Closing the gap: Understanding the perceptual differences between generations regarding music streaming technology

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Abstract

In 2015, the recording industry saw its first measurable year-on-year growth in twenty years. Digital revenues contributed to this growth as they now account for 54 percent of the global recorded music market. However, the true driving force behind the industry's change in fortune was music streaming technology. Although music streaming has become the preferred method for recorded music consumption, there appears to be generational differences in the utilisation rate of the technology. The study used a modified version of the Technology Acceptance Model (TAM) to investigate the differences in behavioural intention regarding music streaming technology between digital natives and digital immigrants. Results showed statistically significant differences between digital natives and digital immigrants. Although the study revealed a difference between digital natives and digital immigrants, the differences were small. Both groups scored high on measures of the perceived usefulness and the perceived ease of use regarding music streaming technology thereby indicating that other factors may also contribute to the differences in utilisation rates.

Keywords: music streaming, digital native, digital immigrant, Millennials, Generation Z, recording industry, behavioural intention, Technology Acceptance Model (TAM)

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1 Introduction

Fuelled by advances in technology and evolving consumer preferences, turnover and profits in the global recording industry began their steady decline in 2005 (International Federation of the Phonographic Industry, 2019). This erosion of profits was created by a decline in the sales of physical and digital albums and tracks along with changing music consumption preferences. In the United States, during the period between the first quarter of 2017 and the fourth quarter of 2018, the sale of physical albums declined by 33.3 percent, digital albums by 25.3 percent and digital tracks by 27.7 percent (Recording Industry Association of America 2019). However, the global music market achieved a crucial milestone in 2015 as digital formats became the primary revenue stream for recorded music, overtaking sales of physical formats (IFPI 2016). Digital revenues rose 10.2 percent to US $6.7 billion in 2015, helping to offset the falling sales of CDs and leading to the industry's first measurable year-on-year growth in twenty years. Music streaming technology was the driving force behind this growth.

2 Music streaming

The popularity of music streaming as the preferred method for music consumption has exploded since 2011. In 2018, music streaming helped the global recorded music market grow by 9.7 percent. This was the fourth consecutive year of global growth and the highest rate of growth since 1997 (IFPI 2019). It was also the first time since 1999 that U.S. music revenues grew materially for more than two years in a row. Digital revenues now account for 58.9 percent of the global recorded music market. Total streaming revenues grew by 34 percent and now account for 46.9 percent of the global recorded music industry's total revenue. Paid streaming revenues also increased by 32.9 percent. By the end of 2018, there were 255 million users of paid subscription accounts globally, with 79 million having been added during the year (IFPI 2019).

The U.S. recorded music industry is expected to surpass $18 billion by 2020 with $16 billion coming from streaming services and live music

(PricewaterhouseCoopers 2016). Although total digital download and physical unit sales declined by 26 percent and 33.3 percent respectively, streaming revenues grew by 30.1 percent to $7.4 billion in 2018 (RIAA 2019). Digital content creators currently have considerably more access to information, technology and the distribution chain. Furthermore, barriers of entry into recording industry have been significantly reduced and thus new opportunities have been created (Renard et al. 2013). The first half of 2019 witnessed a six-month record of over 507 billion on-demand streams in the United States (Nielsen 2019). Singles and albums that span a wide array of genres, moods and even languages were the catalysts behind the impressive 2019 milestone. This milestone serves as an indicator of changing music consumption preferences. Leading the way, as the primary users of music streaming services, are Generation Z and Millennials (Fluent 2017; Nielsen 2017a).

3 Digital natives

There have been varying definitions for Generation Z and Millennials. Furthermore, depending on what definitions are used to identify start and end birth years for each generational category, cross-over may occur between older Generation Z and younger Millennials. For the purposes of this article, definitions outlined by Cord et al. and Tapscott are used. Millennials, also referred to as Generation Y, are individuals born between 1980-1990 and the first generation of digital natives (Cord et al. 2015). The term digital native refers to a generational cohort of consumers based on their fixed product of early development - i.e., year of birth after 1980 - and therein assumed difference in comparison to older generations because of their assumed exposure, experience, and/or emersion with digital technology (Jones et al. 2010). Based on the preceding definition, members of Generation Z are also considered digital natives and are defined as individuals born between the mid-1990s to the early 2010s and aged from 9 to 24 years old as of 2019 (Tapscott 2009).

Unlike Generation Z and Millennials, the generations preceding them are considered digital immigrants. Digital immigrants are individuals born before 1980 who have learnt to use new technologies, but still maintain their connections to the pre-digital past (Prensky 2001). Therefore, the nature of technology usage and the acceptance of technology between digital natives and digital immigrants are presumably radically different (Gu et al. 2012). Digital natives have a distinctive set of abilities, preferences, and attitudes that set them apart from previous generations (Rideout et al. 2010). In 2018, younger Americans were found to be the 'power' users of music streaming services in the United States (Nielsen 2017a). These findings support Gu et al.'s (2012) research by highlighting the differences that exist in relation to music streaming technology as digital natives stream music at a much higher rate than digital immigrants. It also appears to be their preferred method of music consumption. If presented with only one way to listen to music, 50 percent of individuals between the ages of 16 to 24 would choose audio streaming (IFPI 2018). Furthermore, a survey by Fluent, LLC (2017) found that 92 percent of Generation Z and 91 percent of Millennials used music streaming services compared to the lower 77 percent of individuals aged 35 years and older. Individuals aged 18 to 34 also use multiple streaming apps at a rate of 57 percent, while individuals 35 years and older use multiple streaming apps at a rate of 39 percent (Nielsen 2017a). Therefore, it appears that age is one of the main factors affecting an individual's music consumption behaviour (Chamorro-Premuzic et al. 2010; ter Bogt et al. 2003).

4 Behavioural intention

A substantial amount of research indicates music consumption behaviour has a psychological basis. The theoretical framework guiding much of the research in this area is that music reflects and reinforces people's psychological, biological, and social needs (Rentfrow 2012; Chamorro-Premuzic et al. 2010; Laukka 2007; Tarrant et al. 2000). One of the theories used to assess the link between social norms and behavioural inten-

tion is the Theory of Reasoned Action (TRA). This theory proposes that behaviour is determined by the behavioural intention to engage in the behaviour (Ajzen & Fishbein 1980; Fishbein & Ajzen 1975). Another theory used to assess the motivational forces behind behaviour is The Theory Planned of Behaviour (TPB). It is based on the premise that behavioural intention is assumed to summarize the motivational forces influencing the enactment of behaviour, indicating how much effort people are willing to exert in the planning of behavioural enactment (Rise et al. 2003). Many models for measuring behavioural intention have been derived from TRA and TPB. The Technology Acceptance Model (TAM) is one such model. This alternative model performs well against TPB (Amoroso & Gardner 2004). TAM theorizes that an individual's behavioural intention to use technology is determined by two beliefs: perceived usefulness and perceived ease of use. It has become a well-established and robust model for predicting user acceptance (Amoroso & Gardner 2004).

A recent study by Lonsdale & North (2011) examined music consumption in relation to age. They discovered that people over 30 years-old regard music as less important when compared with adolescents. Although this research on musical attitudes and age highlights the fact that music is very important during adolescence, it is unclear whether it remains as important as individuals grow older. Furthermore, the current data on music streaming technology indicates a higher usage rate among adolescents (Fluent 2017; Nielsen 2017a). A study by Cuadrado-García et al. (2019) used fuzzy-set qualitative comparative analysis to examine whether demographics (age and gender), music genres, devices used to listen to music (mobile vs. non-mobile), and perceptions about negative consequences of music downloading (digital piracy) can characterize the way individuals obtain recorded music (purchase versus downloading). The authors were unable to identify the patterns of individuals who actually purchased music. It is also possible that differences in meaning and social norms surrounding the language of music consumption have evolved between digital natives and digital immigrants. According to Wittgenstein (1967), there are large number of instances in which the word "meaning" can be defined thus: the meaning of a word

is its use in the language. When an individual speaks, what he or she means depends not only on what is said but also on the context (social norms) in which it is said (Richter 2019). The words, "listening to music", may invoke different meanings and methodologies for these two groups. Thus, if the recording industry wants to develop a thorough and complete understanding of how age affects music consumption behaviour, the differences in behavioural intention regarding music streaming technology between digital natives and digital immigrants should be investigated.

5 Method

The study used self-administered online surveys (appendix A) to collect primary research data on music listeners to examine the relationships between behavioural intention, digital native status and their music consumption behaviour. Participants were members of the Amazon Mechanical Turk (MTurk) human intelligence marketplace. Amazon launched the marketplace in 2005 for internal projects requiring human intelligence. It has since been made available to anyone with an Amazon account (Keith et al. 2017). Individuals utilising the platform include a combination of workers (individuals who complete human intelligence tasks or "HITs") and requestors (individuals who post the HITs). A convenience sample consisting of MTurk workers was used for three reasons: (1) the population was easily accessible; (2) survey costs could be kept reasonable and (3) data collection could be facilitated in a reasonable amount of time. There was a total of 687 responses collected from MTurk workers; however, only 415 were used in this study as the remaining 272 responses were removed from the dataset because the participants were not from the United States. Of the 415 respondents used, 41.4 percent were male, 57.8 percent were female, 0.7% identified as other and 47.2 percent were from the southern United States. The study participants ranged in age from 17 to 77 with a mean age of 36.4. The age variable was also used to classify respondents aged 17-37, which accounted for 60 percent of the sample, as digital natives. Partici-

pants aged 37 and older, which accounted for 40 percent of the sample, were classified as digital immigrants. A summary of the descriptive demographic statistics is presented in appendix B.

Scales Derived for Modified Technology Acceptance Model (TAM)	
Perceived Usefulness	• PU1 Using music streaming technology can enable me to listen to the music I want more quickly • PU2 Using music streaming technology can improve my music listening experience • PU3 Using music streaming technology can make it easier to listen to music • PU4 Using music streaming technology can increase the amount of music I listen to • PU5 Using music streaming technology can enhance my effectiveness in finding and listening to the music I want • PU6 I find music streaming technology useful in listening to music
Perceived Ease of Use	• PE1 Learning to use music streaming technology is easy for me • PE2 I find it easy to get what I need with music streaming technology • PE3 My interaction with music streaming technology is clear and understandable • PE4 I find music streaming technology to be flexible to interact with • PE5 It is easy for me to become skilful at using music streaming technology • PE6 I find music streaming technology easy to use

Figure 1: Modified Technology Acceptance Model (TAM)

A modified version of the Technology Acceptance Model (TAM), as shown in figure 1, was used to create the research instrument for the study. TAM is an adaptation of the Theory of Reasoned Action developed by Fishbein & Ajzen (Amoroso & Gardner 2004). TAM is tailored explicitly for modelling user acceptance of technology systems and provides a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions (Amoroso & Gardner 2004). It is comprised of twelve items and two constructs: perceived usefulness and perceived ease of use. All items were rated on a five-point Likert-type scale (1 = Strongly disagree, 5 = Strongly agree). Internal consistency and reliability testing returned a favourable Cronbach's alpha of .94 for perceived usefulness and .93 for perceived ease of use.

6 Analysis and results

The study sought to answer the following research question: "What are the differences in behavioural intention towards music streaming technology between digital natives and digital immigrants?" The question generated two hypotheses:

H1(a): Digital natives find music streaming technology more useful than immigrants.

H1(b): Digital natives find music streaming technology easier to use than immigrants.

Independent t-tests were used to compare the differences between digital natives and digital immigrants in their perceived usefulness and perceived ease of use of music streaming technology. Perceived usefulness and perceived ease of use scores were calculated by averaging participant's responses on the items for each construct.

There was a statistically significant difference in the perceived usefulness scores for digital natives (M= 4.31, SD= .66) and digital immigrants (M= 4.07, SD= .76); $t(413) = 0.24$, $p < .05$ (see figure 2). This indicated digital natives found music streaming technology to be more useful than did digital immigrants.

Age: Binned	Usefulness
Digital natives	**4.3098**
Digital immigrants	**4.0730**
SD	**.76**
F	**1.379**
t	**0.241**
df	**413**
p-value	**0.001**
Remark	**Significant**

Figure 2: Results for Perceived Usefulness of music streaming technology

Age: Binned	Ease of use
Digital natives	**4.3132**
Digital immigrants	**4.0011**
SD	**.81**
F	**1.839**
t	**4.407**
df	**412**
p-value	**0.000**
Remark	**Significant**

Figure 3: Results for Perceived Ease of Use of music streaming technology

Digital natives also had statistically significantly higher perceived ease of use scores (M= 4.31, SD= .63) regarding music streaming technology compared to digital immigrants (M= 4.00, SD= .81), t (412) = 4.41, $p < .05$ (see figure 3). This indicates that compared to digital immigrants,

digital natives found music streaming technology easier to use. Although there was a difference between digital natives and digital immigrants, the differences were small as both groups scored high on perceived usefulness and perceived ease of use. Furthermore, the null hypotheses were rejected based on the results of the test.

In terms of participants' level of perceived usefulness, participants found music streaming technology relatively useful; the mean score on perceived usefulness items was 4.22, with a standard deviation of .71 (on the scale of 1 to 5). Similarly, the data suggested that participants believe music streaming technology is easy to use. The mean score on perceived ease of use items was 4.19 with the standard deviation of .72 (on the scale of 1 to 5). The results of the study indicated there are differences between digital natives and digital immigrants surrounding their attitudes towards music consumption. It appears that their attitudes do set them apart from previous generations (Rideout et al. 2010). Digital natives had more favourable attitudes towards digital downloading and music streaming technology regarding both usefulness and ease of use when compared to digital immigrants. Miquel-Romero and Montoro-Pons (2017) found that age affects both listening frequency and device choice. Music listening frequency declines as individuals age which could be associated with the increasing opportunity cost of time. However, younger listeners listen more frequently and on digital download and music streaming compatible devices such as MP3 players, smartphones and computers. Therefore, the differences in perception relating to the ease of use and usefulness may be attributed to the fact that older individuals listen less frequently and are more likely to use traditional media to listen to music, which further support the study by Gu et al. (2012). The nature of technology usage and the acceptance of technology differs between digital natives and digital immigrants. Furthermore, these differences may be attributed to their exposure to, experience of, and/or emersion in digital technology (Jones et al. 2010). However, the similarities in digital native and digital immigrant usefulness and ease of use scores on measures of perception regarding music streaming technology indicate that other factors such as gender, loca-

tion or socio-economic status may likely contribute to the differences in use rates.

Music, typically, is more important in the lives of adolescents (Sikkema 2005; ter Bogt et al. 2003). It is possible that older individuals use music streaming technology at lower rate due to the changes that occur as one moves through the life cycle. Increasing age may also be associated with a decline in the appreciation of music, which may result in greater distraction experienced by older individuals in the presence of background music (Chamorro-Premuzic et al. 2010). If this is the case, older individuals may avoid the use of music streaming technology to eliminate potential concentration issues as they navigate through daily activities. This is in direct contrast to younger individuals, especially Millennials, who are engaged with digital services during all waking hours of the day and keep their devices close at hand, and turned on, when they sleep (Nielsen 2017b).

7 Discussion and conclusion

The study was only conducted to examine what, if any, differences exist in perceptions between generations regarding music streaming technology. It did not seek to answer why these differences may exist or examine other potential causes of differences in perception regarding music streaming technology. Furthermore, the use of convenience sampling in addition to paid, self-reporting respondents increased the potential for response bias in the study. The study was also limited by the fact that samples were chosen only from the population of the United States. Finally, there is a possibility that the study suffers from selection bias as well since the sample was drawn from a population of individuals possessing digital technology skills. Therefore, the findings of the study may not be capable of general application to certain populations in the United States or those of other countries. There may also be other generalisability issues within the population as 47.2 percent of the respondents in the survey were from the South region of the United States. Nonetheless, the data collected was valuable.

These limitations notwithstanding, the present study: (1) contributes to the overall body of knowledge on music consumption behaviour; (2) adds to the body of research on digital natives and behavioural intention; and (3) supports the evolving music consumption trends reported by music and entertainment industry organizations such as the IFPI, RIAA, and Nielsen. Overall, the available literature indicates that age has a noticeable impact on music consumption behaviour. This study adds to that literature by revealing the generational differences in perception regarding music streaming technology that currently exist.

In closing, future studies could add value to this topic by seeking to better understand why age affects music consumption behaviour and the use of music streaming technology. The results of the study also provide insight into future research directions that may be beneficial to the recording industry. Additional topics for future research include: (1) the effect of recording artist catalogue availability on music streaming technology use; (2) the effect of feature, advantage and benefit awareness on music streaming technology use and (3) the effects of gender, socioeconomic status and location on music streaming technology use. As music consumption moves from a model of ownership to access, the recording industry must seek to understand how to serve the needs of older music fans. This is important because older individuals often have larger amounts of disposable income and could therefore prove to be profitable to the industry.

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9 Appendix

9.1 Appendix A: Survey instrument

This questionnaire is intended to collect data about music consumption (listening) behavior and technology usage. The questionnaire provides information that will assist in the study. Your answers will be treated as completely confidential by the researcher and will only be released as part of a statistical analysis.

Digital downloading examples- iTunes, Amazon MP3, Google Play, CD Baby, etc.
Streaming examples- Apple Music, Tidal, Pandora, Spotify, YouTube, Google Play Music, etc.

1. I use the Internet every day
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

2. I use computers for many things in my daily life
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

3. When I need to know something, I search the Internet first
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

4. I use the computer for leisure every day
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

5. I keep in contact with my friends through the computer every day
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

6. I am able to surf the Internet and perform another activity comfortably
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

7. I can check email and chat online at the same time
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

8. When using the Internet for my work, I am able to listen to music as well
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

9. I am able to communicate with my friends and do my work at the same time
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

10. I am able to use more than one application on the computer at the same time

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

11. I can chat on the phone with a friend and message another at the same time
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

12. I use pictures more than words when I wish to explain something
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

13. I use a lot of graphics and icons when I send messages
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

14. I prefer to receive messages with graphics and icons
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

15. I use pictures to express my feelings better
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

16. I use smiley faces (emojis) a lot in my messages
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

17. I expect quick access to information when I need it
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

18. When I send out an email, I expect a quick reply
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

19. I expect the websites that I visit regularly to be constantly updated
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

20. When I study, I prefer to learn those things that I can use quickly first
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

21. Using digital downloading/streaming can enable me to listen to the music I want more quickly
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

22. Using digital downloading/streaming can improve my music listening experience
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

23. Using digital downloading/streaming can make it easier to listen to music
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

24. Using digital downloading/streaming can increase the amount of music I listen to
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

25. Using digital downloading/streaming can enhance my effectiveness in finding and listening to the music I want
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

26. I find digital downloading/streaming useful in listening to music
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

27. Learning to use digital downloading/streaming is easy for me
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

28. I find it easy to get what I need with digital downloading/streaming
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

29. My interaction with digital downloading/streaming is clear and understandable
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

30. I find digital downloading/streaming to be flexible to interact with
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

31. It is easy for me to become skilful at using digital downloading/streaming
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

32. I find digital downloading/streaming easy to use
Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

33. Number of years using music downloading services:

34. Number of years using music streaming services:

35. Annual (yearly) amount spent on digital music downloads:

36. Annual (yearly) amount spent on music streaming services:

37. Age:

38. Gender

9.2 Appendix B: Descriptive statistics

Demographics of survey participants

Variable	*n*	Percentage	Mean
Male	172	41.4	N/A
Female	240	57.8	N/A
Other	3	0.7	N/A
Northeast Region	70	16.9	N/A
Midwest Region	78	18.8	N/A
South Region	196	47.2	N/A
Midwest Region	71	17.1	N/A
Age	N/A	N/A	36.4
17 – 37	249	60.0	N/A
38 – 77	166	40.0	N/A
Less than $1.00 annual spend on music streaming services	190	45.8	N/A
Less than $1.00 annual spend on digital downloads	134	32.3	N/A
Number of years using music streaming services	N/A	N/A	7.0
Number of years using digital download services	N/A	N/A	8.9