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Research Paper And Video Project About Music Technology Evolution And Its Effects On Artist Revenue and Consumer Listening

Abstract

In this paper I will try to show how the technology that changed over time affected both artists and music consumers. The theory from some of the literature I found is that disruptions in music technology also had many economic impacts to both artists and their audience. In the literature it is suggested that streaming rectified the revenue hit that was derived from the ill effects of digital piracy. In this paper and in the accompanying video that can be found here -

https://drive.google.com/file/d/15IIBwwFLZqpnfqPl_pqmR YsAHgfjMuiN/view?usp=sharing

I will describe the evolution of the technological changes and show that these advances also had the same exponential curve in change very similar to the changes that occurred in print although the ability to record sound arrived thousands of years after the ability to record letters and words. However, at some point the technological changes created the same kind of disruptions - meaning the ability to record sound and transport it and listen to it in various ways. This created markets and economic advancements that were not there before - again similar in many ways to technological changes in other fields. Later in this paper I will focus on the last few years of these changes with an emphasis on streaming technologies. This in my opinion a change that is still ongoing and was transformational in the way revenue distribution came back after a very tough time that included a breakdown in the established industry and the piracy that affected it during this crisis. Another theory

is that the instant gratification of on demand technology that gives consumers exactly what they want when they want it was also solved with streaming music services.

The literature that I chose to cite and that I based my research on was primarily from trade magazines and industry news. These articles paint a picture of a changing landscape in the music industry and also talk about some of my ideas that led me to research and write this paper.

Thesis

Music streaming has changed the music industry again. Technology has changed music so many times just in the past few decades. It is worth outlining a brief history of how music changed thanks to technology and how it led to the streaming music platform so popular today. Each change impacted artists, the industry and music fans. As a music enthusiast myself I will draw on my experience as relates to how music has been purchased and consumed over the years I have been enjoying my favorite artists. After an overview of how music delivery has rapidly evolved over the past few decades I will focus and expand on Spotify. Music has been with us for thousands of years. We have been creating instruments that improved and became diverse over time. Music served many purposes - religious, ceremonial and celebratory [1](Page, 2010)

Since music was never recorded and distributed until the last century, it was always an event between the performers and the audience. This resembled storytelling as it was also only passed from generation to generation until these stories could be written down. Unlike stories that could be written down thousands of years ago with the

invention of writing and scrolls/books, music was only captured on recordings

thousands of years later thanks to technologies such as records and tapes. Until then

these songs were passed down from generation to generation by memory. Until music

could be recorded and sold, artists could only make a living by either performing or by

having a patron that would pay for their expenses.[2](Smiljka, 2014)

There was no music industry and the relationship was direct between artists and their

audience. The ability to capture sound and store it on a medium is the origin of what we

call the recording industry today. Now artists could record their music and sell it to anyone

that was interested in listening in the comfort of their homes and later cars as well as

portable devices. Fast forward to the 20th century and we have the following musical

landscape - A music industry that can sign artists to their label and market their music to

listeners around the world by selling the medium on which that music was recorded. Also

radio was now ubiquitous broadcasting music and creating the first royalty fee structures.

The first popular media were tapes and vinyl records. Stores were created for the sole

purpose of selling these mediums and the public could purchase these and listen at their

leisure. Artists could now make a living by selling their music and not rely solely on

performances or patrons. The downside for them was that in order to get a recording deal

they would normally have to sign away their rights to the content and share in the revenue

generated by the sale of these albums. Most artists did not care as this was the only route to

commercial success but in some cases the terms were very onerous and musicians had to

hire lawyers that specialized in these contracts to get the best terms possible. For the fans

this was a great deal as they could now listen to music at any time and could collect a

variety of music. You needed special equipment to play these mediums that were expensive

at first but came down in price as these new technologies became more widespread. Interestingly, the first instances of music ripping and piracy happened when both tapes and vinyl records were available. I remember the excitement of hooking up a tape recorder to a record player by means of a centralized unit called an integrated amplifier and manually recording sections of vinyl records on cassette tapes that could later be played back - this was the beginning of the playlist that could take various songs from a vinyl record (or from live radio) and could be customized by mood or genre. By the 1950's and on the term rock star was in use and that meant that if an artist was popular enough, they could earn millions just by selling a large amount of records. The labels that produced the recordings of these artists would also be in a position to make sizable amounts of money by taking their cut of every recording sold. Agents, producers and label owners could also become exceedingly wealthy if they were fortunate enough to discover and sign the right talent to their record label. This arrangement lasted for almost 50 years as the medium of records and tapes allowed the content to be locked in such a way that benefitted musicians and the industry that produced this music. For an artist to be successful they needed the labels to promote them and market their music - hence the terms that were very favorable to the music industry. This made sense because the music labels had to invest a lot of money in the promotion efforts and success was not always guaranteed. This also led to a situation where some artists and bands made it really big and others had a hard time finding success. One of the reasons was due to the fact that recording music involved expensive systems and those were only available to labels and producers with deep pockets - it was impossible to record anywhere else other than in one of these big commercial setups. Thus the bar to success was set very high and the control was mostly in the hands of recording

executives. In most cases to get a recording deal a band would have to sign terms that gave most of the revenue from the first albums to the label that signed them and only if they were wildly successful would they be able to renegotiate licensing deals that were more favorable to them for subsequent album releases. There are many stories regarding famous artists such as David Bowie and Prince that underwent litigation and feuds with their labels to get better terms and creative license. Even today in the digital music landscape we hear of these disputes - most famously with Taylor Swift over her wishes to own the content of her first few albums.

This golden age of music industry money making was a direct result of technological limitations that only allowed large corporations to produce and distribute recordings and there was absolutely no way for artists to circumvent these limitations other than to rely on the record labels for discovery, promotion and distribution. There were instances of piracy when tapes were made or existing vinyl records which were then sold on the black market but this was a very small fraction of music sales and did not impact the music industry in a significant way. We should also remember the record store - something that barely exists today. In order to purchase music a consumer had to travel to a record store and look through the bins of records and tapes to find the music they were looking for. In some cases it was possible to listen in stations inside the store that featured certain artists but in general you entered the store knowing what you wanted and in some cases would discover new music - but the discovery of new music was not a very easy process because it was not possible to sample anything other than what the store was promoting. I remember the days of going visiting Tower Records in the Village and flipping through the albums which were arranged either alphabetically or by genre. In some parts of the store there would be

listening stations with headphones where there may have been 10 albums that you could listen to. This was another way for the labels and the stores to promote what they wanted to sell and mostly would benefit established and known artists. Until the 1980's music as a medium was not very portable. Records could only be played at home and only when cassettes were introduced were listeners able to take music with them in cars and battery operated tape players. The pinnacle of portability was the invention of the Sony Walkman that was small enough to fit in a bag and used cassettes for playback of recordings. During the early 80's a new medium for recording was established - the disc. This was the first digital permutation of music that was established where music could be stored on plastic discs and read by a laser that took the encoded music from digital format and played it on the same speakers that used to be connected to the amplifier and the record player. Now instead of a needle tracking the grooves of a track on a vinyl record there was a laser tracking the grooves of a compact disc. This enabled additional portability and slowly vinyl and cassettes became relics of an analog past with only enthusiast support - primarily for vinyl aficionados. Cassette tapes became nearly obsolete soon after the introduction of discs.This was a tremendous advancement for music production and music consumption and somewhat for the artists creating the music. For the labels this was a great cost savings - producing discs was a cheaper production method than printing vinyl and compact discs also took up less space on the shelves. Since they charged the same as they did for vinyl records this increased their margins.

For consumers this technological advancement was also positive as discs were easier to maintain and the technology now enabled them to play the same disc at home, in the car and in portable disc players. Discs also provided cleaner sound and longevity. Some vinyl

lovers will swear the sound is not as real on CD as on vinyl. [3](Walsh, 2001)

For the artists there was no initial change but as the equipment costs for digital recording came down it started the first wave of smaller studios and independent production that did not have to rely on the expensive vinyl producing infrastructure. Discs were the transitional medium that marked the end of the lock on music that so benefitted the industry, although they had no idea how digital would be used to their disadvantage. On one hand it allowed for greater efficiency regarding production and distribution but because now music was digital it set the stage for the next transformational, if not revolutionary phases of music recording and music consumption.

The age of Napster

The availability of compact discs converged with the rise and ubiquitousness of home computers. At the time, home computers were also undergoing many changes and one of these was the transition of storage from tapes and floppy discs to compact disks. Now consumers could install programs, listen to music and enjoy interactive games on a CD ROM device that could be added as a component in their PC (personal computer). Some capable computer experts figured out a way to take the music that was encoded in these discs and save a digital copy in MP3 or .WAV format on the computer's hard drive. Most compact discs did not have any digital rights management built in and this was also very hard to do as it would impact playback. Now the music industry's nightmare began to unfold - anyone with a PC and very basic computer skills could borrow a CD (compact disc) from a friend and make a copy for themselves at home. This was called "ripping" and it became wildly popular. At first this was not a big deal as most people just played with these new features

and made copies of their existing collection on their computers but soon a new application written by2 college students would change the musical landscape forever. In June 1999 Sean Parker and Shawn Fanning released a software application that allowed users to swap music files. This application was easy to install and incredibly simple in it's design. Any user could search for songs, artists and could also follow other users. It was an incredible experience to browse music and have a copy of that song in seconds. It was also gratifying when you would see someone downloading a song from your collection. Everyone that used it knew that it was wrong but it became so popular that at one point there were 80 million users. Some colleges reported that up to 60% of internet traffic was due to Napster traffic. Needless to say, the music industry took notice. Never in their worst scenarios did they anticipate that the convenience of digital music would be used so

effectively to minimize their control and profits. Most users that used Napster also justified their actions as a reaction to how the music industry had controlled production and distribution of music. The recording industry hired lawyers and technical people to find ways to curb and eventually stop this music piracy. In some cases the music industry sued some users of Napster to try and make an example of them and scare other users. Now that music could be ripped and shared across the world in minutes, the music industry knew that new business models had to be found and started searching for these new ways to defend themselves against this form of piracy. As in all industries change was difficult to define as no one wants to admit that a golden age is over and that a new era is about to start whether they like it or not. Also this was a classic case of self cannibalization where the industry had no choice but to accept new realities or continue to lose revenue.

iTunes and the 99 cent song

Even as the new reality was taking shape and the realization that change was here to stay - it was very difficult for the music industry to agree on how to accommodate this new technology and find new business models that would maintain profits. Fortunately, Apple's Steve Jobs - a visionary and music lover himself - convinced the music industry that something was better than nothing and that clinging to their old business models was not in their best interests. Jobs proposed a solution where consumers could buy whole albums or one song at a time - for 99 cents. This was an incredible feat, Jobs deserves tremendous credit for making this happen. Of course he also saw an opportunity to build an ecosystem around this business model with iTunes and the iPodand these products are the building blocks of the empire that Apple is today. (Isaacson,2011)[4]. Of course - Apple also got a cut from each song that was sold. Now the revenue was split between the record producers/labels, the artists and Apple as the marketplace for purchasing this music. Apple and others such as others were in the business of organizing and playing music of which the most famous were MusicMatch and Winamp. These applications allowed users to play, organize music and create playlists. Devices that played these digital recordings soon followed and some of them were so small that they could fit in a shirt pocket. Of course the most famous of these was the iPod, a huge hit for Apple. Then companies such as Samsung and Nokia started adding music playing functionality to their phones. Steve Jobs saw the threat immediately and decided to build the iPhone to preserve Apple's lead in the portable space. But there was one significant drawback to downloading songs - whether legally or not. It was difficult to maintain your music collection. Only Apple had a system where you could sync your music across devices and even then it was hard to keep track of what you

owned and where it was stored. If you had purchased songs from multiple companies that made it even harder. This was due to the fact that the cloud as we know it today was not available and all music had to be stored locally on the device you wanted to listen to. But overall this was great for the music industry. Consumers felt that paying 99 cents per song was a fair deal and piracy plummeted as more people abandoned Napster and other piracy programs like it and went back to paying for their music since they felt this was the right thing to do. The industry was pleasantly surprised as the lower cost of music allowed more volume and more sales. Artists did not feel the pressure of releasing a whole album and felt comfortable releasing singles. Music was now increasingly purchased online and instead of using your fingers to browse thru bins containing albums, you could use your browser and explore, sample and instantly download music in the comfort of your home. It did not take long for most record stores to close and these days they are a relic of the past. These days very few exist - serving the needs of vinyl enthusiasts and relegated to vintage store status.

Music streaming starts

In the year 2000 a new service from Pandora revolutionized the music industry once again. Tim Westergren, a musician himself, came up with the idea of categorizing music based on genres and creating a Music Genome
Project much like the Human Genome Project that was mapping out our DNA. [5](Morell, 2013) His idea was to allow users to create personalized radio stations so that someone could create a station based on a favorite artist or song and then Pandora would pick the next song based on the initial pick in the hopes that this next song was also something the listener would enjoy listening to. [6](Kleiner, 2013) An interface on the computer or mobile

device would also let the listener click on a thumbs up indicating they liked that selection or a thumbs down indicating that this song was not to be played again on this particular station. This feature was a machine learning function that further fine tuned the songs to be played for that listener on that radio "station".[7](Francisco, 2012) In addition to algorithms Pandora's Secret sauce was people. Music lovers and professional players who, for example would pick one of four jazz tunes and "describe the harmonic language," answer whether it's "tonal or modal," and "outline the progression."[8](Gray, 2011) As Pandora signed up more labels the choices grew and the library of available songs grew from the most popular genres of pop and rock to include classical music, jazz and other genres. The reason Pandora was so successful was it suggested new music and broadened the horizons of people - introducing them to music they

may have never found on their own. It seemed that this was a powerful addition to the listening experience and from personal experience I discovered so many new artists thanks to this service. Many people are at times stuck with music they grew up with and find it difficult to explore and find new music to enjoy. Pandora put that discovery process on auto pilot and greatly succeeded.. Pandora got paid from advertisements or you could pay a monthly subscription and enjoy the music ad free. Revenue from ads and subscriptions would be distributed to the record labels and the artists, with Pandora taking a cut for themselves. Today Pandora is valued at 25 Billion dollars and has 66 million active subscribers. [9](Dredge, 2019) These numbers are down from last year and the year before due to competing services - most notably Spotify and Apple Music but it is still a formidable player in the streaming services. This music delivery model served all 3 parties well - consumers, the industry and the musicians. For consumers this provided a service that

allowed them to create personalized stations and learn about new music. For the industry and musicians it created an additional revenue stream and an added benefit was that musicians could be discovered thanks to the recommendations provided by the Pandora service. The limitations were you could not download music and could only listen when there was an internet connection. Later Pandora would fix these limitations in response to competitors such as Spotify by allowing caching of music to be played when no connection was available but you could not create your own playlist. These limitations were offset by a much cheaper price than the services that allowed you to store music on your devices.

Enter Spotify

In 2008 two Swedish entrepreneurs - Daniel Ek and Martin Lorentzon came up with a new way to deliver music. Their main technological differentiator was the availability of the cloud that could centralize the playlists and preferences of each user. Here is how this made a huge difference - In the days of iTunes a user might have 500 songs on their computer for example.

If they purchased a new computer they would have to download all of these songs to that computer. With Spotify you had a choice of downloading these songs or just streaming from the library that would be attached to your account. Thus you could alternate between different devices and Spotify would keep a virtual library ready to be listened to from any PC or mobile device. The second revolutionary feature was the fact that a user would pay a

subscription fee and have the option of listening to anything on the Spotify library. Paid subscription users would also have the option of downloading music to any device they liked and the choice could be made between what you wanted to stream from the cloud and what you wanted to store locally. Basically - Spotify was giving consumers the best of iTunes and Pandora combined in one application. Ek and Lorentzon thought that this was the best way to combat piracy and also support artists. Initially some artists refused to post their content on Spotify but these days there are very few holdouts. Even Jay-Z and Beyonce who started their own streaming service called Tidal - a service that specializes in high definition sound (also called lossless audio) relented and posted their content on Spotify after having their music exclusively on Tidal for a while.

Initially Spotify concentrated on increasing their music catalog and offering their service to as many users as possible, investing heavily in marketing. At a later date Spotify increased their services by incorporating algorithms much like Pandora. Another similarity to Pandora was their use of people that in this case not only categorized music, but also curated music and created playlists - these were the Spotify DJs that became famous in their own right like Tuma Base who created the popular RapCaviar playlist [10](Rosenbaum, 2015) On Spotify you could search for artists or search by genre. If you wanted music suggested to you - a mood option search would also be available so that if a work out was in the plans or a quiet dinner date at home - Spotify would provide the music for the occasion. Another great feature was that even if you created your own playlist - Spotify would give you an option to continue the music once the playlist ended, using music suggested by the algorithms. Spotify also adopted the thumbs up/down to allow users to fine tune their musical tastes.

Streaming and the music industry

As we mentioned before, music sales took a huge hit when piracy ran rampant starting in 2000 due to applications like Napster and others. In the US, music's biggest market, annual revenues fell from $14.6bn in 1999 to $6.3bn in 2009. [11](Wolfson, 2017). Thanks to streaming, revenues have picked up but the industry recognizes that the days of wealth created by sales of vinyl, tapes and CDs will probably never return. There are still many in the recording industry that are making good money but it is a more modest industry these days. But there are other benefits to the industry that come from streaming. Whereas a sale of a record was a one time payment, a song on Spotify that is streamed pays a fraction each time it is played. This allows the industry to spend more time nurturing artists and decreases the risk of launching new music. There are now no risks of printing albums that do not get sold, everything is digital and the feedback of what works and what does not is instantaneous. Labels can take more risks with artists as the barrier to introducing their music is now less prohibitive. Labels now look for artists that are Spotify friendly as that increases their chances of ending up on a Spotify sponsored playlist leading to the potential of a large number of streams. Existing catalogs are also much more valuable now as it is easy to take any song and market it based on holidays, special events or renewed interest due to movies, specials or life events. In the digital age many artists are bypassing big companies and producing their own music, but there are still some advantages to signing a recording deal - promotion, access to producing talent and connections to expand

their reach globally, so artists that see the bigger picture still align themselves with the big labels. Lately labels are seeing revenues rise as more people sign up for streaming services and the fractions per stream accumulate to significant numbers for the industry.

[12](Karp, 2016)

Streaming services and artists

At first streaming was anathema for many artists as their initial response was to compare how much they made when an album was sold compared to how much they make on each stream. But the difference is that when they sell an album it would be a one time revenue collection, when their music is streamed they can make a fraction each time but those fractions can add up to significant sums. Currently it is estimated that each stream on Spotify sends $0.0040 to the songwriter. This seems like a very small amount but if you take a look at Max Frost - one of my favorite artists, not a big name by any means - you will see that just his top 5 songs alone have generated 40 million streams in the last few years - netting him 160,000 dollars. If you add the streams on the rest of the songs on his albums that number goes much higher. Add to that the other streaming services such as Apple and others and it seems that even artists that are not very big can make a great living thanks to streaming services. Max's Instagram posts certainly show that he is living a good life thanks to the revenue coming from the streaming services. Another point that should be made is now that music is completely digital, musicians can record their music at home using programs such as Pro Tools and upload their music straight into the streaming ecosystem and avoid the recording industry as a middle man. There are even cases of fan funded production companies - similar to crowdfunding. Of course they will not benefit

from the promotion and nurturing that the industry can provide but there are countless

stories of artists that made it big without having to rely on record executives and

expensive recording studios. Thus digital and streaming have truly allowed artists to

create music and market themselves independently. Even artists that have not recorded

anything new in recent years can still make money these days thanks to streaming

revenues. In the days of vinyl and CDs the revenue would significantly slow as sales

dwindled but these days bands like Fleetwood Mac, who has 11 million monthly listeners

can expect a large cheque each month - producing revenues much larger than the old radio

broadcast royalties - those were calculated based on number of listeners while in the

streaming world they get paid every time anyone streams one of their songs. Some of the

big artists can expect to earn tens of millions of dollars per year. Even obscure artists can

find a niche and make nice money. Artists such as Nils Frahm, a relatively obscure German

composer, gets more than 2.5m monthly streams from appearing on playlists such as

Peaceful Piano and Songs for Sleeping.[13](Wolfson, 2017)

So now many artists who were once considered too fringe or not commercially appealing

can still find a niche audience that appreciates their craft and will support them by

listening to their music online.

Streaming and the consumers

For consumers listening to music the verdict is decidedly positive. There has never been a

time where music was so readily available, affordable and explorable than now.

Today a consumer of music can find songs they like and have it playing instantaneously.

They do not have to go to a physical store and search for the album as they used to. This

instant gratification is very convenient compared to any other way music had been delivered in the past. The cost is also a fantastic bargain. For the price of what one album used to cost each month, we can now have access to libraries containing tens of millions of songs and listen to all of that on demand. The next point of explorability is the biggest one - where we once had to rely on what we heard on the radio or what our friends were suggesting - we can now browse for hours discovering new music on the fly and adding what we like to our collection from the comfort of our homes or anywhere we have a net connection. On a personal note I have found so many new artists in the last few years that I barely ever go back to the music I listened to growing up. This is all thanks to streaming services like Spotify. This capability has also enabled me to find these new performers and go see them live in concerts which is something I enjoy a great deal.

Covid-19 Addendum - This thesis was completed before the coronavirus pandemic and the video that is added to this paper. The pandemic closed down all performance venues and shut down a revenue stream for all artists. Some live streaming concerts were conducted but those were not of any major significance and did not help a great deal. Obviously the venues themselves also hurt since there is no takeout or delivery service for live music. Streaming on services such as Spotify helped since so many more people streamed more music and artists had plenty of time to write and record new material. Thanks to social media artists were able to connect to fans in the absence of any touring.

Conclusion -

I have experienced many of these technological changes described in the paper and in my

project linked here -

https://drive.google.com/file/d/15IIBwwFLZqpnfqPl_pqmR YsAHgfjMuiN/view?usp=sharing

my theory was that in a very short span of time there was a whirlwind of change in the

music industry thanks to technological changes - from crude recording devices, to analog to

digital and these days cloud based streaming. It was also my theory that this caused some

major upheavals in how artists were compensated and how consumers were able to get

their music. By organizing the events in a timeline we are able to see how each change

affected the artists and how they were able to sell their music. We are also able to see which

changes benefited them and which changes caused disruptions such as piracy in the days of

Napster. Alongside the artists - consumers also changed their habits and the way they

listened to music. Overall music consumers were not affected negatively by these changes

but usually benefited from more ways to enjoy music. Also we see that just in the course of

the last 15-20 years the changes were much more exponential as compared to the advances

during analog times. The way music jumped from tangible media that could be held in our

hands to being on demand cloud based is breathtaking. Lastly I would like to make the

point that as in regards to information and data technology/management we now have access to incredible volumes of data as to how and where music is consumed. There was only so much time to remark on this in the project but consider the fact that in the album and CD sale days we had basic information on how many albums were sold and where they were sold. Now with streaming we have real time information about daily, monthly and annual streams and exactly which consumers streamed them. This is information that can be visualized and used for many purposes for example - showing consumers what they listened to in a given year and how many new artists they discovered and of course artists can now measure their success in very granular ways.

Streaming music services is the latest evolution connecting artists to their fans. It combines the latest advances in technology - internet, cloud, mobile devices, storage and social media. It also appears to have created a medium that is serving everyone very well - the artists, the music industry and the consumers. I have asked friends and family to comment on their experiences with streaming services (Spotify and others) and feedback is overwhelmingly positive.

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