology (Orlikowski, 1992). Region coding enables the industry to keep in place their differentiated release schedules.

Consumers had already experienced one digital revolution and knew what to expect. DVD became an instant success and exceeded by far the expectations of the electronics and the entertainment industry. DVD soon became the standard for pre-recorded movies. To be able to completely replace VHS, recorders for home use were developed as soon as possible and were introduced in 2000. DVD also became a popular data storage medium holding almost seven times the capacity of CD.

The DVD revolution actually used essential elements from the video disc VDP systems to create what is now called "home theatre" systems or HT. DVDs were so interesting to the electronics industry because the new format was about more than just DVD players. DVD incorporated the VDP's multichannel audio with Dolby Digital and DTS technology as used in the cinema. In order to fully use these capabilities the consumer had also buy a new audio/video system with multichannel audio. These systems usually consist of a DVD player, a multi-channel receiver, an active subwoofer and no less than 5 speakers.

It is not difficult to understand why electronics and speaker manufacturers were very enthusiastic about the new format. It was the biggest change in systems since the introduction of stereo.

Multi-channel systems have not been so satisfactory for audiophile listening and in recent years these consumers have gone back to dedicated stereo systems. (Steward, 2007).

However, in the mainstream, the HT system has replaced the stereo home system. The entertainment industry also saw HT as a major selling point to increase DVD sales and rentals over the VHS figures.

To complete this account, we can now draw the timeline for DVD:

1976 VHS video introduced

1997 DVD video / DVR-ROM / DVD-Recordable introduced

2003 DVD sales surpass pre-recorded VHS sales

2003 DVD rentals surpass VHS rentals

2006 DVD players surpass VCRs in US households (Olsen 2003, AVRev.com 2003, Chan 2006)

3.7 Welcome to the 21st century: MP3

The end of the 1990s marked the arrival of a new revolution: MP3s. This time it was not just another technological paradigm shift (Dosi, 1982) but more part of a new socio-technological paradigm.

(Freeman, 1988) For the first time the music industry was really confronted with the power personal computers and the internet brought to consumers. The new revolution had not been brought about by the electronics manufacturers, but by computer technology and computer users.

Worse, it rendered obsolete one of the pillars of the music industry: The monopoly on distribution.

With MP3s music had been not only been turned into data, but it was place-shifted as well.

Doctorow (2006) explained why MP3s are the industry's nightmare: *"Computers are machines for copying data. A good computer is one that copies well, quickly and cheaply. The internet is a machine for moving copies of data around. When the internet works well, it copies data quickly and cheaply. Ideologically, this is difficult for some people to accept. If your fortune has been based on stopping people from copying information, it is an inconvenient truth indeed. If you earn your living by preventing copying, the only options are to change everything, or deny everything."* The industry opted for the latter and sued.

Just like the movie industry had done with the VCR and the music industry's action against DAT, everything surrounding MP3s became a judicial battlefield. However, this time the opponent wasn't an electronics manufacturer, but the whole of society which was moving into the 21st century with the internet revolution.

Before MP3, the music did not take distributing music over the Internet very seriously. Since 1995 RealPlayer software had made it possible to broadcast sound over the Internet. Amazon.com used it to preview music sold on the site and radio stations used it to make their broadcasts available online. However, it wasn't possible to download music files and save them onto a computer - this was the novelty of MP3. (Walker, 2000)

The official name of MP3 is MPEG-I Audio Layer 3. It is an audio encoding format that uses a compression algorithm. The format is in a way comparable to a JPEG image. It is designed to greatly reduce the amount of data required, yet still sound like a faithful reproduction of the original uncompressed digital audio. It was invented as part of the DAB digital radio research program and it became an ISO/IEC standard in 1991. (Jones, 2000)

In 1994 the Fraunhofer Society released the first real-time software MP3 encoder, Winplay 3, that allowed people to encode and play back MP3 files on their PCs. In the second half of the 1990s, MP3 files began to spread on the Internet, starting on college campuses where students enjoyed fast Internet connections. The Winamp audio player, which had been released in 1997, helped boost MP3s popularity. Winamp allowed users to build and exchange personal playlists of songs. Thus enabled, PCs offered a new level in what was one of the CD player's selling points at its introduction: Control over the sequence of musical selections. (Markoff, 1999 and Jones, 2000)

1998 saw the arrival of mass-produced hardware MP3 players, the Saehan / Eiger Labs MPMan, and the Diamond Rio. Now the MP3s could also be place-shifted, a new mobile revolution. Music had become portable without the use of a carrier such as a compact cassette or a CD. The Diamond Rio was an instant hit and helped put MP3 further on the map. The RIAA sued Diamond for enabling illegal copying of music, but, ironically, Diamond won on the basis of the Betamax case that had made the movie industry bite the dust in the 1970s. (van Buskirk 2005)

The big boom of MP3 came in 1999 with the peer-to-peer file sharing network Napster. Together Winamp and Napster made it simple for average users to play back, create, share and collect MP3s and play them both at home on PCs or on a Rio. (Jones, 2000) Soon "MP3" surpassed "sex" as the most popular query in internet search engines. Under the nose of the music industry, in times of declining sales, a major popular trend had arisen and they made absolutely no money out of it. The music industry was shocked and urged on to sue Napster, to the point where it eventually was closed down. As a next step the RIAA started suing individuals who engaged in file sharing. (Markoff, 1999)

According to Doctorow (2007) the music industry shot itself in the foot by suing Napster out of existence. Napster had intended to - once the site would have been up and running with paying customers - pay the record companies in exchange for licenses to their works. That was a reasonable plan as Napster was incredibly successful and many users were quite willing to pay a reasonable monthly fee. By killing Napster the industry showed that it wasn't embracing the new technology by finding a working business model for it. Rather, they simply tried to make the whole thing go away and slowly introduced initiatives of their own which unfortunately couldn't convince consumers at all. They didn't wait for the music industry and embraced services like Kazaa and Gnutella who had no intention of paying license fees to the music industry.

Years later the music industry was offered a way out when Apple opened the iTunes music store in 2003. The closed ecosystem with the hugely popular iPod, user-friendliness and the fixed price model helped iTunes to become the only really successful legal download option.

3.8 A new CD for the 21st century: DVD-A and SACD

The music industry saw the rumblings of MP3s at the end of the 1990s as a threat to normal business operations, but not as a replacement. Operations needed to go on as usual. The electronics industry had applied the 20 year rule and had been developing a successor for the CD. This time the music industry was interested from the start.

More selling points for the music industry than for consumers, the new format would be more expensive than CDs - compensating for the increasing pressure to lower CD prices - and sport very solid copyright protection. Although the CD had made the music industry very rich, it would now rather see the format go away. Digital sound seemed like a very lucrative idea in the early 1980s. Yet no one had foreseen that computer technology would later bring direct copying and an out of control MP3 revolution, so no protection had been included in the CD format. DVDs did have protection but that had been cracked very quickly.

To attract consumers, the new format would adopt multi-channel audio. This seemed like a logical step, when customers had embraced the multi-channel DVD, bought loads of music/concert DVDs and already had HT systems in place.

Furthermore the new format would have superior sound quality. From its debut, the CD had been criticized by audiophiles, arguing that the 16-bits 44.1kHz coding had not enough resolution for a natural sound. In recording studios coding from 24-bits 96kHz to 24-bits 192 kHz were long in place and various ways were possible to enhance a home format as well.

These features were expected to compel consumers to start replacing their music collections again, like they had done with CD, at a premium price and in copy-protected form. The industry took the rapid adoption of DVD (replacing VHS) as a sign that consumers would also be interested in a new CD (replacing the successor of both vinyl records and compact cassettes).

Things went different than planned, however. For starters, there was not one format but two. The DVD forum oversaw the development of a common standard. As it was about to enter into listening test for the DVD-A format (DVD-Audio), members Sony and Philips announced they were working together on their own next-generation audio disc called SACD (Super Audio CD). They argued that SACD provided higher-quality sound than DVD-A. The other leading electronics companies were not about to give Sony and Philips financial and technical control over the next-generation music format. Sony and Philips split royalties they earned from every CD player sold. With SACD they claimed to use an extension of the CD format, which meant they would continue to control royalties. Both sides went along on their own and a format war was under way.

Retailers and music industry were in despair. They feared a format war would threaten a new CD-like wave of profits. Sony and Philips argued that SACD did not aim at the mass market like DVD-A, but rather at audiophiles, the same stance they took at the introduction of the CD. (Brinkley, 1999)

Both formats were introduced in 1999, around the time Napster came into existence. DVD-A was enthusiastically received by electronics and music/video retailers as an addition to their booming DVD business and declining CD sales. SACDs were positioned differently and relied on the audiophile press to create demand and to urge record companies to make the discs. The situation was different than with the introduction of the CD. Philips had sold off Polygram to Universal, who had no plans to support SACD. Sony had acquired CBS which did support SACD, but also produced DVD-As.

With stakes set high, the combined industries were shocked there was little to no consumer demand, although press reviews were favorable. The sales figures of 2004 are illustrative. Five years after the introduction of the new formats, CDs sold 766 million units and DVD Video sales kept on increasing at an incredible rate of 66%. SACDs stopped at 0.79 million units and only 0.35 million DVD-As were sold. Ironically, combined, SACD and DVD-A sold less than the small quantity of vinyl LPs the major music industry released through its small specialized labels. (1.3 millions).

According to Cadeddu (2005) *"This is - by now - what can be properly called a commercial flop"*.

With the accounts of Willis (2004) Cadeddu (2005), Sterne (2006) and Schofeld (2007) it is possible to reconstruct what went wrong.

The combined industries had expected consumers buying higher-quality DVD-A and SACD versions of their favorite music that they'd already bought on vinyl and CD - and in copy-protected form. Consumers already perceived CDs as too expensive and the new format cost even more, even compared to DVD. It could happen that the soundtrack of a movie on DVD-A was more expensive than the movie on DVD video. Consumers failed to see what would offset this price increase. As the new disc could not be copied, consumers could not make a copy for personal use (car stereo, for example) Consumers had grown used to place-shifting the music or movies they had legally bought. The new format added nothing in terms of usability. They were still an optical discs like DVDs and CDs. The new music formats were not a revolution like it was with the CD versus the LP & compact cassette, or with MP3 versus CD for that matter.

The argument for better sound quality was lost even on the audiophile niche, who didn't take to SACD. In the 21st century CD technology had matured to the point where an audiophile CD player could outperform a similarly priced SACD player. If audiophiles used another format it was vinyl. Most mainstream listeners did not have the systems or listening habits to tell the difference in sound quality between DVD-A and CD. Even CD quality was increasingly replaced with compressed audio formats like MP3.

All in all, the combined industries had made false assumptions about customer motivations, who were not interested in better sound quality and restricted portability. MP3s did offer what consumers wanted: Easy exchange, easy storage and maximum portability. (Willis 2004, Cadeddu 2005, Sterne 2006, Schofeld 2007)

3.9 A new DVD for the 21st century: Blue-Ray and HD-DVD

To complete this account it is worth mentioning the arrival to market of high-definition video in 2007. The music and movie industry have integrated into the entertainment industry. Furthermore, also the electronics and the computer industry have become more and more integrated, sharing and supplying components. Together the industries went about to create a new format for video and storage.

In a good tradition there are two competing formats: Blue-Ray Disc (BD) and HD-DVD. A new format war is underway, although technology has stepped in to provide universal players capable of playing both formats. The 20 year development cycle has been cut in half, as DVD is only 10 years old. This can be explained by three reasons. First the market for consumer electronics has enjoyed rapid adoption of high-definition TV-sets. Secondly, in general society in the 21st century is more technology-oriented due to PCs. Thirdly and most importantly, the new formats will enable the entertainment industry to work towards a new business model. The new model is very complex and is worthy of its own research. Below follows a brief overview based on the accounts of Cole (2006) and Holzman (2007).

Ever since the arrival of VCRs and PCs, the entertainment industry has fought against the possibility for consumers to time-shift and place-shift content at their own discretion. This right is embedded in the legal provision for Fair Use, where a consumer is entitled to make a copy for personal use.

The new format builds on the results of the industry's successful lobbying with Congress for new copyright laws to offset piracy. Under the new laws it has become illegal to circumvent DRM systems the industry puts in place. The new DRM systems only allow approved devices to replay content. A device becomes approved when it has the proper DRM support. The DRM key is not included with the carrier any more, but actively negotiated. To this end the new devices need to be connected to the internet. This will enable the industry to control possibilities for consumers to handle the content. It could include a shift away from the notion of a physical product to a "shrinkwrap-licensing" where the consumer only owns the physical carrier, not the content on it. Every time a users wants to time-shift or place-shift the content the industry could charge for the privilege, or even completely revoke the key after a couple of years. (Cole 2006, Holzman 2007)

Perhaps the account of the hi-definition audio disc can shed a light on the future of these formats. After all, DVD sales are strong and the biggest hit in video is compressed movies and TV-series on iPods. It remains to be seen if customers feel the increased picture and sound quality compensates for a higher price and fierce DRM.

The overview of developments in the mainstream shows that audio and video formats have become intertwined, as both stem from the same R&D process. Development of the VDP led to the CD, the VCR enabled DAT, without CD there would not have been DVD and DVD-A springs off DVD video. Beyond R&D also the music and movie companies have merged into entertainment conglomerates. Finally, consumers who get used to a technology in one of the domains will start to expect similar innovation in the other domain.

4. Value systems in the mainstream

We have seen the agency involved by the electronics manufacturers, the entertainment industry and the consumers in the introduction and adoption of music and video replay formats. Based on patterns in these accounts we can extract patterns in structure, meaning and power. This allows for construction of the value systems of the three parties involved.

4.1 The electronics manufacturers

The electronics manufacturers' main goal is to supply consumers with as much electronics devices for music replay as possible. Their value system includes a 20 year rule to replace a mature format with a new format, to keep sales at a healthy level. The manufacturers undertake much R&D in technology along trajectories (Dosi, 1982) within various paradigms. In fact two sorts of intersecting paradigms can be distinguished: By carrier (vinyl, tape, optical disc) and by recording technique (analog or digital).

Over the years a process of consolidation has occurred. The music and movie industry have integrated into the entertainment industry. Furthermore, electronics manufacturers have merged with the entertainment companies. Finally, also the electronics and the computer industry have become more and more integrated sharing and supplying components.

The electronics manufacturers are dependent on standardization within their industry. Every time two formats were introduced the success of the new technology was at risk. Furthermore, the electronics manufacturers are also dependent on the entertainment industry. For recordable formats, technology was devised by the electronics manufacturers without prior consent of the content providers. When customers embraced the new technology the music and movie industry had to follow. DAT was the first instance where this approach didn't work and the music industry managed to kill off the format. Technology with playback only required the participation of the content providers to have product available for consumers. VDPs were introduced together with a movie studio. In the case of the CD, content was provided by Philips owning a subsidiary record company. Later technology formats saw the formation of standards committees to establish standards not only within the electronics industry, but also with the content providers. Although standards committees minimize the risk at an introduction, they also takes away the possibility for a competitive edge. For manufacturers much is to gain from being the first or only inventor; in the form of royalties they will receive.

Finally and obviously, the manufacturers are also dependent on consumers embracing a new format. Compact cassette and CD for audio on one hand and VCRs and DVD for video on the other hand were a huge success both for the electronics manufacturers and the entertainment industry. Together with the success came copyright issues, however, that continue to make cooperation with the entertainment industry more elaborate for the electronics manufacturers.

To attract consumers the electronics manufacturers might embed assumptions on what customers might like. More often they embed structural characteristics and needs of the electronics and entertainment industries. A case in point is the MP3 revolution and the failure of high-definition (hi-def) audio. It was in the interest of the combined industries to move along a trajectory within the optical disc paradigm, on a way to higher definition sound quality and with embedded restrictions for consumers. The combined industries, however, failed to recognize that consumers had liked compact cassettes, VHS and - by that time - CD-R for affordability, portability and creative possibilities.

In hindsight it was not certain at all that what was in the interest of the combined industries could be pushed into a market with different priorities not to the liking of the entertainment industry. For the first time the electronics manufacturers were confronted with the fact that their business and the PC and internet domain were converging, which gave consumers an alternative. Consumers embraced technology that did not come from the electronics manufacturers.

The MP3 revolution has shown that with the development times of technology, by the time the product is introduced a major change (paradigm-, cultural- or socio-technical shift) might have occurred with consumers already moving in a different direction.

We can now construct the value system of mainstream electronics manufacturers as follows:

Power:

Develop and push new technologies in the market, success rewarded with very high revenue stream.

Structure:

R&D, manufacturing, sales in mainstream electronics outlets.

Meaning:

Music is the software to sell the hardware, a 20 year replacement cycle to keep markets growing.

To succeed the electronics manufacturers have to strike a balance between their desired competitive advantage, the limitations imposed by the entertainment industry and the purchasing behavior of consumers.

As presented by Schofeld (2007): *"Just because technology permits us to move forwards with new products does not mean that there is a viable business model to support it."* Of course this goes for both the electronics manufacturers and entertainment industry.

4.2 The entertainment industry

The goal of the music or entertainment industry is to provide consumers with as much content as possible.

From the previous accounts it can be deducted that the value system consists of: Obtaining and guarding copyright, making the most money out of it by selling and distributing copyrighted content and trying to maintain a profitable status quo rather than voluntarily changing the market to better serve consumers.

Ironically, the industry actually got started in much the same way as Napster and YouTube started. Over a century ago music publishers tried suing the piano-roll companies for copyright infringement, because these companies took sheet music and turned it into piano rolls without consent of the publishers. They failed, but US Congress stepped in to compensate the artists and enacted a law requiring royalties be paid for each mechanically reproduced song. This development opened the way for a music industry to emerge with the inventions of Edison and most of all Berliner (his disc format won over Edison's cylinders). Nowadays music publishers are part of the industry's operations.

After the industry was established it conveniently forgot about its founding history and opposed every change to the status quo: Commercial radio, compact cassettes, VCRs, DAT and internet file sharing. Whenever a new technology arrived at the scene the industry opposed it fiercely, sought legislation or sued. After a while the industry discovered that what was perceived as a menace actually turned out to be the industry's saviour. *"The industry benefited tremendously once they let it go. In a few cases, it's been forced upon them. They're following history again. They haven't learned."* (Holloway, 2006)

Commercial radio in the 1930s was the first challenge to the industry. Radio needed to pay rights to artists but not to record companies. As consumers found radio more attractive than records, sales went down. The industry developed an anti-airplay model in the early 1940s and called for legislation. Newcomer Capitol Records, on the other hand, believed that active promotion at broadcasters would stimulate sales. They were rewarded with a significant increase in record sales and Capitol quickly rose to dominance in the record industry. Other record companies begrudgingly ceased their quest against radio stations and later also became very happy with the pro-airplay model. (Dowd, 2001)

The second challenge were the recording capabilities of compact cassettes (home taping). In the late 1970s sales of records were decreasing. The music industry blamed it on a depressed economy, a stagnant musical climate and home taping of music. They ran an advertising campaign denouncing home taping as theft and pursued Congress to amend copyright laws. The music industry called for a tax on both single and dubbing cassette decks, however such a bill was not passed by Congress. Later compact cassettes grew into the most profitable recording format for the industry until almost a decade after the introduction of the CD. (Jones, 1990)

Not so much later the movie industry fought VCRs. Between 1976 and 1984, Hollywood sued Sony, arguing that makers of VCRs should be held liable when people tape movies and television shows. The industry lost what became known as the "Betamax case" and TV viewers could legally tape with their VCR. *"Today, it is hard to imagine a world without VCRs. Hollywood has come to love the VCR. Sales of video tapes and later DVD discs account for about half of the revenues of an average film."* (USA Today, 2005)

Amazingly enough, in the early 1980s, the music industry even opposed the CD, fearing it would confuse customers and threaten the status quo. Philips had to use Polygram to force the product into the market. Only when consumers happily adopted the format to replace existing collections the industry became enthusiastic and quickly killed off the vinyl LP. CDs became the industry's biggest success.

DAT had the ability to create perfect digital clones of the new profitable CDs. Consequently the music industry took action to prevent the introduction of DAT machines. An agreement was reached as late as 1992 when the manufacturers included SCMS and Congress passed the infamous Audio Home Recording Act. The new legislation enforced SCMS for all digital recording devices and imposed a tax on DAT devices and blank media. However, the SCMS was detrimental to the sound quality of the new devices, their main selling point. Furthermore the quarrels delayed introduction for almost three years. After that time DAT never really made it into the market again and the format had effectively been killed off. (Rohstein, 1993)

For the introduction of the DVD the electronics manufacturers didn't make the same mistake and included the movie industry in the standards process. Hollywood was happy to create their version of the CD success story and the manufacturers had included copyright protection systems. Unfortunately these were quickly cracked, leaving the movie industry in the same position as their music counterparts.

At the end of the 20th century the music industry tried to achieve the same result of DAT with Napster. They effectively managed to shut down the Napster P2P service, although it had intended to compensate the industry for copyright. Then the industry was left without a system for digital music distribution that consumers had valued. Consumers turned to P2P services that had no intention of working with the industry to compensate for copyrights. Only years later, in 2003, Apple offered a non-P2P system that convinced consumers to legally acquire music. The industry grudgingly agreed with Steve Job's fixed pricing model. It turned out this pricing was one of the keys to the success of iTunes.

Yet the industry hates it and is still trying to devise a service on its own terms. All in all iTunes is actually quite profitable for the music industry. Prices of an album are the same as a CD, yet there are no packaging or physical distribution costs. (Dowd 2001, Doctorow 2007)

Now in 2007, YouTube also intends to generate income and share it with the copyright holders. Yet, just like Napster they are sued. Only this time, it's not just the record industry but anyone who makes video or audio. Doctorow (2007) names a network employee who *"thought that a severe, punishing legal judgment would send a message to the tech industry not to field this kind of service anymore."* Unfortunately the internet killer-apps are not just inventions of the tech industry, they are what consumers want. Again, if the entertainment industry manages to kill-off YouTube they will be left without an attractive alternative against the illegal sites. (Doctorow, 2007)

This time the industry seems to start taking on to this idea. One example is Universal signing a licensing deal with YouTube not long after suing it. Universal will receive a share of the advertising revenues that YouTube generates, while YouTube will get access to the masters from Universal's music video library. This is in fact a blank levy system as used many times before. Ironically, it is the same system proposed by Napster and other P2P sites that were banned. (Bangemann, 2007)

The issue of entertainment copyright and downloads, including Congressional activities and court battles from 1999 to 2007 is a subject worthy of its own research. Further elaboration would go beyond the scope of this thesis. An excellent overview of developments up to 2002 is provided by Labriola (2002).

In summary, the music, movie or entertainment is slow to adapt to new changes. However, in hindsight, they need the technology push by the electronics manufacturers as they make much money of it later.

The push helps to keep business alive or to expand into new business.

The industry also needs consumers to keep on buying their products, sometimes several times in various formats. Customers are a necessary evil for the industry as they have the tendency to use technology to circumvent the copyright as envisaged by the industry (there are other views on copyright obviously).

We can now construct the value system of the (major) music industry along the following lines:

Power:

A monopoly on the distribution of music, retain status quo, push new music and carriers in the market.

Structure:

A three pillar system with A&R, distribution and publishing.

Meaning:

Selling music is exploiting and protecting copyright when dealing with consumers.

4.3 The consumers

The goal for consumers is to play music, obviously. Music is powerful cultural content. Various studies (such as Williams, 2003) have researched how music help shape identities and can even spark subcultures.

Consumers spend considerable amounts of money on buying music and the devices that play it.

In the previous chapters we have seen that consumers have considerable power as they can make or break a new format by embracing it or not. Consumers love recordable formats, as it enables them to create the sound palette of their own devise, where and how they want it.

We have also seen that consumers opt for a balanced combination of affordability, convenience and portability. Although not affordable, CD and DVD were happily embraced as consumers were convinced its justified the extra outlay. Both formats were considerable more convenient (random access) and portable (12 cm discs) than their predecessors.

Today an even more affordable and even more convenient alternative is available in the form of MP3 (and other compressed formats such as AAC). The success of this technology, as with compact cassettes before it, is proof that ultimate sound quality is not the key element in the mainstream consumer's eyes.

In the 20th century, for mainstream listeners, it has become rare to sit quietly in a room and just listen to recorded music coming out of speakers. Instead customers started enjoying music on the move, first in their cars and later on their Walkmans and ghetto-blasters. In the 21st century this has extended to PCs and MP3 players.

As Sterne (2006) argues, *“the story of sound reproduction in the last hundred years is a spatial story, about how recorded and transmitted sound became more portable and suffused an ever growing segment of people’s everyday lives, both during hours of waking and during hours of sleep.”*

The value system of mainstream consumers can be constructed along the following lines:

Power:

Whether or not to allocate resources to music and devices, whether or not to accept new formats.

Structure:

Buying products from electronics manufacturers and music industry.

Meaning:

Enjoying music, buying a product that meets requirements and expectations.

In the next chapter we will look at the value systems consumers now attach to CDs specifically.

5. Another Aramis - who is killing off the CD today?

Despite MP3s and other compressed formats, CDs are still the predominant format in music replay. According to the RIAA, in 2006, CD sales accounted for 80% of all music sales. To study how declining CD sales can coincide with booming sales of its predecessor - vinyl replay - in 2007, we shall look at the value system of consumers towards the CD specifically.

To the electronics manufacturers the CD is really history and has been for years. After the introduction of the high-definition audio formats the manufacturers stopped making dedicated CD-transports and have used PC drives since. The manufacturers focus on optical disc devices that are backwards compatible with CDs, such as DVD players. Furthermore, they have taken the carrier-less revolution with CD-ripping and downloading as a fact of new consumer behavior and are increasingly focussing on interaction with iPods and PCs.

The music industry still holds on to the CD format. It is the only commercially successful carrier they have left, although CD sales have been declining for several years since the record year of 2001. In 2006 the decline has become quite steep and the industry has been forced to finally take on to legal downloading. For now total music sales are declining only slowly, with legal downloading compensating for about half of the decline in CD sales (RIAA website). However, the outlook for the next couple of years is much worse. Global music sales will drop to \$23 billion in 2009, just over half of 1997's \$45 billion and down 16 percent from 2006. The biggest reason for the steep decline is *"a drop in CD sales, which will not be fully offset by digital sales in the next five years."* (Bangemann, 2007)

Drury (2007) even believes that the record companies are not likely to close the revenue gap with the glory days of the mid-1990s ever again. *"No amount of lawsuits, DRM, or licensing deals will be able to turn back the clock."*

However, most don't expect the CD to roll over and die. According to the International Federation of the Phonographic Industry (IFPI), download sales will account for a quarter of all worldwide music sales by 2010, meaning the CD will be here for many years to come. (BBC News, 2007).

The 80% figure of 2006 still represents an enormous dollar value and the industry will do whatever it can to continue supporting, promoting and defending CDs. To the industry it is clear: There is nothing wrong with CDs. It is the possibility for consumers - due to new technology not sanctioned by the music industry - to obtain music for free - by stealing it through illegal file sharing - that is solely to blame for the declining CD sales.

Given the industry's tendency of blaming new technology exclusively for its woes, it is plausible to look at other factors. Especially since the outcome of a study in 2004 stated that the effect of file-sharing is statistically insignificant. (Knight, 2004)

Furthermore, a Canadian report concluded that *"The assumption by the recording industry that demand for CDs is fundamentally strong and that Internet piracy is to blame for falling sales is a simplistic reaction to a complex problem ... to place the burden wholly or partly on illegal downloads from the Internet is to ignore a host of other reasons."* (Geist, 2005).

NPD group did agree with the industry that file sharing has had a negative impact on CD sales. However, their research showed that *"even if digital file sharing were to disappear tomorrow, the record labels and retailers would still need to overcome important underlying causes of recent market declines."* (NPD Group, 2003)

Bangemann (2007) referred to a study commissioned by Rolling Stone magazine and Associated Press to explain such causes. The study showed that *"Music fans are largely disenchanted with the market. By and large, music fans think that music is too expensive and that much of what is available isn't very good."* Price and quality are only part of the problem. A complete overview of issues that indicate changes in the value system of consumers towards CDs is listed below.

1. The CD format is 25 years old. Its inventors had always planned the format lasting 20 to 25 years. (BBC News, 2007). Apple's iTunes music store arrived when the CD format was 20 years old. It can be argued that simply the manufacturers' 20 year rule applies, however this time it is enforced by consumers. The combined industries did try to use the 20 year rule themselves, but had thought of replacement in the wrong direction - high-definition disc formats with copy protection - and the formats failed. Society moves on, however, so after 20 years it makes sense that a new technology steps in.

2. The CD boom in the 1990s was unsustainable. That era is now known as the glory days of the music industry, never before so many music products were sold as with the CD. However, CD sales since 1989-2001 consisted for a large part of consumers replacing music they had already bought on vinyl records and compact cassettes. It is safe to say that most collections have been replaced by now and these sales figures will never come back with new material only.

3. Consumers still think CDs are too expensive. Ferré (2003) explains that CD were double the price of compact cassettes and vinyl LPs when the format was introduced in 1983 - between \$15 and \$20. At that time the high price made sense. The CD represented "perfect sound forever" so it still seemed like a good buy. Customers understood that with a groundbreaking new format, record companies had to buy new equipment for manufacturing and packaging. Furthermore, record stores had to change their floor layout and buy new displays.

The music industry had said that prices would come down to the level of the previous formats as soon as the turnover would be completed. Twenty-five years later, CD pricing is even rising again, although the industry has by long recouped on its investments. Downloads offered consumers the possibility to fight back and obtain music for free. Even with legal downloads consumers can spend less because it is possible to pick songs rather than buying an album (see under 6.).

4. There is less interesting music. Ferré (2003) and Drury (2007) give an account of how the music industry signs less bands and releases “safe music”. Even the industry now acknowledges that this has led to a “weak release schedule”, meaning music that fails to attract the consumers. In the early days of the CD there was still a large amount of high quality releases regularly. Record companies would sign many new acts, and nurture them to success. For consumers there was a vast selection of quality music to choose from. Nowadays the music industry is looking for instant hits and signs less artists. It only releases “safe music” that is supposedly guaranteed to be successful. If such bands are not available, the music industry will create them itself.

In his study among youth music listeners Hayes (2006) found that many had stopped buying music. They complained about a greedy music industry only developing and promoting material for teenage consumers. The art of producing “serious” albums had been lost in the steady release flow of “the next catchy song” by “untalented performers”. This notion is problematic for an industry indeed focussing on young audiences. It is even more problematic when that focus has already driven away older consumers. Research company NPD Group (2003) found it wrong business sense of the music industry to continue focus on the teenage and college population, which will not grow between 2003 and 2008. It would be wiser to also start focussing on consumers over the age of 36, as they represented 45% of all CD sales in 2003. Now, increasingly, this group is purchasing less music, because there's less music they feel compelled to buy.

6. Downloads allow for cherry picking. Bangemann (2007) argues that one important aspect in the transition from sales of physical media to digital media is the decline of the album. Consumers have been thrilled by the possibility to “cherry-pick” their favorite songs.

Nichols (2003) explained that a CD with approximately ten songs sells for around \$16. Even if the consumer likes just one (hit) song he/she still has to buy the entire CD. Apple started offering AACs (a newer compressed format) for download at \$ 0.99 per song and the iTunes Music Store has been a huge success. Even if a consumer were to purchase an album with ten songs it would cost \$9.95. Compared with a CD album sound quality is less and there is no physical product. However, increasingly consumers don't care and choose the download option. This has consequences for the revenue streams. Although there are no physical manufacturing and distribution costs with downloads, consumers only buying a few songs rather than a whole album brings in less money. Consequently, although legal downloads will continue to grow, they will not be able to make up for the decline in CD sales.

7. In general consumers buy less music and more other entertainment products. According to Geist (2005), US census data show that people spend less hours listening to music. Instead, they surf on the internet, play more video games, and watch more movies. DVD sales, which accounted for zero revenue in 1999, generated over 170 million Canadian dollars in new revenue up till 2004. Geist argues that the popularity of DVDs is directly related to the decline in CD sales, as consumers can spend their money only once.

8. CDs don't offer consumers what they perceive as relevant benefits over downloads. CDs could offer a better sound quality, but as Sterne (2006) has argued, the lower sound quality of compressed music doesn't matter in the mobile digital lifestyle.

Sherwin(2007) explains that it doesn't help that the sound quality of CDs is decreasing rapidly, due to the so-called "loudness wars". The music industry orders engineers to artificially enhance sound levels so it will catch listeners' attention on the radio, in pubs or in cars. The idea behind it is that at first instance, psychologically, a louder track will sound more appealing to a listener than a quiet one. Along these lines, making a song louder will make it sell better. However, when all companies do this all new music will have the same loudness again. The process takes place at mastering, the final stage before a track is prepared for release. It is exclusive to digital, with vinyl the needle would jump out of the groove if a track was mastered too loud. Digital technology made it possible for engineers to push for the loudest possible level. The problem is that the resulting "square waves" generate a buzzing effect and digital distortion on CD players.

Apart from sound quality, CD as a physical product doesn't offer much extended artwork over downloads, like with an LP record. The digital artwork that comes with the download also follows the music, so it will appear in iTunes and on the screen of the iPod. Finally, CD has proven not eternally durable as the combined industries said at its introduction. CDs do get scratched, after which they will skip. (Marriot, 1999). Other reports mention problems with the reflective coating with the same result.

Given the issues listed above, the value system consumers attach to CDs in 2007 is as follows:

Power:

Consumers allocate less resources / purchasing power to CDs.

Structure:

Consumers enforce a new market without CDs and physical distribution.

Meaning:

Consumers find the price of CDs too high for the meaning that should return. The music is not attractive and the artwork and sound quality are not perceived as better than with MP3, which offers superior convenience, creativity and portability.

These factors explain why MP3 and other compressed formats are increasingly preferred by consumers. However, they can also help explain the re-emergence of vinyl as a high-quality, lower cost, high meaning listening format for the home, as shown in the next chapters.

6. Developments in vinyl replay

In the previous chapters we saw how the move away from vinyl to CD and MP3 was a change in technological paradigms.

This chapter will show how a musical paradigm shift changed the faith of vinyl replay after it was forced out of mainstream music replay.

6.1 The emergence of a vinyl subculture

To trace the roots of the current vinyl landscape we first have to go back to 1988, the year that the new CD format finally surpassed vinyl records. After that year vinyl was rapidly pushed out of the mainstream music market. Both the electronics manufacturers and the music industry pulled out from vinyl and focussed on the CD. Yet, the vinyl format did not die after 1988. Rather, a subculture developed, of consumers that continued to buy and play vinyl records. These customers were predominantly old enough to have grown up on vinyl themselves, favoring mainstream pop and rock, folk, jazz and classical.

Record collectors took advantage of many CD converts dumping their entire LP collection. Intersecting with collectors were audiophiles (an audiophile is not necessarily a collector and vice versa, but the combination is common).

Perlman (2004) defined the audiophile as someone interested in specialty audio.

Led by journalist Michael Fremer of TAS and Stereophile, a vocal part of them considered their main interest - sound quality - of CD to be substandard to vinyl replay. (Liversidge, 1995)

After 1988 turntables continued to be sold. The mainstream electronics industry ceased production of turntables and moved entirely to manufacturing CD players. (Plasketes, 1992) However, specialist manufacturers already existed and some successfully continued their business. Many vanished, however, with some to be reiterated recently. At the end of the 1970s, three hallmark turntable designs were introduced that - in improved form - still lead the market today: The direct-drive DJ workhorse SL-1200MK2 by Technics and the belt-drive audiophile turntables by Rega (Planar series) and Linn (LP12).

Vinyl records were also still to be found after 1988. Throughout the 1990s smaller labels continued to release vinyl records. This music included indie-rock but also more audiophile jazz and pop-reissues. As mainstream retail outlets didn't stock vinyl records anymore, this music was sold in vinyl specialty stores which usually also carried used vinyl.

The large number of consumers switching to CD and selling their entire record collections had created a huge availability of used vinyl records. A thriving used records store business emerged, but vinyl enthusiasts also found a wealth of used records at flea markets and record conventions.

The vinyl specialty store and used record business has grown out to be a sizable large industry since the 1990s. (Hayes, 2006 and Plasketes, 1992)

6.2 The emergence of a new musical paradigm

The new vinyl subculture at the end of the 1980s was not entirely made up of an older generation of audiophiles and/or collectors. During the 1980s, paradoxically, the rock underground had moved from compact cassettes to vinyl. Music from college and alternative radio continued in the vinyl subculture for the whole decade. (Jones, 1990)

Alternative rock still fitted within the rock 'n roll musical paradigm with an artist playing guitars and other instruments. This was then recorded and sold on a carrier - compact cassette, vinyl or CD. Almost every text on vinyl replay includes the line "the format rock 'n roll was born to". However, a new musical paradigm was already in the making: Music made with the turntables themselves! Two parallel mutually reinforcing developments started by the 1970s: Turntablism & hip-hop and disco & dance music.

The description below draws upon the overviews by Langlois (1992), Farrugia (2004) and One (2007).

In 1995 by DJ Babu introduced the term "turntablism" to describe a phenomenon that had started in the Jamaican DJ culture of the 1960s. "My definition of a turntablist is a person who uses the turntables not to play music, but to manipulate sound and create music." In the 1970s the Jamaican influences landed in New York with famous Bronx DJs like Afrika Bambaataa, Grandmaster Flash and Kool Herc.

Kool Herc is attributed with the invention of "breakbeats". A DJ fuses the percussion breaks from two identical records by playing the break over and over switching from one deck to the other. Hip-hop derived from "hip hoppin" on the turntable. Grandmaster Flash was one of the first DJs to utilize breakbeats and moved on to invent more turntablist techniques. Around that time Grand Wizard Theodore discovered the "scratch", another major component of turntablism.

These DJs had to assemble their technology- turntables, mixers, samplers - to enable their creative work. Then, in 1978, Technics released the SL-1200MK2, the first and still foremost DJ turntable. They were referred to as "the wheels of steel". Around the same time mixers arrived to market to suit the DJ's needs, as well as the first (analog) Roland bassline and drum machines, worth a fortune nowadays. In the first years of the 1980s turntablism reached the mainstream audience. Grandmaster Flash's 1981 single The Adventures of Grandmaster Flash on the Wheels of Steel was the first record to demonstrate hip-hop DJ-ing skills. A year later The Message became a hit, seen by many as the first serious rap record (the first commercially successful rap record is obviously Rappers Delight by the Sugarhill Gang). In 1982 another classic was released - One For the Treble by Davy DMX. However, the first turntablism smash hit arrives one year later with Rockit, by jazz legend Herbie Hancock and Grandmaster D.S.T. , featuring cuts and scratches.

In the mid 1980s the first affordable (Akai) samplers become available, enabling DJs to capture and manipulate existing sounds. Other Hip-hop DJs in New York begin to exploit the possibilities of the SL-1200MK2 by scratching, cutting breakbeats and mixing samples into the set.

Hip-hop and turntablism had brought about several things: The mindset that the turntable could produce an end-result beyond the records played on it, the skills for turntablism, the specialist Technics turntables, analog drum machines and samplers. The inclusion of “rapped” vocals in the mix -originating from a Jamaican phenomenon called “toasting” - gave rise to New York’s “hip-hop” genre. A little later Chicago’s DJs developed what came to be known as “House music”. At this point the development of turntablism intersected with that of electronic dance music (E/DM).

The earliest form of dance music evolved in the late 1960s. It consisted of fast soul songs, funk by the likes of James Brown and rhythmic latin tracks. DJs started developing the concept that, in order to keep people dancing throughout the night, they needed to provide a constant flow of music.

In the 1970s disco emerged as a new musical and cultural form, bringing about innovations in vinyl and in replay technology. In 1975 record companies began releasing music on 12” singles. They offered better sound quality and made it easier for DJs to pinpoint specific locations in the tracks. In 1978 the new vinyl met the new hardware that was also used by turntablists: The Technics SL-1200MK2 turntables and mixers.

Not only had this technology helped spreading breakbeats and scratches in hip-hop, it also enabled an essential feature of dance music: “Beat matching”. This is the process of getting two records in time with another, which became the essential skill in dance music DJ-ing.

Over time, the role and status of DJs changed considerably. From the first concept of providing a constant flow of music, DJs moved on to developing musical sets by playing records in a different sense, seamlessly layering and mixing in and out of tracks. For dance music DJs - like for the turntablists- operating the Technics became close to improvising on a musical instrument.

By the mid 1980s electronic dance music (E/DM) began to materialize in cities such as New York and Chicago that had strong disco music and club followings. “House music” originated from Chicago and was named after a key club – the Warehouse - where its DJ Frankie Knuckles mixed drum machine-generated beats on top of soul and disco tunes. Another DJ - Marshall Jefferson - developed a deep, melodic sound with strings piano. Shortly thereafter Detroit producers turned the Chicago House sound into “Techno”, followed by “Garage” in New York, and “Jungle” in the UK.

Farrugia (2004) makes an interesting analogy between the Hippie revolution of 1967 and the House revolution 20 years later. Both brought about a musical and cultural revolution strongly linked to vinyl records. Due to laws that restricted club operating hours, people wanting to dance all night began turning to illegal warehouse parties, creating new small-scale Woodstock festivals, a phenomenon that crossed the Atlantic to the UK as well.

In what later marked a turning point, in 1987, DJ / promoter Paul Oakenfold invited DJ friends from the UK to a villa he had rented in Ibiza. Together they spent the summer dancing all night on the new ecstasy drug. When they returned to London the group became ambassadors of a new shared subculture.

“Club nights and warehouse parties, House music, Ibiza New Age and Ecstasy created the acid-house explosion of the summer of 1988, otherwise known as the Summer of Love. Similar to the summer of 1967, it was fueled by music—the likes of which most people had never heard of before—and drugs.”

1988 (the year that CD sales passed LP sales) thus marked the beginning of a new (vinyl) music-based subculture that would bring about a world-wide paradigm shift in music and (vinyl) music replay over the 1990s. (Langlois 1992, Farrugia 2004, One 2007)

6.3 Dance saves vinyl

At the end of the 1980s, when vinyl was being killed off by the music industry, smaller pressing plants were snapped up by entrepreneurs for next to nothing. On a small scale they were used to produce the vinyl records that DJs had set up to promote E/DM. In general the E/DM culture established its own ecosystem of manufacturing and stores, or added to the existing specialty and used records shops.

The E/DM culture started pointing a younger generation to turntables. Their visits to the shops, also helped to raise awareness of the black treasure that was available. The subculture of record collectors was once again - after indie rock - rejuvenated with a new generation. Demand for new Technics or audiophile Rega turntables remained stable.

Throughout the 1990s the E/DM and rave culture continued to grow. The press picked up on the new phenomenon, especially on the mass-attendance at rave parties and the drug use involved. The whole new musical paradigm and youth subculture started to catch the eye of a surprised mainstream world. It was the most pronounced youth culture since punk and - well into the CD era - it was centered around DJs, vinyl records and turntables! By the of 1990s E/DM music had grown out of a subculture into the mainstream youth culture. Dance music was now E/DM music and every rock festival also included performances by DJs to dance on well after the concerts had finished.

This sparked a totally unexpected renewed interest in vinyl replay both with youth and with generations that had experienced the transition to CD. As Fremer (1998) put it: *“Vinyl records are back in vogue, thanks to an odd alliance of veteran musicians, college-age alternative rockers, rap fans, dance club disk jockeys, recording engineers and audiophiles who have helped revive and strengthen a format all but given up for dead by the musical mainstream.”* The new wave of vinyl happened completely outside the scope of the major music industry and the electronics manufacturers.

Yet vinyl became a subculture business larger than just pressing E/DM records. From 2000 onwards complete large pressing plants were saved from the dead by independent entrepreneurs. Often the people who used to operate them - by now retired - were brought in to bring the plants back to life. To their surprise vinyl was pulled away from the death due to a new generation rediscovering it. (Fremer, 2007)

What followed was a stream of standard re-issues, audiophile remasters, new vinyl and increased 2nd hand sales by 2000.

From the end of the 1990s, the specialist turntable manufacturers ramped up production to satisfy a steady growth. For (would-be) DJs the Technics SL-1200MK2 and copies sold like hot cakes. The price of 2nd hand turntables went up. To cater for audiophiles and old and young generations of collectors, the specialist turntable manufacturers such as Rega brought out new volume models at the lower end of the spectrum. Pro-ject was founded in Austria, also selling affordable quality turntables in sizable quantities.

The booming trend became apparent in 2003. Nielsen SoundScan announced that *"formats classified as 'Other' (largely vinyl, but including a small number of DVD audio-albums) showed an increase of more than 30 per cent in the period 2000-2003."* (Hayes 2006)

That same year The National Association of Recording Merchandisers (NARM) reported that sales of new and used vinyl records combined had increased by more than 300 percent since 2000, bringing in \$67 million. New CDs alone brought in more than \$12 billion. The mainstream was obviously in the digital domain, but vinyl replay as a subculture was definitely on the rise. (Manez, 2003)

The owner of independent reissue label Sundazed in New York commented: *"I don't consider it a small niche anymore. At Sundazed, we did half a million in sales in vinyl in 2003. That's not small potatoes. It has become so much more mainstream that even the lay person knows something's going on."* (Petrick, 2004)
Yet the biggest boom was still to come.

6.4 Vinyl is back in the (youth) mainstream

Last year, Virgin Megastores UK announced it would re-arrange its stores to better accommodate vinyl records. According to the company, *"up to 70 percent of sales of new releases are vinyl."* (Glover, 2006). In 2007, in the UK Virgin Megastores, vinyl outsells CDs 80% to 20% for albums available on both formats. (Lindich, 2007)

Even the 7" vinyl single has returned. According to the British Phonographic Industry (BPI), *"annual sales of vinyl singles in the U.K. rose sixfold, accounting for 14.7 percent of all physical singles sales in 2005, up from 12.2 percent in 2004."*

Of course this applies to customers actually coming into stores to buy music on a physical carrier. However, Virgin Megastores UK predicts that digital music downloads *"will account for no more than 10 percent of the overall market by 2009. The company hopes its vinyl strategy "will offer consumers enough added value to head off growing competition from cut-price supermarket CD offers and internet download services."* (Glover, 2006)

Also chain store HMV agrees that vinyl is back and the company has been rapidly expanding its record racks to meet rising demand. (Allen, 2007)

The new boom includes not only vinyl records, but also the devices for replay - turntables. In 2006 more turntables were sold than in 1984, when compact disc was only one year old and CD players were still very expensive. More makes and models of turntables are available today than there were then. (Lindlich, 2007)

In an interview with Steward (2007), Roy Gandy of Rega, manufacturers of the Rega Planar turntables, confirmed that the turntable business is booming. *"We've seen a steady growth in turntable sales from 1997-2005. In 2006 they have exploded. We can't make enough of them to satisfy demand. And that's at all levels (from the \$350 P-1 to the \$4500 P-9, ed.) There's a definite buzz about vinyl and it's not just among specialists. It's reached the streets. Even when I play tennis I get people saying to me 'I hear turntables are coming back'. It's not a huge comeback - you have to put it into context - but there is a growth in record production. It's not anywhere near the levels which it used to be (before the CD, ed.) but within a niche market it's an acceptable, if not dramatic growth."*

The roots of today's boom in new vinyl sales lie in indie-rock again. In 2004 the White Stripes, one of the *"new millennium's edgy, cool, neo-garage rock bands"* released their debut album on LP. The 7" vinyl single that followed achieved the highest weekly sales figures in over 20 years. (Petrick, 2004)

A decade after House DJs, young rock bands have started insisting with their major record companies that their music be released on vinyl. The record labels realized at some point that bringing out vinyl in limited edition form would create collectable material for the fans. Indeed, according to Music Week, young consumers who buy a 7" single sometimes do not even have a turntable. They will get (hopefully buy) the downloadable version of the song for listening and and the vinyl single as a piece of collectable art. (Allen, 2007)

Lindich (2007) describes how the comeback of vinyl cuts across demographics. Younger consumers are buying older pop and rock albums on vinyl, while older consumers add modern artists such as the White Stripes to their LP collections. Interestingly, in many cases, *"consumers are buying both the CDs and the vinyl versions, the former for convenience and the latter for love"*, combining two value systems in one purchase.

After years of misery for the major music industry it finally enjoys a development in youth culture which simply brings in money again without any copyright issues, as it slowly ventures back into the vinyl territory it left to the independent companies at the end of the 1980s.

7. Value systems in vinyl replay

The common discourse around the attractiveness of vinyl replay includes the following arguments: Sound quality, operation of the turntable and handling the records (including artwork), collecting records and a notion of authenticity. As such the meaning of vinyl replay transcends the functional value of music replay towards a cultural meaning.

This chapter will reflect on such semiotizations, which will allow us to construct the value systems involved.

7.1 Sound quality

The meaning closest to functional replay is sound quality. From the introduction of the CD 25 years ago, audiophiles have claimed that analog vinyl replay provides superior sound quality compared to CD. Many saw in the combined industries efforts towards high-definition formats a confirmation that the CD "red-book" standard indeed had severe limitations.

Today, among the specialist manufacturers of turntables, Roy Gandy of Rega declared that *"people are happy to admit that it's just a better medium for listening to music."* He is happy with the also firm demand for his series of CD players, though. (Steward, 2007). According to Ivor Tiefenbrun of Linn *"it took Linn 15 or 20 years to produce a CD player that I believe is equal to our top-performing record player, and many of our customers still don't agree with me on that."* (Lander, 2001) Harry Weisfeld of VPI Turntables likes the CD, *"but it doesn't have enough resolution. When it was designed they didn't have the computing powers they have now."* (La Gorce, 2003)

Although audiophiles in 2007 are happy with the sound quality offered by the latest specialist audio CD players, many of them keep a turntable as well to enjoy a typical vinyl sound. Some even use vinyl only. (Naim Forum 2007).

It is easy for any decent turntable to sound better through a home stereo system than an iPod with compressed MP3s, or the first CD players for that matter. As one reviewer of Hifi Insight (2006) exclaimed: *"I am absolutely sure if people had listened to a budget turntable such as Rega's Planar 2 or 3, they would not have ditched their record collections in the mid eighties in favor of CD."* And it is important to note that the turntables on the market today are incomparable to the ones sold in 1983 when the CD arrived. When vinyl replay moved into a subculture, the specialist audio manufacturers were able to market their products in a premium segment. Healthy sales margins have allowed for 20 years of steady incremental innovation.

Better turntables now also allow for better records. The vinyl records market consists of used records, repressings of older music, new records by new bands and special remasters. Each year more and more audiophile pressings are released by specialized companies. The original master tapes are painstakingly captured and mastered towards a premium product above the price of a CD.

According to Taylor (2005), most vinyl collectors now have much better turntables and cartridges than the average record buyer owned in the past. *“Before the CD, record companies were forced to master within the limitations of the playback equipment of the time. Today it is possible to extract the maximum from a master tape”*. The end result on the new hardware is vinyl’s version of high-definition audio.

With these accounts we can now construct two of the value systems at work in vinyl replay.

As we have seen the survival and comeback of vinyl replay took place without involvement of the major electronics manufacturers and the major entertainment companies. Consumers are served by specialist companies who produce what the market demands, not the other way around.

The value system of the electronics manufacturers that supply vinyl replay systems thus reads as follows:

Power:

Steady innovation brings attractive products to consumers, rewarded with healthy margins

Structure:

Specialist audio market, small companies usually operated by the founder, products sold in (specialty) “electronics stores that don’t sell microwaves”.

Meaning:

Incrementally enhance a long standing cultural product, drive a sound business doing so, instead of a 20 year cycle further exploit potential of mature products.

Secondly, the value system of the vinyl music industry can be constructed along the following lines:

Power:

Allocate resources to license copyrights from major record companies, enhance/restore the products and manufacture quality products at a premium price.

Structure:

Specialist re-issue companies, since approximately 2004 also small departments of major music industry, sales through physical and online specialist record stores.

Meaning:

Reproduce older recordings and bring to market what consumers ask for.

7.2 Operation and artwork

Beyond sound quality the look, feel and operation of turntable and record come into play. Playing records requires more investment in time and effort to keep the records clean and making sure they don’t scratch. Furthermore the listener has to flip the sides after twenty minutes or so.

Plasketes (1992), Petrick (2004), Taylor (2005), Hayes (2006) and Lindich (2007) all provide similar explanations. The affective relationship users have with vinyl stems from the artwork of the sleeves, caring for the delicate records and operation of the turntable.

Especially the visual appeal of the LP records are an important reason for vinyl's attraction. One of Hayes (2006) subjects argued that *"there's something about having a piece of vinyl because it's a piece of art."*

This is all the more true for the young consumers of the aforementioned White Stripes records, where the vinyl version has transcended replay completely as it is bought as a collectable.

To conceptualize the appeal of the operation of the turntable we may draw upon Merelman (2000), who in a manifesto on the modernist versus postmodernist society wrote: *"The ordinary American could inspect, imitate, apply, and even improve modernist technologies. The average citizen could therefore comprehend the causal principles by which modernist machines and tools worked. Modernism also allowed people to inspect machines in their entirety and thus to understand them as unified systems."* From the accounts above this undoubtedly applies to vinyl replay. To stay out of a discussion on modernism, however, I propose that a more neutral description can be found with *"tangible technology"*.

As Perlman (2004) stated, in the switch to integrated circuitry the electronics industry increasingly sealed off the equipment. With the advent of the CD player *"the turntable – the component most welcoming of user intervention – was replaced with yet another black box"*.

Patrick (2004) agrees, quoting a Blue Note employee who said that *"There's a connection between you and the album, instead of putting a CD in a slot where it disappears."*

7.3 Buying vinyl records

Complementary to the process of the operation of the turntable, finding recordings to play is also an activity that time is allocated to as part of the rewarding experience. Collecting vinyl has a meaning that transcends the functional buying of a particular piece of music, as done when locating CDs.

By far most of the vinyl sold is used not new. This brings about a specific dynamic to buying recordings. The price of the recordings will vary from as low as \$1 incrementally rising, with exceptional collectables capable of raising much money. The very low price enables music listeners to engage in a non-safe buying pattern, choosing a record simply for the sleeve just to enjoy the artwork or giving something promising a try. More rare and thus expensive recordings, when found and purchased, will bring a reward in the sense of building or completing a collection.

The billions of records available second hand also raise interesting economic dynamics, building upon the elaborate argument by Hayes (2006): *"The items have already been sold at a previous point in time.*

However, these conditions of initial sale have little impact on the economic transaction that occurs when the record is sold for the second time.

The price of the record is highly arbitrary, reflecting the dealer's awareness or appreciation of the record. A music fan interested in used recordings is able to play a more active role in the process of acquisition by shopping around, haggling with dealers, and receiving discounts for frequent or large purchases.

Furthermore, this consumer is also able to purchase music for a price that he or she might consider a bargain, thus leveraging the use value attributed to a particular record against the exchange value that the merchant has assigned it. For music fans, these bargains provide an effective way to amass a collection of records cheaply and quickly.”

7.4 Authenticity

The least tangible of meanings generally attached to vinyl is authenticity, which can actually mean three things. A common discourse is that vinyl is the format rock ‘n roll was born to. (The previous chapter showed it is also the format E/DM music was born to). When the listener prefers artists that recorded before the advent of the CD, the vinyl record is perceived as more “authentic”, because it was the format it was released on at the time. More generally speaking, pops and cracks, the artwork, the full-size records, the operation of the tangible technology combined provide a meaningful rewarding experience, as opposed to the functional experience of other formats. Moving to an even higher level, vinyl replay was our first home replay format. The fact that it is still around, makes all other innovations merely transitional formats and accredits vinyl replay with “authenticity”.

However, the use of "authenticity" will imply some devaluation of the value of later music replay formats, whereas consumers have shown to appreciate the role of these formats in a society of music on the move. In many cases critics of such accounts used terminology as “luddite” or “romantic” when describing what they perceived as an inexplicable use of seemingly obsolete technology. Indeed, as Jones (2006) has shown, "luddite" and "romantic" are very closely linked in a notion of a rejection of modern technology.

We have to keep in mind that most of these critiques stem from the introduction of the CD player in the 1980s and an unexpected resurfacing of vinyl at the end of the 1990s. However, with the current booming interest in vinyl replay we face a totally different situation in 2007, for two reasons.

Firstly, with the MP3 revolution a paradigm shift has occurred that brings a very different meaning or explanation to vinyl replay. The LP/CD controversy is over, exactly because listening to a CD at home is no longer the dominant format for music listening. Yes, CDs are all but gone, however, we have predominantly moved to music in computers, be it ripped from CD or downloaded from the web. Music has become pervasive and carrier-less, thus ultimately mobile. In general music is now lo-fi, or with lesser audio quality and more attuned to songs than to albums.

This development makes room for listening to music at home as a luxury, the pleasure of refinement, like good wine. Although one could do this with a good CD player, this particular consumption of music lends itself very well to the more elaborate character of playing a vinyl album.

In this light I want to step away from the notions of "authentic" on one side and "luddite" and "romantic" on the other side, as I find them problematic for use in the present. They signify rejection of new technology and thus incorporate a negative value. Instead, I propose the use of the term "classic experience" with an inherently neutral or slightly positive association.

The term "classic experience" denotes activities or a subculture where people not necessarily reject contemporary practice, but further want to enhance their spare free time in today's busy society.

A contemporary phenomenon that fits within the pattern described for vinyl replay in 2007, is the so-called "slow food" movement. Now that we have all the choices for speedy meals, there is an appeal to carefully prepared food. Although some will do nothing but slow cooking, I understand this more to be a trend to enrich normal life. Slow cooking harks back to when grandmothers and mothers were at home preparing the food, in the traditional way. Most people can not or do not want to go back to that era, yet want to re-install some of its values in a modern rewarding and meaningful experience.

Secondly, the target group for vinyl replay has shifted recently. As we saw in the previous chapter, vinyl replay has now moved from a subculture back into (youth) mainstream. Let us revisit the description by Fremer (1998) of who the subculture included: *"an odd alliance of veteran musicians, college-age alternative rockers, rap fans, dance club disk jockeys, recording engineers and audiophiles"*

According to Harley (2007), many young people now embrace vinyl replay for its "retro-cool" factor, and *"then discover the musical pleasure the LP can deliver."* With the latest wave of enthusiasts, with vinyl more in the mainstream, the discourse has thus shifted from authenticity to "retro".

As Hayes (2006) has noted, there is a general tendency in our present culture for this "retro-feel".

We see it in car design, with the new Mini, Beetle, Ford Mustang and Fiat 500. Brown (1999) defined retro as *"combining the old with the new, usually in the form of old-style styling with hi-tech technology."*

He added that *"So ubiquitous is retro-marketing, indeed, that it is quite difficult to think of an unaffected product category"*.

Grainge (2000) added that retro is not so much the result of a cultural void, but that it *"has developed in accordance with a series of cultural, demographic, technological and commercial factors that have made pastness an expedient and marketable mode"*.

Brown and Hayes both specifically name music and movies as a prime domain for retro. Examples of movies are remakes of *Starky & Hutch*, *Mission Impossible*, *Charlie's Angels* and Bond-inspired movies as *Austin Powers* to name a few. *White Stripes* is a prime example of retro-rock music. Hayes considers it a natural consequence for the youth in his study to pick-up on this trend. As it increases in popularity and availability in mainstream outlets thus rises, also older consumers are exposed again to the vinyl format, this time as a trend or niche market within mainstream culture.

In summary, the vinyl subculture intersected with a development in society that propagates retro design and values rewarding and meaningful activities. Vinyl replay now combines both in a classic experience, within the context of our present world and its technologies.

With this account we can now construct the value system of the vinyl consumers:

Power:

Allocate resources away from mainstream electronics manufacturers and entertainment industry, to specialist manufacturers, specialist labels and specialist shops.

Structure:

A music listening subculture consisting of audiophiles and/or collectors and/or enthusiasts of the generations before and during the CD transition, as well as the E/DM generation and the newest college generation. They buy (with the exception of the Virgin Megastores) in smaller shops that carry 2nd hand vinyl records (both low-budget and collectables), re-issued older works and vinyl releases of new groups.

Meaning:

To enjoy music, the records with their artwork and the playback system beyond the mainstream meaning of casual listening and functional technology. Music, playback and collecting combined offer a retro-inspired classic experience with a high cultural value.

The conclusion section that follows will compare the value systems, revisit the research question and draw conclusions from this research.

Conclusion

With this thesis I wanted to study a revival of vinyl replay within the dynamics of music replay in 2007, including declining CD sales, the disappearance of compact cassettes, RIAA actions against file-sharers and the increasing popularity of legal downloading, to understand how such events could co-occur.

The Structuration framework, as laid out by Giddens and applied to technology by Orlikowski, helped me to operationalize such a study. Orlikowski views technology as an occasion for structural change. This change involves actors and institutions in processes of “Power” (in the allocation of resources), “Structure” (institutionalized patterns of interaction) and “Meaning” (semiotic valences). It then follows from Giddens’ framework that such processes are historically and socially situated. (Orlikowski, 1992)

For my research I have combined Power, Structure and Meaning into what I have called “value systems” for each of the three parties involved: Electronics manufacturers, entertainment industry and consumers. The notion of value systems allowed me to describe and analyze a historical overview of major developments that have shaped audio (and video) replay and compare the values these developments hold for the parties involved between mainstream audio (& video) replay and vinyl replay. The result is an organized insight into a complex situation of agency and structure, over time, across formats.

With the research question “What value systems have developed in mainstream music and video replay and how do the value systems of vinyl replay differ?” it is now possible to describe and explain the revival of vinyl replay within the dynamics of music replay in 2007.

In the mainstream developments are characterized by a constant menage-a-trois of the electronics manufacturers, the entertainment industry and consumers.

Electronics manufacturers have power as their R&D results in new technological formats that are brought to the market in cycles of 20 years. The overview of developments in the mainstream shows that audio and video formats have become intertwined, as both stem from the same R&D process. Development of the VDP led to the CD, the VCR enabled DAT, without CD there would not have been DVD and DVD-A (audio) springs off from DVD video.

The power of the music industry is that they can either oppose or support the new formats. Their main value is safeguarding and exploiting copyright. In acceptance lies the potential for huge profits for both the electronics manufacturers - who can supply new devices - and the entertainment industry - who can supply existing and new content again on a new format.

Yet consumers have considerable power too. When they don’t allocate resources a format is not accepted and does not bring the envisaged profits.

We saw a divergence in value systems between the combined industries and consumers. The first have strived to introduce new formats with increasing sound quality and decreasing room for consumer agency towards time- and place-shifting.

Consumers on the other hand have always valued convenience, portability, affordability and creative freedom over quality, accepting the lower quality of compact cassettes over vinyl, VCRs over TV and movies and MP3 over CD. In two instances there was a convergence: With the CD and the DVD the combined industries and consumers embarked together on a digital revolution.

The music industry could not have foreseen in the early 1980s that moving to a digital carrier-based format, which seemed perfectly logical at the time, at one point would intersect with PCs and internet - both systems designed to take the digital music off the carrier and make it work in cyberspace. Although CD and later DVD have brought the combined industries massive revenues, they have also confronted the entertainment industry with the worst copyright issues and a fundamental threat to its existence.

MP3 has proven to be part of a socio-economical paradigm change, a development that can't be stopped by the entertainment industry. It also highlighted a special moment when consumers didn't (have to) wait for the combined industries to cater for their needs, but went their own way with a technology from outside the combined industries. Instantly this has rendered previous developments obsolete. All carriers for audio that came after the vinyl record have not survived today's scrutiny, being merely transitional stages in hindsight. The world has moved on and today music (and increasingly video) is found on iPods, the culmination of a trend that started with compact cassettes.

I have shown that the role of the compact cassette was important in the disappearance of vinyl from the mainstream. Compact cassettes had already surpassed vinyl when the CD arrived. It took CDs ten years to surpass compact cassettes, double the time needed to surpass vinyl. I have also shown that the CD not so much "naturally" superseded the vinyl format, but that the latter was actively negotiated out of the market by the music industry, helping the adoption of the CD format. Compact cassettes brought consumers for the first time an affordable, convenient, portable and creative format. CDs were a hybrid between the portability of compact cassettes and the high quality home listening status of vinyl replay. They later became a link between compact cassettes and MP3s (today's compact cassettes) by containing music in rip-able, digital encoding.

The availability of digital carrier-less music made us enter a digital networked age, where music has become a commodity rather than a physical work of art. The boom of 2007 shows that society still has room for a technology with a physical carrier: The vinyl format that started the music industry.

When it was surpassed in the mainstream, vinyl replay became a subculture, surviving on its own away from the actions of the combined industry. The value systems of vinyl reflect an absence of the electronics manufacturers and the entertainment industry. Equipment is supplied by specialist manufacturers who gradually improve on existing technology. Content sells either in a second sale economy or stems from specialist companies. The value system of consumers is triggered by cultural meanings transcending functional criteria. These meanings include artwork, handling records and the players, collecting content and a notion of authenticity.

This notion drove audiophiles, collectors and makers of the hippest music to propagate and sustain it. I have argued that it was a new musical paradigm, music with turntables, that assured growth in a vibrant subculture, rather than survival in a diminishing subculture linked to the pre-CD era. Then also vinyl replay intersected with a 21st century development: A general retro wave in society. It has now enabled vinyl replay to gain a permanent place in the mainstream as a “classic experience”, rather than a strange practice by people who seemingly rejected new technology. Vinyl replay cuts through demographics, again incorporating members of all post-war generations. It has transcended beyond functional replay, sometimes even as far as becoming “collectables”.

The biggest surprise of my research was the extent to which vinyl replay has boomed the last two years. I had expected to write about a vinyl subculture which managed to stay alive underground, building on audiophile and authenticity arguments. However, vinyl moving beyond a subculture and returning as a niche format of the mainstream completely changed the value systems that I thought I would find. Another surprise was how another societal change, moving to the internet, completely upset a modus operandi of the combined industries by empowering consumers to take the initiative.

This story has shown many parallels and differences. Consumers buying entertainment products gave rise to the entertainment industry and electronics manufacturers. In turn, these structures try to shape the behavior of consumers. Giddens and Orlikowski were right: The biggest lesson that can be drawn is that technology never develops in a separate space. It as much structures society as it is structured itself by major developments in society.

With their framework I was able to analyze today's complex situation in music and movie replay from a socio-historical perspective and to provide a context that goes beyond the usual discourses on CDs, file-sharing and vinyl records.

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