Uncovering the Barriers to Sustainable Music Consumption

A Thesis Submitted to the Committee on Graduate Studies
in Partial Fulfillment of the Requirements for the Degree of Master of Arts
in the Faculty of Arts and Science

TRENT UNIVERSITY
Peterborough, Ontario, Canada
Sustainability Studies M.A. Graduate Program

January 2019

Abstract

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The study sought to uncover the motivations influencing collectors when they buy recorded music. These motivations were analyzed through the lenses of environmental, economic, and cultural sustainability. Trent Radio Programmers were interviewed because of their frequent use of recorded music, sizable collections, and active participation in the local music scene. The study identified disconnects between artist, industry, and consumer motivations that hinder the achievement of a sustainable system. Environmental sustainability was not considered, while the artists' economic and cultural sustainability were. This finding translates to the idea that in the music industry, to strengthen cultural sustainability, economics must be supported, which requires environmental impact. This research has the potential to catalyze critical conversations about digital media, artist welfare, and the state of the music industry.

Keywords: Environmental Sustainability, Economic Sustainability, Cultural Sustainability, Music Collecting, Digital Media, Physical Media, College Radio

Acknowledgements

This thesis is dedicated to my parents, Natalina and Bob, for giving me roots and wings.

I would like to thank the staff at Trent Radio, specifically Jill Staveley, Mauricio Interiano, and John K. Muir, for their unrelenting enthusiasm and willingness to collaborate in many phases of the study. Additionally, I would like to acknowledge the research participants, the thirteen Trent Radio Programmers, who graciously shared their thoughts about something they hold so dear. Your individualities brought life to this work.

I would also like to thank the Trent Master of Arts in Sustainability Studies (MASS) graduate program for providing me with this opportunity. Especially, faculty members Asaf Zohar, Tom Whillans, Stephen Hill, and Chris Furgal. Further, I would like to thank the 2015 MASS cohort for showing me it does not *always* have to be about papers and readings.

Finally, thank you to my co-supervisors Tom Whillans and Hugh Hodges, and committee member Liam Mitchell, for their invaluable guidance and support throughout this process. Thank you for adopting my whacky project when no one else wanted to and for seeing it through.

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Chapter 1: Introduction

1.1 Research Context

In the sustainability conversation, creative media are often left out. Recorded music is a multibillion-dollar industry, with products that are experienced worldwide on a daily basis, yet literature on its sustainability is lacking. Aside from ominous warnings through musical composition, such as *F♯ A♯ ∞*; *The Body, the Blood, the Machine*; and *HOPELESSNESS* (Wilkie, Ilavsky, & Godspeed You! Black Emperor, 1997; Canty, 2006; Anohni, Hudson Mohawke, & Oneohtrix Point Never, 2016), music is not associated with the Doomsday Clock striking midnight.

Recorded music flies under the radar in sustainability because it is designed to. Relationships between labels and artists are notoriously opaque and exploitative, and formats are trending toward becoming service-based streams on the internet, a monolith requiring more trust as it embeds within society. This leaves the consumer with little knowledge of how their spending is influencing the industry. Without properly informed research and education, music will remain a sustainability issue fueled by uninformed decisions.

Sustainability is best understood when viewed through multiple lenses. This project focused on environmental, economic, and cultural sustainability in recorded music, through the perspective of music collectors. Each major format of the last 60 years has had environmental benefits and drawbacks, but none truly warrant the label of "environmentally sustainable" (Smith, 2015). Permanence is the crux of the physical formats, and utility is that of digital (Smith, 2015; Gabrys, 2014). This study addressed the issue of environmental sustainability in recorded music by examining the extent to which collectors considered the environmental impacts of their collections.

Economic sustainability is the goal of any business, but in the music industry it has proven difficult to achieve. After piracy's influence in the early 2000s, sustainable economics has never been more distant for labels as they rebuild. Artists suffer under their contracts, reverting to diverse revenue streams to make ends meet (DiCola, 2013). The industry is climbing back through selling experiences – streaming services and live concerts (Winseck, 2017). This study addressed economic sustainability by assessing whether collectors considered the underlying economics of their purchasing decisions.

Due to the connection between artist and industry, musical culture is tied to and influenced by economics. The music industry is especially lacking in the support of diversity and stewardship, two requirements for cultural sustainability in music (Titon, 2009). This study addressed cultural sustainability by determining the extent to which collectors considered the cultural implications of their collections and connections with music. Collectors spend a tremendous amount of money on music, and thus hold considerable influence on the decisions the industry makes. This study ultimately explored the consideration collectors had regarding the environmental, economic, and cultural sustainability of recorded music, uncovering barriers that exist in creating a sustainable music system.

1.2 Rationale

There is a very small body of literature connecting sustainability to music. Especially in environmental and economic disciplines, there are some sporadic, stand-alone works. The result is a lack of continuity or idea building. In cultural studies, there are many works involving music. They are mainly based in theory and warrant expansion into qualitative work.

Trending in academic work are studies at the local and individual level, as they offer a more detailed qualitative look into the nuances of sustainability (Sherry et al., 2005; Mrosek,

Balsillie, & Schleifenbaum, 2006). It is a missing dialogue in the music and sustainability conversation. Local-level qualitative work was thus a worthwhile next step for the study to take on, as it opened opportunities to explore ideas of environmental, economic, and cultural sustainability on a deeper level.

1.3 Objectives

The study focused on the level of consideration Trent Radio Programmers, a group of volunteer radio show hosts, had for the environmental, economic, and cultural sustainability of their music collections. Academic literature is inconclusive regarding which format is the most sustainable above all, therefore the study shifted in focus from whether the Programmers were "correct" or "incorrect" in their formats of choice to their level of consideration of sustainability in their purchasing.

The study was designed to address many gaps existing within the empirical literature of music and sustainability. Firstly, it addressed three of the four pillars of sustainability: environment, economy, and culture. It was determined that the social pillar would be too expansive to warrant including in a master's level work. The study contributes to existing literature by explicitly connecting music collecting to sustainability, while also combining several pillars of sustainability in one work.

Secondly, the study took a practical local-level approach, using one-on-one interviews with Trent Radio Programmers as the means of data collection. Qualitative, local-level research adds unique perspectives to the literatures of environmental, economic, and cultural sustainability and recorded music. To benefit comparability and applicability to other work, additional questions of why and how the Programmers collect were also asked.

1.4 Research Questions

1. To what extent do Trent Radio Programmers consider the environmental, economic, and cultural sustainability in their collecting?
2. Why do Trent Radio Programmers collect vinyl, cassette, CD, MP3, and streaming?
3. How do Trent Radio Programmers collect vinyl, cassette, CD, MP3, and streaming?

The primary research question was chosen because of its attention to the context pertaining to sustainability and recorded music. The use of the word "consideration," rather than "knowledge," or "action," was determined as the best approach in uncovering the foundation of the topic. With limited studies combining sustainability and recorded music, the extent of consideration was worthwhile to explore for its generality and allowance for exploration, while not implying that explicit knowledge or actions exist, as this is unknown in academia. If the extent of knowledge or action was the focus of the study, important themes that could only be revealed after asking about consideration may be missed, resulting in them being at risk of never being addressed in future work.

The secondary research questions on why and how the Programmers collect were chosen to ensure proper context was gained from the subjects to tie into the sustainability narrative. Therefore, these questions solely focused on collecting, while the primary question adds the framework of sustainability.

1.5 Positionality Statement

Given this topic of study, my education in environment and sustainability played a significant role in my positionality. I studied Environmental Science/Studies at Trent University for my undergrad and lived in Peterborough for all four years. Immediately after my

undergraduate program, I began a Master of Arts in Sustainability Studies degree at Trent University, and stayed in Peterborough three more years. Living in Peterborough for seven years has fostered a love for this city.

I was raised mostly in Canada, living abroad in Italy for three years of my childhood. I have an Italian-Canadian upbringing, with a family holding liberal values, and am of the white cisgender male middle class demographic. If I was forced to label myself politically, I would consider myself most closely resembling a socialist.

In my fifth year living in Peterborough, I began to become involved at Trent Radio. I have now hosted a variety of shows, ranging from playing music only from regretful times of adolescence, to an analysis of R. Kelly (jokingly, of course), to a show dedicated to King Gizzard and the Lizard Wizard. In late 2017, I joined their Board of Directors, Local Content Archive project, and team of Operators. I have an informal musical background. I am passionate about music, participating as a concert attendee, music collector, and guitar player. I have attended hundreds of shows, starting at an early age. My music collection is comprised of roughly 850 CDs, 130 gigabytes of MP3, 50 vinyl records, and 30 band tee shirts, more than anyone I know my age. Streaming services and CDs account for the majority of my listening at the present.

I have a variety of work and volunteer experiences relating to the field of sustainability. I have worked in a laboratory and field setting at the University of Guelph, building and testing green roofs. I also worked at the University of Guelph's urban organic farm, which used sustainable, low-cost methods to produce food. I have worked as an intern at MicroSintesis (a novel probiotic start-up), where I compiled data for and wrote their marketing and business plans. Most recently, I have worked for the Biodiversity Institute of Ontario. My role was to

conduct a stakeholder analysis focusing on Ontario environmental assessment methods. After eight years of volunteering at the Hillside Music Festival, I was named a Waste Management Crew Chief in 2015, then a Co-Coordinator in 2018. I now co-lead a team of 80 young people, focusing on keeping the festival as environmentally sustainable as possible through many low-cost initiatives. In 2016, Hillside was honoured with Canadian Music Week's Best Green Operations award, as well as Festival and Events Ontario's Best Greening award from 2016-2018.

I view the research process as an opportunity to gain the data that is sought for, but also as a chance to be open, and identify anything unexpected. I feel that only with a proper interdisciplinary background will a study be most impactful, approachable, and therefore useful. My study's combination of sustainability and music collecting has many parallels with my own interests. This topic is very seldom researched, so it is appropriate at this point to have studies coming from researchers with a relatable background.

The approach to address my positionality and bias was to reflect and communicate my research on a regular basis. This included regular meetings with my supervisors, committee member, and other Trent personnel for their ideas and opinions. Secondly, although I cannot control my background, I have ensured as much objectivity as possible during the research processes. I have no possibility of personal or financial gain depending on a given result, which allows for even-handedness.

Chapter 2: Literature Review

2.1 Environmental Sustainability

After first being discussed during UNESCO's Biosphere Conference in 1968, environmental sustainability became popularized through the 1987 United Nations World Commission on Environment and Development's (the Brundtland Commission's) *Our Common Future* report. It claimed that poverty reduces sustainability, thus accelerating environmental degradation – developing the need for balance between economy and ecology (Pyla, 2012). It was also where the term "sustainable development" was first used. In relation to recorded music, the less harmful the format is for the environment while maintaining a reasonable amount of profitability, the more environmentally sustainable it is.

2.1.1 The Beetles Before the Beatles

Before 1950, recorded music could have been considered environmentally sustainable. The predominant format of the time were 78s, named after their RPM. These discs were made from shellac, a natural bioplastic produced by the lac beetle (*Laccifer lacca*), who live in the forests of India, Burma, and Thailand. Jacob Smith in *Eco-Sonic Media* (2015) argues that 78s should be considered "Green Discs." They were produced from a collaboration, rather than exploitation, of humans and nature, required little electricity, had a minimal carbon footprint, and were composed of a reusable, nontoxic, biodegradable, even edible bioplastic from a renewable source. The following section was inspired by pages 13-41 in *Eco-Sonic Media* (2015).

Shellac is created when lac beetles swarm a host tree in the hundreds for their sap. The sap provides nutrition, but also secretes from the glands of the beetle, coating their backs to protect them from predators and weather (Slack & Wise, 2007). With hundreds of beetles

congregated to one space, the secretions from their backs eventually form a shield of sorts, covering the branch (Smith, 2015). Males leave the group, fertilize the females, and die shortly thereafter. The females continue to be attached to the tree, growing, secreting resin, until their eggs hatch. When the eggs hatch, the females die, and the process is repeated with the new larva on a different host tree. This process happens twice per year (Bose, Sankaranarayanan, & Segupta, 1963). The lac resin left behind is the backbone of the shellac industry.

Shellac cultivation is environmentally sustainable. For the Indian shellac cultivators, they are required to maintain the health of the trees, ensuring proper pruning and fertilization. They consider themselves as breeders of "tiny livestock," paying close attention to the beetles during their reproductive processes and only removing the shellac when appropriate (Parry, 1935, p. 22). Smith (2015, p. 20-21) argues for the shellac harvest to be considered an "ecological economy," for the process' equal yield of ecosystem goods (shellac for human use) and ecosystem services (maintenance of forest quality). Shellac cultivators of the early 1900s were known for their pre-capitalistic worldview, selling only enough shellac to provide for basic needs, to maintain forest equilibrium.

In the beginning of the shellac industry, it was primarily used for wood finishing, colouring, and the production of jewelry. Demand began to increase with the rising popularity of recorded sound (Talking Machine World, 1929). In 1896, shellac was deemed superior to rubber for phonograph discs for a variety of reasons: they required low temperatures and pressure for shaping, held accurate molding, combined well with pigments, and manufacturers could reuse the scrap in production (Angelo Brothers, 1956). Shellac became the key ingredient for phonograph records from 1890-1940. By 1940, the United States were the world's largest importer of shellac, mostly using it for records (Talking Machine World, 1929).

Shellac shortages threatened the music industry during World War I, when the U.S. government required it for the manufacture of ammunition (Talking Machine World, 1920). During World War II, the U.S. War Production Board deemed shellac vital for the manufacture of aircraft instrument panels and ammunition casings (Billboard, 1942). The major record labels of the time, RCA-Victor, Decca, and Colombia began a campaign in 1942 to collect old shellac discs. Scrap barrels were placed outside of record stores, scrap reminders were placed in bills, patrons were encouraged to return old records when buying new ones, and some stores bought records by the pound, no matter what their condition. Theater admission could be covered with records, and credit could be earned at ballrooms on "disc nights" (Smith, 2015). The greatest record hunt of all time was underway. Patriotic musicians dedicated themselves to shellac salvage in working groups, whereas the Boy Scouts, the Red Cross, and U.S. Legions all banded together in the shellac war effort.

The shellac shortage brought early forms of environmental sustainability initiatives. Concepts of recycling, deposit-return, and extended producer responsibility (EPR) were all used for the wartime cause. This would not have been possible without shellac as the main ingredient. The shellac shortages of the 1940s prompted the music industry to find alternatives to shellac. In 1945, RCA-Victor released the first synthetic disc, made from polyvinyl chloride (PVC), otherwise known as vinyl. Vinyl was marketed as "unbreakable" and "ageless," harder and finer than shellac, with the ability to have more grooves pressed into them (Time, 1945; Billboard, 1945).

The vinyl record introduction of 1945 kick-started a new idea in the music industry – permanence was marketable, and collectable. PVC was so inexpensive and effective that there was no financial incentive for reuse – a theme that would continue as a staple in the industry. As

technology advanced, issues of portability, utility, and quality were addressed, but never recycling or reuse. 78s are largely a forgotten format of the past, reserved for music preservationists, archives, and trivia questions. Vinyl came into full control of the market by the 1950s, and quickly took music collection to a new level (Smith, 2015). From the 1950s until the present day, the ability to make and sell music has become more accessible, and the average expendable income has steadily increased (U.S. Bureau of Economic Analysis, 2018). Music collections grew.

2.1.2 The Environmental and Human Impact of Physical Music

This study focused on the five most prevalent music formats of the present: vinyl, cassettes, CDs, MP3s, and streaming (Table 1). There is little research providing hard evidence explicitly pertaining to their environmental sustainability. However, after analyzing the compositions of the products and the listening habits associated with each, some conclusions were made.

Table 1: Vinyl, cassette, CD, MP3, and streaming's physical compositions.

	Vinyl	Cassette	CD	MP3	Streaming
Case Composition	Cardboard	Polypropylene, Coated Paper	Polypropylene, Coated Paper	N/A	N/A
Recording Composition	Polyvinyl Chloride	Polypropylene, Polyester Film	Polycarbonate, Aluminum, Lacquer	Digital File	Internet Stream
Player Type	Phonograph Record Player	Cassette Player	CD Player	MP3 Player, Computer, Mobile Phone	Computer, Mobile Phone

As shown in Table 1, the physical formats of vinyl, cassette, and CD are mostly plastic products. Between them, polyvinyl chloride (PVC), polypropylene (PP), polycarbonate (PC), and polyester (PET) are used. The constituents of plastic products are extremely harmful to human

health (Thompson et al., 2009). Table 2 is a summary of common chemicals in each plastic and the associated human health effects.

Table 2: Plastic additives found in PVC, PP, PC, and PET, and their associated health effects.

Toxic Compound	Typical Use	Health Effect	Present In
Bisphenol A (BPA)	Plasticizer; can liner	Mimics estrogen	PVC, PC
Pthalates	Plasticizer, artificial fragrances	Interferes with testosterone	PVC
Persistent organic pollutants (POPs)	Pesticides, flame retardants	Neurological and reproductive damage	PVC, PP, PC, PET
Dioxins	By-product of waste incineration	Carcinogen; interferes with testosterone	PVC, PP, PC, PET
Nonylphenol	Plasticizer, anti-static	Mimics estrogen	PVC
Polyaromatic hydrocarbons (PAHs)	Released in fossil fuel burning	Developmental and reproductive toxicity	PVC, PP, PC, PET
Polychlorinated biphenyls (PCBs)	Electronics manufacture	Thyroid hormone interference	PVC, PP, PC, PET

(Thompson et al., 2009).

The health effects listed are caused by inhalation of fumes or ingestion (i.e. food containers, water bottles). Since music collections and food normally do not mix, nor are they burned (spare the Disco Demolition Night of 1979), human impacts through direct contact are largely avoided. In the manufacturing process of plastic products, all the harmful chemicals listed are in regular use. Those directly involved in the manufacture of plastics have significant correlations with the listed health effects, especially cancer (Kolstad et al., 1995).

Recycling rates are steadily increasing in Canada, but they are not nearly at their potential. As of 2004 only 27% of recyclables were put through the proper waste stream (Statistics Canada, 2004). When plastics are not recycled, they are likely landfilled. Plastics are estimated to take hundreds of years to decompose completely (Shah et al., 2008). When they are decomposing, they are exposed to heat, water, and other chemicals, all of which promote the release of the toxins as leachate (Fatta, Papadopoulos & Loizidou, 1999).

Leachate is the general term used for the liquid released from landfills. It is extremely harmful, composed of a concentrated conglomerate of all the liquids in the landfill. Landfills take precautions against the escape of leachate with liners and barriers, but pipe cracks and liner tears are common, releasing it into the environment (Cozzarelli et al., 2000). There are major consequences if it enters the water cycle. Fatta, Papadopoulos, and Loizidou (1999) found that in an aquifer near a landfill, the water had elevated levels of conductivity, chemical oxygen demand, nitrogen, phosphorus, sulfate, chlorine, potassium, iron, and lead. In addition, the surrounding groundwater of the site was deemed non-potable, exceeding the limits of the Environmental Protection Agency (EPA). Although plastics are not the only landfill component adding to leachate, they are prominent contributors. All plastics involved in the creation of physical music contribute to leachate (Bejgarn et al., 2015; Cheng et al., 2009; Sajiki & Yonekubo, 2003).

Another common waste stream in North America is incineration. It involves burning waste at very high temperatures and filtering the gaseous emissions before they enter the atmosphere. It eliminates issues like leachate and landfill expansion, but also has been known to cause health problems for those living nearby. Pearlman et al. (1971) noted that there were increased levels of nitrogen dioxide near incinerators, resulting in infants exposed for two years or more to show significant increases in bronchitis. Incinerators are known to release other significant airborne pollutants, such as: dioxins (a result of PVC incinerating), polycyclic aromatics, organics, and heavy metals (a result of PVC incinerating) (Rowat, 1999). As a result, studies have shown that living near an incinerator correlates with increases in cancer, adverse impacts on the respiratory system, heart disease, immune system effects, and increased allergies (Allsopp, Costner, & Johnston, 2001).

It is important to note that when physical music's lifecycles come into consideration, these impacts are minimized. Collected vinyl, cassettes, and CDs seldom become waste. A fraction of collections is thrown away. If albums are removed from a collection, they are normally sold or donated. Of the small fraction of physical albums thrown away, they are mostly because they are unplayable – which in some cases still is not enough to warrant disposal. Physical music, especially vinyl, are commonly repurposed as wall hangings or art (Smith, 2015, p. 8).

One of the only circumstances resulting in the mass disposal of physical music is when albums predicted to be popular underperform in sales. To approach demand effectively, albums are produced in bulk ahead of release. In small-scale settings, unsold recordings are not a major problem. They can be sold over time and kept boxed away. In major label sales, an unpopular recording can result in millions of copies going unsold, with limited space to store them. Doug Morris, current chairman of Sony Music Entertainment, and ex-CEO of Sony and EMI was said to have "buried enough unsold inventory in his life to know the system was not terribly efficient… In a bad year it sometimes seemed easier to take discs directly to landfill, avoiding the cumbersome retail supply chain entirely" (Witt, 2015, p. 199-200). From a collector's perspective physical music rarely becomes waste, unless the record does not warrant collecting in the first place.

2.1.3 The Environmental and Human Impact of Digital Music

Digital media are given a false identity of "weightless" and "invisible." Indeed, it is easier to make, ship, and sell bits than atoms (Atkinson & McKay, 2007), but digital media have their own brand of impact that is steadily increasing. As of 2016, only 47% of the world's population had internet access, with 40% in the developing and 81% in the developed world

(International Telecommunications Union, 2016). This is while in 2009, it was estimated that the world's data network already consumed 3% of the world's energy (Bach, 2012). Data centres are expected to increase fivefold between 2002 and 2020 (Boccaletti, Loffler & Oppenheim, 2008), and with it the use of digital music, which occupies a major part of server traffic.

For MP3s, servers are constantly operational for collectors to access. Streaming services mirror MP3s in that their servers are continually available and running. However, streaming never gifts a copy of the song to the user, as it always relies on internet use. Streaming constantly reuploads to devices on-demand, requiring more processing power and energy use for servers and players. MP3 and streaming are not equals. Once the same song is streamed twice, it doubles the internet, server, and device stress (Gonzalez, 2018).

In 2012, Dagfinn Bach wrote *The Dark Side of the Tune: The Hidden Energy Cost of Digital Music Consumption*, one of the first reports to outline the immense energy usage associated with digital media. Within it, he states that streaming demand is increasing so quickly that technology will be unable to develop fast enough to mitigate the energy usage. He forecasts that global data traffic will hit one yottabyte (1e+15 gigabytes) by 2027, resulting in the need for one fifth of all energy used in 2010 (Bach, 2012). Bach states that growing energy need is largely facilitated by video and music streaming's constant server demand as it becomes more commonplace around the world.

Nature of use differs between physical and digital music formats. Physical music is inconvenient to use when compared to digital. They are time consuming, delicate, and large, resulting in them often being used less. Digital music offers a more accessible option. It has the potential to be used at nearly any time of the day, at any location, with mobility and utility predicted to only increase with time (Atkinson & McKay, 2007). Assuming a similar amount of

energy used to play physical and digital music, physical music will require less energy per day solely through it being used less. Although cassettes and CDs have mobile options, they are overshadowed by the immense utility advantage of MP3s and streaming.

Price is a key decision criterion. In the case of physical music, it is often bought on a small scale, due to limited access and financial feasibility. This keeps their impacts held in check. It also forces labels to estimate the number of units to manufacture so to not overproduce. With digital music, its availability and cost-efficiency give collectors the ability to accumulate more music at a faster rate. Reynolds (2011, p. 126-127) explains this idea in the following excerpt: "'Either/or' is the logic of difficult choices in an economy of scarcity. The extreme example is the folk myth of the person who skips a meal in order to buy the record… 'Plus/and' is the logic of downloading… If there's no cost, and no issues to do with storage, there is no earthly reason to desist from the 'and this… and this too' imperative."

Digital music welcomes music to be played when it is not in a setting for attentive listening. Its access allows for it to be used during physical activity, as background for conversation, or to drown out roommates while writing an overdue thesis. The increasing subscription to streaming services requires more energy for internet infrastructure, devices, and servers.

2.1.3.1 E-waste and Controlled Obsolescence

For collectors, digital media's only physical element is its player, aside from headphones. Physical formats are tied to cases, discs, and larger players. With the music industry all-in with streaming, the ways in which physical music is made and played are at a stand-still. They are all "obsolete," leaving innovation to modern formats, but also allowing CDs and vinyl to be played on the same devices forever. With digital devices, technology is rapidly advancing, and

unsustainable product design has made obsolescence profitable. Although mobile devices are multi-use, the ability for digital music to add to their value in purchase and repurchase scenarios directly contributes to high device turnover.

Since the first iPhone was sold in 2007, there have been 14 different models released. The same rapid innovation can be seen in many electronic devices. With every new model, the previous models become more incompatible, replacement parts more unattainable, and features more dated. In an extreme example, the average mobile device's lifespan in Hong Kong is less than two years (Deng, Giesy, & Zheng, 2017). Huabo et al. (2013) estimates that 177 million mobile phones were thrown away in 2010 alone. The increasing rate of replacement raises manufacturing demand, further multiplying the affiliated waste. 2% of materials used to make a computer are found in the final product, leaving the other 98% to waste (Hilty & Ruddy, 2000). If all the precious metals in cellphones were properly recycled in the United States, it would result in an annual payout of $12 billion.

In many ways, electronic waste (e-waste) is worse than plastic waste. Computers are composed of 1500-2000 pieces, comprised of 43.7% metal, 23.3% plastic, 17.3% electronics, and 15% glass (Berkhout & Hertin, 2004). Their product design does not welcome easy repairs, or regularly available new parts. They are designed to be most easily "fixed" through the purchase of a brand-new device. Obsolescence-oriented design makes electronics very complicated to recycle. Ideally, they are dismantled by hand. However, time demand and expense lead recyclers to inefficient means via mechanical shredding, mechanical separation, and acid decomposition (Cucchiella et al., 2015).

The crude recycling of e-waste brings harm to human and environmental health. A study of the environment near a recycling facility in Guiyu, China revealed that airborne dioxins were

100x levels previously measured, carcinogen levels in rice paddies exceeded national standards, and heavy metals were up to 300x higher than a neighboring town (Sthiannopkao, 2012). Due to their complication, expense, and abundance, e-waste is often shipped illegally from developed countries to those developing. People in these countries are tasked with removing the small valuable metals, often resorting to burning unwanted materials for efficiency. The waste handlers of West Africa, China, and India are known for their high childhood cancer rates and shortened life expectancies. In many ways, e-waste management is a way to bury the cost of overproduction in the lands of those who have never experienced the technology (Cubitt, 2017).

2.1.4 Is Recorded Music Environmentally Sustainable?

Both physical and digital music media offer benefits and drawbacks to environmental sustainability, but in both cases the drawbacks outweigh the benefits. Physical music uses less energy, has a slow rate of consumption, is seldom thrown away, and is made of materials that are common practice at recycling facilities. On the other hand, physical media require more manufacture and shipping, and need discs to accompany their players. Digital music offers benefits in dematerialization, removing some manufacture, shipping, and wholesale. However, it also welcomes overuse, has ever-growing energy demand, and is used on a player that is rapidly disposed of while also very challenging to recycle.

A question remains in which formats are more environmentally sustainable, despite them both being harmful in different ways. Results are contradictory and limited in academia, with only two studies found that compare music formats quantitatively. Bach (2012) notes that streaming an album 27 times is the equivalent of the production and shipping of the same music on CD. Conversely, Weber et al. (2010) found that using digital music offers a decrease in carbon emissions of 40%-80%. The ambiguity is difficult to cure, as the lifecycles of albums

differ on the level of the individual unit, and digital music technology is rapidly changing. There are also subfactors in shipping, usage trends, manufacture, and recycling to add to these studies. Both Weber et al. (2010) and Bach (2012) recommended further research with different scopes and scenarios. As a result, this study will assume inconclusiveness regarding which format is most environmentally sustainable.

2.2 Economic Sustainability

Economic sustainability is the result of proper management of environment, society, and culture. At first, it was determined to be achieved through the consideration of only environmental sustainability, highlighted by the Brundtland Report. With time, social sustainability (Elkington, 1998) and cultural sustainability (Hawkes, 2001) have made their way into the discussion. Considering environment, society, and culture in economic decisions is supported through ideas of stakeholder engagement (Freeman, 1984), and extended producer responsibility (EPR) (Lifset, 1993). There are many cases where economically sustainable business models resulted in an increase in profitability, reputation, workplace morale, and quality of work (Rosenberg, 2009; Battilana et al., 2012; K. Wilburn & R. Wilburn, 2014). At the current state of the music industry, economic sustainability has not yet been shown.

2.2.1 The Music Industry, Piracy, and Streaming

Major labels (herein referred to as the "music industry") are using streaming services as the tentpole in the rebuilding of their revenue. The following section is inspired by pages 114-126 from Stephen Witt's *How Music Got Free* (2015). In early 1999, the music industry was in control of its customers. The Big Five major labels: Universal Music Group, EMI, Sony Music, BMG, and Warner Music Group had every popular artist signed, and were selling millions of

CDs for an inflated $25 each. There was no viable alternative for collectors beyond vinyl and cassette, which were considered inferior by many, so the industry continued to grow. It was reflected in collective industry revenues, with 1999 still standing as the all-time high ($14.6 billion), building off 1998's high ($13.7 billion), and 1997's ($12.2 billion) before that (Witt, 2015).

In June 1999, Napster, a peer-to-peer (P2P) MP3 file sharing internet service was launched (Witt, 2015). It is regarded as the first large-scale source of free, pirated digital music for mass consumption. Napster was short-lived, succumbing to a copyright-fueled lawsuit issued by the Recording Industry Association of America (RIAA) in July 2001 (A&M Records, Inc. v. Napster, Inc., 2001), but its impact is still felt today.

A misconception about Napster was that it hurt industry revenue. The years 1999 through 2001 were still banner ones, and had some representatives conceding that it may have been helping the CD market (Witt, 2015). Radiohead's seminal 2000 release *Kid A* (Godrich & Radiohead, 2000), an album destined for "did not chart" status in the United States for its commercially unfriendly sound, was leaked on Napster three months prior to its release. It debuted at *number one*, beating the likes of Eminem, Madonna, and Britney Spears (Sheffield, 2015). CDs were still the superior mobile technology, and MP3 downloads were restricted to desktop computers. Napster was free advertisement.

During the time of the Napster launch, another lawsuit between the RIAA and Diamond Multimedia was playing out. Diamond was responsible for the first commercially successful MP3 player. The player was deemed by the RIAA to be a breach of copyright law, as it motivated users to download pirated MP3s. It was ultimately determined that since the player itself could not produce digital music recordings, then it was not a breach of copyright (RIAA v.

Diamond Multimedia Systems, 1999). Diamond won and released their landmark Rio PMP300 in 1999. The loss to Diamond was eventually perceived as negligible for the RIAA after their win versus Napster – without media for the device, they would be useless, and CDs would reign on.

With time, it was revealed that the lawsuit versus Diamond was more important than stifling Napster. When Napster lost, its P2P framework was driven underground (Menn, 2003), eventually resurfacing as hundreds of new filesharing internet services (Witt, 2015). It quickly became clear that the RIAA had won the wrong lawsuit.

Piracy would have remained at a small-scale, and industry revenues high, had there not been a mobile player. In 2001, Apple released the first iPod, blowing the piracy floodgates open. The first legal online MP3 store, the Apple iTunes store, was opened in 2003 (Witt, 2015). While the industry scuffled in the battle against piracy, Apple, a tech company with no prior stake in music, took over the legal MP3 market while also selling a device that did not discriminate between legal or illegal MP3s. There was some success from this revenue stream for the industry, although it was nothing compared to the physical music era. The industry was unable to provide anything of greater value than what was available for free, and now they had to work through Apple, the retailer *and* distributor if they wanted to sell MP3s. Revenues plummeted. Every year from 1999-2015, record labels generated less or equal revenue than the year prior, reaching rock bottom in 2010 at $6.1 billion (Witt, 2015).

There was a major change in 2015. The industry had increased their annual income from the previous year (International Federation of the Phonographic Institute [IFPI], 2017). The industry had an answer to piracy – streaming services. Streaming services offered new value to the digital music market. For a small monthly fee of $10, a user could have unlimited access to a

library of 10 million songs to stream over the internet. Gone were the days of dealing with P2P websites full of pop-ups, ever-changing domains, and advertisements for Russian wives. Editing song information also became a thing of the past – all of it was correct, provided by the labels. Best of all, a user could download the music they wanted to listen to right to their device if they knew they were going to be offline. Since 2015, thanks to streaming, the industry has built on revenues from the year prior, with prospects for further growth (IFPI, 2017). Profit is still minimal in comparison to the years of the CD, but nevertheless a positive step. In 2017, despite three years of consecutive growth, revenues were still 68% of those in 1999 (IFPI, 2018). The industry had landed on a way to stop piracy, but not through removing it – by offering something better. The only problem was that streaming was not the industry's idea, and like the MP3 era, would have to deal with Silicon Valley once more.

The industry made a critical error in 2000: they failed to recognize that they sold music, not records. Piracy aside, the blind focus on selling physical media, and the lack of recognition that digital media was the way of the future caused their monopoly to dissipate. History repeated itself with streaming, where tech companies like YouTube, Spotify, and Apple dominate the market and labels have no choice but to collaborate. Labels are now dealing in a service and experience industry, which is very difficult to monetize when the competition is free. Streaming is becoming an effective means to combat piracy and regenerate profit, but if anything happens to deter the public, it is very easy to turn back. Piracy holds their monopoly in check.

2.2.2 Did Musicians Ever Make Money Off of Records?

There is a common misconception that piracy hinders both artist and label profits. Historically, artists have made a fraction of what labels and associated employees have made from album sales, no matter what the format. In 2000, the music industry's golden era, Courtney

Love released her interpretation of the finances involved in making an album on a major label. The following breakdown was for a fictional popular band with a generous 20% royalty rate, and $1 million recoupable advance for their debut album (Love, 2000). This breakdown is supported in a similar scenario outlined in Makoway (2001, p. 226).

Of the band's $1 million advance:

- $500,000 is used to record the album.
- $100,000 goes to their manager.
- $25,000 go to their lawyer and business manager.
- The band pays $170,000 in taxes and fees.

In the event the record is a hit, and sells 1 million copies:

- The band makes two music videos. The videos cost $1 million to make.
    - This is 50% recoupable.
- The band receives $200,000 in tour support.
    - This is 100% recoupable.
- The record label spends $300,000 for radio promotion.
    - This is 100% recoupable.

If the 1 million records are sold at full price ($10):

- The band earns $2 million in royalties.
- The band owes the label $2 million in recoupable expenses.
- The band makes a total of $0 from the record.

The label makes:

- A gross revenue of $11 million.
- They have spent:
    - $500,000 is to manufacture CDs.
    - $1 million on the band's recoupable advance.
    - $1 million on two music videos, 50% of which is recoupable.
    - $300,000 for radio promotion, which is recoupable.
    - $200,000 in tour support, which is recoupable.
    - $750,000 in publishing royalties.
    - $2.2 million on marketing.

In total, the label makes $6.6 million from the record, before recoupable expenses are taken from the band. In the event of the record being unpopular, the recoupable funding can result in artists owing money to the label. This happens 80% of the time (Krueger, 2005). Since it

is not a loan, artists are not obligated to pay money back if they do not have it. Artists are usually dropped at this point (Makoway, 2001). In 2001, Mark Makoway, lead guitarist of the rock band Moist released *The Indie Band Bible: The Ultimate Guide to Breaking a Band*, where he painstakingly outlines everything an artist needs to know when starting a band. There is one overarching theme throughout the book where he advises: “Never sign anything without consulting a lawyer” (p. 86).

Major labels are motivated by hits. They are willing to sign many promising artists and fund them knowing that most represent a loss because one chart-topping hit is enough to offset the investment. They are also more willing to invest heavily in one proven artist than use the same money for multiple smaller bands (Makoway, 2001). In the case of independent (indie) labels, a similar scenario exists to a smaller scale, although some are known to value gradual artist development over immediate hit-making (Makoway, 2001).

The turbulent relationship between musician and label warrants the question, “Why use a label in the first place?” Despite the many stories and warnings of bad record deals, it is by far the most popular avenue for artists to take. Record labels provide large recoupable funding, a pre-existing framework for album manufacture and distribution, resources for promotional development, and tour support (Makoway, 2001). They provide a ticket to stardom if you can sell millions. The problem is most do not.

2.2.3 How Musicians Actually Make Money

Most artists never make their living from recorded music. DiCola (2013) surveyed 5,000 artists on their most profitable revenue streams. The eight most profitable, and their percent of income are shown in Table 3.

Table 3: Artist revenue streams and percent of income.

Revenue Type	Percent of Income
Touring, shows, or live performance	28%
Teaching music	22%
Salary as an employee of a symphony, band, or ensemble	19%
Session musician earnings	10%
Other	7%
Song-writing or composing	6%
Recorded music	6%
Merchandise sales*	2%

*Note that this value is especially low compared to other findings, such as in Vogel (2015) and Christman (2017).

In many cases, artists are not nearly as diverse in their revenue streams as depicted. However, it is apparent that artists make most of their money through playing live shows, and other irregular contracts. Many musicians work outside of their industry to make ends meet. These facts are reinforced in that 1% of musicians account for 77% of all artist revenues from recorded music (Mulligan, 2014). The industry is always booming if you are a superstar. Scott Welch, manager of Alanis Morissette and LeAnn Rimes, addressed this issue when he stated "The top 10% of artists make money selling records. The rest go on tour" (Connolly & Krueger, 2006, p. 6).

Touring has historically been the best way for artists to generate revenue. In fact, Winseck (2017) found that artist losses from recorded music post-1999 were replaced by concert revenue. Concert income has been fueled by an increase in ticket cost. They have increased by 400% from 1981-2012 in comparison to the 150% increase in overall Consumer Price Index (CPI) (Krueger, 2013). Profit margins for artists at live shows are very good. They can make 35% of ticket revenue, and another 50% of merchandise sales at a show (Vogel, 2015). Millennials are the top concert-going demographic, with 46% of concert attendees being within

age 18 and 34, and 57% of their music budget being spent on concerts and festivals (Nielsen, 2016). Live music, an experience rather than a good, is what they are now willing to pay for.

For most of history, recorded music was a means of advertisement for artists, aiding other revenue streams. The scope at which artists' music can reach is maximized with piracy, as it has no financial barrier for potential fans. Gayer and Shy (2006) found that when a label's profit is decreased by piracy, artist profit generated from concerts is higher. When piracy was removed from consideration, they found that one third of the artists' networks fell. They concluded that a piracy-free music industry grants labels autonomy to exercise power as a monopoly over fans and musicians.

Piolatto and Schuett (2012) found a similar result. They stated that piracy aided artists' ability to generate profit, if they had sufficient side revenues. They added that popular artists were more proficient in all revenue streams, but less popular artists still benefitted because piracy increased the likelihood of them to become popular. Alcala and Gonzalez-Maestre (2009) reinforce this through their study on piracy and profit distribution among artists. They found that piracy decreased a superstar's revenue, making the survival of niche and young artists easier with more opportunities available. Through piracy, they also believe that the chances of discovering new talent, and ability to increase popular music diversity is strengthened.

Streaming is beginning to replace piracy as the means in which people regularly access music. Industry revenues have increased for three years straight (2015-2017), with projections for continued growth. According to the IFPI (2017), the 5.9% increase in global revenue between 2015-2016 was the result of a 60.4% growth in streaming revenue, despite decreases in digital downloads (-20.5%) and physical music (-7.6%). Vinyl sales have increased steadily since 2006,

most notably eclipsing revenues from 1991 in 2016 (Bein, 2017). Vinyl now represents roughly 7% of recorded music revenues.

From an artist's perspective, the transition to streaming makes little financial difference to piracy. Artist royalty payouts are incredibly low on streaming services. Below is a chart summarizing artist revenue per play for the top nine streaming services, and the number of plays an artist needs on each to make a monthly minimum wage in the United States as of June 2018.

Table 4: Streaming service payouts per play, total users, and plays required to earn monthly minimum wage in the United States in 2018.

Streaming service	Artist revenue per play	Total users (million)	Plays required to earn monthly minimum wage
Napster	$0.0190	5	80,000
Tidal	$0.0125	4	120,000
Apple Music	$0.0074	36	200,000
Google Play	$0.0068	10	220,000
Deezer	$0.0064	16	230,000
Spotify	$0.0044	159	366,000
Amazon	$0.0040	20	366,000
Pandora	$0.0013	81	1,100,000
YouTube	$0.0007	1,000	2,100,000

(Information is Beautiful, 2018)

Streaming services are not a viable revenue source for musicians outside of those receiving monthly streams in the millions. There is a small royalty for all artists on the platform, but the real gain is through the ability for streaming to act as advertising, akin to piracy. Unlike pirated music, streaming does directly contribute to the poor distribution of wealth among artists in the music industry. It widens the wage distribution between superstar and up-and-comer even further, with 99% of streaming revenues from the top 10 most streamed songs. This leaves less than 1% of revenues to *all other music* (Krukowski, 2017).

As a music fan, a question remains about the best way to support an active artist. Attending live shows or supporting side revenues benefit artists in the high margins they receive. For music collecting, purchasing music or other merchandise at the live show or from them directly online is most effective. Sharing music with other potential fans also helps to multiply the chance of financial support. Below is a breakdown of the different scenarios in recorded music monetization.

Table 5: Units of different music formats sold and record deal scenarios needed to earn monthly minimum wage in the United States in 2015.

Platform	Record deal	Retail price	Units required to earn monthly minimum wage	Artist cut	Artist revenue per unit
Self-distributed CD	Unsigned	$12.00	105	100%	$12.00
Bandcamp album download	Unsigned	$10.00	148	85%	$8.50
iTunes album download	Unsigned	$9.99	210	60%	$5.99
iTunes single track download	Unsigned	$0.99	1,826	70%	$0.69
Retail CD	Signed	$12.00	457	23%	$2.76
iTunes album download	Signed	$9.99	547	23%	$2.30
iTunes single track download	Signed	$0.99	5,478	23%	$0.23

(Information is Beautiful, 2015)

Buying music directly from the artist, or through an artist-first web service like Bandcamp is the most effective way to support artists through their recorded music. As labels get involved, and more profit-first retailers are used, artists receive a lesser margin. Bandcamp takes only a 15% cut of digital sales, and 10% cut of physical. Since 2008, they have paid artists more than $150 million (Stutz, 2016). Zoe Keating, a Canadian classical musician, stated that through Spotify she made $1,916 in 2014. Through Bandcamp, she made $42,527 (Dredge, 2014). When

reasonable agreements are made, the recorded music industry shows signs of potential for sustainable change.

2.2.4 The Musician's Lifestyle

The poor state of economic sustainability in the music industry can be connected to the health concerns associated with some musicians. With the most commercially popular musicians making 99% of recorded music's profit, it results in challenging living conditions for the other musicians, impacting cultural sustainability via their capacity to continue making music. It mainly stems from musicians focusing on tours as the main avenue for supporting themselves financially. In a study by Kenny and Asher (2016), they analyzed the deaths of 13,000 rock and pop musicians. Disturbingly, they found that musicians have a life expectancy about 20 years lower than the general population. There are also higher rates of accidental death (up to tenfold), suicide (up to sevenfold), and homicide (up to eightfold). Wolkewitz, et al. (2011) found that musicians in their 20s and 30s were up to three times more likely to die prematurely than the general UK population. Touring is not the only contribution to this statistic, but it plays a significant role.

For example, in a recent sold out North American Tour, King Gizzard and the Lizard Wizard played 19 shows in 23 nights (Slingerland, 2018). This is not an uncommon tour schedule. Aside from the wealthiest of musicians, most artists are travelling by van, staying in cheap hotels, and eating very poorly. There is also the added stress of performing, limited finances, and the ever-constant threat of a label drop if their newest album underperforms. In a recent study, artists were found to have the fifth highest rate of depression of any occupation (Lindvall, 2010). Complimenting this statistic are food service staff workers, a common side occupation for musicians, who have the second highest rate of depression. Many musicians also

live in scenes that celebrate drug and alcohol use, though it is unclear whether it is a symptom or cause of depression (Kenny & Asher, 2016).

In an interview with Marc Burrows (2016), Rebecca Taylor of Slow Club outlined some of their financial struggles. Keep in mind that Slow Club routinely sell out venues of 2,000, get regular commercial radio play, and their videos have more than 3 million views on YouTube. To many, they are thought to be a band who has "made it." Taylor stated that she has been essentially homeless, sporadically staying on couches and sharing single hotel rooms with the rest of the band. "What a lot of people take for granted – the security of a wage, a pension, and anything around it, like a holiday – you just can't have that" she explained.

Being a musician is very hard work. There is a slim chance of ever becoming a star, and even if they are truly talented, there is no guarantee of ever becoming financially stable. Many talented musicians will quit the pursuit of music because the lifestyle is not sustainable. If the music industry valued holistic economic sustainability, and allowed for musicians to have basic incomes, and thus reasonable tour schedules and overall lifestyles, one can only imagine the advancement of the cultural landscape in music.

2.2.5 Is Recorded Music Economically Sustainable?

In the current state of the music industry, recorded music cannot be considered sustainable. Musicians are being exploited in their record contracts, and profits are funnelling toward the upper 1% of musicians more than ever. These two mechanisms push most musicians to the pursuit of other revenue streams, the most popular being very harmful for physical and mental health (Kenny & Asher, 2016; Wolkewitz et al., 2011; Lindvall, 2010).

2.3 Cultural Sustainability

Environmental and economic sustainability are storied and well documented. Both are connected in discussions of sustainable development (Pyla, 2012). In 1997, building off the idea of Social Enterprise from Freer Spreckley (1981), John Elkington connected the idea of social sustainability to environment and economics through the Triple Bottom Line (Elkington, 1998). This framework is very influential, often being drawn upon in sustainable development and corporate social responsibility (CSR) initiatives.

Since the Triple Bottom Line, culture has begun to be extracted from social sustainability as its own entity. Australian cultural analyst Jon Hawkes (2001) was the first to differentiate cultural sustainability from social sustainability in an empirical sense. It is here where the first argument for a framework accounting for the cultural impact of environmental, economic, and socially-informed decision-making was made. Soini and Birkland (2014) define cultural sustainability as maintaining cultural beliefs, cultural practices, heritage conservation, and culture as its own entity, while also considering the question of whether the affected cultures will exist in the future.

In 2009, Jeff Todd Titon clarified cultural sustainability in music through making connections to ecology, and notably not referring to social sustainability. He defined first that musical culture is a group's total involvement with music: ideas, behaviour, artifacts and material culture, institutions, and product. In his analysis of music and sustainability, he argues that cultural sustainability can be achieved in music if four principles are respected: diversity, limits to growth, interconnectedness, and stewardship.

As the previous economic section has shown, in the context of music, cultural sustainability is fused to and hindered by poor economic sustainability. The current state of

musical economic sustainability works in nearly complete contradiction to what Titon (2009) states is required for cultural sustainability. In a more culturally sustainable music system, it offers the potential for progression in music.

2.3.1 Is it Diverse?

The music industry does not support sonic diversity. The industry thrives on the mass production of parody and nostalgia, putting innovation and progression aside. Reissues of albums are becoming more prominent because of their extreme profitability – a fraction of the effort is needed, and it is guaranteed to sell (Erlewine, 2016). The same can be said for reunion tours, as the fanbase is already established. KISS famously had a farewell tour in 2000, only to have 11 tours afterward, all under the guise of "this may be the last one" (Jenke, 2018).

In commercially popular music, "new" is often a façade better represented as "renew." Norman Blake of Teenage Fanclub once sarcastically addressed the music industry, suggesting that "Any music that *doesn't* sound like anything else in rock music always sounds *terrible*" (Reynolds, 2011, p. xxxii). For example, if some of the top-charting songs of 2017 are analyzed, it becomes clear that they are often a rework of the past. Harry Styles' "Sign of the Times" (Bhasker, Salibian, & Johnson, 2017) is bursting with 70s revival. The most obvious connections are to Pink Floyd, David Bowie, and Queen. At the core of Selena Gomez's "Bad Liar" (Kirkpatrick, 2017) is a sample taken from The Talking Heads' "Psycho Killer" (Bongiovi & Quinn, 1977). Portugal. The Man's "Feel it Still" (Bateman et al., 2017) nods to 70s disco and funk in its bassline and falsetto vocals. Taking nostalgia to the bizarre is Charli XCX's "Boys" (Lowe & Hansson, 2017), which is driven by a sample taken from 1985 Super Mario sound effects. Nostalgia sells, and the music industry profits most through the hits of the present. Top-charting music is a Trojan Horse for the past.

Recordings are a permanent encapsulation of time, and they can be used as building blocks for forward progression. When there is too much obsession with the past, progress can be stalled. Obsession is aided by availability. Reynolds (2011, p. 28) claims that "for a historical account to work it requires filter, otherwise the sheer sludge of information silts up the narrative flow." Digital recordings are making the past more accessible than ever before. In 2000, catalogue sales (physical recordings older than 16 months) accounted for 34.4% of album sales in America. Current sales (physical recordings newer than 16 months) were 65.6%. By 2008, catalogue accounted for 41.7%, and current was 58.3% (Reynolds, 2011, p. 64). In 2009, MP3s were added to the same analysis. Most digital sales were catalogue, at 64.3%, whereas current stood at 35.7% (Reynolds, 2011, p. 65). Assuming a consistent amount of new music being created, these results show the increasing ignorance of current recordings in favour of the past.

Current top-charting music (#1-#5 on Billboard) has also been proven scientifically to lack sonic diversity. Jehan (2005) published a dissertation featuring a framework for artificial intelligence-created music. The immediate implications of the framework were that it was able to reduce songs to a set of eight datapoints. These are danceability, energy, speechiness, liveness, loudness, acousticness, valence, and instrumentalness. Jehan then co-founded EchoNest, which was bought by Spotify to be the base of their recommendation systems. Using data from EchoNest, it was found that top-charting music has been gradually becoming more similar, with 2012-2016 the peak of homogeneity (Askin & Mauskapf, 2017). Two other recent studies using similar methodologies found the same result (Serrà et al., 2012; Mauch et al., 2015). These findings can be attributed to two major trends in the music industry.

Firstly, song-writing credits are increasing. In the 1980s, a song-writing team was usually comprised of two people. Today, over half of top-charting songs are written by more than four

people, with some reaching over 10, such as “Uptown Funk” (Lawrence et al., 2015). This mode of song production is factory-like, with teams assigned specific snare and bass tracks, for example. John Seabrook, author of *The Song Machine: Inside the Hit Factory*, describes this as a “track-and-hook” method (2015), where songs are put together like a recipe. He admits that this process “doesn’t lend itself very well to art,” whereas tech writer Nicholas Carr stated that top-charting music “has been so thoroughly industrialized that it makes the old Motown ‘Hit Factory’ look like a sewing circle” (Thompson & Daniels, 2017).

The second major change in the industry connecting to diversity is the increasing number of hit songs per major producer. As teams for writing songs increases, the number of individuals in charge has concentrated. From 1985-1989, 19% of top-charting songs were produced by the top 10 producers. This value spiked from 2010-2014, with 43% by the top 10 (Thompson & Daniels, 2017). The most notable producer has been Max Martin, who has produced or co-produced 22 number one hits since 1999.

Streaming concentrates profits toward the most popular artists more than ever before (Krukowski, 2017). With the industry in this state, it discourages diverse artistry. Industry provides access to and only supports artists who sound like the past or are willing to have their songs produced by hit-makers, weakening sonic diversity. There is not enough financial security to warrant something new when this system is more profitable than it has ever been. It leaves novel artists struggling to make ends meet, with the constant temptation to parody what is, or was, popular.

2.3.2 Does it Grow Sustainably?

As section 2.2 on economic sustainability has shown, the music industry, especially the major labels, possess a growth-oriented capitalist mindset. Preference of instant profitability over

artist development and innovation compromises cultural progression, and artist livelihood (Titon, 2009; Kenny & Asher, 2016). From a cultural sustainability perspective, this would not be considered sustainable growth nor adequate dispersal of resources to achieve such.

The current state of recorded music could be considered economically sustainable, and desirable, from the industry's point of view. It is fueled by the abuse of nostalgia, hit-makers being concentrated to a small group, and top songs again bringing in payouts. This growth has been shown by the annual revenue improvements the music industry has experienced since 2015 (IFPI, 2017). The industry, not the musician, is set for sustainable growth for years to come.

2.3.3 Is it Interconnected?

Piracy was the great intervention for the music industry. Unlike the other cultural sustainability requirements from Titon (2009), the music industry can be considered interconnected because intervention in one area (recorded music) created a response within another (live music). With the drop in profit from recorded music since 1999, the music industry pivoted from records to live and streamed music. The industry was forced to give up selling records and move to selling experiences. It is most apparent, and profitable, through the development of large-scale music festivals.

Experiential music has proven to be a successful response to piracy. Since 1998, the music industry as a whole (labels, artists, concert-organizing companies, and tech companies) has grown from $1.26 billion to $1.4 billion (Winseck, 2017). Although the profits pre-piracy for labels have not been achieved, the re-monetization of music has largely been a success. The main cause is in the growth of the live music market. Live Nation, the world's largest concert-organizing company, announced in 2017 that they had six straight years of record-setting revenue (Brooks, 2016). Trending with the rise of live concerts has been the development of

large-scale music festivals. On average, for a fee of $300 per weekend, fans have access to 70 festival sets. This poses substantial value to a consumer, and extreme profit for concert-organizing companies. In the United States, the top ten music festivals sold $195 million in tickets in 2014. This does not include sponsorships, merchandise, or food and alcohol sales (McIntyre, 2016). Artists make more money playing festivals in comparison to individual shows on tour, and often play to larger audiences, offering the potential to make new fans (Makoway, 2001).

However, these festivals suffer from the same sonic diversity issues of recorded music, taking nostalgia to the live experience. There is also a major gender imbalance. Of 10 festival lineups analyzed, Vagianos (2016) found the gender split to be 78% men-only acts, 10% mixed-gender groups, and 12% acts with only women. Although there are festivals supporting diversity, experimentation, and local talent, these are not nearly at the scale or financial influence of the mega-festivals.

2.3.4 Is there Stewardship?

Musicians are the caretakers of music. Artists are the only stakeholders who possess the ability to innovate and move music forward. Despite the current state of music sustainability, there remain instances where musicians show a caretaker mindset. Four side revenues showcased by DiCola (2013): live performance, teaching music, session recording, and song-writing for others all reflect stewardship rather than ownership of music. They are housed in collaboration and sharing.

However, due to the economic focus of the music industry, ownership must be tied to care in recorded music to ensure musicians are legally protected and benefit from their work. Ownership is the backbone of copyright. In music, when an original composition has been fixed

to a medium and can be reproduced, the composer is granted exclusive rights to reproduction, distribution, performance, and derivative works (Lessig, 2004).

Although copyright ensures proper acknowledgement, when it is too restrictive it limits the potential for creativity and innovation (Lessig, 2004). Since music's first monetization, there have been hundreds of lawsuits between musicians. There are some copyright circumstances that are blatant plagiarism. Vanilla Ice's "Ice Ice Baby" (Vanilla Ice et al., 1990), which topped the Billboard Hot 100 in 1989, has a sample from Queen and David Bowie's "Under Pressure" (Mercury et al., 1981). Although the sample was clearly taken from "Under Pressure," Queen and David Bowie were not given any song-writing credit or royalties. Legal representatives of Queen and David Bowie threatened a copyright infringement lawsuit, which resulted in a settlement out of court and requirement to pay sizable financial re-compensation (Runtagh, 2016). With permission and proper funding, creativity can still exist. However, permission and funding are often resources exclusive to the wealthy.

A more ambiguous case of copyright is in Robin Thicke, T.I., and Pharrell's "Blurred Lines" (Thicke et al., 2013). In 2013, the family of Marvin Gaye issued a copyright claim that "Blurred Lines" infringed on Marvin Gaye's "Got to Give it Up" (Gaye, 1977; Pharrell Williams v. Marvin Gaye, 2017). Unlike "Ice Ice Baby," this lawsuit was opaque in where the plagiarism lied. Gaye's family stated that the "feel" and "sound" of "Got to Give it Up" was being stolen, but in copyright law no "idea, procedure, process, system, method of operation, concept, principle, or discovery" is eligible for protection (S. 102(b) Copyright Act, 1976). In other words, feel and sound do not count.

Pharrell made the false allegations clearer when he stated the obvious: "Go to the piano and play the two. One's minor and one's major. And not even in the same key" (The Associated

Press, 2013). Questlove, bandleader of the Roots, supported Pharrell in this statement: "Technically it's not plagiarized. It's not the same chord progression. It's a feeling… We all know it's derivative. That's how Pharrell works. Everything that Pharrell produces is derivative of another song – but it's a homage" (Rosen, 2013).

Despite the legal and professional support that "Blurred Lines" did not infringe on "Got to Give it Up," on March 10, 2015 the jury unanimously found Robin Thicke and Pharrell liable for copyright infringement, owing $7.4 million in damages (Runtagh, 2016). The ruling was appealed, and in 2016 over 200 professional musicians filed an amicus brief in support, stating "The verdict in [the] case threatens to punish songwriters for creating new music that is inspired by prior works" (Blisten, 2016). Despite this, the result of the appeal was to uphold the original verdict. The music industry is in a state where they are thriving on nostalgia but are also volatile with copyright.

When copyright is weakened, creativity can flourish. In November 2017, King Gizzard and the Lizard Wizard released their fourth of five albums that year, *Polygondwanaland*. They released the album for free on MP3, but also gave all the relevant information for pressing vinyl, cassette, and CD, stating "Ever wanted to start your own label? Go for it! Employ your mates, press wax, pack boxes… We do not own this record. You do" (King Gizzard and the Lizard Wizard, 2017). The band waived their reproductive and distributive copyrights. The result has been over 200 different physical album creations, each with their own unique designs, quirks, and organizations (Discogs, 2018).

Aside from songs that are a part of the public domain (after a 50-year term of protection in Canada), performance and derivative copyright remain rigid. However, if an artist goes through the proper legal process, a sampling deal can be made. Since the early 2000s, it has been

increasingly difficult and expensive to get sampling permission from artists. In 2000, electronic musicians the Avalanches released *Since I Left You* (Chater & Seltmann, 2000). It is said to have contained over 3,500 samples. In 2016, they released their major label follow-up, *Wildflower* (Chater & Di Blasi, 2016), which contained only 50 (Brent, 2016). The cost breakdown of *Since I Left You* is unknown, containing public domain, unrecognizable remixing, and various niche music and film. But in 2000, samples were much easier to use, and cheaper to gain licence to. *Since I Left You* is the highest rated electronic album in the history of aggregate review website Metacritic (Metacritic, 2018). If it was made in the present day, it would never see the light of day.

In an interview with Spin, rapper El-P was questioned about the declining use of samples in hip-hop, to which he replied, "The people that do sample [are the ones who] can afford to" (Newton, 2008). The RZA of the Wu-Tang Clan attested to the increasing cost of sampling, when he stated "In the old days, samples were $2,500 or $1,500. I paid $2,000 for a Gladys Knight sample for 'Can it Be All So Simple' off *Enter the Wu-Tang (36 Chambers)*… Something like that nowadays would cost $10,000" (Brent, 2016). Restrictive and expensive copyright law in the music industry has forced a value of ownership, rather than stewardship. The monetary value of recorded music is overshadowing the value of cultural progression.

2.3.5 Is Recorded Music Culturally Sustainable?

Musical culture is far from sustainability. Diversity is being undercut by the fandom, and thus funding for nostalgia and similarity. Growth of the industry does not have sustainability in mind, as record labels struggle to regain their dominance, and concert organizers show no sign of slowing. Music is notably interconnected, with a shift in focus from recorded music to live experiences. Finally, the music industry does not foster stewardship of music. The grip over

copyright is tightening while nostalgia is becoming more profitable, posing a serious issue moving forward.

In Titon's (2009) four principles for cultural sustainability in music, collectors can positively affect the theme of diversity. Purchasing music and attending live shows can directly support those diverse musicians. Collectors can also affect the growth of the industry through buying music gradually, methodically, and locally. Interconnectedness is mostly impacted by consumers in general, rather than collectors, with more money funnelling toward live experiences than ever before. Akin to diversity, stewardship can also be influenced by collectors through the purchase of recorded music and attendance at live shows, or investment in other artist revenue streams involving the maintenance of musical tradition. All of these themes tie to economic sustainability, as they have a core of financial support alongside cultural encouragement.

2.4 The Current State of Recorded Music and Sustainability

In the current state of music collecting, it is limited in environmental, economic, and cultural sustainability. A focus on permanence and obsolescence hinders the environmental pillar. Poor wealth distribution and challenging musician lifestyles as a result are the root of poor economic sustainability. The music industry's focus on conformity, growth, and ownership challenges cultural sustainability. However, these problems are not static. Consumers can build, hinder, or maintain these issues through their spending decisions.

2.5 College Radio and Collecting

The literature has revealed that music is influenced to a great degree by consumers. Although there are other actors influencing the ways in which the music industry operates

currently, the power remains in consumers' hands. Consumers do not directly dictate the frameworks responsible for the lacking sustainability of recorded music, but they do buy into them and give them strength. The music industry will always gravitate toward the financial decision-making of the consumer (Witt, 2015). Therefore, consumers are the most critical stakeholder to understand. This research is directed toward consumers who have influence over and involvement with other consumers – college radio programmers. Along with being music collectors, programmers host a combination of traits that make them critical pieces of the music system: spending more on music than average, broadcasting music of their choice to listeners, actively participating in local music scenes, and supporting musicians they enjoy (Fauteux, 2015; Merrill, 2008; Wall, 2007). They became the focus of the study because they offer a unique combination of influence on the music system, and desire for music collection.

As collectors, college radio programmers engage with music on a deep level. Formats of vinyl, cassette, CD, MP3, and streaming all offer unique reasons for their collection. With physical formats of vinyl, cassette, and CD, these offer desirability in great visual and tactile appeal (McCourt, 2005; Bitzilekis, 2016; Yochim & Biddinger, 2008), nostalgia (Spitznagel, 2016; Shuker, 2004; Bitzilekis, 2016), and sound quality (Levine, 2007; Corbett, 2017; Yochim & Biddinger, 2008). In Nick Hornby's classic *High Fidelity*, he describes collecting physical music poetically: "It's not like collecting records is like collecting stamps, or beermats, or antique thimbles. There's a whole world in here, a nicer, dirtier, more violent, more peaceful, more colorful, sleazier, more dangerous, more loving world than the world I live in; there is history, and geography, and poetry, and countless other things I should have studied at school, including music" (p. 83, 1995). Physical music collecting offers a powerful, multisensory way to

engage with music, best simplified in a quotation from McCourt (2005) where he describes physical collection as simply being "emotionally gratifying."

Digital formats offer a different way to collect. Rather than physical goods, collectors attain data and lists. New work in media studies has shown that despite missing some of the aesthetics beloved in physical music, digital collecting can still be personally gratifying (Hagen, 2015; McCourt, 2005; Burkhart, 2008; Magaudda, 2011; Szymanski, 2010). Digital media offers value in utility, such as their portability, ease of use, and ease of attainment; a style attributed more to "fluidity, rather than integrity" (McCourt, 2005). They also offer different avenues for recontextualization within collections (Zhong et al., 2013; Hagen, 2015). An example is in Spitznagel (2016), where he describes how MP3s can be organized by personalized genres: "'Alternative & punk' and 'Rock' doesn't tell me anything meaningful about my music. So I've organized my MP3s into categories like 'Androgynous Pop-Rock' and 'Mildly Annoying Baby Boomers' and 'Indie Rock I'm Marginally Interested In'" (p. 68). Digital music can also be dynamic and engaging, as Burkhart (2008) describes online music searching as "soul-searching that can relieve the collector's fetishes." Digital media offers different value to music collecting, but nevertheless can still be very satisfying for collectors.

Chapter 3: Methods

3.1 Research Approach

The purpose of the study was to uncover the extent to which Trent Radio Programmers considered the environmental, economic, and cultural sustainability of their recorded music collections. The Programmers' reasons for why and how they collect physical and digital music were also explored. Interviews were used as the primary method for addressing these questions. Interview protocols were approved by the Trent University Research Ethics Board before conducting the interviews. Informed consent was gained from all participants (form available in Appendix C).

The study was based within a grounded theory approach. It is defined by Creswell (2014, p. 42) as research that "derives a general abstract theory of a process, action, or interaction grounded in the views of the participants." The limited existing research within the study's niche of sustainability and recorded music deemed a grounded approach most appropriate.

The study used a qualitative research style, with one-on-one interviews as the means of data gathering. Interviews were chosen because context from the individual level was needed in grounding the research, and they provided opportunities for anecdotal evidence and background for use in the results and discussion sections. Interviews provide a straightforward approach that complements the use of grounded theory in a novel topic. However, these interviews were semi-structured in recognition that grounded research by nature cannot anticipate all the lines of inquiry that emerge during an interview.

3.2 Population Description

Peterborough is in Southwestern Ontario, roughly two hours from Toronto, and has a population of 80,000. It has representation from many demographics, due to its blue-collar history, surrounding rural area, growing immigrant population, many small independent businesses, and two post-secondary institutions.

Peterborough is a unique microcosm of art and culture. Despite a relatively small population, its downtown alone hosts over ten venues for touring musicians, and over ten art galleries. It is also host to many youth-oriented music programs, such as the Peterborough Integrated Arts Program, Rock Camp for Girls*, and the Kawartha Youth Orchestra. Peterborough's art initiatives, student population, and unique venues aided in the development of a distinct music scene that is more populous and diverse than a city of its size should warrant. Currently in production is a documentary titled *The Radius Project*, which focuses on why there are such a wealth of major musicians coming from in and around Peterborough (Hurcomb, 2018). The Peterborough area has bred many commercially successful artists, such as Neil Young, I Mother Earth, My Darkest Days, Serena Ryder, Royal Wood, Metric, Skid Row, Three Days Grace, Ronnie Hawkins, Willie P. Bennett, and The Strumbellas. Most notable is the sonic diversity coming from the region, with this list of artists representing genres of folk, alternative rock, metal, country, and pop.

Peterborough was chosen as the population for the study because of its thriving art scene and the presence of Trent Radio. Trent Radio Programmers were chosen as the specific group of subjects because they are a recognizable group of music appreciators in Peterborough. Many of the Programmers are participants in Peterborough's live music scene, active musicians, and/or passionate music collectors.

Trent Radio is a community radio and production facility in Peterborough, Ontario. It is a non-commercial, non-profit charitable organization that offers producer-oriented programming. Trent Radio does not require programming of a particular style, but it does push for "exceptional programming… [that is] innovative, unusual, diverse, and communicative" (Trent Radio, 2008). The Programmers benefit from the training for, and use of the sophisticated Trent Radio studios, while Trent Radio benefits from their voluntarily provided content. There are roughly 100 Programmers at Trent Radio during the fall and spring seasons, and 50 during the summer season. There are three full-time staff members, and four part-time workers at the station.

The Programmers are required to state on air that they are "broadcasting through the facilities of Trent Radio," to project full ownership of the programming they are providing. Apart from meeting the requirements of the Canadian Radio-television and Telecommunications Commission (CRTC), the Programmers are empowered to broadcast anything they please. Trent Radio will organize programs to ensure they are scheduled to an appropriate length, and daily program lineups are unrepetitive in topic.

The demographic of Programmers at Trent Radio is wide. Students at Trent University represent a significant portion of Programmers, along with community members from Peterborough and the surrounding area. John K. Muir, Trent Radio's General Manager, when asked to profile the typical Trent Radio Programmer, stated "I would be unhappy if you could find it, and would do whatever I could after having found it, to undermine it." The inclusive mindset of the organization has resulted in a wide variety of programs, from world politics and Christian music, to writing an original song in 30 minutes, and learning the autoharp live on air. Although all are invited to participate, there are some relevant generalizations about the population. Due to the high population of Trent students, most Programmers are under 30 years

old and have at least some university education. Although radio shows are in no way limited to being about music, roughly 80% of programs have a musical focus.

The Trent Radio population has an active interest in recorded music, band apparel, and live shows, requiring personal financial investment. They also support musicians through sharing music on radio or with other Programmers. They use many avenues to influence the music industry. Interviewing Trent Radio Programmers does not generate results that are applicable to the entire Peterborough population. Since a small group of Programmers were interviewed for this study, the data collected is not representative of Trent Radio's entire population. However, interviewing this group does provide insights to the niches of music collectors, college radio programmers, and local music supporters.

3.3 Interview Strategy

The only instruments used in the study was an interview guide and recording device. The Programmers were presented with the same set of questions, organized into four main sections: why they collect their formats, how they collect their formats, their thoughts on sustainability, and their opinions of streaming services. In total there were 19 questions asked.

Questions were designed in a semi-structured style, and the guide was made to ensure that all Programmers were prompted with the same questions in the same order. The "Why?" and "How?" sections of the guide were developed to aid in the comparability of the demographic to other studied populations, whereas the sustainability and streaming sections focused more on exploration. A copy of the interview guide is available in Appendix A.

All interviews were conducted by the primary researcher. Interviews were done at the primary researcher's office, or a nearby seminar room if the office was unavailable. The office is located at Wallis Hall, at Trent University's Traill College, in Peterborough, Ontario, several

blocks from Trent Radio. Upon the arrival of the interviewee, consent forms were signed, and the general structure of the interview was explained. At this point the recording device was turned on, and the interview began.

Interviews were administrated in an open-ended, conversational style and lasted between 20 and 60 minutes. If clarification about a question was requested, it was granted. In all cases cultural sustainability needed to be defined for the Programmers, in which case the same definition was used for all. This is available in Appendix A, under question 13. The Programmers were offered the ability to go off the record at any point to clarify themselves or speak to points that they did not want included in the study.

Every Programmer was prompted with the same set of questions, in the same order. The amount of time spent in each section was often proportional to the number of different formats the Programmer collected. In the case of some Programmers having stakes in all five formats of interest, sections of the interviews focusing on how and why they collected were more time consuming. Interviewees were left to speak feely when answering questions, but in some cases where clarification or a secondary question was needed, they were asked.

3.4 Data Gathering

Thirteen interviews were conducted from January 2017 through March 2017. Participants were recruited via three avenues: poster advertisements in the Trent Radio facility, two mass emails to Programmers actively programming during the time of collection (available in Appendices D and E), and snowballing via word of mouth. A snowball strategy involves asking participants to refer other Programmers whom they know personally to participate in the study (Patton, 2015). All active Programmers had the opportunity to participate, but the use of a snowball technique does skew opportunity toward Programmers with personal connections to

those already interviewed. The only requirement of participants was that they were active Trent Radio Programmers during the timeline of the interview period. Interviews were recorded with an audio recorder. All audio data was transcribed verbatim. One supplementary interview was conducted to add context to the study. John K. Muir, the General Manager of Trent Radio and an experienced Programmer, was interviewed to gather his expertise on the history of Trent Radio and the demographics of its Programmers.

3.5 Means of Analysis

Transcribed interviews were uploaded to NVivo 11 Professional, a qualitative data analysis computer program. A thematic coding analysis was conducted on NVivo, where all themes from every Programmer's interview were coded and organized. Coding was done by the primary researcher. Data was organized by interview question. Questions were given a folder, and each answer's themes were coded within. For example, in the case of the question "Why do you collect the formats that you do?", if a Programmer stated that they collected vinyl because of its nostalgic value, the coded statement would be labelled as "Nostalgia" and placed in the folder of "Why Programmers collect vinyl."

In some cases, interview statements held connections to many different themes. For example, one statement could hold themes of nostalgia, physical aesthetic, and sound quality. In this case, the same statement would be coded for all three themes within a question's folder. In other cases, answers were applicable to other questions in the interview. In this scenario, the statement would be coded within any question folder where the theme(s) were applicable. An example could be for the question "Why do you collect the formats that you do?" If a Programmer stated that they collected cassettes to support local artists, this answer would fall into the question folders of "Why do you collect cassettes?", "Do you ever consider the

economic sustainability of your collection?", and "Do you ever consider the cultural sustainability of your collection?" with the coded theme of "Artist Support."

3.6 Presentation of Results

In the results chapter of the study, results were presented in a similar organizational style to the coding strategy. The general structure of the interview guide was used in the presentation of findings. Every theme from the thematic analysis was not presented in the results section. Due to the very large number of themes identified in the interviews, a more concise presentation style was needed. In each subsection, the most reoccurring themes from the thematic analysis were presented. In the case of questions with many reoccurring themes, the cut-off for inclusion was fewer than three Programmers stating the same theme, unless there was a particularly interesting insight. In the case of questions with minimal codes, reoccurring or otherwise, any themes with greater representation than one Programmer was used. Showcased themes in the results section were up to the discretion of the primary researcher, and if a different researcher was presenting data, the themes that were showcased may have been different.

Chapter 4: Results

4.1 The Programmers' Definition of a Music Collection

The Programmers had multiple viewpoints regarding what is to be considered a music collection. In general, the Programmers considered them to be copies of different recorded music owned by an individual. Some Programmers had more specific requirements of a collection, such as active organization, physicality, calculated additions, or the ability to trigger memories. One Programmer only considered music collections as consisting of vinyl, cassette, and CD formats. Eight felt it should be restricted to vinyl, cassette, CD, and MP3, whereas four believed that vinyl, cassette, CD, MP3, and streaming should all be included.

4.2 Collecting Vinyl, Cassette, CD, and MP3; Using Streaming

The following section addresses the research questions focusing on why and how Trent Radio Programmers collect their formats of choice. Their methods are presented for vinyl, cassettes, CDs, MP3s, and streaming services.

4.2.1 Vinyl

Vinyl records were collected by eleven of thirteen participants and all agreed that it should be considered a collectable format. Vinyl is an overarching term that includes 12" LPs, 12" EPs, 12" singles, 12" maxi singles, 12" picture discs, 10" LPs, 10" EPs, 10" picture discs, 7" singles, 7" flexidiscs, and 7" picture discs. Reasons for collecting vinyl records were housed within three key themes: visual appeal, entertaining friends, and its "different" sound. Regarding visual appeal, the physical size of vinyl was the major component. Vinyl record sleeves measure 31.43cm x 31.43cm, by far the largest of the formats investigated in the study. For comparison, CDs are the second largest, most commonly 12.00cm x 12.00cm. A larger surface area offers

greater size and detail for the album artwork to be showcased and identified. For some Programmers, the size of vinyl represented a greater sense of ownership and physicality in comparison to other formats. Of the eleven Programmers who collected vinyl, eight of them mentioned their visual or physical appeal as a primary reason for collecting them.

The second most prominent theme that arose was the desire to use vinyl records for entertainment. Connecting with the visual appeal of vinyl, some Programmers cited the ability to look at and go through the collections of others, and vice versa, as a key component of their value. Due to the physical presence of vinyl records, they are often showcased in common spaces and are available to be explored. A connecting social piece was having a vinyl-themed party or an event at a party focused on vinyl. One Programmer, Hayley R., mentioned having a birthday party where friends came with their vinyl and they took turns playing them. Another Programmer, Jason S., mentioned that it is a common event during his parties to bring guests to his collection, where they will debate and pick an album side to play. Similarly, Nick S. recounted his times bringing vinyl to friends' houses for parties, whereas Shannon C. attended vinyl listening parties. In total, nine of eleven vinyl collectors included entertaining others as a key piece of why they collect the format.

The third theme mentioned throughout was vinyl's different sound. One Programmer was very passionate about the greatness of vinyl's sound quality above all else, whereas another explicitly challenged this idea. Sound quality did not emerge as a theme, but vinyl's "different" sound in comparison to other formats was consistent. Imperfections were viewed as a positive aspect of the listening experience. Daniela L. described the sound as "a little ragged" and Greg B. stated that vinyl's cracks were "cool to hear." Five of eleven vinyl collecting Programmers mentioned its different sound as a key reason they collected it.

Some themes that reoccurred to a lesser degree in the vinyl discussion were focused on nostalgia and the history of the record. In terms of nostalgia, it was a deeply personal connection to the vinyl object. Pippa O. showcased this idea when she told the story of her only piece of vinyl: “The one vinyl that I actually consider mine, that I won’t be getting rid of is from a… recording of a musical that I really like that my dad got… and I would listen to throughout my childhood. And we used to have a record player… and he got rid of most of his record collection, but me and my brother saved that vinyl.” Three collectors stated they had deep sentimental value for specific pieces. On the other hand, some collectors were drawn to the history of the record itself, such as release date, producer(s), or recording studio. Three Programmers mentioned the idea of history as a key reason why they collected vinyl.

When the Programmers were asked how they used their vinyl collections, there were two predominant themes. Primarily, vinyl was used in an intimate setting in the home, alone. Seven of eleven Programmers used vinyl this way. The Programmers mentioned going through the process of compartmentalizing their time at home so to ensure the proper time was available to listen to the entire record, or one whole side without interruption. Although vinyl was collected by eleven participants, only six admitted to actively using their collections with any regularity. Lack of access to a functioning player, and preference for another format were the primary reasons for this.

4.2.2 Cassettes

Cassettes were collected by eight of the thirteen participants, and all believed they were a collectable format. There were two primary reasons the Programmers collected cassettes: necessity and artist support. Cassette exclusives were a key driver in their collection, with five Programmers speaking to that theme. Some interviewees who were active local musicians

mentioned how cassettes are viable because they are less financially demanding to produce, have a good profit margin, and still offer a physical piece. In some cases, if the Programmers wanted to listen to an artist's music in general, a cassette purchase was a requirement. Second to format exclusivity, three Programmers stated that their cassettes were mainly purchased as a means of supporting artists.

Despite the Programmers' reasons to collect and sometimes produce cassettes, most were critical of their sound quality and quick deterioration in comparison to other formats. Three Programmers openly critiqued the sound quality of cassettes. One Programmer who was also an active local musician stated that musicians should not produce cassettes, favouring vinyl, as it represents greater confidence and investment in their art.

A minor theme was cassettes' small size and portability, with four Programmers mentioning that factor, although they have mostly moved on to smaller and more portable formats, such as MP3. Of the eight Programmers who have cassette collections, five admitted to not actively using them. With that said, one Programmer recently purchased a new Walkman for using his cassettes again. Some cassette collections were used sporadically on radio shows, by virtue of not personally having a functioning player.

4.2.3 Compact Disc (CD)

Of the thirteen participants, eleven collected CDs, and all participants believed they should be included as a collectable format. The primary reason the Programmers collected CDs was because they felt required to at the time. Eight participants offered that because CDs were the dominant format of the 1990s and early 2000s, they were forced to buy them if they wanted to own music. This can be attributed to the fact that six Programmers interviewed were over the age of 30, meaning they lived through the dominant CD era of the 1990s and early 2000s.

A lesser mentioned theme was nostalgia, with three collectors stating that their CDs strictly represented an era of their listening history. Annette P. stated her CDs were "grounded in [her] high school/elementary school world," whereas Bennett B. adds that his CDs are mostly from the "early mid-90s to 2005 when nobody was pressing records." Due to the eras CDs represented, there were memories from that time directly associated with them. Jason S. exemplifies this dynamic in the following excerpt: "Every piece that I have in my collection, be it tape, or CD, or whatever, I've got a story behind. Skipping school on Tuesday to go to Music World to buy a CD… That's why I don't get rid of them, cause I can just walk past that shelf and have all my memories of acquiring them too." Jason S. is a collector who does not regularly use CDs, yet he stated their nostalgic value was strong enough to warrant their maintenance and display. The second most occurring theme was that CD collections act as a physical backup for MP3 collections, due to their ability to be imported onto computers. Five Programmers stated this. Many Programmers noted that their MP3 and CD collections overlapped.

Similar to, but not as predominantly as vinyl, three Programmers mentioned the physicality and aesthetic of CDs as a key reason for their collection. Hayley R. showed this idea in her interview: "There still is, almost a visual element to having a CD collection. [You] can flip through them physically and look at them. Read the inside pamphlets and stuff, and it's not something you can do if all of your music is just on your computer." She also mentions the liner multi-page booklets unique to CDs, which were also cited by three other Programmers as a key piece of their value. Interestingly, all three Programmers who cited CD liner notes also collected vinyl, but only one of them mentioned liner notes when discussing it. In the case of sound quality, CDs did not have the same level of discussion as vinyl. Five of eleven collectors mentioned the "different" sound of vinyl, but in the case of CDs, only one of eleven collectors

mentioned sound. The lone Programmer valued CD sound quality for their ability to be played loudly.

More predominantly than all the other formats, seven Programmers mentioned buying CDs at live shows as a means of supporting musicians. Along with cassettes, CDs are the most regularly available format at local live shows. CDs purchased at live shows were stated to physically represent the memories of the show, akin to a souvenir.

Six of eleven Programmers do not presently use their CDs. Most Programmers have moved on, focusing their current listening on vinyl or mobile technologies. For the five who do use them, they were mainly used in the home. Four collectors used their CDs while traveling in automobiles. Many cars from the mid-90s through late 2000s are still functioning and are equipped for only CDs. It was stated in one case that CDs were more disorganized and prone to damage when being used in the car than at home. There was no mention of mobile CD player use currently.

4.2.4 MP3

All thirteen participants had MP3 collections. Twelve of thirteen participants believe MP3s should be considered a collectable music format. MP3s were the most frequently discussed of all music formats, with reoccurring themes related to storage, convenience, and cost-effectiveness. Note that many benefits in MP3 collection can be magnified, and financial commitment minimized, with the use of piracy rather than online stores or download cards.

The most popular motivator for collecting MP3s was the ability for the Programmers to store and accumulate them easily. MP3s are nearly weightless, and thousands can be stored on hard drives or mobile devices no larger than the average CD. There were some examples of immense accumulation. The largest belonged to Joshua S., who had a collection of over 200

gigabytes of underground rap music. Ten of thirteen Programmers discussed the accumulation of their MP3s as a key piece in their value.

The second most prominent theme was convenience and mobility. Complementing the themes of easy storage and accumulation of a collection, ease of attainment was a major contributor to the Programmers' affinity for the format. MP3s are usually bought from online stores that can be accessed at any time via mobile devices with internet access. MP3s are also very portable. With a MP3 player no larger than a cassette, a Programmer's full collection could be carried at all times. Eight Programmers cited this as a valuable aspect of their MP3 collection.

The third most prominent theme was the minimal financial commitment involved in collecting MP3s, with four Programmers stating this as appealing. On a per-album basis, MP3s were determined to be the cheapest format to buy and collect while maintaining a sense of ownership. MP3s also allow for single song purchasing, giving collectors the autonomy to pick specific pieces from an album to add to their collections. The minimal financial commitment also allows for collectors to try an album on MP3 before making a larger commitment of purchasing the same work in a physical format. This connects to the theme of discoverability, where the Programmers used MP3s as an avenue to find new music in a low-risk setting. In the latter half of the try-before-you-buy system, the Programmers were adamant in their commitment to buying a physical format if they deemed the music good enough. For example, Bennett B. stated that "90% of the time" he would eventually buy the vinyl of something he enjoyed. Three Programmers use the try-before-you-buy method with MP3s. Contrary to vinyl, cassette, and CD, there was no mention of sound quality in the MP3 discussion.

Of the eleven Programmers who still used their MP3s, all were on mobile devices used in a combination of at home and on-the-go. The two Programmers who no longer use their MP3s

stated that they had moved on to streaming services as a replacement. Four Programmers also actively used their collections for their radio shows.

4.2.5 Streaming Services

All Programmers currently use a streaming service. At the very least, a free service such as YouTube, or Spotify's free tier was used. Three Programmers used a paid service, such as Spotify Premium, Apple Music, or Tidal. Streaming was most commonly mentioned as not being a collectable format, as it was felt that there was no form of personal ownership. Nine of thirteen Programmers did not believe that streaming services were a collectable format. Streaming drew many comparisons to radio, satellite radio, or using a public library because of the large amount of media, but never outright personal possession. Hence, they cannot be referred to as "collectors" in this section. Rather, they are labelled as "streaming users."

The greatest reason why the Programmers used streaming services was for the discovery of new music, with nine of thirteen mentioning this. The idea of streaming being "guilt-free" was discussed by six Programmers. With unlimited use of the service, it allows for maximal exploration with little financial burden, alleviating some of the guilty regret of buying music that they did not enjoy in hindsight.

Seven Programmers stated their distrust of streaming services. The Programmers must relinquish control of the content to an outside party to participate. They shared stories of how they had lost something dear to them because of a streaming service. Shannon C. discussed her frustrations when she shared a story about Jay-Z's "On to the Next One": "Though I liked that song and listened to it a crud-load, I was never gonna buy it… It disappeared off YouTube, I felt as if I had been robbed… Something scares me about the MP3 and streaming because the next day, Jay-Z's 'On to the Next One' disappears." Jason S. shows another side of this, when he

combined ideas of ownership with vulnerability: “You don’t have anything at the end of it. When you stop paying that $10 a month, you don’t have access to that song anymore. And when you have a physical collection, you’ve always got it there.”

Five Programmers stated that they would rather own music than use a streaming service. Hayley R. spoke to this idea in her interview: “A collection of music you have through a streaming service, you can still listen to it just as often you could with a physical collection. But you don’t actually have ‘it.’ It just doesn’t feel the same.” Josh S. brings a different idea to the theme of ownership, when he discussed the care required when collecting MP3s in comparison to streaming: “I feel like there is less of a feeling of maintenance. You have to look over, and watch over, and take care of these things. Organize it… There’s a whole list of things you have to do to maintain that. I feel like giving that individual care to the MP3s is something that you don’t have to do when streaming things off of the internet. So, the value of that is more than the value you get from streaming.”

Themes also surrounded ease of use, immediacy, mobility, and cost-effectiveness. These positively influence the theme of online discoverability, allowing the Programmers to access a world of music with no preparation beforehand. Ease of use and immediacy were both mentioned eight times each by the Programmers during the interviews, whereas mobility was mentioned five times. Streaming is a step beyond MP3 in this sense, as there is no library size limitation, and no requirement to have a specific device filled with music on-hand. Due to streaming’s greater utility, two Programmers have completely switched from primarily MP3 for mobile music to streaming services, and seven have stated they have mostly switched over.

Another theme in streaming’s online discoverability was their algorithmic recommendations. Spotify’s Discover Weekly playlist, or YouTube’s sidebar were the most

mentioned. Six Programmers mentioned the algorithm playlists as a key piece for why they used streaming services. Most Programmers were grateful for the recommendations, as they have led them to new music that they would not have heard otherwise. Rob H. mentions this in his interview, “Occasionally it does end up being a very valuable kind of serendipity for discovering new music that I haven’t listened to or hadn’t paid close enough attention to. It could be a song I’ve actually heard 1,000 times before, but for whatever reason Spotify puts it in this context, it’ll grab my attention, and I’ll be curious of who it is.” Some Programmers were very appreciative of what playlists have allowed them to discover, such as Shannon C.: “I discovered Sister Ernestine Washington through an amazing gospel Spotify playlist. Would never have found her [otherwise].” Combining this dynamic with the immediacy and guilt-free idea of streaming further adds to its prominence as an aid to discovery.

Similar to MP3s, a try-before-you-buy dynamic was used by the Programmers. Jason S. showed this in his excerpt: “If I stream something enough and I like it, I’ll buy it on vinyl.” This exemplifies how streaming is becoming an avenue in allowing collectors to make informed decisions on their physical purchasing. Five Programmers used streaming in this way.

Finally, the theme of efficient storage on a mobile device was cited. Streaming takes no space on a device beyond the need for an app. Three Programmers mentioned this as a reason for their streaming. The vast library of music available with streaming was mentioned three times, along with the ability to call upon music that would not be worthy of collecting (e.g. ambient noise for studying) at specific times. Similarly, two Programmers were concerned about the format not having artists outside of the mainstream.

Nine of thirteen Programmers used streaming on-the-go, through a mobile device. There were other instances of the Programmers using streaming for radio, studying, or at home.

Playlists were also popular among the Programmers, used by eight. The most popular way to use them was via algorithmic recommendation playlists, then for occasions (three Programmers), followed by thematically (two Programmers). All but one Programmer had used streaming in a one-off manner.

4.3 Exploring and Sharing Music

This section addresses the research question of how Trent Radio Programmers collect their formats of choice. How the Programmers explore music to build their collections and share music to build others' is presented below.

4.3.1 Exploring

A major piece of a music collector's identity is finding new things to listen to, and in the Programmers' case, potentially broadcast. There are many avenues in which the Programmers found new music to collect, although they were housed within two main streams. One was fundamentally social and active, whereas the other was dependent on the internet. The primary way in which the Programmers found out about new music was through word of mouth, with representation from nine of thirteen participants. Attending concerts was second to word of mouth. There were multiple exploratory dynamics within concert attendance, such as: arriving early to watch opening bands, attending large music festivals, or attending shows where the acts playing are relatively unknown. An example of exploring music at live shows was with Annette P., who explained her "feet first" technique: "If I'm walking past The Spill, or walking past The Garnet, or a venue downtown, and I hear music and I think it sounds good, I'll go in." The final social piece was via social media, with five Programmers using this avenue. Posts of new songs from artist pages or from musically likeminded friends can spark new listening experiences.

On the other hand, exploration also occurred via internet-based technologies. This form was used to a lesser extent than socially-based exploration but was nevertheless prominent. The primary online exploration technique was via algorithm playlists in streaming services, with six Programmers using them. Next was through researching artists' careers. For example, this could be through seeking out an artist's other projects, specific session musicians' other work, producers' other albums, or becoming more familiar with bands on a label. Four Programmers actively used this strategy. Another form of internet exploration was via artist websites, music websites, blogs, or online magazines. A common theme was using websites' year-end countdown lists, album reviews, or artist features. Four Programmers mentioned using these.

4.3.2 Sharing

The other side of exploring music is sharing music with others. Contrary to exploring music, an activity all Programmers actively participated in, five Programmers confessed to not actively sharing their taste with others. Of the eight Programmers who shared music, word of mouth was used by seven. All eight shared their taste via their radio shows, and seven mentioned playing music for others in a setting outside of radio. Social interaction and radio were the dominant themes of sharing, but there was a small fraction who used internet-based means. Two Programmers regularly contributed to internet forums.

A small but relevant addition to the sharing piece is two Programmers mentioning their willingness to aid in others' exploration when they are a niche expert. An example of this is Annette P., who is well versed in current Indigenous music and will share her expertise when someone is actively seeking out that niche. She will share on social media or in-person. Another example is Rob H.'s willingness to share his expertise of folk music with likeminded others.

4.4 Sustainability

The following section addresses the degree to which Trent Radio Programmers considered the environmental, economic, and cultural sustainability of their music collections. Each pillar is addressed in its own section.

4.4.1 Environmental Sustainability

There was no explicit connection between the formats the Programmers collected, and the desire to increase environmental sustainability through that decision. When asked if environmental sustainability was ever considered when making a purchase, twelve of thirteen said they did not actively consider it. However, there are a number of unconsciously environmental characteristics of the Programmers' collections that reveal sustainable themes.

The Programmers voiced their lack of reliable knowledge when speaking to the environmental impact of collecting various formats of music. Six Programmers were transparent in this, stating explicitly that they had never thought about the topic until the interview, nor knew enough to have an informed opinion. Speculative ideas surrounding the topic were shared, but in general they were not stated with the same confidence as other points in the interviews.

4.4.1.1 Vinyl, Cassette, and CD

Physical formats were generally viewed as equal or worse in comparison to digital formats in environmental sustainability. On one hand, they were perceived as lesser by virtue of their plastic compositions and waste creation. On the other, they were praised for having permanence in the collection, having a prominent used market, and a small window of environmental harm before relative net-zero. Regarding the permanence of physical music, Jason

S. showcased this idea with his thoughts on still buying vinyl: “I’ll buy the record because I feel like I’ll still have that in 50 years, and I might not have my iPhone 6+.”

There were many cases of the Programmers being “unconsciously environmental” in their actions involving the physical formats. Although they are not done in a “for the environment” mindset, they are nevertheless positive for environmental sustainability. Some examples of this were buying and selling used music, repurposing vinyl for decoration, and not buying more music until other albums in the collection were well used. The most reoccurring example of unconscious environmentalism was the Programmers’ reluctance to get rid of pieces in their collections. In some specific small-scale cases, changes in musical taste, unusable pieces, selling music, running out of space, having duplicates, buying the wrong thing, and having the item now affiliated with negativity resulted in disposal.

Physical music has a thriving used market, with many record stores, thrift stores, independent dealers, and online resources available. In Peterborough there are five popular areas for buying used music. The second-hand market offers an opportunity for the Programmers to purchase physical music but limit the impact of their purchase in comparison to buying the same music new. Rob H. exemplifies the lack of guilt he feels when buying used music: “With the second-hand market, I’m not really concerned about [environmental sustainability] at all. So, for better or worse the environmental damage of the production of music has already been done.” Later, he expands on this idea: “Vinyl production in particular is really environmentally atrocious in a lot of ways, because it is just straight up crude oil being pressed into a disc… I don’t see that being an issue because it is something that already exists.” Rob expressed hesitation putting his own music into the used market, but also recognized the feasibility of that option in the long run.

4.4.1.2 MP3 and Streaming

Digital formats were generally regarded as more environmentally sustainable than physical formats. Like physical music, many of the Programmers were critical of the perceived benefits associated with digital media. Examples from the interviews were the need for servers and charging devices. Conversely, digital media was praised for its lack of physicality and use of technologies already possessed, such as computers and cell phones. There were three distinct groups during the digital conversation regarding environmental sustainability. Firstly, there were groups who believed digital media was the greatest for environmental sustainability. Secondly, there were groups who were undecided. Thirdly, there were groups who challenged any environmental benefits associated with digital formats.

In the first group, one outlier Programmer, Dave H. did consider the environment explicitly in his collecting, and it impacted the formats that he used in his daily life. To limit his ecological footprint, he nearly exclusively used MP3s. He follows this idea by describing MP3s as representing "nothing" in his interview: "It's really great because it's just nothing. It's just taking up a little bit of space. So what is it taking up but a tiny bit of energy consumption through my computer and that's it?" Dave H. values the space saving and ease of use associated with MP3s more than most. He has a wide fanbase for his show and is sent music from record labels regularly. He now refuses to be sent CDs, favouring MP3s in order to save physical space. Along with Dave H., four other Programmers believed that digital music was the most environmentally sustainable music format. Rob H. summed up this idea with his portrayal of physical music in comparison to digital, "I know vinyl manufacture can be pretty environmentally terrible, and CDs can be as well. At this point most of the new things that I buy are digital, so I'm not really concerned about it to a large extent."

In another group of four Programmers, they used digital media and held uncertainty about the benefits. Josh S. showed this in his interview when he commented on the environmental benefit, but also shares doubts: “At the same time, I don’t feel like there’s a huge environmental impact with… MP3s. I feel like… I don’t know any of this to be true when I’m saying it.” Similarly, Daniela L. was uncertain in her comments: “I feel that streaming, or having music on your computer, or on your phone, or on the cloud… It’s pretty environmentally sustainable, from what I know…”

The final group expressed doubt that digital media was environmentally sustainable whatsoever. Three Programmers expressed this opinion in their discussion. The constant need for running servers and the source of the electricity being used for devices were the main components of their arguments. Bennett B. brings his argument to life in an excerpt from his interview, comparing cloud-based formats to vinyl: “I personally think the internet is a very destructive thing. Yeah, ‘It’s all in the cloud, whatever’ but the servers they need? How many servers do you need to hold the millions and millions of hours of music? And what made those servers? You make one record, that record is there. I’m sure it does degrade, but you can listen to it in 3,000 years.”

4.4.2 Economic Sustainability

Personal and the local music industry’s economic sustainability was largely considered by the Programmers. Although the Programmers were not always the most economically sustainable from a personal standpoint, the means in which they were purchasing had underpinnings of sustainable economics for the local industry. Many of their purchasing decisions were based in sustaining local or small-venue musicians.

Table 6: The estimated cost breakdown to purchase each music format.

Format	Album Cost	Available Used?	Available Free?
Vinyl	$40	Yes	No
Cassette	$10	Yes	No
CD	$15	Yes	No
MP3	$10	No	Yes**
Streaming	$10/month*	No	Yes***

Note that each format's players have not been included do to their variable price ranges.

* For unlimited listening of the service's library for one month.
** Piracy allows for free attainment.
*** Free tiers are available, but they hold drawbacks such as advertisements, the inability to save music for offline, and limited control of song skipping.

4.4.2.1 Vinyl, Cassette, and CD

The most common comment the Programmers made while reflecting on the economic sustainability of their physical collections was that they had no guilt spending money on things they enjoyed. Seven Programmers made this statement clear. Nick S. exemplified this during his interview, speaking to whether spending money on a more expensive format was worth it: "It gives me pleasure more than most things. I listen to a lot of music. Music is a main part of my life, so I spend my money. I don't feel guilty about spending money on music." Not to be confused with mindless spending, the Programmers were conscious when they spent sizable amounts of money, as shown by Bennett B. when he discussed buying an expensive vinyl box set, "I saved for it and bought it. And I don't regret it… Am I pissed I spent 500 bucks on this? Yeah, fully. But I also am not constantly buying records." Hayley R. was consistent with this mindset, when she stated her strategy for purchasing vinyl: "Just cornerstones of the collection are things that I eventually will buy on vinyl."

With physical music purchasing, although it is more expensive on a per-album basis than digital media, the Programmers still used economically-minded sustainability ideas to mitigate

their spending. A common theme was to use streaming services and MP3s in a try-before-you-buy strategy before deciding whether to purchase physical music. As mentioned previously, five Programmers used digital media in this way, to facilitate later physical collecting. The used music market was also a major piece for physical music collectors. Akin to the environmental benefits of buying used music, there are also economic benefits as used goods are generally inexpensive compared to the same product new.

4.4.2.2 MP3 and Streaming

Some Programmers were fully influenced in their choice of format by a need for personal economic sustainability. Four Programmers were drawn to streaming solely because they were the cheapest options available to them. Pippa O. mentions this in her interview, sharing that she will "prioritize getting formats that are cheaper, and [acquire] them for as cheaply as possible."

Five Programmers felt that they did not spend enough money on music to be truly impactful on their personal economic sustainability. Many of the Programmers have transitioned to MP3 and streaming for their daily listening, which are very cost-effective. Although there are sizable physical collections among the Programmers, most were accumulated during a time of format exclusivity or late adoption of digital technologies. Therefore, only specific pieces are added to physical collections at the present.

Due to the explosion of MP3 and streaming formats, many physical collections had lost their utility to the Programmers. Jason S. and Nick S. showed displeasure in their interviews, as they were forced to spend hundreds of dollars on CDs in the 1990s, but collectors now have an easier economic route. They explain it in their interviews: "That was one of the reasons I wasn't so sure I was ready for Spotify. I wasn't sure if I was ready for my CD collection to be worthless yet." Further, "To be honest after spending so much money on CDs growing up in the 90s and

the early 2000s you feel a little screwed at the fact it's so easily available now." Despite this, both are regular MP3 and streaming users. Jason S. eventually came to terms with the lost utility of his CDs, as explained in the following excerpt: "I think it was Q-Tip, actually did a commercial for one of the streaming services, talking about how he's travelled the world looking for beats and scoured looking for rare records, and now everybody has them available to them. That's kind of the way I felt, but if Q-Tip can get over it so can I." He also mentioned the importance of the memories he has connected to his physical collection, despite the loss of utility: "As I had everything available to me it was almost like 'What have I done the last 20 years with my money?' But I still have those memories when I walk past the shelf so I'm happy for that."

4.4.2.3 Sustaining the Local Music Economy

The Programmers shared a high level of economic knowledge regarding the monetary relationships of the music industry. Six Programmers interviewed are current musicians, and most Programmers are actively involved in the local Peterborough music scene as concert-goers. A common theme was concern about who they are supporting when their money is being spent on music. Six Programmers stated that they did not want to support any artists that they viewed as being too successful, whereas two stated they did not want to support artists who no longer actively created music. The Programmers were most concerned with buying from local or small-venue artists.

The Programmers showed that ideology through artist support at live venues. The majority of purchases made at venues are physical music, requiring a larger financial commitment from the Programmers. Digital music is available in a very limited capacity at shows, and Pippa O. shows how this can be frustrating as a digitally-focused collector: "I should

be supporting artists more because I don't tend to pay for a lot of music, and I know that's not the most sustainable for the music industry itself." She goes on to state that "if it was economically viable for me to pay for more music… That would make it more culturally sustainable."

Due to the higher cost associated with supporting artists, the Programmers were asked whether their investment was worth the personal economic strain. The Programmers were consistent, stating the two most reoccurring economic sustainability themes again: they had no shame in spending on their passion, and the cost can be minimal. Hayley R. showcases the first theme in the following quotation: "Me deciding to spend my money in that way does feel worth it to me, often because… I care a lot of the time about who I'm buying from, [and] who gets the benefit of me spending money on things. I don't feel too bad about that. I feel positively about that most of the time." Secondly, Josh S. exemplifies the theme of a minimal financial hindrance in his interview: "Yeah, it hits my wallet a little bit, but you're paying $10-15 for a show. Hopefully they're only charging $10 for an album. It's $25 and there are a lot of people who shell out $300, $350 to go see… Bon Jovi."

A sub-theme involved comments on artist payouts from streaming services. Two Programmers who are active musicians and have their music on streaming services mentioned how they received miniscule payouts from the services. Ironically, these two Programmers were also two of the greatest supporters and users of streaming services. Two other Programmers who are not active musicians also brought up the issue of compensation.

4.4.3 Cultural Sustainability

Maintaining cultural sustainability was the greatest sustainability concern of the Programmers interviewed. Eleven of thirteen participants stated that supporting local artists was

a top priority. Support came in three general ways: attendance, a purchase, and sharing. All thirteen participants supported through attendance at shows. Nine of thirteen Programmers stated that they regularly make purchases at live shows. In total, three vinyl, four cassette, seven CD, and two MP3 collections were contributed to through purchased music from live shows. Eight Programmers were active in their sharing of local music. Purchasing local music at live shows for artist support was the most discussed means of facilitating diverse artistry.

4.4.3.1 Buying Local Music

The Programmers had a variety of motivators for their purchases, although the most compelling came through the idea of supporting local artistry. Firstly, some artists purchased music at live shows because it was exclusively available at the show. Shannon C. shows the frustrations of forgetting enough money for buying music at live shows in her interview: "I've let a bunch of CDs go, or good albums go because I forgot to bring the cash to a show… Sometimes I tell myself 'Oh I'll get it on the internet later,' but a classic example is the Burning Hell who have released amazing albums, which sell out when you try to buy them on the internet later. There's this sort of 'Had to be there' aspect." One of the other unique opportunities presented at live shows is the ability to see bands and buy merchandise before they break into popularity. Nick S. showed in his interview how unique collectables can be purchased in this way: "You would see bands and you think, 'Oh they're a pretty good band, maybe I'll check out their CD or something' and then they become huge bands later." Attending live shows also offers the opportunity to get music that is not readily available over the internet. Pippa O., a primarily free tiered streaming user, shows this mindset in her interview: "If they're local independent artists I'd want to support them more. And those don't tend to be the people that I listen to over streaming services. They don't tend to be as available over streaming services." Supporting

artists, with the bonus of exclusivity or rarity offers motivation for collectors. Four Programmers held this mindset.

Attending live shows also offered the ability for the Programmers to take a souvenir of the experience with them. Josh S. explained this idea in his interview when he discussed why he has bought CDs even though he never listened to them after, "I may never open the CD. I may never listen to it because I know it's not going to sound the same as the music I listened to live. But, it's something that… holds a memory of that show for me, so I keep it around as something that reminds me of that experience, and it shows that I liked the show enough to invest in their music and hope that they continue making music." Overall, six Programmers stated the importance of the memories fused to purchases made at live shows.

Supporting artists also made the Programmers feel they were a part of the musical communities they were investing in. Josh S. showed this idea when he stated that buying a CD at a show made him a "shareholder" in the band, and the CD was the physical representation of buying stock. Josh also went on to say that he felt responsible for maintaining the legacy of the bands he bought music from: "I feel like there is almost a weird obligation that I have to those artists to kind of preserve the music that they've released. To make sure that there's some sort of cultural echo of their existence going on even if they're just working at an auto shop or working a soul crushing office job." In a more personally driven sense, Hayley R. also stated that she felt she had a stake in the artists she bought from, resulting in the creation of identity: "If I come across something that's from Peterborough, whether I listen to it all the time or not, it feels like I should take this in as a mini-archive of things. Like music from my friends, even if I don't listen to it all the time. It is part of my collection for the purpose of curating some sort of identity and locating myself."

In some cases, artist support came in a charitable approach. An example of this is Dave H., where labels give him free MP3s before he interviews bands. He showed a charitable mindset in his artist support during his interview: “Sometimes I feel bad for an artist and I’ll just buy something… I’ve got these nuns who have a rock band in Peru, and it’s like ‘You know what? I’m not gonna ask for the music.’ And it’s like, what they can make from me I can give to them.” Hayley R., who is an active musician herself, also shared a charitable mindset in her reasons for artist support: “I do try to buy things like my cassettes, and occasionally CDs, and vinyl from them for the reason that I think I would like to give them my money.”

4.4.4 Purchase and Use of Collections

One of the worst personal acts when looking through the lens of environmental sustainability is purchasing a good, and not using it to its maximum potential. Due to the connection of economic and cultural sustainability, and the means collectors have to influence sustainability in music, they must make a purchase of physical music at a live show to be most effective. In the interviews, ten Programmers mentioned not actively using one or more of their collections within a given format anymore. Table 7 is a breakdown of the Programmers’ collections regarding their contributions to local artist support. It features what collections each has, which are actively used, and which are purchased in the support of local artists.

Table 7: Total collections, collections actively used, and formats purchased for artist support. Bolded font signifies music stated to be purchased at a live show for artist support.

Programmer	Vinyl	Cassette	CD	MP3	Streaming
1			Use	Use	Use
2	**Use**	Use	**Use**	Use	Use
3	No use	**No use**	No use	Use	Use
4	Use			No use	Use
5	No use	No use		**Use**	
6	Use		No use	Use	Use
7	**Use**	**Use**	**Use**	Use	Use
8	Use	No use	No use	Use	Use
9			**No use**	Use	Use
10	Use	Use	**No use**	Use	Use
11	No use		**No use**	No use	Use
12	No use	**No use**	**No use**	Use	Use
13	**No use**	**No use**	**Use**	**Use**	Use
Total Collections	11	8	11	13	12
Total Collections Actively Used	6	3	5	11	12
Total Bought for Artist Support	3	4	7	2	N/A
Total Bought for Artist Support and Actively Used	2	1	3	2	N/A

In total, 55 different music collections were mentioned in the interviews. Of the 55, there were 19 instances where the collection was not being actively used anymore. 10 Programmers stated that they buy music at live shows for artist support, making 17 different collections built upon via these live venue purchases. Table 7 shows that six Programmers bought music from live shows to be part of a collection that received no active use. Eight different collections were within these circumstances.

The most problematic were the formats of cassette and CD. Of the eight cassette collections mentioned in interviews, half were augmented by live show purchasing, with only one collection getting any regular active use. Of the eleven CD collections, seven were augmented by live show purchasing, with only three getting any active use.

Chapter 5: Discussion

5.1 Environmental Sustainability

Environmental sustainability was the least considered aspect of sustainability in the Programmers' collecting. A way of organizing reasons for environmental indifference is through analyzing the psychological barriers associated with the cohort.

5.1.1 The Dragons of Inaction

Gifford's (2011) "The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation" outlines some of the psychological reasons why, despite the public's belief that environmental sustainability is an important problem, actions to create change are limited. His seven psychological behaviours are limited cognition, ideologies, comparisons with others, sunk costs, perceived risks, discredence, and limited behaviour. Below is a breakdown of all the dragons' different manifestations, and an explanation of which matched with results provided by the Programmers.

Limited Cognition:
The Ancient Brain – Climate change is a slow, distant threat; therefore, we think to provide for immediate issues.
Ignorance – Not knowing that a problem exists, or not knowing what to do once aware.
Environmental Numbness – First, ignoring distant climate change impacts which are not immediately identifiable or impactful. Second, with frequent messages about climate change, resonance wears with time.
Uncertainty – Hesitation when uncertain, resulting in inaction.
Judgemental Discounting – The assumption that environmental problems are worse in places other than one's own.
Optimism Bias – Discounting potential risk when there is reason to be cautious.
Perceived Behavioural Control/Self-Efficiency – Since climate change is a global problem, many believe they can do nothing about it as individuals.

The Programmers showed evidence of limited cognition in the interviews. Twelve of thirteen Programmers stated that they do not actively consider the environment when they are

collecting music. This shows the ignorance manifestation of the limited cognition dragon. Specifically, the focus on not knowing that a problem exists. Although the Programmers were quick to connect that collecting had environmental consequence, it appears the interviews were a catalyst in creating many of these thoughts. Six of thirteen participants stated that they had never thought about the issue until the interview. An example of the interview acting as a catalyst is with Josh S., who verbally connected some environmental consequences to streaming mid-interview: "Now that I start to think of it more… especially if you're streaming music, you're gonna be taking a lot more power and energy to do that, right? You've got to plug it into a wall to get electricity into your phone to… Actually, that's cool, I hadn't considered that. Yeah, it is environmentally unfriendly to always be streaming your stuff… You're using a disproportionate amount of energy, and just because you go to plug it into a wall as opposed to put oil in your car you're still depending on fossil fuels to power your phone. Oh!" Situations such as this show the potential that may be present for collectors to respond to and learn new information about environmental sustainability.

The other relating manifestation was uncertainty. For example, especially when discussing digital music, there were three distinct groups identified: digital media was best, undecided, and digital media was worst – as a group, the Programmers were undecided. When discussing physical music, the Programmers were also unsure, but leaned toward them being environmentally unsustainable. Nick S. showed this idea in his interview, when he stated "I don't actually know enough about the environmental impacts of having CDs and records… It's not something that crosses my mind and I think about very often. And I am someone, for the record, who does normally support environmental things."

It is noteworthy that once prompted with the idea of environmental impact and collecting being connected, the Programmers had more understanding of the physical impacts than the digital. This is evident in the fact that every major idea identified in the literature review for physical music was mentioned aside from leachate and incineration, whereas with digital music ideas of controlled obsolescence, e-waste, and growing physical internet infrastructure were not. Only two Programmers mentioned the underlying impact of server use. This result indicates that there is still much to learn and teach with regard to physical and digital media's environmental impact.

Ideologies:
Worldviews – The belief in free-enterprise capitalism, and some of its aspects such as the freedom of the commons.
Suprahuman Powers – The belief that a religious deity or Mother Nature causes or will solve environmental problems.
Technosalvation – The belief that technology can reverse the effects of climate change.
System Justification – A tendency to defend and justify the status quo if benefiting from it.

The ideologies of conflicting worldviews, suprahuman powers, and system justification were not apparent in the interviews. However, ideas of technosalvation were present. There were a group of five Programmers who stated their belief that digital music was most environmentally friendly. All Programmers also used digital music. It is understandable for digital music to be perceived as an improvement over physical, as mechanical innovation has a storied history of continual improvement (Gifford, 2011). However, digital music was not presented as a solution to climate change, it was understood as a green alternative to physical music. Rob H. sums up this idea with his portrayal of physical music in comparison to digital, "I know vinyl manufacture can be pretty environmentally terrible, and CDs can be as well. At this point most of the new things that I buy are digital, so I'm not really concerned about [environmental sustainability] to a large extent."

There are a number of works presently that suggest otherwise (Cubitt, 2017; Gabrys, 2015; Bach, 2012). The belief that digital media is more environmentally sustainable than physical has emerged globally, which is not proven to be true. This idea was present among some Programmers. Notably, the Programmers never suggested physical music as a solution to the environmental sustainability issues associated with digital music. Although it was not apparent with the Programmers due to their general uncertainty, Gifford (2011) warns of naïve ignorance when dealing with technology: "Overconfident beliefs in the efficacy of technology appear to serve as a barrier to their own climate-mitigating behavior." This further stresses the need for trustworthy, conclusive science.

Comparisons with Others:
Social Comparison – After comparing actions to others, determining "correct" behaviour, even if that behaviour is harmful to the environment.
Social Norms and Networks – Increasing or decreasing actions to reflect the norm in social networks.
Perceived Inequality – When people believe others will not take steps to help the environment, they are less likely to themselves.

There was no explicit evidence of the Programmers conforming to a social norm regarding the environmental impact of a given format. However, the Programmers alluded that there may be more social opportunities available depending on which formats they possess, impacting environmental sustainability. Especially in the case of collecting vinyl, there were examples of Programmers having vinyl-themed parties, listening parties, or bringing vinyl to friends' houses. With these events happening, it may be tempting for Programmers to buy vinyl to participate or contribute more. If this was the case, it would reflect the social comparison, and social norms and networks manifestations. Annette P. spoke to the social benefits vinyl collection brings in an excerpt from her interview: "There definitely is a lot of pressure to… have a collection that people can see. And music's a really good way to connect with someone. So, I

think that for someone who streams… It's a lot harder to figure out if you're at their apartment, what kind of music they're into." The same can be said with digital music and resources, as they accounted for a major component of the Programmers' sharing and exploration of new music. Social norms are double-edged in the fact that they can be powerful tools to bring progress, regression, and/or stasis (Thøgersen, 2008; Gifford, 2011).

Sunk Costs:
Financial Investments – Once invested in something, ceasing use is more difficult.
Behavioural Momentum – Habits are difficult to break, and many are environmentally impactful.
Conflicting Values, Goals, and Aspirations – Goals many not align with climate change mitigation.
(Lack of) Place Attachment – Those with no attachment to a place are less likely to protect it.

The issue of sunk costs was impactful among the Programmers. Financial investments, behavioural momentum, and conflicting values were all exemplified during the interviews. Many collectors have been collecting music of a given format so much that a switch to a new one would represent a loss of sweat equity and money. This was shown mostly among Programmers who had given up using their CD and/or cassette collections. There was displeasure among some Programmers that these once dominant formats were less valuable. Jason S. explained this in his interview, when he discussed the lost utility of his CDs: "That was one of the reasons I wasn't so sure I was ready for Spotify. I wasn't sure if I was ready for my CD collection to be worthless yet."

There was a circumstance where a Programmer was able to rectify some financial investment and change collecting habits. Colin W. was the only Programmer who sold pieces from his physical collection in favour of a digital collection. Selling music is one way to combat the financial sunk cost of having a collection of an older format. However, nostalgia, needing a MP3 backup, and format exclusives pose barriers, as the interviews have shown. It is also

noteworthy that although financial sunk cost can be rectified, the sweat equity of locating highly sought-after pieces is never reimbursed.

Although specific goals as a collector or musician were not brought up in the interviews, the Programmers certainly have ambitions through their interests in music. Some Programmers are musicians, all collect music, and all produce radio content. Personal goals are not always compatible with environmental sustainability (Nordlund & Garvill, 2002; Stern, 2000; Vining & Ebero, 1991). Thus, the conflicting values, goals, and aspirations manifestation comes into play in this situation as the music industry is far from sustainable.

Discredence:
Mistrust – Not trusting the authorities from where climate change information originates.
Perceived Program Inadequacy – Not trusting or disagreeing with the nature of programs and policies implemented by governing bodies.
Denial – The outright rejection of environmental problems.
Reactance – Stemming from a distrust of authorities, will actively engage in more environmentally harmful activity.

There was some evidence of discredence among the Programmers for digital music, but none for physical. As mentioned previously, there were a group of three Programmers who questioned the merits of digital music. There was no specific authority being challenged, as suggested in the mistrust manifestation, but there was questioning of the general schools of thought pertaining to digital music's reputation as the superior in environmental sustainability. This mindset is consistent with ideas in media studies (Cubitt, 2017; Gabrys, 2015; Smith, 2015).

Perceived Risk:
Functional Risk – Questioning the efficacy of changes.
Physical Risk – Questioning the potential physical dangers of adaptations.
Financial Risk – Issues with the significant upfront cost of environmentally-friendly adaptations.
Social Risk – Fear of judgement from others for their lifestyle change.
Psychological Risk – Fear of a loss of self-esteem of confidence as a result of judgements.
Temporal Risk – The time and resources spent for the new course of action may fail to produce the desired results.

There is no music format on the market being advertised as "environmentally friendly." As mentioned previously, some Programmers questioned the efficacy of streaming and MP3 in their unofficial title of "environmentally sustainable." This mindset would be framed within the functional risk manifestation, or "Will it work?" as Gifford (2011) explains it.

Limited Behavior:
Tokenism – The easiest solutions are usually the least effective.
The Rebound Effect – A positive environmental behaviour is followed by one that negates it.

The limited behaviour dragon was not strong among the Programmers. Twelve of thirteen Programmers exclaimed that they did not actively consider the environment in their collecting. Through this finding, it makes issues of Tokenism or The Rebound Effect negligible. There were circumstances of the Programmers being unconsciously environmental in their physical collecting, such as participating in the used market, repurposing vinyl as art, and not buying music until it is truly needed. There was no evidence of these actions being followed by an environmentally negative act. The unconsciously environmental solutions could be considered an offshoot of Tokenism, as they do not need considerable effort and are motivated more by economic efficiency than environmental sustainability.

The Dragons of Inaction Summary

Table 8 outlines how the Programmers matched up with the psychological barriers to environmental sustainability as outlined by Gifford (2011).

Table 8: Psychological barriers to sustainable actions compared to Programmer evidence.

General Psychological Behaviour	Programmer Evidence
Limited Cognition	Yes
Ideologies	Yes
Comparisons with Others	No
Sunk Costs	Yes
Discredence	Yes
Perceived Risks	Yes
Limited Behaviour	No

The dragons of limited cognition, ideologies, sunk costs, discredence, and perceived risks were all represented in the Programmer interviews. There were four main barriers uncovered via this psychological analysis: lacking knowledge, no environmentally sustainable product on the market, investments in then-required formats, and wanting to support musical culture effectively, which requires an environmentally unfriendly purchase.

5.1.2 The Environmental Consequences of Support-Only Purchasing

As Table 7 in the Results section has shown (page 72), there were instances where Programmers bought music for artist support and failed to use it. Josh S. explained his perspective on this in his interview: “It’s less of a collection and more of me trying to just support artists that I go and see at live shows.” Lifecycle Assessments (LCAs) are a strategy in environmental auditing that focus on a “cradle-to-grave” assessment of products. They analyze all the processes concerned with getting a product to a consumer, the product’s use, and what happens to it after disposal (Goleman, 2010). One of the most universally accepted pieces of information LCAs have shown is that when a product enters a waste stream prematurely, or is bought and not used, the impacts of creating the good are magnified (Casamayor, Su, & Sarshar, 2015; Mazhar & Kaebernick, 2005). The lifecycle of the product is technically more inefficient if the product is not used effectively (Casamayor, Su, & Sarshar, 2015). In total, six Programmers

interviewed stated that they bought music from a live show for artist support for a collection that did not get any active use, thus representing an environmental problem.

It is noteworthy, however, that the impacts associated with these purchases are variable. In some cases, a limited number of units are produced to sell, thus more production would not be stimulated by a purchase. In other cases, more pressings can be done at later times, and purchases would impact the decision to increase production later on. There are also considerations such as the materials used in the format, the distance the product has travelled, or the waste stream the product enters, if at all. However, purchases in this context still represent a misuse of the resources used in the product's lifecycle no matter what the exact circumstances.

This finding acts as an anecdote for the state of music collecting and sustainability. To support diverse artistry, and thus cultural sustainability, a strategic purchase is required to be most impactful. For the purchase to be most effective in supporting the musician, a physical format must be bought through the artist as directly as possible to give them the best margin. However, physical formats have environmental impact, and the impacts are increased if the product is bought solely for support and is not used.

5.2 Economic Sustainability

When discussing economic sustainability, the Programmers offered very interesting insights. Personal economic sustainability was considered in their collecting, but consideration did not result in action for the physical collectors. If the individual wanted to buy a product, they usually bought it. Their spending was not a senseless act, however. Use of MP3 and streaming in a try-before-you-buy sense created listening opportunities to determine whether the physical album warranted buying in many cases, offering a "I'll often just buy it if it's good" mindset, as suggested by Rob H.

If the Programmers did care immensely about their personal economics, they did not collect physical music at all. The predominantly digital collectors were more motivated by cost. They were drawn to their utility and ease of accumulation, fostering a feeling that they did not spend enough to truly have an impact on their personal economic sustainability nor the music industry's. Where the economic sustainability piece becomes intriguing is when the idea of local artist support is added to the narrative. The same theme of relative indifference with the cost of music, which was normally solely possessed by those collecting physical music, was felt by all interviewees for the sake of economic sustainability in the music industry. All Programmers made the economic sustainability of local musicians a priority in their spending. The following is an overview of the potential reasons why the Programmers acted in this way, focusing on hedonism and knowledge of the music industry.

5.2.1 Hedonism

The Programmers' preference for spending in support of local musicians may be influenced by its hedonic benefit. Research has contrasted hedonic goods and utilitarian goods as "luxury" and "necessity" (Dubois, Laurent, & Czellar, 2005). Hedonic goods are associated with experimental consumption, fun, pleasure, and excitement (Babin, Darden, & Griffin, 1994). Utilitarian goods on the other hand, are akin to goods motivated by functionality (Dhar & Wertenbroch, 2000). Products can be high or low in hedonism or utilitarianism, and this is often determined conclusively by how the product is used by an individual. For example, if a computer is used for report writing only it is utilitarian, but if it is used exclusively for casual gaming, it would be hedonic. Recorded music has been recognized as a hedonic product in academia (Green, Sinclair, & Tinson, 2014; Khan, Dhar, & Wertenbroch, 2015). However, technological advances are shifting music toward utilitarianism more than ever before. Digital music is

becoming practical and everyday, while physical music remains characteristic of a hedonic delight (Wertenbroch, Khan, & Dhuar, 2004). For example, in the cases of Jason S. and Nick S., who both had sizable CD collections in the 1990s and 2000s, they both stated feelings attributed to lost utility, not enjoyment, when streaming became popularized.

Hedonism can be maximized when a purchase results in a greater sense of purpose, or involvement. Tying hedonic feelings to a physical good can also be beneficial in maximizing these feelings (Chang & Liu, 2012; Chowdhury & Khare, 2011). For example, Hayley R. spoke to these themes regarding her cassette collecting: "I often buy cassettes just because I want to support a band that's on tour, and its a reasonable way for me to do that. And I get a cassette!"

Elements of hedonism could be seen when the Programmers spoke of purchasing music for artistic support. Ideas of being a stakeholder in the art and giving charity were all recurring themes from the interviews that tie to hedonism through the associated feelings of a higher purpose (Chowdhury & Khare, 2011). In Magaudda (2011, p. 29), these themes were also addressed in an interview, where a vinyl collector compared buying physical music to digital with respect to the relationship between artists and fans: "Today there is a risk that bands could be a mere space occupied in a computer folder, and maybe it is for this reason that people like me have started to buy vinyl disks. Maybe it's because of the need to have human contact with the artist, even if this happens to be through fetishes." Even with the digital collectors valuing cost-effectiveness and utility, the hedonic value of supporting musicians motivated a purchase. Strengthening this idea is Wertenbroch, Khan, and Dhuar (2004), who note that hedonic products allow consumers to be less price sensitive.

When environment is added to the equation, a dichotomy between feel-good, hedonic consumption, and the impacts of consumerism arise. As discussed previously, consumption of

recorded music can have considerable environmental impact, especially when the product is not used to its full potential. Shopping is used as a way by many to reduce stress (Pierceall & Kiem, 2007), provide a hedonic boost (Babin & Darden, 1994), or increase life satisfaction (Headey, Muffels, & Wooden, 2008). This literature would then suggest that by removing the hedonic goods – the purchase of physical music for environmental reasons, would make the Programmers less satisfied. This may not be the case. Sustainable consumption does not necessarily mean consuming any less, rather, it involves consuming differently (Venhoeven, Bolderdijk, & Steg, 2013). A simple way that plays into the already established characteristics of hedonism is to focus on the pacing of purchasing. A critical component of hedonism is that they are not everyday purchases (Babin, Darden, & Griffin, 1994). They are reserved for special moments, where the purchase and subsequent use can be savoured. This dynamic creates environmental and cultural benefit, as consuming less is a very effective strategy for environmental sustainability, while also pacing the growth of the industry.

5.2.2 Knowledge of the Music Industry

It was apparent throughout the interviews that the Programmers possessed a greater knowledge of the music industry than most. Huffman (1974) stated that education, along with the availability of information, and incentive to be informed are the most crucial factors in making good consumer decisions.

The Programmers showed their advanced knowledge of the music industry in their treatment of popular musicians in comparison to those within the Peterborough or small-venue scene. These purchases were less financially committed. Streaming, MP3s, and buying used music were the dominant means of collection for artists viewed as too popular or too old to benefit from the purchase. Akin to the Programmers, participants in Green, Sinclair, and Tilson's

(2014) study felt that their money was also best spent on local music talent, rather than very popular artists. The following are two excerpts from their interviews; the first outlining local artists: “Yeah, [local artists] need the money to go do what they enjoy, you have got to give them money to keep them going, to support them.” Secondly, they address popular artists: “Metallica and stuff, they are not going to be put out, they are not going to be kicked out of their house because they can’t pay their mortgage because someone has [pirated] their album.” These ideas are consistent with Brunk (2010) and Green and Peloza (2014), who stated that educated consumers consider the size of the organization when evaluating whether to support them or not.

Although it is unclear what the root of the Programmers’ knowledge of the music industry is, there is evidence from the interviews that shed light. Six Programmers interviewed are active local musicians. Surely, they have a knowledge of how they and other musicians would benefit most from consumer spending. Trent Radio also acts as an incubator for the Programmers to share ideas with other musically likeminded people. There are a variety of events held there, along with the potential to volunteer, get involved with governance, or use their facilities, all of which offer networking opportunities and the potential to learn or educate.

Economic Sustainability Summary

The Programmers actively contribute to good economic sustainability initiatives through their spending on local, diverse musicians. The Programmers offered two main reasons why they held this mindset for supporting local musicians when easier, cheaper options are available for collecting music in general. Firstly, supporting local musicians through a strategic physical music purchase, especially in a live show setting, offers hedonic benefits. Secondly, the Programmers are knowledgeable of the music industry, and the spending strategies needed to support the stakeholders they want to within the industry.

5.3 Cultural Sustainability

In cultural sustainability, the Programmers' top priority was supporting diverse local culture. This was aided by the diverse musicianship existing in Peterborough (Hurcomb, 2018). The Programmers did so through strategic music purchasing, although supplementary means in sharing music, exploring music, and attending live concerts were also discussed. From the consumer's level of influence, these means are most effective in challenging the music industry into becoming more culturally sustainable.

As mentioned previously, supporting local-level artists brings better financial stability, which by association supports their pursuits in music, and challenges some of the capitalistic norms of the music industry. However, there are also explicitly cultural implications to these actions. The Programmers offered four key reasons why they buy music at live shows: access to exclusive merchandise, getting a souvenir, feeling like a stakeholder, and charity. Although these motivations have been spoken to from an economic perspective, they can also be organized based on cultural sustainability through their collector motivations and cultural motivations.

5.3.1 Collector Motivations

Getting exclusive or rare merchandise and the ability to get a souvenir from a live show fall under collector motivations. This is most easily explained in the fact that the Programmers are collectors of music, thus they put themselves in positions to buy interesting collectables. Because these purchases are hedonic, while also often being in hedonic settings like live shows (Green, Sinclair, & Tinson, 2014; Khan, Dhar, & Wertenbroch, 2015), memories were often attached to these purchases. Memories have been proven to be easier to recall when a physical good is attained representing the event (Wallendorf & Arnould, 1988). This was apparent in the interviews, with the Programmers not being able to speak about their physical music without

sharing stories, and their top reason for collecting them being their physicality and visual appeal. Conversely, when digital music was being discussed, the only notable stories mentioned were that of being let down by the services and technologies they relied on.

An example of the attachment people can have for physical music is the basis of Eric Spitznagel's (2016) *Old Records Never Die: One Man's Quest for His Vinyl and His Past*. It is a personal recollection of his selling and reacquiring of specific pieces of his record collection. In most cases replacing a missing piece of a collection is trivial. Online sources in Discogs or eBay, or local record stores are very likely to have the replacements. With enough funding, Spitznagel could have had his collection back in a matter of days. However, there was a problem with this strategy: he did not want another copy, he wanted the *exact* records he sold years ago. Some examples include KISS' *Alive II* with "HANDS OFF!!!" written across the band's name, Bon Jovi's *Slippery When Wet* (he hates Bon Jovi) with Heather G.'s phone number on the album sleeve, and The Replacements' *Let it Be* which he swore would still smell like marijuana (p. 48-53, p. 82-85). With each piece he seeks out, stories are told of how the records became such important parts of his adolescence.

This high level of connection to physical goods was showcased by the Programmers throughout the interviews. Most notably was Bennett B. when he described the way he organized his vinyl collection. He described the organizational style as "by mood." It is a deeply personal interpretation of which albums "could go next to" one another. He explains this in the following excerpt: "Deerhoof and Propagandhi can go next to each other. And Deerhoof can go next to Dylan, but Propagandhi can't go next to Dylan. And I don't know why that's true, but that's true."

This is not to say that memories cannot be created or associated with digital music. It can provide unique listening experiences that physical music cannot offer (Hagen, 2015; Kibby, 2009; Zhong et al., 2013). However, with physical media being the only format available at live shows and giving true artist support, it strengthens the potential for them to have powerful memories because they were bought at an event and offer a sense of higher purpose.

Sproles (1985) outlines that there are six general decision-making types when consumers are making purchases: perfectionism, value for money, brand consciousness, novelty-fad consciousness, shopping avoidance, and support-seeking. The Programmers consistently showed the categories of perfectionism and novelty-fad consciousness in their collector motivations.

Sproles (1985) states that in the perfectionist decision-making style, consumers value high quality, while also maintaining a careful, and systematic strategy. In general, vinyl and CD are the music formats held in the highest regard by experts and collectors alike (Spitznagel, 2015; Levine, 2007; Corbett, 2017). They are also considered to have the highest audio quality (Levine, 2007). In a live show setting, consumers do not have the autonomy to decide which format to buy. CDs and vinyl are normally the only ones available, rendering the first trait of perfectionist consumers irrelevant as they are guaranteed to get a high-quality recording. The careful, systematic strategy among perfectionist consumers was shown in the interviews. The Programmers valued the ability to get exclusive music from live shows. This could not be achieved without proper strategy, preparation, and opportunity. The Programmers spoke of missing out on, and opportunistically buying exclusive goods. Shannon C. mentioned in her interview an example of a small financial strategy for buying music at live shows: “Sometimes it’s as simple as remembering to bring… $30 to a show instead of $10.” Bennett B. also mentioned something he has experienced others doing that has restricted them from being able to

buy music at concerts: “They’re gonna be at a show and… want an extra drink so they don’t save that extra $5 or $10 so they can put it towards a record.” Although these are simplistic, it takes strategy, preparation, and opportunity to buy music effectively at shows.

For the novelty-fad conscious consumers outlined by Sproles (1985), their values included knowledge of the fads of the time, excitement from seeking out new things, and having an impulsive shopping style. Some consider the vinyl and cassette resurgences as fads (Corbett, 2017). It should be noted that five vinyl collections (45%), and two cassette collections (25%) are owned by the Programmers younger than the age of 30, well after these formats were a requirement for collectors, akin to antique collecting. Daniela L. and Hayley R. mentioned the vinyl comeback as a reason for their collection of that format. Daniela L. also mentioned in her interview that her vinyl collecting would not have been for her friends’ influence: “I… wouldn’t have started collecting vinyl if my friends didn’t have a record player.” Seeking out new things connects to several themes from the Programmers. Firstly, the Programmers’ value of local, diverse talent. Secondly, the Programmers have an affinity for, and many avenues for exploring and sharing new music. The impulsive shopping style of novelty-fad conscious consumers also ties to the characteristics of hedonic buying (Wertenbroch, Khan, & Dhuar, 2004; Green, Sinclair, & Tinson, 2014).

5.3.2 Cultural Motivations

In the Programmers’ cultural motivations are the themes of feeling like a stakeholder and giving charity. As mentioned previously, consumers can reinforce, resist, or maintain issues within the music industry when they spend or do not spend on artists or events that: lack diversity, are pro-nostalgia, enforce poor wealth distribution, and/or have poor gender representation. Simon Frith (2007) supports this idea in his collection of essays, *Taking Popular*

Music Seriously when he states, “Popular music is a product of continuous negotiation, dispute, and agreement among consuming actors who, by these processes, create their worlds” (p. ix). The Programmers advocate for cultural sustainability through supporting the diverse musicianship and stewardship featured in Peterborough. Kagan and Kirchberg (2016) reinforce the need for diversity in their definition of cultural sustainability, where they outline that one of the keys in achieving such is through “guarding against cultural homogenization.” The themes of being a stakeholder and giving charity to the band are tied to economics, but they also involve the purchase of high-quality formats, thus supporting cultural sustainability.

As explored previously, physical music is often the only format available for purchase at live shows. The Programmers showed that even the exclusively digital users care to support diverse artistry, even though in some cases the purchase of cassettes and CDs will go without real use. Musicians have the agency to sell what they please at live shows. This often means selling their music in a high-quality format, while ensuring a good profit margin. For the Programmers, being limited to only buy physical music forces a different listening experience than what they are accustomed to in their daily listening, as this is usually MP3 or streaming. The physical aesthetic of physical music, along with its greater sound quality gave the Programmers a truer experience of the music the artist intended to create.

Aside from their physical appeal, physical music – especially vinyl and CD, are known to offer better sound quality than MP3 and streaming. In MP3 and streaming, to offer the immense utility consumers value and increase profitability for the industry, the music files are compressed (Sterne, 2012). In some cases, with MP3 the audio files are shrunk by as much as 90% from the original recording (Levine, 2007). Compression removes sounds that are considered indistinguishable by the human ear (Sterne, 2012). However, a missing piece in compressed files

are the high and low ends of the recording, leaving MP3s sounding flat, or tinny (Levine, 2007). The dynamic ranges of some recordings are also being changed, making the difference between loud and soft parts of the music lesser. Daniel Levitin, a professor of music and neuroscience at McGill University stated that most people's MP3s are virtually indistinguishable from CDs, but still "it's like going to the Louvre and instead of the Mona Lisa there's a 10-megapixel image of it" (Levine, 2007).

For many in the general population, a decrease in sound quality is inconsequential. There has been evidence of this from as early as AM radio, to presently with streaming services and MP3. As Sterne (2006) explains, MP3s are "designed for massive exchange, casual listening and massive accumulation." Music is shifting to becoming more utilitarian because of its embeddedness in everyday life, and thus can create inattentive listening situations. Before digital music, listening to music personally while exercising, studying, or conversing with others was less universal. When the consumer is not paying total attention, nuanced details in the music are often ignored. It can tempt musicians and mastering engineers to question whether addressing these details is necessary. Jason Falkner, a musician most known for his collaborations with Paul McCartney, Beck, Air, and Aimee Mann shared in an interview his thoughts on digital music through his experiences while making music: "I'm in the studio all the time, and work with people, and they're like 'Well, it doesn't really matter, because nobody's going to hear it, they're just going to listen to it on MP3'" (PonoMusic, 2015). With physical music, the nuances musicians work hard to create are still present, representing near exactly what they want the listener to hear. It would be very easy for musicians to offer digital music at their live shows for purchase. Download cards offer great profit margins, are easy to store and maintain, and could even be printed in a city before a show, yet they are largely not used. Only offering physical

music can be considered an act by the musician to force the consumer to listen to their recordings in the way they want their art represented.

Although sound quality is important to musicians, in the interviews it was mentioned minimally, which is consistent with overall listening trends. In the vinyl conversation, the Programmers mentioned their "different," but not superior sound (aside from one audiophile), and with CDs they were only mentioned once for being able to be played loudly. The sonic issues involved with the compression of digital music were not mentioned whatsoever. This is especially surprising considering several of the Programmers are active musicians themselves, many collect physical music, and the cohort was chosen because of their passion for music.

Having higher quality recordings available can represent musicians' confidence in their recordings. One Programmer, Bennett B., spoke to the merits of making and selling physical music in a story he told of a friend who was pressing his music to vinyl: "I'm really glad he's pressing it to vinyl because it means he has to take it seriously… If I see you with a good vinyl on your merch table… it's like 'Ok, you really defend your work. You just dropped $4,000 to sell this to me.' I don't give a shit how good your band is, if you have a cassette on the table, you can print a cassette with packaging for under a dollar per unit. That's no investment, I'm sorry."

Although sound quality and proper representation of art were not key motivators for all the Programmers, through their purchasing for artist support, they are still positively influencing Titon's (2009) principles of diversity, sustainable growth, and stewardship for developing cultural sustainability in music.

Cultural Sustainability Summary

The Programmers considered cultural sustainability to a high degree in their collecting. They supported musicians by purchasing music to attain rare collectables, get a souvenir, feel

like a stakeholder in the art, and give charity. Rare collectables and souvenirs can be categorized as collector motivators, which were connected to the Programmers' desire for, and memories attributed to physical music, as well as their perfectionist and novelty-fad decision-making styles. Being a stakeholder and giving charity were considered cultural motivations. Although most Programmers did not state any consideration of audio quality or how the artists want their recorded music best represented, they were still supporting cultural sustainability.

Chapter 6: Conclusion

6.1 Summary of Findings

Barriers to sustainable music consumption for the Trent Radio Programmers in environmental, economic, and cultural sustainability have been uncovered. Environmental sustainability was not considered by the Programmers. Barriers of lacking knowledge, no sustainable formats available, sunk investments in then-required formats, and wanting to support cultural sustainability effectively were revealed as the primary drivers.

Economic and cultural sustainability are inherently connected in the music industry. Both were well considered by the Programmers. It was found that barriers existed to a lesser degree in these pillars of sustainability because the Programmers prioritized supporting local, diverse musicians financially. From an economic sustainability perspective, the two key reasons the Programmers acted in this way were the hedonic benefit and their knowledge of the music industry.

From a cultural sustainability perspective, the Programmers were influenced by both collector and cultural motivators. As music collectors, they valued unique pieces and having physical formats that allow for memories to be embedded within them. They also possessed a combination of perfectionist and novelty-fad decision-making styles. For the Programmers' cultural motivators, sound quality and having music in the way the artists intended were valued to a lesser degree but were supported by their purchases nevertheless.

Finally, and most importantly, this project has revealed a relationship between the environmental, economic, and cultural pillars of sustainability within the context of recorded music. In the music industry, to support cultural sustainability, economics must be incorporated to be most effective. However, the most effective economic channels involve environmental

impacts. Although the Programmers were conscious of and active on issues within economic and cultural sustainability in their collecting, they could not effectively influence them without environmental sacrifice.

6.2 Research Limitations

The study was most limited in components related to scope and population. Although some strong themes were found in this study, more subjects are needed to strengthen the efficacy of findings. The study was also limited in population due to the use of one knowledgeable group, which is not reflective of the general population of music consumers. Funding and time were two barriers to generating greater, and more representative populations.

Social sustainability was not included in the study. Therefore, there were no opportunities to ask questions pertaining to it during the interviews, nor the analysis of social sustainability themes during coding. This is a limitation in achieving a complete analysis of all four pillars of sustainability.

Due to the study's novel combination of recorded music and sustainability, a limitation was the depth at which some themes were explored. The study was kept general to encompass as many themes as possible. This strategy, although effective in showcasing the broad landscape of the situation, was limited in the ability to achieve very detailed analyses of specific findings.

6.3 Future Research Directions

There are many opportunities for expansion from this study. They offer the ability to widen and deepen the understanding of music and sustainability. Further work is required regarding the general public's perceptions of music and sustainability. The population of casual listeners is much larger than that of the passionate music fan, and thus they hold sizable

influence over many of the issues presently in music and sustainability. Exploration of the topic into different regions and demographics also offer opportunities for expansion.

A missing component of this study was the social sustainability pillar. It is a critical addition to the sustainability narrative, that can easily be built within the framework already established. A more in-depth analysis of the many themes discussed in this study is also recommended. Topics within the Literature Review and Discussion are large enough to warrant qualitative studies for themselves.

Finally, it is very important that more knowledge is gained regarding the environmental sustainability of music. A large barrier uncovered in this study through both supplementary research and the interviews was that more conclusive evidence is needed in understanding the environmental consequences of digital media. This information will aid in determining the most environmentally sustainable music format, helping consumers to make informed decisions.

6.4 Strategies for Supporting Sustainability in Collecting

This study has helped to reveal strategies for music collecting that encompass the pillars of environmental, economic, and cultural sustainability. For those who wish to support sustainability in their collecting, the following is an overview of purchase strategies that are most effective, based on this study's findings.

Firstly, it is recommended for collectors to focus on artist support, especially through the purchase of physical music, as long as the purchase is made through the artists as directly as possible. This satisfies the economic and cultural music sustainability pillars most effectively. Although there are environmental impacts with consuming too many physical goods, if physical collecting is kept within a reasonable pace, this would likely be the most sustainable means to collect with all three pillars considered. Furthermore, economic and cultural sustainability can be

multiplied if the purchases are made at the musician's live show, because these events offer a good profit margin for them.

Secondly, although digital music will only become more embedded within society with time, it is recommended to limit its use as much as possible. Digital media use reinforces the issues existing in the economic and cultural sustainability of the music industry, unless they are offered for free. From an environmental perspective, although there is no clear science on which format is best, ever-growing digital infrastructure poses major threats to both environmental and human health in the future.

Finally, although it may be unreasonable for some collectors, there is also the option of avoiding collections altogether. This solution branches from the idea of moving from individual collections to community collections to borrow from, akin to a library rental. It poses an economic issue because it removes the potential of selling many copies, but it may also increase the potential for attendance at live shows and using musicians' other side occupations, as piracy's influence exhibited. There is also environmental upside to this option. Once the initial impact of attaining the physical media is made, if adopted at a large scale the space could offer nearly net zero emissions for hundreds of music appreciators. Notably, Trent Radio allows for volunteers to listen to and sometimes borrow from their expansive in-house archive.

6.5 Closing Thoughts

This study has begun to raise the issues associated with music and sustainability from academic obscurity. It is a hope that this study has sparked others to challenge the opaqueness in recorded music's environmental, economic, and cultural sustainability, and build upon what has been written. There are still many nuances and complexities that warrant investigation and expansion.

This study has uncovered most generally that to support culture in music, strategic payment is needed, and it comes at the price of the environment. It would have not been possible to understand recorded music and sustainability in this way without viewing the issue through multiple lenses. This idea is grounded in the evidence that the Programmers and other guiding works have shown.

The primary causes of the sustainability imbalance are the ties between culture and economics, and environment and support. These pull what should be equal consideration of all elements of sustainability toward only the economic pillar. Strengthening the pull is public misguidance, resulting in poor consumer decision-making.

When the arcane shell of the music industry is cracked, it reveals a core of hard working artists and individuals vying to maintain their craft. This is all done at the local level. Before any musician made their way into stardom, they began there. Towns can make them feel big, worthwhile, and that their art is worth pursuing. If sustainability and recorded music become better understood, and the public properly educated, it offers tremendous potential to build music into parts unrealized.

Support the music that lives in your town.

References

Alcala, F., & Gonzalez-Maestre, M. (2009). Copying, superstars, and artistic creation. *Universidad De Murica*.

Allsopp, M., Costner, P., & Johnston, P. (2001). Incineration and human health. *Environmental Science and Pollution Research, 8*(2), 141-145.

A&M Records, Inc. v. Napster, Inc., 239 F.3d 1004 (9th Cir. Oct. 12, 2001).

Angelo Brothers. (1956). *Shellac*. Kolkata, IN: Angelo Brothers.

Anohni, Hudson Mohawke, & Oneohtrix Point Never (Producers), & Anohni (Composer). (2016). *HOPELESSNESS* [Recorded by Anohni] [CD]. London, GB: Rough Trade.

Askin, N., & Mauskapf, M. (2017). What makes popular culture popular? Product features and optimal differentiation in music. *American Sociological Review, 82*(5), 910-944.

The Associated Press. (2013, September 13). Pharrell denies 'Blurred Lines' copies Marvin Gaye: 'It's completely different.' Retrieved September 29, 2017, from Billboard website: https://www.billboard.com/articles/news/5695041/pharrell-denies-blurred-lines-copies-marvin-gaye-its-completely-different

Atkinson, R. D., & McKay, A. S. (2007, March). *Understanding the Economic Benefits of the Information Technology Revolution*. Washington, DC: The Information Technology & Innovation Foundation.

Babin, B. J., Darden, W. R., & Griffin, M. (1994). Work and/or fun: Measuring hedonic and utilitarian shopping value. *Journal of Consumer Research, 20*(4), 644-656.

Bach, D. (2012). *The Dark Side of the Tune: The Hidden Energy Cost of Digital Music Consumption*.

Bateman, R., Carothers, Z. S., Gorman, F., Holland, B., Howk, E. A., O'Quin, K., . . . Taccone, A. (2017). Feel it Still [Recorded by Portugal. The Man]. On *Woodstock* [Digital file].

Battilana, J., Lee, M., Walker, J., & Dorsey, C. (2012). In search of the hybrid ideal. *Stanford Social Innovation Review*, *10*(3), 50-55.

Bein, K. (2017, January 10). UK vinyl sales in 2016 hit highest level since 1991. Retrieved August 1, 2018, from Billboard website: https://www.billboard.com/articles/news/dance/7648047/uk-vinyl-sales-high-mark-2016

Bejgarn, S., MacLeod, M., Bogdal, C., & Breitholtz, M. (2015). Toxicity of leachate from weathering plastics: An exploratory screening study with *Nitocra spinipes*. *Chemosphere*, *132*(1), 114-119.

Berkhout, F., & Hertin, J. (2004). De-materialising and re-materialising: Digital technologies and the environment. *Futures*, *36*(8), 903-920.

Billboard. (1942, April 25). Diskers ready new plans. *Billboard*.

Billboard. (1945). RCA-Victor. *Billboard*.

Bitzilekis, A. E. (2015). *Echoes of Nostalgia: The Enduring Appeal on Retro Products? (Greek Consumer's Insights on Vinyl)* (Doctoral dissertation).

Blistein, J. (2016, August 31). Tool, R. Kelly, Danger Mouse support 'Blurred Lines' appeal. Retrieved July 26, 2018, from Rolling Stone website: https://www.rollingstone.com/music/music-news/tool-r-kelly-danger-mouse-support-blurred-lines-appeal-104228/

Boccaletti, G., Loffler, M., & Oppenheim, J. M. (2008, October). *The McKinsey Quarterly: How IT Can Cut Carbon Emissions*. New York, NY: McKinsey & Company.

Bongiovi, T., & Quinn, L. (Producers), & Byrne, D., Frantz, C., & Weymouth, T. (Composers). (1977). Psycho Killer [Recorded by Talking Heads]. On *Talking Heads: 77* [Digital file].

Bose, P. K., Sankaranarayanan, Y., & Segupta, S. C. (1963). Chemistry of lac. *Indian Lac Research Institute*, 43.

Brent, J. (2016, February 4). Could the Avalanches have made *Since I Left You* in 2016? Retrieved September 18, 2017, from Complex website: https://www.complex.com/music/2016/02/could-the-avalanches-have-made-since-i-left-you-in-2016/

Brooks, D. (2017, February 23). Live Nation posts sixth consecutive year of record growth. Retrieved August 25, 2018, from Billboard website: https://www.billboard.com/articles/business/7701939/live-nation-posts-sixth-consecutive-year-of-record-growth

Brunk, K. H. (2010). Exploring origins of ethical company/brand perceptions — A consumer perspective of corporate ethics. *Journal of Business Research*, *63*, 255-262.

Burkart, P. (2008). Trends in digital music archiving. *The Information Society*, *24*(4), 246-250.

Burrows, M. (2016, January 30). The long, hard road to rock n' roll success: 'We're essentially skint.' Retrieved July 21, 2018, from The Guardian website: https://www.theguardian.com/business/2016/jan/30/rocknroll-stardom-live-music-struggling-bands-slow-club-brawlers

Canty, B. (Producer), & Harris, H., & Foster, K. (Composers). (2006). *The Body, the Blood, the Machine* [Recorded by the Thermals] [CD]. Seattle, WA: Sub Pop.

Casamayor, J., Su, D., & Sarshar, M. (2015). Extending the lifespan of LED-lighting products. *Architectural Engineering and Design Management*, *11*(2), 105-122.

Chang, C.-T., & Liu, H.-W. (2012). Goodwill hunting? Influences of product-cause fit, product type, and donation level in cause-related marketing. *Marketing Intelligence & Planning*, *30*(6), 634-652.

Chater, R., & Di Blasi, T. (Producers). (2016). *Wildflower* [Recorded by the Avalanches] [CD]. London, GB: EMI.

Chater, R., & Seltmann, D. (Producers). (2000). *Since I Left You* [Recorded by the Avalanches] [CD]. Sydney, AU: Modular.

Cheng, X., Shi, H., Adams, C. D., & Ma, Y. (2010). Assessment of metal contaminations leaching out from recycling plastic bottles upon treatments. *Environmental Science and Pollution Research*, *17*(7), 1323-1330.

Chowdhury, T. G., & Khare, A. (2011). Matching a cause with self-schema: The moderating effect on brand preferences. *Psychology & Marketing*, *28*(8), 825-842.

Christman, E. (2017, May 22). Global music merch biz grew to $3.1 billion in 2016: Study. Retrieved August 2, 2018, from Billboard website: https://www.billboard.com/articles/business/7801357/global-music-merch-biz-grew-to-31-billion-in-2016-study

Connolly, M., & Krueger, A. B. (2005). Rockonomics: The economics of popular music. *National Bureau of Economic Research*, 1-87.

Copyright Act, 17 U.S.C. S. 102(b) (1947 & Supp. 1978).

Corbett, J. (2017). *Vinyl Freak: Love Letters to a Dying Medium*. Durham, NC: Duke University Press.

Cozzarelli, I. M., Suflita, J. M., Ulrich, G. A., Harris, S. H., Scholl, M. A., Schlottmann, J. L., & Christenson, S. (2000). Geochemical and microbiological methods for evaluating anaerobic processes in an aquifer contaminated by landfill leachate. *Environmental Science and Technology*, *34*(18), 4025-4033.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.

Cubitt, S. (2017). *Finite Media: Environmental Implications of Digital Technologies*. Durham, NC: Duke University Press.

Cucchiella, F., D'Adamo, I., Lenny Koh, S. C., & Rosa, P. (2015). Recycling of WEEEs: An economic assessment of present and future e-waste streams. *Renewable and Sustainable Energy Reviews*, *51*(1), 263-272.

Darden, W. R., & Babin, B. J. (1994). Exploring the concept of affective quality: Expanding the concept of retail personality. *Journal of Business Research*, *29*, 101-109.

Deng, W.-J., Giesy, J. P., & Zheng, H.-L. (2017). End-of-life (EoL) mobile phone management in Hong Kong households. *Journal of Environmental Management*, *200*(1), 22-28.

Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of Marketing Research*, *37*(1), 60-71.

DiCola, P. (2013). Money from music: Survey evidence on musicians' revenue and lessons about copyright incentives. *Arizona Law Review*, *13*(1), 1-70.

Discogs. (2018, July 26). King Gizzard and the Lizard Wizard - *Polygondwanaland*. Retrieved July 26, 2018, from Discogs website: https://www.discogs.com/King-Gizzard-And-The-Lizard-Wizard-Polygondwanaland/master/1268453

Dredge, S. (2014, February 24). Musician Zoe Keating reveals iTunes, Spotify and YouTube payouts for 2013. Retrieved July 25, 2017, from The Guardian website: https://www.theguardian.com/technology/2014/feb/24/zoe-keating-itunes-spotify-youtube-payouts

Duan, H., Miller, T., Gregory, J., & Kirchain, R. R. (2013). *Quantitative Characterization of Domestic and Transboundary Flows of Used Electronics: Analysis of Generation, Collection, and Export in the United States*. Bonn, DE: StEP.

Dubois, B., Laurent, G., & Czellar, S. (2005). Segmentation based on ambivalent attitudes: The case of consumer attitudes toward luxury. *Marketing Letters*, *16*, 115-128.

Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st century business. *Environmental Quality Management*, *8*(1), 37-51.

Erlewine, S. T. (2016, May 2). Why the death of greatest hits albums and reissues is worth mourning. Retrieved July 26, 2018, from Pitchfork website: https://pitchfork.com/features/article/9887-why-the-death-of-greatest-hits-albums-and-reissues-is-worth-mourning/

Fatta, D., Papadopoulos, A., & Loizidou, M. (1999). A study on the landfill leachate and its impact on the groundwater quality of the greater area. *Environmental Geochemistry and Health*, *21*(2), 175-190.

Fauteux, B. (2015). Campus frequencies: 'Alternativeness' and Canadian campus radio. *Interactions: Studies in Communication & Culture*, *6*(1), 29-46.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. Cambridge, GB: Cambridge University Press.

Frith, S. (2007). *Taking Popular Music Seriously*. Aldershot, GB: Ashgate.

Gabrys, J. (2015). Powering the digital: From energy ecologies to electronic environmentalism. In R. Maxwell, J. Raundalen, & N. L. Vestberg (Eds.), *Media and the Ecological Crisis* (p. 3-18). New York, NY: Routledge.

Gaye, M. (1977). Got to Give it Up [Recorded by M. Gaye]. On *Live at the London Palladium* [Digital file]. New York, NY: Tamla.

Gayer, A., & Shy, O. (2006). Publishers, artists, and copyright enforcement. *Economics & Policy, 18*(4), 374-384.

Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist, 66*(4), 290-302.

Godrich, N., & Radiohead (Producers). (2000). *Kid A* [Recorded by Radiohead] [CD]. London, GB: Parlophone.

Goleman, D. (2010). *Ecological Intelligence: The Hidden Impacts of What We Buy*. New York, NY: Broadway Books.

Gonzalez, B. (2018, April 27). The difference between streaming and downloading media. Retrieved July 26, 2018, from Lifewire website: https://www.lifewire.com/difference-between-streaming-and-downloading-media-1847372

Green, T., & Peloza, J. (2014). How do consumers infer corporate social responsibility? The role of organisation size. *Journal of Consumer Behaviour, 13*, 282-293.

Green, T., Sinclair, G., & Tinson, J. (2016). Do they know it's CSR at all? An exploration of socially responsible music consumption. *Journal of Business Ethics, 138*(2), 231-246.

Hagen, A. N. (2015). The playlist experience: Personal playlists in music streaming services. *Popular Music and Society, 38*(5), 625-645.

Hawkes, J. (2001). *The Fourth Pillar of Sustainability: Culture's Essential Role in Public Planning*. Champaign, Il: Common Ground Publishing.

Headey, B., Muffels, R., & Wooden, M. (2008). Money does not buy happiness: Or does it? A reassessment based on the combined effects of wealth, income and consumption. *Social Indicators Research*, *87*(1), 65-82.

Hilty, L., & Ruddy, T. F. (2000). Towards a sustainable information society. *Sustainable Information Society*, *4*(1), 2-9.

Hornby, N. (1995). *High Fidelity*. New York, NY: Berkley Publishing Group.

Huffman, W. E. (1974). Decision making: The role of education. *American Journal of Agricultural Education*, *56*(1), 85-97.

Hurcomb, M. (2018). About. Retrieved July 23, 2018, from *The Radius Project* website: http://theradiusproject.com/about/

Information is Beautiful. (2015, April). Selling out: How much do music artists earn online? Retrieved February 15, 2018, from Information is Beautiful website: https://informationisbeautiful.net/visualizations/how-much-do-music-artists-earn-online-2015-remix/

Information is Beautiful. (2018, March 3). Money too tight to mention? Major music streaming services compared. Retrieved July 20, 2017, from Information is Beautiful website: https://informationisbeautiful.net/visualizations/spotify-apple-music-tidal-music-streaming-services-royalty-rates-compared/

International Federation of the Phonographic Industry. (2017). *Global Music Report 2017*.

International Federation of the Phonographic Industry. (2018). *Global Music Report 2018*.

International Telecommunication Union. (2016). *Measuring the Information Society Report*. Geneva, CH: United Nations.

Jehan, T. (2000). *Creating Music by Listening* (Doctoral dissertation).

Jenke, T. (2018, April 26). Gene Simmons has confirmed a KISS farewell tour is on the way. Retrieved July 26, 2018, from Tone Deaf website: https://tonedeaf.com.au/gene-simmons-confirms-kiss-farewell-tour/

Kagan, S., & Kirchberg, V. (2016). Music and sustainability: Organizational cultures towards creative resilience – A review. *Journal of Cleaner Production*, *135*, 1487-1502.

Kawase, S., & Obata, S. (2016). Psychological responses to recorded music as predictors of intentions to attend concerts: Emotions, liking, performance evaluations, and monetary value. *Musicae Scientiae*, *20*(2), 163-172.

Kenny, D. T., & Asher, A. (2016). Life expectancy and cause of death in popular musicians: Is the popular musician lifestyle the road to ruin? *Medical Problems of Performing Arts*, *31*(1), 37-44.

Khan, U., Dhar, R., & Wertenbroch, K. (2004). A behavioral decision theoretic perspective on hedonic and utilitarian choice. *INSEAD*, *66*, 1-37.

Kibby, M. (2009). Collect yourself. *Information, Communication & Society*, *12*(3), 428-443.

King Gizzard and the Lizard Wizard. (2017, November 14). *POLYGONDWANALAND.* This album is FREE. Free as in, free. Free to download and if you wish, free to make copies. Make tapes, make CDs, make records… [Facebook status update]. Retrieved from https://www.facebook.com/kinggizzardandthelizardwizard/photos/a.173717175974527.43633.168329496513295/1778782185468010/?type=3&theater

Kirkpatrick, I. (Producer), & Gomez, S., Michaels, J., Tranter, J., & Weymouth, T. (Composers). (2017). Bad Liar [Recorded by S. Gomez]. On *Bad Liar* [Digital file].

Kolstad, H. A., Juel, K., Olsen, J., & Lynge, E. (1995). Exposure to styrene and chronic health effects: Mortality and incidence of solid cancers in the Danish reinforced plastics industry. *Occupational and Environmental Medicine*, *52*(5), 320-327.

Krueger, A. B. (2005). The economics of real superstars: The market for rock concerts in the material world. *Journal of Labour Economics*, *23*(1), 1-30.

Krueger, A. B. (Presenter). (2013, June 12). *Land of Hope and Dreams: Rock and Roll, Economics and Rebuilding the Middle Class*. Speech presented at Rock and Roll Hall of Fame, Cleveland, OH.

Krukowski, D. (2018, January 30). How to be a responsible music fan in the age of streaming. Retrieved February 14, 2018, from Pitchfork website: https://pitchfork.com/features/oped/how-to-be-a-responsible-music-fan-in-the-age-of-streaming/

Lawrence, P., Hernandez, P., Williams, N., Gallaspy, D., Simmons, L., Wilson, C., . . . Taylor, R. (2015). Uptown Funk [Recorded by B. Mars]. On *Uptown Special* [Digital file].

Lessig, L. (2004). *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity*. New York, NY: The Penguin Press.

Levine, R. (2007, December 26). The death of *High Fidelity*: In an age of MP3s, sound quality is worse than ever. Retrieved June 1, 2018, from Rolling Stone website: http://www.electriccity.be/Images/The%20Death%20of%20High%20Fidelity%20_%20Rolling%20Stone.pdf

Lifset, R. J. (1993). Take it back: Extended producer responsibility as a form of incentive-based environmental policy. *The Journal of Resource Management and Technology, 21*(4), 163-175.

Lindvall, H. (2010, December 17). Behind the music: Why are musicians more likely to suffer from depression? Retrieved July 27, 2018, from The Guardian website: https://www.theguardian.com/music/musicblog/2010/dec/17/musicians-depression

Love, C. (2000, June 14). Courtney Love does the math. Retrieved July 25, 2017, from Salon website: https://www.salon.com/2000/06/14/love_7/

Lowe, C., & Hansson, J. O. (Producers), & Lowe, C., Hansson, J., Leff, A., Warren, E., Andress, I., & Pollack, M. (Composers). (2017). Boys [Recorded by Charli XCX]. On *Boys* [Digital file].

Lusardi, A., & Mitchell, O. S. (2010). Financial literacy among the young. *The Journal of Consumer Affairs*, *44*(2), 358-380.

Magaudda, P. (2011). When materiality 'bites back': Digital music consumption practices in the age of dematerialization. *Journal of Consumer Care, 11*(1), 15-36.

Makoway, M. (2001). *The Indie Band Bible: The Ultimate Guide to Breaking a Band* (Canadian ed.). Vancouver, BC: Madrigal Press.

Mauch, M., MacCallum, R. M., Levy, M., & Leroi, A. M. (2015). The evolution of popular music: USA 1960-2010. *Royal Society Open Science*, *2*, 1-10.

Mazhar, M. I., & Kaebernick, H. (2005, February). *Reusability Assessment of Components in Consumer Products - A Statistical and Condition Monitoring Data Analysis Strategy*. Paper presented at Australian LCA Conference, Sydney, AU.

McCourt, T. (2005). Collecting music in the digital realm. *Popular Music and Society*, *28*(2), 249-252.

McIntyre, H. (2016, January 15). Coachella leads the highest-grossing music festivals of 2015. Retrieved August 2, 2018, from Forbes website: https://www.forbes.com/sites/hughmcintyre/2016/01/15/coachella-leads-the-highest-grossing-music-festivals-of-2015/

Menn, J. (2003). *All the Rave: The Rise and Fall of Shawn Fanning's Napster*. New York, NY: Crown Business.

Mercury, F., May, B., Taylor, R., Deacon, J., & Bowie, D. (1981). Under Pressure [Recorded by Queen]. On *Hot Space* [Digital file]. London, GB: EMI.

Merrill, S. A. (2008). *College Radio Survivability: Emerging Business Models and the Challenges of Technological Coverage* (Doctoral dissertation).

Metacritic. (2018, July 26). Album releases by genre: Dance. Retrieved July 26, 2018, from Metacritic website: http://www.metacritic.com/browse/albums/genre/metascore/dance?view=condensed

Mrosek, T., Balsillie, D., & Schleifenbaum, P. (2006). Field testing of a criteria and indicators system for sustainable forest management at the local level. Case study results concerning the sustainability of the private forest Haliburton Forest and Wild Life Reserve in Ontario, Canada. *Forest Policy and Economics*, *8*(6), 593-609.

Mulligan, M. (2014, March). *The Death of the Long Tail: The Superstar Music Economy*.

Newton, M. (2008, November 21). Is sampling dying? How greenbacks and red tape are tearing the heart out of hip-hop. Retrieved September 16, 2017, from Spin website: https://www.spin.com/2008/11/sampling-dying/

Nielsen. (2016). *2015 Nielsen Music US Report*.

Nordlund, A. M., & Garvill, J. (2002). Value structures behind pro-environmental behavior. *Environment and Behavior, 34*(6), 740-756.

Parry, E. J. (1935). *Shellac: Its Production, Manufacture, Chemistry Analysis, Commerce and Uses*. London, GB: Sir I. Pitman & Sons.

Patton, M. Q. (2015). *Qualitative Research and Evaluation Methods: Integrating Theory and Practice* (4th ed.). Thousand Oaks, CA: Sage.

Pearlman, M. E., Finklea, J. F., Creason, J. P., Shy, C. M., Young, M. M., & Horton, J. M. (1971). Nitrogen dioxide and lower respiratory illness. *Pediatrics, 47*(2), 391-398.

Pharrell Williams v. Marvin Gaye, 15 F.3d (9th Cir. Oct. 6, 2017).

Pierceall, E. A., & Keim, M. C. (2007). Stress and coping strategies among community college students. *Community College Journal of Research and Practice*, *31*(9), 703-712.

Piolatto, A., & Schuett, F. (2012). Music piracy: A case of 'The rich get richer and the poor get poorer.' *Information Economics and Policy, 24*(1), 30-39.

PonoMusic. (2015, February 2). *Beck - Pono Experience* [Video file]. Retrieved from https://www.youtube.com/watch?v=34QsC-53rn8

Pyla, P. (2012). Beyond smooth talk: Oxymorons, ambivalences, and other current realities of sustainability. *Design and Culture*, *4*(3), 273-278.

Recording Industry Association of America v. Diamond Multimedia Systems, Inc., 180 F.3d 1072 (9th Cir. June 15, 1999).

Reynolds, S. (2011). *Retromania: Pop Culture's Addiction to its Own Past*. London, GB: Faber and Faber.

Rosen, J. (2013, September 18). Questlove on working with Elvis Costello, Miley's twerking, and his lunchtime DJ sets. Retrieved September 16, 2017, from Vulture website: http://www.vulture.com/2013/09/questlove-on-his-new-album-with-elvis-costello.html

Rosenberg, B. (2009). Interface Carpet and Fabric Company's sustainability efforts: What the company does, the crucial role of employees, and the limits of this approach. *Journal of Public Health Policy, 30*(1), 427-438.

Rowat, S. C. (1999). Incinerator toxic emissions: A brief summary of human health effects with a note on regulatory control. *Medical Hypotheses, 52*(5), 389-396.

Runtagh, J. (2016, June 8). Songs on trial: 12 landmark music copyright cases. Retrieved July 26, 2018, from Rolling Stone website: https://www.rollingstone.com/politics/politics-lists/songs-on-trial-12-landmark-music-copyright-cases-166396/vanilla-ice-vs-queen-and-david-bowie-1990-61441/

Sajiki, J., & Yonekubo, J. (2003). Leaching of bisphenol A (BPA) to seawater from polycarbonate plastic and its degradation by reactive oxygen species. *Chemosphere*, *51*(1), 55-62.

Seabrook, J. (2015). *The Song Machine: Inside the Hit Factory*. New York, NY: WW Norton.

Serrà, J., Corral, &., Boguñá, M., Haro, M., & Arcos, J. L. (2012). Measuring the evolution of contemporary western popular music. *Scientific Reports*, *2*, 1-6.

Shah, A. A., Hasan, F., Hameed, A., & Ahmed, S. (2008). Biological degradation of plastics: A comprehensive review. *Biotechnology Advances*, *26*(3), 246-265.

Sheffield, R. (2015, October 2). How Radiohead shocked the world: A 15th anniversary salute to *Kid A*. Retrieved September 26, 2017, from Rolling Stone website: https://www.rollingstone.com/music/music-news/how-radiohead-shocked-the-world-a-15th-anniversary-salute-to-kid-a-49200/

Sherry, E., Halseth, R., Fondahl, G., Karjala, M., & Leon, B. (2005). Local-level criteria and indicators: An aboriginal perspective on sustainable forest management. *Forestry: An International Journal of Forest Research*, *78*(5), 513-539.

Shuker, R. (2004). Beyond the *High Fidelity* stereotype: Defining the (contemporary) record collector. *Cambridge University Press*, *23*(3), 311-330.

Sioni, K., & Birkeland, I. (2014). Exploring the scientific discourse on cultural sustainability. *Geoforum*, *51*(1), 213-223.

Slack, J. D., & Wise, J. M. (2007). *Culture and Technology: A Primer* (3rd ed.). Bern, CH: Peter Lang.

Slingerland, C. (2018, January 10). King Gizzard & the Lizard Wizard map out North American tour. Retrieved July 21, 2018, from Exclaim website: https://exclaim.ca/music/article/2018-01-10-king_gizzard_and_the_lizard_wizard_map_out_north_american_tour

Smith, J. (2015). *Eco-Sonic Media*. Berkeley, CA: University of California Press.

Spitznagel, E. (2016). *Old Records Never Die: One Man's Quest for His Vinyl and His Past*. New York, NY: Plume.

Spreckley, F. (1981). *Social audit – A management tool for co-operative working*. Sully, GB: Beechwood College.

Sproles, G. B. (1985). From perfectionism to fadism: Measuring consumers' decision-making styles. *American Council on Consumer Interests*, 79-85.

Statistics Canada. (2004). Waste management industry survey: Business and government sectors. *Statistics Canada*, 1-46.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407-424.

Sterne, J. (2006). The MP3 as cultural artifact. *New Media & Society*, *8*(5), 825-824.

Sterne, J. (2012). *MP3: The Meaning of a Format*. Durham, NC: Duke University Press.

Sthiannopkao, S., & Wong, M. H. (2013). Handling e-waste in developed and developing countries: Initiatives, practices, and consequences. *Science of the Total Environment*, 1147-1153.

Stutz, C. (2016, April 6). Bandcamp has paid artists $150m in 8 years. Retrieved July 25, 2017, from Billboard website: https://www.billboard.com/articles/news/7325464/bandcamp-paid-150-million-to-artists-8-years

Styles, H., Bhasker, J., Rowland, M., Nasci, R., Salibian, A., & Johnson, T. (2017). Sign of the Times [Recorded by H. Styles]. On *Sign of the Times* [Digital file].

Szymanski, G. (2009). Pandora, or, a never-ending box of musical delights. *Music Reference Services Quarterly*, *12*(1-2), 21-22.

Talking Machine World. (1920). Shellac market. *Talking Machine World*.

Talking Machine World. (1929). Shellac for talking machine. *Talking Machine World*, *2*(12).

Thicke, R., Williams, P., Harris Jr., C., & Gaye, M. (2013). Blurred Lines [Recorded by P. Williams & C. Harris Jr.]. On *Blurred Lines* [CD]. Santa Monica, CA: Interscope.

Thompson, A., & Daniels, M. (2017). The musical diversity of pop songs. Retrieved August 24, 2018, from The Pudding website: https://pudding.cool/2018/05/similarity/

Thompson, R. C., Moore, C. J., vom Saal, F. S., & Swan, S. H. (2009). Plastics, the environment and human health: Current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1526), 2153-2166.

Thøgersen, J. (2008). Social norms and cooperation in real-life social dilemmas. *Journal of Economic Psychology*, *29*, 458-472.

Time. (1945). Plastic music. *Time*, *46*(17).

Titon, J. T. (2009). Music and sustainability: An ecological viewpoint. *The World of Music*, *51*(1), 119-137.

Trent Radio. (2008, July 28). Trent Radio programme proposal guide. Retrieved November 11, 2017, from Trent Radio website: http://trentradio.ca/pd/pp/tr_pp_guidex.pdf

U.S. Bureau of Economic Analysis. (2018). SA51 Disposable personal income summary: Disposable personal income, population, and per capita disposable personal income. Retrieved July 26, 2018, from U.S. Bureau of Economic Analysis website: https://www.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=30&isuri=1&7022=21&7023=0&7033=-1&7024=non-industry&7025=0&7026=00000&7027=-1&7001=421&7028=-1&7031=0&7040=-1&7083=levels&7029=23&7090=70

Vagianos, A. (2016, May 25). Music festivals' glaring woman problem. Retrieved September 13, 2017, from The Huffington Post website: http://data.huffingtonpost.com/music-festivals

Vanilla Ice, Earthquake, May, B., Mercury, F., Taylor, R., Deacon, J., & Bowie, D. (1990). Ice Ice Baby [Recorded by Vanilla Ice]. On *Hooked/To the Extreme* [Digital file]. New York, NY: SBK.

Venhoeven, L. A., Bolderdijk, J. W., & Steg, L. (2013). Explaining the paradox: How pro-environmental behaviour can both thwart and foster well-being. *Sustainability*, *5*, 1372-1386.

Vining, J., & Ebero, A. (1991). Are you thinking what I think you are? A study of actual and estimated goal priorities and decision preferences of resource managers, environmentalists, and the public. *Society and Natural Resources*, *4*(2), 177-196.

Vogel, H. L. (2015). *Entertainment Industry Economics: A Guide for Financial Analysis* (9th ed.). New York, NY: Cambridge University Press.

Wall, T. (2007). Finding an alternative: Music programming in US college radio. *Radio Journal: International Studies in Broadcast*, *5*(1), 35-54.

Wallendorf, M., & Arnould, E. J. (1988). "My favorite things": A cross-cultural inquiry into object attachment, possessiveness, and social linkage. *Journal of Consumer Research*, *14*(4), 531-547.

Weber, C. L., Koomey, J. G., & Matthews, H. S. (2010). The energy and climate change implications of different music delivery methods. *Journal of Industrial Ecology*, *14*(5), 754-769.

Wilburn, K., & Wilburn, R. (2014). The double bottom line: Profit and social benefit. *Business Horizons*, *57*, 11-20.

Wilkie, D., Ilavsky, I., & Godspeed You! Black Emperor (Producers). (1997). *F# A# ∞* [Digital file]. Montreal, QC: Constellation.

Winseck, D. (2011, May 17). Restrictive copyright plays into music industry myths. *Globe and Mail*.

Witt, S. (2015). *How Music Got Free*. New York, NY: Viking Press.

Wolkewitz, M., Allignol, A., Graves, N., & Barnett, A. G. (2011). Is 27 really a dangerous age for famous musicians? Retrospective cohort study. *British Medical Journal*, *343*, 1284-1286.

Yochim, E. C., & Biddinger, M. (2008). 'It kind of gives you that vintage feel': Vinyl records and the trope of death. *Media, Culture, & Society*, *30*(2), 183-195.

Zhong, C., Shah, S., Sundaravadivelan, K., & Sastry, N. (2014, June). *Sharing the loves: Understanding the how and why of online content curation*. Paper presented at International AAAI Conference on Weblogs and Social Media, Cambridge, MA.

Appendix A

Interview Guide

Study Name:
Uncovering the Barriers to Sustainable Music Consumption

Researchers:
Primary: Alex Campagnolo – Master of Arts in Sustainability candidate, Trent University
acampagnolo@trentu.ca
(519) 835-0802
Supervisor:
Tom Whillans – Sustainability Studies Faculty, Trent University
twhillans@trentu.ca

Introduction

- Introduce self, explain the project briefly
- Have participant read and sign the consent form, and allow for any of their questions to be clarified before the interview starts
- Turn on digital audio recorder, notify the participant that the device is on

Why?

1. What is your definition of a collection? What formats are included in the definition?

2. Why do you collect the formats you do?

3. How do you feel these formats compare to the others you could be collecting?

4. What do you think is/are the most valuable aspect(s) of your collection(s)?

How?

5. How do you use your format(s)?

6. In what setting do you use your formats of choice?

7. How do you organize your music formats?
    a. If applicable: Do you use playlists as a means of organization? What type and how?

8. How do you explore new music? What resources do you use?

9. Do you regularly share your musical taste with others? How?

10. How do you maintain and expand your collection? Do you ever remove from the collection?

Sustainability

11. Do you ever consider the environmental sustainability of your collection?

12. Do you ever consider the economic sustainability of your collection?

13. Do you ever consider the cultural sustainability of your collection?
    a. Cultural sustainability: maintaining cultural beliefs, cultural practices, heritage conservation, and culture as its own entity, while also considering the question of whether the affected cultures will exist in the future.

14. Do you feel you should be considering these factors more in your collecting?

15. What do you feel holds you back from considering the aspects of sustainability in your music collecting?
    a. Or motivates you?

Streaming

16. What are your opinions regarding streaming services as a means of collecting music?

17. What level of environmental, economic, and cultural sustainability do you think streaming is best representative of?

18. Do you think streaming is more environmentally, economically, and/or culturally sustainable in comparison to physical collections?

19. What barriers do you or you think others have in adopting streaming services?

Do you have any further comments? Do you feel you have represented how and why you collect appropriately? Do you feel you have represented your thoughts on sustainability and collecting appropriately? Do you think you have represented your thoughts on streaming services appropriately?

Thank you for your time.

Appendix B

Letter of Information

Study Name:
Uncovering the Barriers to Sustainable Music Consumption
REB File #24601

Researchers:
Primary Researcher: Alex Campagnolo – Master of Arts in Sustainability Candidate, Trent University
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(519) 835-0802
Supervisor: Tom Whillans – School of the Environment Faculty, Trent University
twhillans@trentu.ca
Committee Member: Hugh Hodges – Cultural Studies Faculty, Trent University
hughhodges@trentu.ca
Committee Member: Liam Mitchell – Media Studies Faculty, Trent University
liammitchell@trentu.ca
Certifications and Regulatory Compliance Officer: Karen Mauro – Research and Innovation Staff, Trent University
kmauro@trentu.ca

This research being conducted has been approved by the Trent University Research Ethics Board and is being used for a Master of Arts in Sustainability thesis at Trent University. If there are any questions or concerns about the research, contact any member of the research team.

Description of Research

This research is focused on the sustainability of collecting music. The qualitative research involves interviewing Trent Radio Programmers regarding their formats of choice, collecting habits, thoughts on music streaming, and connections to sustainability. The research is based in sustainability studies, but is also very interdisciplinary, involving themes within cultural studies, psychology, business, and consumer studies. This will be the first study of its kind to view the of issues music collecting through the framework of sustainability.

Participant Timeline

- March 1st, 2017: Participant recruitment begins
- March 1st, 2017: Participants begin interviews with the primary researcher
    - Information will be transcribed as interviews are completed
- April 1st, 2017: Interviews will be complete
- March 1st-August 31st, 2017: Participants may be contacted for clarification of their statements, and for approval for the use of their quotations within the thesis
- September 2017: The interview data is archived with the Trent Archives, and the primary researcher's copy will be destroyed

Appendix C

Participant Consent Form

***See Attached Letter of Information**
Study Name:
Uncovering the Barriers to Sustainable Music Consumption
REB File #24601

Researchers:
Primary: Alex Campagnolo – Master of Arts in Sustainability Candidate, Trent University
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(519) 835-0802

Supervisor: Tom Whillans – School of the Environment Faculty, Trent University
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Committee Member: Hugh Hodges – Cultural Studies Faculty, Trent University
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Committee Member: Liam Mitchell – Media Studies Faculty, Trent University
liammitchell@trentu.ca

Certifications and Regulatory Compliance Officer: Karen Mauro – Research & Innovation Staff, Trent University
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(705) 748-1011 ext. 7896

Purpose:
The purpose of this study is to uncover Trent Radio Programmers' choice of music format, thoughts on music streaming, and thoughts on their collections' level of sustainability. It will result in recommendations for facilitating more sustainable music collecting.

Methods:
In-person one-on-one interviews will be conducted with 20 Trent Radio Programmers.

Expected Benefits:
This research will further the understanding of the public's reasoning for using or not using sustainable collecting practices; a topic of study that is still in its infancy. A benefit to the participant is their ability to cite this voluntary experience in the future, and have their thoughts included in a M.A. level study.

Nature and Duration:
Voluntary participation in the form of an exploratory interview to discuss their musical format preferences and connections to sustainability is requested of current Trent Radio Programmers. Participation will be in semi-structured one-on-one interviews. Interviews are expected to last no more than one hour.

Potential Conflicts of Interest:
A conflict of interest may reside in the primary researcher's personal musical taste, taste in musical format, curative techniques, and thoughts on sustainability. The primary researcher also volunteers at Trent Radio and is acquainted with some of the Programmers participating.
□ My thoughts portrayed in the interview will be my own, and do not consider the primary researcher's personal preferences (fill in box for "yes").

How the Data will be used in the Research:
The data is being used to aid the completion of a master's thesis, for the Master of Arts in Sustainability Studies program at Trent University. The information may be presented in conferences and/or university lectures and may be published into journal articles. Interview data will be analyzed with other interview results from the study to determine trends and generate recommendations for sustainable music collecting. The data may be archived for future research.

Potential Commercialization of Findings:
The research findings will not be used commercially.

Voluntary Participation:
Your participation in the research is completely voluntary and participants may choose to cease participation at any time. Certain questions do not have to be answered, and comments can be off the record for clarification at the participant's request.

Confidentiality:
The data is being kept completely confidential throughout the entirety of the study. Data will be kept confidential to those other than the primary researcher, supervisor, or interviewees who wish to edit their own quotations for clarification. Audio data will be transcribed by the primary researcher. In the thesis, no interviewee's personal information is being used, other than the fact they volunteer at Trent Radio. Participants may declare whether they wish to have their first name and last initial used in the thesis or remain anonymous.
□ I consent to my first name and last initial being used in the thesis (fill in box for "yes").

Data Storage and Destruction:
Personal and interview data will be kept on an encrypted external hard drive during the study and locked in a safe. Once the study is complete, only interview data may be submitted to an archival agency, then the hard drive will be destroyed.
□ I consent to this interview being archived for further research purposes (fill in box for "yes").

Recording of Data:
Interviews will be recorded on a mobile digital audio recorder. Data will be transcribed by the primary researcher.

Potential Risks:
There is nothing above minimal risk in this study.

Legal Rights and Signatures:

I _____, consent to participate in the Uncovering the Barriers to Sustainable Music Consumption study conducted by Alex Campagnolo. I have understood the nature of this project and wish to participate. I have received a copy of this form for my own records. I understand that the project has been approved by the Trent Research Ethics Board. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____. Date _____.
Participant

Signature _____. Date _____.

Appendix D

REB File #24601

Opportunity for Trent Radio Programmers to Participate in a Research Project on Music Collecting!

A study is being conducted in the Master of Arts in Sustainability Studies (MASS) program at Trent University exploring how and why Trent Radio Programmers collect and organize their music (vinyl, cassette, CD, MP3, streaming, and otherwise)

If you want to share your passion for collecting in an interview or want more information, contact:

Alex Campagnolo - acampagnolo@trentu.ca

Interviews will take place from February 28th-April 30th and will be 45 minutes in duration

Appendix E

Hi Programmers and Operators,

REB File #24601

A study is being conducted in the Master of Arts in Sustainability program at Trent University, exploring how and why Trent Radio Programmers collect and organize their music (vinyl, cassette, CD, MP3, streaming, and otherwise).

Participation would involve sharing your thoughts in a 30-minute interview, with topics focusing on choice of format, collecting habits, and connections to sustainability (economic, environmental, and cultural).

If you are interested in sharing your passion for collecting, contact Alex Campagnolo (acampagnolo@trentu.ca) for more information. For a more detailed explanation of the research, see the attached letter of information.

Thank you!

Alex Campagnolo