Discovery and User Engagement in Music Platforms: An Experimental Investigation
Emergent Research Forum Paper

Shadi Janansefat
University of Pittsburgh
Shadi.j@pitt.edu

Abstract

Music streaming platforms facilitate the interactions between consumers and artists, and they connect the two sides of the market. The platform markets literature suggests that the success of platforms depends on the volume of consumers’ usage and level of engagement. To this end, music streaming platforms take actions to promote music discovery with the view that consumers’ music discovery activities lead to higher usage and engagement. In this research-in-progress paper, we investigate how informational signals (e.g. popularity and peer ratings) impact users’ music discovery processes. We build on insights from the information search, peer influence, and decision-making literatures to examine the underlying mechanisms of the music discovery process. We hypothesize that informational signals, both in content and variance attributes, would increase a user’s music consumption and engagement with a music platform. We enumerate an experiment design to test our hypotheses.

Keywords
Platforms, music streaming, music discovery, user engagement, stopping rules.

Introduction

Digital music consumption has been transformed in the recent years by the emergence of music streaming platforms such as Spotify and Apple Music. Like other platforms, the mission of a music streaming platform is to facilitate the interactions between its participants: the music consumers and the music artists. On the music streaming platforms, music consumers can browse and search catalogs, gain access to a wide variety of songs, and “stream” music they like. On the other side of these platforms are the music artists, relying on the platform to reach out to a bigger audience and make a strong fan base. By connecting the two sides of this market, music streaming platforms are now the music industry’s fastest growing revenue source.

In the music streaming marketplace, multiple platforms are competing to attract users and gain revenue. The number of subscribers is commonly used to compare the success of these platforms. Spotify has the highest number of subscribers with 40 million subscribed users, trailed by Apple Music with 20 million subscribers. Further, it is also important to consider the extent to which those users are engaged with the platform (Constine 2015). User engagement can be measured by the number of hours spent on the platform and the number of playlists created by the users (Statista 2013). Facilitating discovery of new music is also very important to keep users engaged with the platform (Admirand 2015). Music discovery occurs when a music listener is uncertain about the music she wants to listen to, and browses an available music collection to discover new music (Bogdanov et al. 2010). Engaging in music discovery entails higher usage and engagement on the platform. Of course, the diversity of songs would also depend on the diversity of the available collections on the platform. Recognizing the importance of music discovery, music streaming platforms have taken action to facilitate the task. For example, Spotify offers its users a personalized weekly playlist, “Discover Weekly”, to bring new discoveries matching the users’ listening profiles.

Music discovery can be conceptualized as an information search and decision-making process, and facilitating it would require a focus on the underlying mechanisms. Information search occurs for each song a user encounters, and a decision is made whether to like the song (and add it to a playlist), or pass on it and move to the next one. This process is similar to information search when making a purchase for a
product, differing in the fact that multiple songs can be selected. Informational signals such as ratings and reviews are found to influence the search process and purchase decisions (Svedic 2015). Such signals may include ratings and reviews from peers, as peer influence motivates individuals to try or purchase new products. When involved in information search, consumers use cognitive stopping rules to examine the sufficiency of the collected information to terminate the search and make a decision. Further, the attributes of the informational signals influence the use of the stopping rules (Browne et al. 2007; Nickles et al. 1995). Therefore, any attempt at facilitating the music discovery process should consider both the music catalog content and the nature of the available informational signals for a consumer.

An important gap in our understanding about the influence of the informational signals is with regards to the variance of these signals. The set of available informational signals on an item can be alternating in support of different conclusions (i.e. conflicting signals) or unanimous in support of one conclusion (i.e. aligned signals) (Nickles et al. 1995). For example, Amazon.com presents to its shoppers a side-by-side comparison of the most positive review and the most critical review of a product, each supporting a different conclusion (buying vs. skipping), which depicts the variance in users’ reviews. The variance in user ratings has an informational role: low variance products are inferred to be mainstream; high variance products are inferred to be the niche ones (Sun 2012). In the music context, discovering music is not about finding mainstream songs, but rather is about finding a unique song that matches user’s taste even though there may be a variance among other people’s opinions of the song. Furthermore, exposing users to such a variance may have other beneficial effects for the platform too. When there is variance in available pieces of information about an item, users tend to collect more information before enacting stopping rules (Nickles et al. 1995). For the platforms, it translates to users checking out more information available on the artist or sampling the song. To this end, we aim to understand how conflicting informational signals can enhance the music discovery process and lead to more user engagement. We further take into consideration the moderating role of the characteristics of the music collection used as the starting point of the discovery process. Accordingly, this study aims to address the following research questions:

1) How do the aligned and conflicting informational signals influence discovery and user engagement on a music streaming platform?

2) How do the characteristics of the music collection offered as a starting point for a search influence the user’s music discovery process?

**Theoretical Development**

This study draws from the literature on the digital platforms to shed light on user engagement with a music streaming platform, and it relies on insights from the literature on the information search and decision-making to examine users’ music discovery processes.

**Platform Markets**

A platform market is characterized by the interaction of at least two sides of a market (the complementor and the consumer) through an intermediary (i.e. the platform) (Katz and Shapiro 1985; Rochet and Tirole 2003). In recent years and with wide spread adoption of the Internet, the platform business model has been widely adopted to enable the interaction between market participants over the Internet, such as by digital content providers (enabling interaction between content owners and content consumers). For example, the music streaming platforms allow music consumers to stream music without making a purchase for the copy of the music. On the other side of the platforms are the music artists who recognize the value of making their music available on the platforms to get their music to the fans (Maftei et al. 2016).

To achieve success, it is important to get customers and complementors to both adopt and continuously use the platform. This is due to the presence of indirect network effects on platforms, where the gain for an agent on one side is commensurate with the number of agents on the other side (Farrell and Klemperer 2007; Katz and Shapiro 1985). On the music streaming platforms, the value for the music artists lies in how much the consumers use a platform rather than just the user registration numbers. The more time users spend on the platform and the more songs they listen to, the better off are the music authors. Additionally, it would create an added value for the artists if the music consumers diversify their listening habits. Therefore, it is vital for the music streaming platforms to encourage more usage and user engagement.
Another successful competing strategy for a platform is to create a switching cost for its consumers. Consumers incur a switching cost if they have made an investment in the current platform but they wish to switch. Categories of switching costs include transaction cost, cost of learning the new brand, and the psychological cost incurred due to brand-loyalty (Klemperer 1995). The switching cost is present for the consumers of music streaming platforms, and once they commit to a platform, they face switching costs (Eisenmann et al. 2006). The possible sources of switching costs are re-creating playlists and learning cost of the new platform. Prior works in the context of online service providers show that high volume of website usage is negatively associated with switching behavior (Chen and Hitt 2002). Similarly, encouraging high volume of usage is crucial for the music streaming platforms to reduce the switching behavior.

Recognizing the importance of encouraging user engagement and higher volume of usage, music streaming platforms encourage music discovery, as music discovery is considered similar to brand engagement. To facilitate music discovery, different strategies are followed such as using human curation of playlists, proprietary algorithms, and integration with social media (Harding 2015). These methods result in curated playlists that serve as the starting point for the music discovery. However, understanding the underlying process of music discovery and examining the consumer’s information search and decision-making process is the key to facilitate music discovery beyond that starting point.

**Information Search and Decision-Making**

The task of music discovery often starts with browsing an available music collection to find interesting and novel songs relevant to consumers’ musical preferences (Bogdanov et al. 2010). In this process, the available information items for each song are examined before a decision is made to either select the song or skip it. This process is inherent to any information search and decision-making task, where the criteria for the termination of the process is the decision maker’s assessment that enough information has been obtained for reaching a conclusion. The underlying mechanism for arriving at this judgment is the use of cognitive stopping rules to evaluate whether sufficient information has been collected to draw a conclusion (Nickles et al. 1995). These stopping rules are the mental list rule, the magnitude threshold rule, the difference threshold rule, and the representational stability rule. Of particular interest to our study is the magnitude threshold rule, in which “the person has a cumulative amount of information that s/he needs before s/he will stop searching”. In the tasks such as music discovery with high information load and complexity where the decision is made based on the decision maker’s “sense”, the magnitude threshold stopping rule is found to be the most frequently used to determine the end of the search process (Browne et al. 2007).

In the information search and decision-making process, the content and nature of the available informational signals influence when a certain stopping rule is invoked. For example, when informational signals are alternating in support of different conclusions (i.e. conflicting signals) rather than unanimously supporting one conclusion (i.e. aligned signals), passing the magnitude threshold requires obtaining more information (Nickles et al. 1995). Hence, if the available informational signals for a certain song are conflicting (e.g. platform users liking a song but a few friends liking a song) rather than aligned (e.g. both platform users and friends liking a song), making a conclusion on the song requires gathering more information. The additional information can be collected by knowing more about the artist or sampling the song. Further, prior works show that the underlying message conveyed by such variance in opinions is that this song is not mainstream but rather a niche song (Sun 2012). As the goal of music discovery is often to go beyond the mainstream “top 50” songs, the prospect of finding a niche and unique song is alluring to consumers. At the platform level, users obtaining more information means more time spent on the platform and higher user engagement. Therefore, we hypothesize that:

*H1: When users are exposed to conflicting informational signals, their listening sessions are longer.

H2: When users are exposed to conflicting informational signals, they sample more songs.

Further, adoption of music streaming is found to increase the discovery of new music, as well as the variety in music consumption measured by number of distinct artists and genres. This is because variety is free at the margin with streaming services where there is no ownership fee that can inhibit acquiring variety (Datta et al. 2016). Similarly, when users are exposed to conflicting informational signals and they sample more songs, they are further exploiting the possibility of consuming more diverse music as offered by the music
streaming platforms. Therefore, they are more likely to discover a more diverse set of songs. Additionally, it is crucial to consider the diversity of the initial music collection as the starting point of the discovery and account for its moderating role. As a result, we hypothesize that:

**H3:** When users are exposed to conflicting informational signals, they discover more diverse songs. The increase is more substantial when the starting point music collection is more diverse.

**Peer influence**

To examine which informational signals can better facilitate music discovery, we consult the literature on peer influence. Prior research has shown the importance of peer influence in motivating individuals to try or purchase new products and services (Christophe Van den Bulte and Gary L. Lilien 2001; Iyengar et al. 2015). Results of a natural field experiment on adoption of online music services show that peer influence causes a 60% increase in the odds of subscribing to the music service (Bapna and Umyarov 2015). The peer influence is very important in the music context since the consumption of music is very much social and cultural, leading to socio-network effects on music consumption (Molteni and Ordanini 2003). To this end, we exploit the popularity among platform consumers and the consumer’s peers’ opinions for the song as informational signals. We design an experiment and manipulate these informational signals to create conflicting and aligned signals and evaluate how exposure to such signals impacts user’s behavior.

**Research Design**

**Experimental procedure**

Subjects are first asked to fill in a questionnaire about their demographics and to name (up to) ten friends (peers) whose taste in music they follow. To test our hypotheses, we have developed a platform that contains a set of 150 music tracks (song list), showing 10 tracks at a time, with navigation buttons available. These songs are randomly selected from “Travel” playlists on a reputable music streaming platform. Each track is accompanied with track information (artist, duration, song popularity, and peers’ opinions) as well as a 30-second sample of the track. The song popularity is randomly assigned to each song (from 1 to 100) and is described to users as a metric that shows the popularity of the song on the platform. The genre of the songs on the song list and the peers’ opinions for each song are subject to the experimental manipulation, respectively manipulating diversity of song list and variance of informational signals. Opinions of peers are presented using thumbs-up or thumbs-down icons. On hover over the icons, randomly selected name(s) of the peers who like or dislike a track becomes available. The subjects are instructed to go through the song list, with the goal of putting together a one-hour playlist of songs to listen to on an upcoming road trip they will be taking alone. We measure the time spent on the experimental task and the number of distinct artists and genres in the created playlist as the dependent variables of interest.

**Design and Manipulation**

The study employs a 2 (diversity of song list) X 3 (exposure to informational signals) between-subject design. We manipulate the diversity measured as the number of genres in the song list, and create a low diversity vs. a high diversity song list. To manipulate exposure, there are three groups. The first group is provided with the platform popularity (which is randomly assigned), but not the peers’ opinions. The second group is provided with the platform popularity and the peers’ opinions. For this group, peers’ opinions and the platform popularity are aligned (i.e. high platform popularity and thumbs up, low platform popularity and thumbs down). The third group is provided with the platform popularity and the peers’ opinions, but the two signals are conflicting (i.e. low platform popularity and thumbs up, high platform popularity and thumbs down).

**Conclusion and Future Research**

This research-in-progress study investigates how users discover music on streaming platforms by examining the underlying information search and decision-making processes of users. Music streaming platforms rely heavily on promoting music discovery to get their users engage more with the platform and to generate high volume of usage. This study builds on the literature on information search, peer influence, and decision-making to propose design recommendations that lead to higher levels of user engagement in...
music streaming platforms. The next step in this study is to execute the experiment steps and collect data to test our hypotheses. The study’s overarching goal is to shed light on how music discovery can be better facilitated by considering design factors that judiciously present available informational signals to users of music streaming platforms.

REFERENCES