

Audio Quality X Accessibility

How Digital Technology Changed the Way We Listen and Consume Popular Music¹

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Abstract: Based on the studies of Milner (2009), Katz (2004) and Wikstrom (2009), the article explores in details how the experience of listening and consuming music has been changing through the years due to the appearance and evolution of digital audio technology; analyzing the consequences in the recording industry and specially in its main product: popular music. The work approaches two different steps of this evolution (Compact Disks and Mp3) in terms of formats, devices and delivery methods; and how each one of them had an influence in our relationship with music.

Keywords: Digital Audio Technology; Music and Technology: Digital Audio Formats (CD and Mp3); Music and Perception within Different Medias; Music Industry.

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In this article, I am going to explore how much of the experience of listening and consuming music has been influenced by the appearance and evolution of digital audio technology, under two aspects: quality of audio and accessibility. For that, I investigated the work of Milner (2009), Katz (2004) and Wikstrom (2009) among others.

1. Digital Audio Technology: Formats and Devices

1.1. Compact Disks (CD) - The First Digital Format for Mass Distribution

Although CD was the first digital audio format, we note that a lot of questions raised by its appearance find parallels in other format changes in history. One thing that appears to be common in every change is that purists claim for a loss of authenticity. During the LP era, in the 1950s, there was a good example with the competition between the two speed formats available in the market: 33rpm and 45 rpm. As asserted by Milner (2009) “The New York Times critic Howard Taubman spoke for many record buyers in 1950 when he admitted that although many 45s were aurally superior, he preferred LPs for their “sheer listening comfort and continuity of performance” (Milner, 2009: 137). The same thing happened when some vinyl lovers defended it against the appearance of the CD. In 1994, Eddie Vedder, vocalist of Pearl Jam wrote a song to defend the old format that says: “You are so warm/oh, the ritual” (cited on Milner, 2009: 197). In 1992, Neil Young was even more radical: “From the early 1980s up till now, and probably for another fifteen years to come-this is the darkest time ever for recorded music. We’ll come out on the other edge, and it’ll be ok, but we’ll look back and go, “Wow, that was the digital age. I wonder what that music really sounded like. We got so carried away that we never really recorded it. We just made digital records of it” (cited on Milner, 2009: 185).

For every format change in history, there are purists loyal to the old format, longing for authenticity. Claiming that there was a loss of authenticity. It is not about the fact that the new format sounds worse. As said before 45 rpm has a better sound quality than 33 rpm as the CD is aurally superior to the LP. The point is that the new format sounds different than the way people are used to. So when the first digital technology came as a format with the CD, people resist not because it sounds worse as a format but because it is not the same sound that they grew up listening to. As asserted by Katz (2004) ‘Authenticity is clearly a moving target. Often something is authentic to the extent that it has been replaced by something newer, less familiar, and more convenient’. (KATZ, 2004: 171).

There is another similarity among all the formats before the MP3: they were all planned and controlled by the industry. As asserted by Milner (2009): ‘We all know how this story turned out. The CD, despite the dogged efforts of the analog loyalist, took over the world. Five years after entering the

market with almost zero name recognition, the CD was the fastest-growing home entertainment product in history. 'In 1983, 800,000 CDs worth \$17.2 million were shipped to retailers. By 1991, the number of CD players shipped topped 333 millions, worth \$4.3 billion.' (Milner, 2009: 221). It was also mentioned by Wikstrom (2009): 'The 1990 saw the development of digital technology which led to the unprecedented growth of the recording industry, leading to its peak in worldwide music sales in 1998. This expansion primarily was linked to the advent of the CD in 1982' (Wikstrom, 2009: 64).

1.2. MP3 and Internet Revolution: Accessibility, Portability and Convenience Without Industry Control.

If we analyze the evolution of formats, there is normally a goal for a better sound, but not in two important moments in history: the first appearance of audio recording and the appearance of MP3. They both have one good reason to exist: portability. Although, in history, other formats were created to give more portability to the listener such as the cassette, the minidisk, or even the CD, no single format got even close to MP3: 'Digital music files, however, are dramatically more portable than their more tangible kin.' (Katz, 2004: 164).

The MP3 is convenient and accessible. The format became popular because of its association with the Internet. On top of that, there is the fact that it is a non-rivalrous source: 'Digital sound files, like ideas, are also non-rivalrous' (Katz, 2004: 163). It means that 'To download is not to use or take someone else's song file, but to copy it' (Katz, 2004: 163). 'The sound does not degrade when it is copied' (Katz, 2004: 164).

This was the revolutionary aspect brought by the combination of MP3 and Internet. People do not feel that music is a valuable commodity anymore. It is not physical; it is virtual, intangible. Listeners do not grab an LP or CD; they do not feel that is real. It is more like a story or an idea that can circulate freely between people, like the information in the Internet. As asserted by Katz (2004): 'Moreover, the intangibility of MP3s and the ease with which they are obtained, disseminate and deleted may encourage the sense that music is just another disposable commodity, an attitude I personally find worrisome.' (Katz, 2004: 175).

By the end of the 1990s/beginning of 2000s, the MP3 format, the Internet and the websites of free download became popular very quickly: 'Napster is the most famous example of a P2P network. Developed by two college students in 1999, it allowed users to share the MP3 stored on their computers. At the height of its brief life Napster is said to have had tens of millions of users downloading hundreds of millions of sound files. Its appeal was clear: it was free easy to use, and provided access to an immense collection of music.' (Katz, 2004: 162).

According to Lenhart (2004) the success of Napster was so strong that it actually drove non Internet users to start using it to download songs: ‘One may make the case that the growing publicity surrounding Napster, and an interest in getting free music, essentially “drove” people to use the Internet.’ (Lenhart 2004: 190).

Besides all this access to music, there is the fact that for the first time in history the new format was not a creation of the industry. Moreover, the industry does not have any control of it and have found it really hard to adapt to this new reality. How is it possible to sell music in a world full of music available for free in a couple of clicks?

When we talk about how digital technology changed the way we listen to music in terms of format, we have two main points to analyze: Compact disks (CD) and MP3 + Internet. CD is a new format that brings more audible quality to listeners and naturally created resistance from the purists who prefer the sound of the antecedent format. It is not very different from what happened with the appearance of other formats, such as the 45 rpm LP.

The MP3 format associated with the Internet brought by digital technology had a much deeper impact in the way we consume, listen and attribute value to music. In the next sessions we will analyze deeply how these aspects influenced the way we listen to music in terms of audio devices, delivery methods and listening habits.

1.3. Quality of Audio X Portability in terms of Audio Systems

We have already discussed portability in terms of formats and the high connectivity among listeners in the Internet. However, there is also another very important aspect about portability regarding digital technology that is the digital audio devices.

According to Milner (2009) Sony launched the Walkman in 1979. It became very popular in the 1980s and further on had its different version for different formats: mini disk and CD. The quality of cassettes was quite poor compared to LPs. So Walkman didn’t cannibalize the home systems. The Discman, launched in 1984 (Ahmed, 2013), were never very efficient, quite frequently there were problems while playing the music if you move them too quickly and it even might damage your CD.

None of these portable devices was as successful as the new generation digital devices such as iPod and mobile phones, as they all worked with digital media files (mainly MP3). The timing they first appeared was perfect, just after Napster emerged: ‘(...) in October 2001, Apple launched its first generation MP3 player, the iPod. As opposed to a bulky compact disc player, the iPod allowed users access to all their MP3 tracks in a convenient, stylish, and relatively inexpensive way’ (Swanson, 2013: 210). This means a whole new world in terms of portability. The listener did not need to carry a bag full

of cassettes, mini disks or CDs anymore. They could carry all the music they want to listen on a player with a size smaller than a matchbox. As asserted by Katz (2004) 'Digital music files, however, are dramatically more portable than their more tangible kin.' (Katz, 2004: 164).

However, the question that remains is: what happened to the sound quality? How can we get a good bass definition if we are listening through headphones or the small speakers of a laptop? What happened to the stereo image of songs if we are listening to the mono speakers of mobile phones?

There were few efforts from the industry to invest in new high quality formats such as the super formats. In 1999 (same year as Napster was launched) Philips and Sony released SACD (Super Audio CD), characterized by a dynamic range of 120 dB and an audio bandwidth up to 100 kHz (Janssen et al, 2003). Although the quality was much higher than the current format (CD), it didn't get much attention.

The successful digital sound devices were the ones that emphasize what all this evolution is about: portability, accessibility and convenience. The mixing engineer Chris Lord-Alge said: "With audio and music right now, it's all about convenience, not sound quality. That's why there's Pro Tools, that's why there's MP3s, that's why there's Ipods." (cited on Milner, 2009: 354).

2. Delivery Methods: Free Download Websites, Internet Radios, Spotify, YouTube, Social Networks etc.

2.1. Free download Websites, Streaming Websites and Internet Radio

Nowadays, CD stores are closing and the Internet is taking its place as the way to access music. Before going to every single delivery method available in the web, we need first to understand the changes that the web brought to us. According to Wikstrom (2009), the new music industry dynamics is characterized by high connectivity and little control. For the fans, besides of being reached by the artists chosen by the industry to be developed and launched in the market via big mass communication media, the new fan can also freely browse in the web to find what he/she wants to listen to. Listeners are more connected to each other than never before: 'A network is consider to have a high level of connectivity if most of its members are connected to each other, and vice versa.' (Wikstrom, 2009: 5).

That is how free download websites - the first massive popular Internet delivery method-worked. 'The scale and popularity of Napster use trumped all predictions that the online market was exaggerated, or incapable of delivery songs on a gigantic scale. By mid-2000, Napster had around 500,000 people using it every night.' (Alderman, 2001: 108). In 2008, digital music piracy reached

astronomic levels: ‘IFPI (...) estimated unauthorized file-sharing at over 40 billion files in 2008.’ (IFPI, 2009: 22).

At that point, according to The International Federation of the Phonographic Industry (IFPI, 2008), digital sales already represented 21 % of the industry income; and more important it had a growth of 24.1 % since 2007, while physical formats decreased of 15.4 % in the same period.

	<i>Physical</i>	<i>Digital</i>	<i>Performance rights</i>	<i>Total</i>
USD millions	13,829.3	3,783.8	802.0	18,415.2
Percentage	75%	21%	4%	

Table 1 - Recorded Music Sales 2008 (trade values, USD millions)

	<i>Physical</i>	<i>Digital</i>	<i>Performance rights</i>	<i>Total</i>
	-15.4%	+24.1%	+16.2%	-8.3%

Table 2 - Recorded Music Sales 2007-8, percentage change

This happened due to the popularization of Internet and the tendency was to get even more popular: ‘The average downloader is almost certainly wealthier than those not on the Internet, given the cost of computers and Internet services (...) But the number of downloaders is growing and the cost of technology is shrinking in every part of the world.’ (Katz, 2004: 165).

Nowadays, according to the most recent IFPI report, physical and digital have the same share of the market: 46 %, leaving performance rights and synchronization with the remaining 6% (IFPI, 2015). Although digital revenue grew push by streaming services, this is not a really optimistic prognostic: ‘However, the growth of subscription and streaming was not quite able to compensate the two other key elements of the industry’s current transition: a global decline in both physical format sales (-8.1%) and download sales (-8.0%).’ (IFPI, 2015: 7)

The important point to emphasize here is that, since the appearance and popularization of free download websites, the experience of listening and consuming music has changed completely. The accessibility to music brought by the high level of connectivity among the fans in the Internet were the basic principles of Napster and became the basic principles about hearing music in the Internet.

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2.2. High Connectivity + Small and Non-rivalrous Digital Audio Files = High Accessibility

Besides the industry has been trying to create control for a long time in the Internet, they also tried another strategy to fight digital piracy: creating new delivery methods that exploited this high level of connectivity: namely Internet Radios and streaming websites.

The first streaming service - called Rhapsody - was launched in 2002 (Swanon, 2013: 210). Nowadays, there are few of them available such as Spotify, Apple Music, Google Play, Rdio, Tidal, Deezer etc. being Spotify the most popular among them. Naxos Music Library (NAXOS MUSIC LIBRARY, 2015) and DG Discovery App (DEUTSCHE GRAMMOPHON, 2015) are options for Classical Music.

Instead of downloading the songs, the user can hear them straight from his/her music player. It has some important advantages over free download websites: it's stable, fast, trustable and does not require space on the HD. This last one makes it even more portable than download websites. You can arrive on a party, access the Internet through your mobile phone, log into your Spotify account and find your play list there to play in the party. 'Eliot Van Buskirk describes Spotify as, "a magical version of iTunes in which you've already bought every song in the world." (cited on Swanson, 2013: 208). Spotify adapted themselves well to the new music scenario. "The primary reason for its success is simply that the service's features and structure are superior to those of its competitors. Put in other words, Spotify's competitive advantage is Context rather than Content.' (Wikstrom, 2009: 175). In other words, Spotify is stable, fast, friendly and trustable. Besides, it gives the freedom - just as free download websites - of choosing among millions of songs available. Comparing to the radio era, the listener does not need to rely on the radio show to choose the songs, he/she is his/her own curator.

In terms of Internet radio, Last FM was very popular. Although, it did not give to the user a complete access to the songs of their favorite artist, it was successful because it explores the high connectivity among users. Katz (2004) said about the differences between cyber space and real space: 'In responding to these differences, users may enjoy greater access to music, discover new repertoire, and exercise an increased flexibility in the way they listen to music.' (Katz, 2004: 165, 166). Last FM explored the 'discover new repertoire' side of it. The way it makes suggestions for fans to navigate among the pages of similar artists was very friendly. On top of that, users had a place to access safely the music of their favorite artists. The major point that was still not solved is that in Last FM users couldn't access a huge amount of songs, and that's where Spotify has become so popular: '...Spotify, may indeed be an important milestone in the music industry's development since it is one of the first online music providers that seems to have been able to negotiate agreements with right holders...' (Wikstrom, 2009: 175).

In 2014, the subscription model of streaming services was already a reality. Frances Moore, chief executive of IFPI (International Federation of Phonographic Industry) asserted: 'It is now clear that music streaming and subscription is a mainstream model for our business. In 2011, there were eight million paying subscribers to subscription services — today there are 28 million' (IFPI, 2014: 5).

The paying subscription services also brings a sense of fidelity to the service as well to the experience of listening to music. In other words, once the user is paying monthly, he/she will be more influenced to use it more. Although, the limited access to music before was never a barrier to music devotion, the access to such a quantity of songs might stimulate the user to experience more music, from different genres. The listener experience might move from a profound experience of consuming certain artists and genres to a broader experience of listening to more songs but in a more superficial way.

Even though the industry is celebrating streaming services as an important way of income for them - in 2013 for the first time overcame U\$ 1 billion (IFPI, 2014), it is far from resolving digital music piracy. According to study run by Borja K, Dieringer S and Daw J. (2015) the effect of streaming website on combating piracy had the opposite effect: 'The findings from our study are in line with this reality: individuals who intensively use music streaming are also digital technology savvies who feel comfortable with music sharing and music piracy.' In other words: 'The results indicate that music streaming increases the likelihood of engaging in music piracy by about 20%.' (Borja; Dieringer; Daw, 2015: 74).

Also streaming services have been a big concern for artists regarding their copyright income - especially for the young ones. Few of them have already manifested their dissatisfaction with the business model. Recently, the world most popular recording artist of 2014 Taylor Swift (IFPI, 2015) - who had already pulled her album 1989 off Spotify - wrote a letter to Apple complaining about the fact that their new streaming service were not paying royalties to artists for the free three-month period trial they offer to users (Taylor, 2015). Taylor manifested her concern especially about young artists: 'This is not about me. Thankfully I am on my fifth album and can support myself, my band, crew, and entire management team by playing live shows. This is about the new artist or band that has just released their first single and will not be paid for its success.' (Taylor, 2015). David Byrne agreed 'In future, if artists have to rely almost exclusively on the income from these services, they'll be out of work within a year.' (Byrne, 2013). According to him, big artists like himself still have the advantage of making a good income from live performance and licensing, but that's not for everyone: 'But up-and-coming artists don't have that advantage – some haven't got to the point where they can make a living on live performances and licensing, so what do they think of these services?' (Byrne, 2013).

It seems that streaming services has few impacts in the way we listen to music. For today, we have a whole new experience in terms of listening regarding the new level of accessibility and connectivity. For the future, we might create an industry that won't stimulate the appearance of creative content. 'Without new artists coming up, our future as a musical culture looks grim. (...) That's not the world that inspired me when I was younger. Many a fan (myself included) has said that "music saved my life", so there must be some incentive to keep that lifesaver available for future generations.' (Byrne, 2013).

2.3. Music at 'Non-music' Websites: YouTube, Search Websites and Social Networks

'The visual aspect of performance is especially important for pop musicians. What would pop be without the wriggling and jiggling, the leaping and strutting, the leather and skin, the smoke and fire? It would merely be sound, and so much the poorer for it.' (Katz, 2004: 20).

For a long time, the music scene is not just about the music itself. It is about look, videos, interviews and behavior. Fans connect to artists because they identify themselves with what they say, dress and the things they do. So it is not a surprise that a lot of people consume music in websites such as You Tube, Wikipedia and News. In the same way, fans buy gossip magazines to check what their favorite artists did in the weekend; they access the web to get this information quicker.

On top of that, there are the sites that increase the connectivity among people with the same interest. They are the social networks such as Facebook, My Space etc. In these cyber places, people can be in contact with millions of other people with similar interest, including music. Nowadays, every band needs to have a profile in each one of these websites to make contact with fans, prospective fans and other musicians. Baker (2007), in his book 'Guerrilla Music Marketing Hand book' where he gives self-promotion tips to artists on a budget, confirms: 'The best way to promote yourself online in today's environment is to think outside the box of your own personal website (...) That's why you need to establish a small presence in all the places where your ideal fans congregate online' (Baker, 2007: 43). Moreover, the information that goes around in the Internet is not controlled by anyone. It is like a free space where people can connect and express themselves with much less influence by the industry and the media: 'Increased connectivity causes the music firms to lose their ability to control the flow of information' (Wikstrom, 2009: 6).

2.4. The Way Delivery Methods Connect to Each Other:

The most amazing thing of the new delivery methods is the incredible connectivity among members and the super accessibility to any kind of media or information. Songs, videos, biographies, song lyrics, connection to other fans or even to the artists, makes the experience of listening and consuming music so much more broad and intense. That is probably why the effort of the industry to control the market has shown to be not very efficient. It is an impossible task to convince these users now to go back to buy their favorite album and play on their sound system for the next couple of months. The most successful projects have been the ones that assume that it's a better idea to sell to this user new tools to 'surf' in this new world than convince them to leave it.

IFPI 2015 reports shows that music is the main subject in all social medias: 'Music similarly dominates other social media channels: nine of the top ten most watched videos of all time on YouTube are music related. The most watched video is Psy's Gangnam Style with more than two billion views to date.' (IFPI, 2015: 33). Still according to the report, David Guetta Facebook page has more than 60 million likes and Katy Perry is the most popular person on Twitter with 63 million followers. (IFPI, 2015).

It is clear that high level of connectivity makes the delivery methods that explores music as a social experience the most promising one. Spotify can be used in connection with Facebook. However, in terms of connecting friends together around music, it seems that the most successful experience so far on that matter is SoundCloud: 'Malcolm Arnold famously said: "Music is the social act of communication among people, a gesture of friendship, the strongest there is." SoundCloud comes the closest of any service I've seen to a digital enactment of that sentiment.' (cited on Gianetti, 2014).

The experience of listening music in the digital world definitely makes it more social as you can share with your friends every single song you hear, as well as its lyrics, artist's bios, related artists etc. The experience of inviting a friend over to hear an album is now much broader with the possibilities of the digital delivery methods and social networks, as well as the amount of friends that get to know the music you appreciate, which reflects your personality and social group and values.

3. Did Music Lose Its Value?

Due to the huge level of accessibility that the Internet brought and the non-rivalrous aspect of MP3, people do not see music as a valuable commodity anymore. According to a study done between mid 1998 and mid 2000 (when Napster arrived) the average number of weeks an album appeared on a 100 Billboard chart drops from 15.3 to 11.3. (Bhattacharjee et al, 2007: 1366). In other words, we have

access to so many songs that we move to the next one faster, increasing the feeling that they are disposal.

It is probably the end of an era when recorded music was the main business of an extremely profitable industry. As asserted by Brian Eno in 2010, history is moving on: 'I think records were just a little bubble through time and those who made a living from them for a while were lucky.' And he goes on: 'Sorry mate – history's moving along. Recorded music equals whale blubber. Eventually, something else will replace it.' (Eno, 2010).

As asserted by Eno, recorded music clearly lost its value as a commodity, but what about music itself?

Byrne (2012) asserted: 'Music tell us things - social things, psychological things, physical things about how we feel and perceive our bodies (...)'. (Byrne, 2012: 101). DeNora (2000) affirmed: 'Music is a device or resource to which people turn in order to regulate themselves as aesthetic agents, as feeling, thinking and acting beings in their day-to-day lives' (DeNora, 2000: 62).

Therefore, its application in different contexts is still very valuable. As we saw in section 2.4 it is the most common subject in social medias. Rethink Music, an initiative of the Berklee Institute for Creative Entrepreneurship, to bring solutions to the future of music reinforce this idea 'From iTunes to YouTube to video games to satellite radio, music— whether free or for a fee—is available in more places and in more forms than at any point in human history, via an array of licensed and legal choices and platforms that were virtually unthinkable just 10-15 years ago.' (Rethink Music, 2015).

Thomas Hesse, president, global digital business, Sony Music Entertainment already observed that in 2008: 'Music has never been more important to the consumer than today. Every year we are seeing increased use of music and what we are doing as music companies is finding new ways of playing into that interest,' (cited on IFPI, 2009: 4)

So it is clear that music is as important in people lives as always been - in every single aspect: social, psychological and physical. It is also clear that people are listening music as never before. These are evidences that the crises is not about music, it is about the music industry. What actually lost its value is music as a commodity, as the industry failed to establish a new business model for recorded music that adapts to the digital world.

And how that affects the way we listen to music? Although we have access to a vast quantity of music nowadays, the lack of a business model must mean that new artists who will dedicate their lives to produce good music will be rare in the future and so will be a good quality contemporary music production. Regarding the new possible forms of income for independent artists, Byrne (2012) asserted: 'Sometimes the response to decline income for musicians is to say that artists should stop

living in the past and seek out new forms of funding (...) But not all the alternatives out there encourage a free, vibrant, and long-term life in arts.’ (Byrne, 2012: 267).

4. Conclusion

As we have seen, a lot of things have happened in the music industry in the last years that have changed the way we listen to music. Digital technology has had a massive influence over it, especially when we talk about Internet and MP3. There is now a level of accessibility, connectivity and portability never seen before. There are so many songs available that what we want from digital delivery methods now is to help us to choose among all these options - as well as helping us with associated services such as lyrics, tickets sales and merchandising. Other previous changes also had an impact although not with the same dimensions such as the CD and the Minidisk. In the post-Napster era, quality of audio is not as relevant as accessibility. Although there is some effort in recovering a rich sound quality (as done by Tidal (2015) and Pono (2015)) none of these initiatives had capture as much attention as the services that offer a good curation such as Spotify.

Therefore, digital devices became extremely successful once they were an extension of the Internet principles: accessibility, portability and convenience. Listeners got their MP3 files on the Internet to play in their small devices. At the same time, listeners buy small devices once they have access to all these MP3 files on the Internet. Digital audio devices and Internet became the perfect marriage.

As happens in different moments of history with different technologies, digital technology become important because they come in the right place and at the right time. The technology instead of creating demand actually fulfils a desire that is already there by bringing more freedom and accessibility in the extremely controlled world of the music business - as well as improving the use of music as a social experience (when in association with Internet).

That’s where digital technology found its way to exist and prosper.

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