

# Music Streaming Services: The Soundtrack to our Future

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On my honor as a University Student, I have neither given nor received unauthorized aid  
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## **The Evolution of Music Listening**

Over the past two centuries, the role of music in our everyday lives has shifted drastically. Starting in the 19th century, individuals could only listen to music in two locations: a public concert site, like a tavern or theater, or at home, on a phonograph or by playing instruments themselves. However, no matter where it happened, listening to music in the 19th century was mostly a public experience or an experience shared with family, friends, and even strangers (North, 2004). Due to the limited options for listening, music in the 19th century was viewed as a prized and valued commodity because not everyone could afford to partake in the experience.

The 20th century brought changes with concern to how music was enjoyed and viewed. With the development of mass media, e.g. radio and television, and the development of music listening devices, music became less of a commodity and more of an everyday resource (North, 2004). Additionally, music itself became a much more private matter. The invention and large-scale distribution of technology like the Sony Walkman, listeners no longer had to share their music experience. Instead, they now had an option to experience it individually or surrounded by others. Released in 1979, the Walkman provided users with the opportunity to make music mobile due to its small frame and lack of weight. Furthermore, the Walkman is credited as being the first personal music device and the first object to change music enjoyment, with concern to music listening devices, music sharing, and the music industry (Du Gay et al., 2013).

The development of the Walkman brought upon a shift in how individuals listened, obtained, and shared music. More specifically, the Walkman brought upon an increase in home-taping. Home-taping is the action of taking a blank tape and copying something onto it, whether it be music, a radio show, or even a concert, with the purpose of sharing that experience with

another or reliving that experience by yourself (Bottomley, 2015). However, while the Walkman is credited as being the first personal music device to bring about all of these changes to societal musical norms, it is not the only device to do this. When the technological shift from Walkman to Discman occurred, the style of music-listening devices wasn't the only thing that changed. Individuals stopped home-taping, and started burning CDs. This dual technological-societal shift occurred again when the Discman gave way to the iPod and the iPod gave way to the iPhone. The rise in popularity of the iPod meant individuals stopped burning CDs and started using Napster, which was a peer-to-peer file sharing service. Once iPhones replaced iPods and other cellular phones became capable of storing and retrieving music from the internet, legal music streaming platforms like Spotify, Pandora, Apple Music, and SoundCloud became the new platforms for music listening and sharing (David, 2016; McCourt & Burkart, 2003). While these new platforms provide a more accessible and legal way to listen to music, this research paper argues they actually reduced the amount of music sharing and fundamentally changed the type of sharing that is allowed to occur.

### **Creating Connections Through Co-Production**

In order to properly discuss the co-evolution of technological-societal shifts that occurred with concern to music, I will be using the co-production framework. Sheila Jasanoff introduced the idea of co-production in order to use a more non-linear approach in understanding how technology and society co-evolve. This model is a shift from the more extreme ideals of technological determinism and social constructivism, which focus on either the technological aspect or the societal aspect as the driving force in change. In co-production, Jasanoff states that it isn't one or the other that drives change, but that they both co-produce each other in a non-

linear fashion (Jasanoff, 2004). Co-production serves as a very effective framework to explore music streaming services because they have not developed linearly or independently of one another or of societal changes. They are constantly evolving, adapting, and impacting the shifts in music listening technology and the social norms that surround acquiring and sharing music. A perfect example of this is Napster.

As mentioned, Napster is credited for being the first independent peer-to-peer file sharing service that allowed users to share music over the internet. To utilize the service, users had to download the Napster software, which then allowed users to access other user's music libraries, through the internet, and download the desired song. This access occurred when users would search for a desired song and Napster would connect them with other users, who were online at the same time, who had that song. Then, all that was left to do was download the desired song from one user's library to another (Tyson, 2000). This was a completely revolutionary system that arose following the recording industry slump of the mid-1990s when the Discman was being phased out and MP3 players were being phased in. Due to this technological shift, a shift in societal musical norms, especially surrounding the acquiring and sharing of music, began occurring. Individuals were no longer buying or burning CDs, partly due to the fact that the new "it" technology was an MP3 player. MP3 players also provided users with the opportunity to listen and obtain music in an easier and more efficient manner. It was no longer necessary to carry your music-listening device (Discman) and your music-storing device (disc holder) because they were one and the same (MP3 player) (David, 2016; McCourt & Burkart, 2003). However, this shift from discs to MP3 players meant that the current societal norm for sharing music, through burning CDs or sharing purchased CDs, had become outdated and needed to be reinvented, which is where Napster comes in.

Napster revolutionized how and with who individuals shared music. Since Napster only required an internet connection and a free new software, individuals were no longer limited to sharing music with close friends and family. Additionally, sharing music had become much simpler than burning a CD and felt much safer, since it all occurred over the internet, which provided individuals with a sense of anonymity (David, 2016; McCourt & Burkart, 2003). Not only did this allow individuals to form new connections with people they had never met before, it also provided individuals with the opportunity to express their true selves in a judgement free environment. This new environment Napster created helped promote the importance of music to personal growth and development (Kennedy, 2014; LaRose et al., 2005). Furthermore, it made the “Napster experience” one that was fun, free, quick, and easy, which allowed file-sharing to become the new societal norm for acquiring and sharing music. However, as we know from the co-production framework, a change in technology which causes a shift in society will inevitably cause another change in technology and the never-ending cycle of technology and societal shift will continue. With concern to Napster, this is seen during the “battle of piracy”.

The “battle of piracy” occurred during the year 2000 when the music industry, specifically recording companies, attributed their decrease in profits to Napster. They believed that the free peer-to-peer file sharing platform was causing an increase in pirating music and needed to be shut down. In 2001, only 3 years after its creation, the music industry succeeded and Napster was shut down (David, 2016; McCourt & Burkart, 2003). However, due to the newly developed societal norm for acquiring and sharing music, Napster was not lost, but just repurposed. The music industry decided to adapt the idea of Napster, but instead of having a centralized base of free music, the new service provided you with a base of music that needed to be purchased. This new service was known as iTunes and it quickly gained traction after its

release in 2003 (Waldfogel, 2010). While the co-production cycle with concern to music-listening devices, music acquiring and sharing, and the music industry does not end with the creation and implementation of iTunes, the next big societal and technological shift that occurs is the creation and implementation of legal and free music streaming services like Spotify, Pandora, Apple Music, and SoundCloud. It is these music services that will be the focus of this research.

### **The Future of Music: Free or Subscription**

Legal and free music streaming services, like Spotify, arose following the piracy problem within the music industry. The overarching goal was to provide a legal alternative to music pirating that allowed listeners, also known as users of music streaming services, to listen to “whatever they wanted, whenever they wanted, wherever they wanted” (Haupt, 2012). While all legal and free music streaming services have the same goal in mind, they all accomplish that goal in different manners. My research focuses on four distinct platforms, Pandora, Spotify, SoundCloud, and Apple Music, and how their attempt at reaching that goal impacts the music industry and the societal norm of acquiring and sharing music. So, first I will offer a brief description of each service.

Pandora is the oldest of the four music streaming platforms and only provides the user with a “radio-station” interface. This streaming service can be accessed by any device that is able to download the Pandora application and is connected to the internet or cellular data. The way the streaming service works is that the listener has the ability to choose any available song and the interface will then create a playlist or “radio station” for the listener based on the original song choice. All songs in this radio station are considered, by Pandoras interface, to be similar to the original song. Listeners are able to create up to 100 radio stations per Pandora account.

Pandora contains a free option, which has ads, and a premium option, which has no ads and allows for offline listening of up to 4 of their stations (Pandora Media, 2019a).

Spotify, SoundCloud, which were both created in 2007, and Apple Music, which was created in 2015, provide their listeners with both a catalog interface and a radio-station interface. Just like Pandora, these streaming services can be accessed by any device that is able to download the application and is connected to the internet or cellular data. By having both a catalogue interface and a radio-station interface, these streaming services provide the listener with the opportunity to pick and choose which songs or albums they want to listen to, whether they'd like to listen to a generated radio station, or whether they'd like to make their own playlist. All three of these platforms have a free option, which contain ads, and a premium or pro option, which has no ads and allows for offline listening. Listeners of Apple Music and SoundCloud are able to create as many radio stations and playlists as they want. Listeners of Spotify are only able to create up to 15 playlists, unless they have the premium option which then allows them to create as many radio stations and playlists as they want. Additionally, all four of these platforms provide rising artists with the opportunity to publish their work on the platform (Apple Inc., 2020; Pandora Media, 2019a; SoundCloud.com, 2017; Spotify AB, 2020).

### **Research Question: The Answer is with the People**

The question I aim to address is: how are current legal and free music streaming services are affecting the music industry and impacting the societal norms surrounding acquiring and sharing music? The methods used to analyze this research question include a case study comparison between Spotify, Apple Music, SoundCloud, and Pandora, which are four different legal and free music streaming services available in the U.S. In this context, the term “free”

means that listeners can create an account and access the service without having to directly pay for those services. The users are subjected to advertisements, however, which supports the revenue model for the firms. Services that require payment, but provide a free trial period were not considered. In order to determine which legal and free music streaming services were going to be utilized in my comparison, I first narrowed it down to services that had a free option. Then, I removed all radio streaming services, like iHeartRadio or SiriusXM, because they are traditionally radio stations that now operate on an online platform. So, I selected from non-radio music streaming services. My next step was removing all music streaming services that were not commonly used or recommended, like Earbits and Anghami. In order to determine this, I compared 3 different “Best Free Online Music Streaming Platform” lists and kept the most common services listed (Germain, 2019; Hall and Kennenmer, 2020; Wilson, 2020). Finally, I then compared the monthly active users (MAUs) and subscribers of each remaining service and chose the four platforms with the highest MAUs (see Figure 1).

In order to fully determine how these four streaming services impact the music industry and the societal norm of acquiring and sharing music, I created a survey and collected responses from 108 individuals ranging from ages 14 to 66. 67.6% of those individuals were female, 30.6% were male, 0.9% were nonbinary, and 0.9% preferred not to answer. The purpose of collecting responses from 108 individuals, ranging in age and gender, is because music is a universal resource that impacts everyone. If only one age group of individuals was targeted, only a part of the story would be shared. Additionally, I wanted to see if music streaming services were popular among all age ranges or only some. This survey was conducted through google forms, which is an easy and straight-forward survey tool that everyone will be comfortable using. It contained a variety of questions that focused on what music listening devices the individual has



used, what music streaming services, if any, the individual currently uses, how the individual shares music, and how the individual has shared music with each new music listening device. Furthermore, I also looked into each streaming services playlist capability and default settings. A playlist is known as a list that is used to organize and store an individual's music collection. Therefore, it felt beneficial to look at how playlists were impacting and changing an individual's sharing ability and patterns.

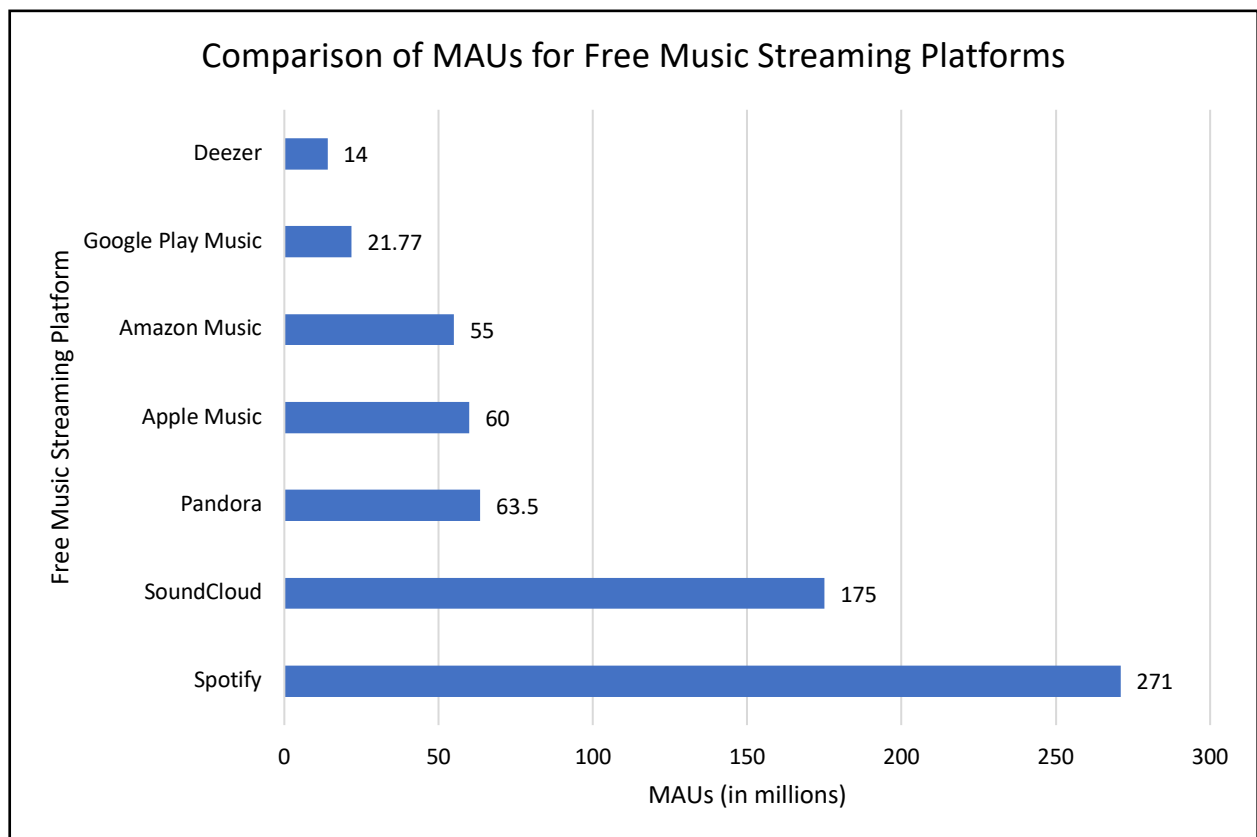


Figure 1 displays a comparison of MAUs for the remaining free music streaming platforms (Germain, 2019; Hall and Kennenmer, 2020; Music:)ally, 2020; Wilson, 2020).

Lastly, for each case study, each service's "terms and conditions of use" policy was compared and I looked into any lawsuits that involve one of the four music streaming platforms and the music industry. These lawsuits were found by conducting a Google search to generate a list of 2-5 different possible lawsuits for each streaming service. I then used the framework of co-production to determine two things. First, I looked at how the technological changes in music-listening devices and the lawsuits that involved each music streaming platform impacted the "terms and conditions of use" policies for each streaming service. Second, I looked at how these streaming services impacted the societal norm surrounding sharing music.

### **Results: The People and Data have Spoken**

The introduction of legal and free music streaming services not only changed how listeners interact with music, but also changed the societal norms surrounding the sharing of music. The survey conducted indicates that out of 108 individuals all of them use a music streaming service as their main method of acquiring and listening to music. Therefore, they can all be considered listeners. This data is consistent with data collected by the International Federation of the Phonographic Industry (IFPI), a not-for-profit international organization that represents the interests of the recording industry worldwide, which states that 89% of music consumers ages 16-64 listen to music through streaming services (IFPI, 2019). Furthermore, over 60% of survey participants stated that at least a couple, if not all, of their playlists are public. This indicates that legal and free music streaming services have not only impacted and increased the amount of music shared by creating a new method of sharing music known as the public playlist, but have also created a new method of sharing known as unconscious sharing. Unconscious sharing is defined as sharing without a purpose. This means that while you may be

sharing something, you either have no idea you are doing so or you don't really mean to do so, but it happens automatically. The most common form of unconscious sharing is the public playlist.

Legal and free music streaming services have also had a large impact on how the music industry operates. While, Spotify, SoundCloud, Apple Music, and Pandora have decreased the amount of user piracy that occurs from listeners, copyright infringement still remains a serious threat. Copyright infringement occurs when work that is protected by copyright law is being used without permission and is commonly conducted, according to the music industry, by streaming services (U.S. Copyright Office, 2020). In the last decade alone, Spotify has been sued for copyright infringement the most, then Apple Music, Pandora, and finally SoundCloud. Not only do these lawsuits cost the music industry millions of dollars, but they, alongside with listener piracy and stream ripping, also costs the music industry \$2.7 billion in earnings annually (Siwek, 2007). Stream ripping is a method of piracy that was created by legal and free music streaming services and occurs when listeners access the premium or pro version of a streaming service without paying. In addition to copyright infringement and stream ripping, the music industry also loses money due to free subscriptions. While paid subscriptions to streaming services do help the music industry make money, the free subscriptions reduce the revenue the music industry gains by around 11% (Wlömert and Papies, 2016). This means that while unexpected, the music industry is actually losing money due to legal and free streaming services rather than gaining money.

## *Sharing*

Even though 100% of survey participants, and 89% of those surveyed by other studies, use music streaming services as their main method of acquiring and listening to music, not all streaming services are equal (IFPI, 2019). The survey conducted indicated that 68.5% of participants use Spotify, 26.9% of them use Pandora, 25.9% of them use Apple Music, and only 10.2% of them use Soundcloud for their music streaming needs. This outcome was slightly unexpected due to the fact that out of those four streaming services, SoundCloud has the second highest MAUs with around 175 million users (music:)ally, 2020). However, this outcome can be attributed to the fact that the majority of SoundCloud users are between the ages of 18-24 and 63% of their audience is male, while the majority of the survey participants are outside this age-range and 67.6% of them were females (hitwise, 2017).

The survey also indicated that while it is easy to share music on any music streaming platform, not just Spotify, Apple Music, SoundCloud or Pandora, the majority of the listeners (66.7%) do not consciously make the decision to share music very often or at all. Furthermore, the survey also indicated that sharing music was not a priority during the eras of Napster, CDs, or cassette tapes. Therefore, I believe that the societal norm of sharing music has steadily decreased since music listening devices have become privatized. Even though the societal norm of sharing music has decreased, the new societal norm of unconscious sharing, that was developed alongside and in response to the creation of free and legal streaming services, has steadily increased.

Unconscious sharing is a new form of sharing that allows two individuals to partake in a “sharing moment”, where one is sharing something with the other, and never know that it happened. This new type of sharing made itself known when 78.7% of survey participants

indicated that they made playlists, but only 30.6% of them knew if all of their playlists were private. Since the default setting for a playlist on Spotify and SoundCloud is public, this means, that whether they meant to or not, 69.4% of survey participants were sharing their playlists with the other listeners on their streaming service. For individuals using Spotify and SoundCloud, this means that they were now *unconsciously* sharing music with around 446 million other people (music:)ally, 2020). This new method of sharing allows Spotify and SoundCloud to connect up to 446 million people without any effort from the user at all, which drastically changes how we, as humans, interact with music and each other in our day-to-day lives. No information for the default setting for playlists on Apple Music or Pandora could be found, therefore no conclusions were made with concern to these two streaming platforms.

### *Impact on the Music Industry*

While the introduction of legal and free music streaming services did reduce the amount of “old” piracy that occurs from listeners, it did help develop a “new” piracy. Before streaming services, piracy took the form of downloading music without the consent of the artist or recording industry and using that music any way you desired. Therefore, when streaming services were developed, they each included a section in their “terms and conditions of use” policy outlining exactly how the user can use the service and what rights the user has to the content found on the service (see Table 1). Spotify has the most expansive “terms and conditions of use” policy when it comes to piracy, followed closely by Pandora, then SoundCloud, then Apple Music (Apple Inc., 2019; Pandora Media, 2019b; SoundCloud.com, 2018; Spotify AB, 2019). Apple Music, specifically, barely mentions piracy. This is due to the fact that the “terms and conditions of use” policy for Apple Music is not specific for Apple Music, but for Apple in general. This means that the

“terms and conditions of use” policy outlines the terms and conditions of use for all Apple products, not just Apple Music (Apple Inc, 2019). However, expansive or not, none of the streaming services were prepared for the primary form of music pirating to transform from using unlicensed methods to obtain and listen to music to stream ripping. In 2019 alone, 23% of individuals who used music streaming services stated that they used an illegal stream ripping service for access. This, according to each platforms current “terms and conditions of use” policy, is allowed, which means that the platforms are actually enabling this piracy. Furthermore, 27% of all individuals, not only those that utilize streaming services, still use unlicensed methods to obtain and listen to music (IFPI, 2019). So instead of reducing the amount of piracy that occurred, like the music industry wanted, free and legal music streaming services actually created a new form of piracy. Table 1, below, displays an excerpt from the “terms and conditions” policy issued by the four streaming service to its users (Apple Inc., 2019; Pandora Media, 2019b; SoundCloud.com, 2018; Spotify AB, 2019).

**Table 1.** “Terms and Conditions” Policy for Spotify, Apple Music, SoundCloud, and Pandora.

<b>Spotify</b>	"You promise and agree that you are using the Spotify Service and Content for your own personal, non-commercial use and that you will not redistribute or transfer the Spotify Service or the Content."
<b>Apple Music</b>	"You may use the Services and Content only for personal, noncommercial purposes (except as set forth in the App Store Content section below). Apple’s delivery of Content does not transfer any commercial or promotional use rights to you, and does not constitute a grant or waiver of any rights of the copyright owners."
<b>SoundCloud</b>	"SoundCloud grants you a limited, personal, non-exclusive, revocable, non-assignable and non-transferable right and license to use the Platform in order to view Content uploaded"
<b>Pandora</b>	"Pandora hereby grants to you a limited, revocable, non-exclusive, non-transferable, non-sublicensable license to access the Services in an Authorized Jurisdiction, and otherwise view and use the Services to the extent permitted by its intended functionality, for your own individual personal, non-commercial purposes and not for the sublicense to or use by third parties."

The music industry not only has to combat piracy from users, but also from the streaming services themselves. In the last decade alone, at least five lawsuits have been filed against Spotify, at least three against Apple Music and Pandora, and at least two against SoundCloud claiming that the streaming services are partaking in copyright infringement, lack proper licensing, and are violating the Music Modernization Act (See Table 2). These lawsuits do not only cost the music industry millions of dollars in cost, but also a lot of time and man-power. Furthermore, the majority of the time the outcome of each lawsuit is not favorable for the music industry (Siwek, 2007). For example, the lawsuit between Spotify, Pandora, and Wixen Music Publishing lasted a little over a year before the case was dismissed. This means that Wixen Music Publishing, and all of the artists it represents, not only lost money due to the lawsuit, but also lost the \$1.6 billion they were expecting to receive because of the lawsuit (Deahl, 2018). The lawsuit against Apple Music, Spotify, & SoundCloud issued by the Pro Music Rights organization in early 2019 has still not reached a conclusion and there is no information stating that they are close to one (Stassen, 2020). Therefore, these lawsuits are just another way that free and legal music streaming services are negatively impacting the music industry and helping them lose money. Specific information with concern to the cost of each lawsuit for the music industry or for the streaming service was not found. Additionally, concrete information as to which streaming service was sued most was also not found.

**Table 2.** Example Lawsuits Filed against Spotify, Apple Music, SoundCloud, and Pandora.

<b>Lawsuit Filed by</b>	<b>Against</b>	<b>Lawsuit Filed For</b>
Wixen Music Publishing	Spotify, Pandora	Lack of proper licensing
Bob Gaudio, artist	Spotify	Copyright Infringement
Bluewater Music Services Corporation	Spotify	Copyright Infringement
Eight Mile Style, Eminem’s Publisher	Spotify	Copyright Infringement
Pro Music Rights	Spotify, Apple Music, & SoundCloud	Violation of U.S Copyright Act
Bryan Eich, artist	Apple Music	Unpaid royalties
Four Jays Music Company	Apple Music	Copyright Infringement
PRS for Music	SoundCloud	Lack of proper licensing and unpaid royalties
The Turtle’s Music	Pandora	Copyright Infringement
Harold Arlen, artist	Pandora, Apple Music	Lack of proper licensing

Table 2 displays a small list of lawsuits filed against Spotify, Apple Music, SoundCloud, and Pandora in the last decade having to do with copyright infringement, lack of proper licensing, and violation of the Music Modernization Act to display the additional burden placed on the music industry due to the creation of these services (Deahl, 2018; Gardner, 2019; Jahner, 2019; Law360, 2019; Porter, 2019; Robertson, 2019; Sanchez, 2018; Sanchez, 2019; Sisario, 2015; Stassen, 2020; Statt, 2019).

With concern to revenue, lawsuits and piracy are not the only reason legal and free music streaming services are making the music industry lose money. Unbeknown to most, the revenue that the music industry receives from free and legal streaming services primarily comes from the paid subscriptions. For example, both Spotify and Apple music pay 70% of the revenue



generated from their paid subscriptions towards the music industry. Free subscriptions make little to no money for the music industry because the streaming platform gets revenue from the advertisements that are found on these free subscriptions and the music industry does not. Furthermore, paid subscriptions that are generated due to stream ripping also do not provide the music industry with any money since the streaming service also does not receive money from these users (Jones, 2019). Therefore, while unexpected, the overall impact of free and legal music streaming services on the music industry is negative. Information with concern to Pandora and SoundCloud was not available.

## **Discussion**

After conducting this research, one thing is abundantly clear and that is that technology and society co-produce one another. The creation of legal and free music streaming services arose out of a need to successfully replace the sharing platforms such as Napster, which curtailed to the societal norm of piracy. This is why each “terms and conditions of use” policy for the streaming platforms reviewed contains a section that outlines, in varying levels of specificity, what is considered piracy, what is considered copyright infringement, what rights each user is granted by the survey, and what actions can be taken against the user if they violate the policy. However, while this technological shift did reduce the number of individuals participating in the societal norm of piracy, a new societal norm of stream ripping was being developed as this technology continued to gain popularity. This development of stream ripping means that each streaming service and their “terms and conditions of use” policy are no longer up-to-date, meaning that since a new societal norm has developed, a technological change and policy update is also coming soon in response to and because of it.

The societal norm of piracy and stream ripping is not the only societal change to occur alongside and in response to the technological progress of music-listening devices. The largest change that has occurred is to the societal norm of sharing. Individuals are no longer participating in active sharing. Sharing has become an absentminded action due to the creation of the public playlists, which allows listeners to connect with one another without even trying to. This technological progress has completely changed how we, as listeners, interact with music and each other in our day-to-day lives. Before legal and free music streaming services, no one could even imagine sharing something and interacting with at least 271 million other people, but today it is just second nature for Spotify users. The technological progress that led us to legal and free music streaming services has also created a society where unconscious sharing is more frequent than normal sharing.

One limitation of this research was in the survey conducted. While the survey provided basic knowledge of each participants music history and listening patterns, it did not go as in-depth as I would have liked. In order to gather a large number of participants, the survey had to be quick and easy to complete. Therefore, a lot of questions that were originally included had to be removed. If it were to be conducted again, the survey would change in so far as some of the background information collected would be removed and more questions would be included that allowed the participants to explain their responses. The purpose of making this change is because a lot of the information collected in the music history background portion of the survey ended up not being used.

Another limitation of the research was that it was very difficult to find information. From trying to determine the history of sharing to trying to determine the default settings for a playlist on all four streaming platforms, a lot was not available. While this limitation may never be

completely eradicated, the effects of it on this research could be reduced by increasing the amount of survey takers, which would increase the amount of sharing history known, and by expanding my research outside of Google, by calling each streaming service directly to ask specific questions.

Lastly, this research was very limited with concern to gathering information on the new form of piracy created by legal and free streaming services. This is due to the fact that I didn't know this form of piracy existed until very recently, so I was unable to properly include it within my research. If I had learned about this new form of piracy sooner, I would have included questions about it in my survey and I would have done more research to try and understand how it worked, what applications are most commonly used, and how the music industry is responding to it.

The biggest takeaway received from this research is that societal norms and culture must play a role when designing, creating, or adapting any technology. No longer should engineers think of technology as something outside of society, when it is fully engrained and impacting to society. Not only does technology impact society, but society impacts technology and engineers must take note of this and create with this in mind. The knowledge I have learned from my research will allow me to be more conscious of how technology impacts our society and how society impacts technology when it comes my engineering practice. Additionally, it will allow me to pass this knowledge on to the engineers around me.

## **Conclusion**

While this study provides valuable information, it is important that this research be continued in order to better understand and validate the conclusions that were made. More

analysis and further research needs to occur on unconscious sharing in order to better understand what it is and what impact it is having on our society. Furthermore, more information needs to be collected on the tension between the music industry and legal and free streaming services if a music listening option that is beneficial to both listener and industry is to be found. Lastly, to better understand how the legal and free streaming services impact society, more information needs to be collected on the new societal norm of stream ripping. If the foundations of stream ripping can be understood, the music industry and the streaming services may be able to combat it better and prevent another unwanted form of piracy from arising.

By understanding that something as simple as privatizing a music listening device can have such a profound impact on how individuals interact with one-another in the modern world displays how interwoven society and technology actually are. This research displayed that there is no change too small when it comes to how it will impact technological progress and societal norms in the future. Everything has an impact and engineers, but also the greater public, must be made aware of this impact and take it into consideration when making decisions surrounding technology or culture. Only by being aware of these unexpected consequences can engineers begin to develop technologies that reduce piracy, positively impact the music industry and the listener, and prioritize sharing.

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