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An Investigation of Economic Considerations Impacting on the Decision to Purchase or Pirate Online Music

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***Abstract*— An empirical study involving a national sample of 454 adult American respondents measured selected economic conditions associated with music piracy. The data collected was used to quantify the sample's purchasing and piracy history, its willingness to pay, to determine the just price of music, the expected value of legal punishment for pirating moderate volumes of music, and to generate a theoretical demand and revenue schedule based on stated willingness to pay at given prices. The study found respondents had a willingness to pay of approximately $1, a just price of 57 cents, and that more than half of the respondents believe that the expected punishment for moderate piracy is less than $1.29, which is the most common per-song price for digital music. The generated demand schedule suggested that the per-song selling prices of 99 cents and 79 cents generate slightly more revenue than $1.29. It was also found that the economic variables highlighted in this study had a similar ability to account for the variance in piracy rates as demographic variables such as age. Of the economic variables tested, the likelihood of purchasing songs at 59 cents per song was best able to predict piracy rates, being able to account for 19.8% of the variance between these variables.**

Keywords*— Music piracy, willingness to pay, just price, expected value of punishment, demand schedule, revenue schedule

I. Introduction

Piracy is the common name attached to any copyright infringement where a second party is supplied with copyrighted materials by another party. Absent permission of the copyright holder, the uploading and the downloading of copyrighted music using a peer-to-peer (P2P) network are both examples of piracy. Piracy is a pervasive behavior in both software and digital music, spanning all socio-economic groups and educational levels [1]. The theoretical frameworks and understandings developed in software piracy studies are commonly used in music piracy studies because the literature commonly considers software and music piracy to be similar, but different behaviors [2] [3] [4] [5]. The study of music piracy applies theories and concepts from the disciplines of economics, business, the law, ethics, sociology, psychology, and criminology to model behavior [6] [7]. The main enablers of software and music piracy have been categorized into the areas of technology, peer pressure, and risk avoidance [2] [8].

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The cross-disciplinary nature of piracy makes a unified theory of piracy difficult to achieve [9] and is a further indicator that piracy is a complex behavior. To date, no single variable has been found that is highly correlated with either purchasing or piracy rates [6].

This paper reports on the findings from empirical research that describes economic conditions associated with piracy including the willingness to pay (WTP) of consumers, the just price of music, the significance legal sanction has on piracy, the price that maximizes revenue for the recording industry, and to investigate whether economic issues can be used to successfully predict the overall piracy behavior of consumers.

This paper is organized into five chapters. This chapter introduces the paper and describes its purpose. Chapter two is a literature review that contains a description of the theoretical background this study is built on. The third chapter describes how the sample was generated and how it compares to the population of U.S. adults. Chapter four states the results of the study and describes the procedures used to calculate the results. Chapter five discusses the implications of the findings of the study as well as identifying future work suggested by the study's findings.

II. Literature Review

A. *A Tale of Disruptive Technologies*

The piracy of digital entertainment goods (books, music, television shows, movies, video games, etc.) is not a new problem. Music was the first of these digital entertainment goods that could be easily transferred over the Internet, and it was also the first to be subjected to wide-ranging Internet-based piracy. It is feasible to pirate music over the Internet today because of the combination of the availability of trans-coded ('ripped') music, the introduction of the MP3 file type, low-cost access to the Internet, and the introduction of P2P networks such as Napster, where the music piracy phenomenon first occurred.

Each of the technologies used in the file sharing explosion was a disruptive technology for the record labels, who are typically the copyright holders of the music they sell. A disruptive technology is any innovation that changes the means that is used to either store or disseminate music. Disruptive technologies are typically forced on the copyright holder by market demand, and cause the owners to lose some aspect of control over their copyrighted material. Disruptive technologies pit the interests of copyright holders against

technological innovators, due to the tendency of disruptive technologies to cause money to flow away from the copyright holder and towards the technological innovator. Disruptive technologies also tend to cause the recording industry to have lower margins, without increasing profits. Disruptive technologies are generally beneficial for consumers and have significantly improved the ability of consumers to enjoy music, by making it both easier to listen to, and less expensive [10]. Over the past 130 years, the music industry has faced many disruptive technologies. For example, John Phillip Sousa, of *The Stars and Stripes Forever* fame, complained about the disruptive technologies of wax roll phonographs and piano player scrolls, both of which allowed people to hear and play his music without having to pay for a concert ticket [11].

Disruptive technologies impact the legal system by forcing legislatures to update and change the copyright law so that it keeps pace with technological change [12] [13]. The Digital Millennium Copyright Act of 1998 is an example of such a legal facelift. Disruptive technologies also impact the legal system because copyright holders typically attempt to use the courts to suppress disruptive technologies [14] [15]. Examples of technological innovators being sued for copyright infringement include player piano scroll makers who were sued by the sheet music sellers (*White-Smith Music Publishing Company v. Apollo Company*), radio stations being sued for playing recordings on air (*Jerome H. Remick & Company v. American Automobile Accessories Company),* and video cassette recorder (VCR) manufacturers being sued by television and movie producers (*Sony Corporation of America v. Universal City Studios, Inc.).*

While some disruptive technology copyright infringement cases are won by the innovators, many such cases have been settled with a financial arrangement between the innovators and the copyright holders [14]. Ironically, the implementation of some disruptive technologies has brought unforeseen profits to the copyright holders [15]. Photocopying and the VCR are both examples of disruptive technologies that copyright holders fought against initially, but eventually led to new profit centers for the copyright holders involved.

It was no surprise that digitizing music caused copyright issues to surface. These issues were described by [16] and [17] as the *Digital Dilemma*. The *Digital Dilemma* is based in the idea that adequate protections for physical content become inadequate when the same content is digitized. The *Digital Dilemma* for music is that for a transaction of digital music to be acceptable to the seller, the buyer has to accept a loss of rights when compared against a non-digital good. The *Digital Dilemma* for the copyright holder is that once a song is digitized, any number of illegal copies can be made of that song. To overcome this fear of piracy, the copyright holders installed Digital Rights Management (DRM) software into their songs, limiting the song's ability to be copied or transferred to other devices. For the buyer, the *Digital Dilemma* is that the DRM placed on the song by the seller is not sophisticated enough to discriminate between legal and illegal copying, so the DRM software denies consumers the ability to make backup copies, store a song on any device they own, save the song using a different file type [12], or assign the song to a new owner. The lawful rights that existed for buyers of music when the music was stored on physical media are denied to consumers who buy music in a digital file.

As predicted by the *Digital Dilemma*, the combination of the disruptive technologies of the MP3 file type, the Internet, and P2P networks turned what had been a relatively minor problem of person-to-person piracy using cassette tapes, into mass-produced piracy with digital music. The MP3 file type gave consumers the ability to compress songs to transferrable sizes, making file transfers of music over the Internet feasible [4]. The Internet instantly connected millions of consumers who previously had no connection. The Internet also posed new legal challenges because it has no physical location, making the determination of jurisdiction problematic [16]. Because of the intangible nature of the Internet, well-established rules for tangible goods, such as theft and copyright laws, were questioned or rejected when these tangible goods were digitized [18]. Finally, P2P networks created the necessary trading platform where peers could easily transfer files between computers.

B. The Music Industry

The music market is best described as a monopoly due to the copyright restrictions placed on each song, though technically the music industry as a whole is organized as an oligopoly [19]. Until recently, 85% of the music market was controlled by the Big 5, consisting of AOL Time Warner, BMG, EMI, Sony, and Vivendi Universal [20]. The remaining 15% of the smaller companies are known as independent labels. In 2012, a re-alignment of the labels created the Big 4: Universal Music Group, Sony BMG, EMI Group, and Sony/ATV Music Entertainment. Because the music market is not competitive, the Big 4 is able to set the price of music at a level that captures consumer surplus [21] [22] [23].

Typically, the record labels act as talent management and provide the expertise and financial support necessary to produce the music. The record labels do not make a profit from most records and most bands that they work with. Instead, a small number of premier acts cover the bulk of the industry's expenses [24]. The major labels use their dominant position in the music industry to pressure radio stations into playing music performed by their acts. This radio exposure advertises the Big 4's music and helps drive the interest of consumers towards bands controlled by the Big 4 [20]. Historically, this *payola* system created a significant barrier to entry for independent labels and independent bands [25].

Non-premier acts almost always assign their copyright to the record label in exchange for royalty payments of between 10% and 15% of record sales. The bands make most of their money by touring and playing concerts [26]. From the band's perspective, record sales and air time on the radio are advertising tools for their tours and concerts. For the bands, piracy has a beneficial externality in that it serves as additional concert advertising. From the perspective of the record label, piracy is an enormous issue because of its effect on music sales, which is their primary source of income.

The digital music format brings some benefits to the recording industry such as reduced production and distribution costs, but it also creates some significant challenges for the recording industry. In the past, bands relied on their record label to produce and market their music [25]. With digital music, the band's need for extensive production facilities to create and distribute physical CDs, and the need for radio time to advertise their music are all reduced due to the use of the Internet and Internet radio as a marketing and distribution system [26]. The opportunities for self-management that digital music brings to the bands reduces their need for the major labels, which in turn should reduce the influence that the major labels can exert on the music industry in the future.

The competition created by P2P piracy has affected the music industry by generating new insight into the music market, by meeting unmet demand, and by forcing the recording industry to modernize their business models and practices [13] [27]. The recording industry in general is susceptible to piracy for a number of reasons, including: their poor relationship with the music-buying public, their poor relationship with bands they represent, their attempt to use a dated business model, their attempt to obstruct people from using the Internet to obtain music, and their attempt to force consumers to buy albums instead of singles [17] [28].

The history of music sales has not been one of steady gains, but of booms and busts where booms tend to correlate with the emergence of new music formats (vinyl disk, the inventions of stereo and cassette tapes, CDs) and busts that tend to correlate with the emergence of competing entertainment goods. There have been four major downturns in music sales in the past century, each of which can be attributed to the emergence of a new form of competing entertainment, such as "talking movies" in 1921, radio during the Great Depression of the 1930s, the rise of television in the 1950s, and the creation of VCRs in the 1970s. The fifth downturn in music sales started in 1999. Entertainment competitors for music that appeared in the late 1990s included home computing, the Internet, video games, and also DVD movies, which commonly had a lower price than its associated CD soundtrack.

The recording industry blames piracy for the significant drop in sales and profits that started in 1999. An interesting analysis by [14] compared music sales to Gross Domestic Product (GDP) over the past 100 years. He found that music sales have ranged from 0.25% of GDP during the Great Depression to 2.6% of GDP in 1921, with an average expenditure for music per year of roughly 1.25% of GDP [14]. While music sales did fall in the early 2000s, they remained very close to the historic average expenditure, meaning that record sales could just as easily be described as regressing to their mean instead of having a significant drop.

Internet radio is a new and emerging type of entertainment good that has beneficial externalities for the record labels. Today, Internet radio allows consumers to listen to streamed music that cannot be easily copied, allowing consumers to sample music before making purchase decisions. A national study of 7,600 respondents by [29] point to Internet radio is an important factor in a recent decline in music piracy rates.

C. Music Consumers

The music market is made up of price-conscious young consumers, who expect a wide selection of artists in the genre of music they want, a fair price, the ability to use digital music as they used CD and LP-based music, the ability to choose singles or albums, and access to additional services, such as concert promotions [30]. Surveys performed in Germany found that 82% of consumers are willing to pay for online music. Suggested selling prices (in Euros; add 20% for dollars) ranged from 10 to 49 cents per song for older material, with one quarter of respondents suggesting 50 cents per song, and up to 1 euro for DRM-free music [31].

Consumers cannot be classified as being simply either purchasers or pirates. For example, 39.6% of the respondents in this study were mixed acquirers, performing both purchasing and piracy. Certainly, some of the piracy attributed to mixed acquirers involves sampling, or testing via piracy, before they decide to eventually purchase or discard the song [20]. Anecdotal evidence gathered by [32] found that students have few ethical concerns about using P2P networks to download copyrighted music. Justifications commonly used are that CDs are too expensive, the record companies are already rich, and that they see no difference between copying a radio broadcast or copying a file from a P2P network.

Different genres of music and different acts within a genre appear to have different piracy rates [33]. If the assumption that declines in music sales are caused by piracy is accepted, then piracy appears to be practiced selectively. Music sales between 2000 and 2004 for rap (-22.7%), R&B (-16.12%), and hard rock (-14.5%) all declined while sales of country (22.24%) and classical music (16.43%) increased. Casual observation appears to point out that the attitude of the music regarding respect for authority and rules appear to correlate with the genre's piracy rate [15] [30] [33] [34].

D. The Product

Music is classified as an experience good, meaning that a consumer must hear the song before they are able to place a value on it [3]. Two different songs by the same artist are likely to carry different values for an individual, and have different values from individual to individual. Music is purchased per-song or per-album from the largest reselling sites (iTunes and Amazon), though subscription-based purchasing, or listening is also available from sources such as Sky Songs and Napster Unlimited.

E. Pirates and Sellers

The recording industry was a slow and reluctant entrant into the selling digital music online, mainly due to their fear that digital music would encourage music piracy [35] [36]. The recording industry's first attempt at selling music online was in the 1990s using e-commerce sites such as Amazon to sell physical CDs through the mail. By not distributing music

through an online channel, the recording industry gave others a chance to fill that niche. In 1999, the opening of Napster created a competing uncontrolled digital distribution system for online music [27] [35]. Napster identified the unmet demand for acquiring digital music over the Internet. The Napster application allowed one peer user the ability to locate and transfer a desired MP3 file from another logged-in peer user's memory. Napster was in effect a search engine that indexed the communal hard disk of all logged-in peers, returning a list of all computers that held the requested song. The requesting peer could then select an uploading peer and transfer the song directly between peers. At its height, it is estimated that 10,000 songs were being transferred every second between 75 to 80 million registered end users [20].

The years from 1999 to 2003 might be called the golden years, or the Wild West, of music piracy because there was neither enforcement of the law aimed at peer users nor was there any serious competition from legitimate sellers of music. Downloading became an economic and a social phenomenon [37]. The P2P sites forced fundamental changes on the recording industry and the way that they sold their product. The new P2P networks gave consumers access to a significantly larger selection of digitally downloadable music, the ability to acquire individual songs, increased their shopping convenience, and gave consumers access to DRM-free downloads [38]. A survey in the fall of 2000 found that 78% of the users of P2P networks did not consider downloading to be theft [28]. According to the Recording Industry Association of America (RIAA), 99% of all music transferred over the Internet in 2000 was pirated [39].

The RIAA attempted to stop file sharing by using two different litigation campaigns to. The first targeted the provider networks [43]. In December 1999, A&M Records sued Napster for contributory and vicarious copyright infringement [40]. The basis of the suit was that Napster was guilty of contributing to piracy by using their servers to index MP3 files located on peer computers and then sharing the locations of that file with other peers. Napster's defense was that the company did not upload or download copyrighted content themselves and therefore, were not guilty of copyright infringement. In *A&M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004 (2001), the 9th District Court of Appeals sided with the recording industry and placed restrictions on Napster that ultimately led to the site's closure in 2003. P2P networks remained very popular after the closure of Napster. In 2003, the KaZaA network indexed between 500 and 700 million total files at any point in time, many of which were music [41], and P2P networks were still used to download an estimated 20 billion songs annually [42]. Napster did re-open at a later date as a legitimate subscription-based site

From 2003 until 2009, other file sharing networks such as Scour, Aimster, Morpheus, Grokster, KaZaA, LimeWire and Pirate Bay attempted to fill the void created by the closure of Napster. These new networks attempted to innovate faster than the law could be updated, in other words they attempted to 'outpace the law.' This was accomplished by moving to semi-centralized (*FastTrack*) and decentralized (*Gnutella*) P2P systems [27], as well as by incorporating the BitTorrent protocol. Ultimately, the courts ruled that all of the above-named P2P networks contributed to infringements on the recording industry's copyrights and either forced them to close, or modify their systems.

The RIAA's second campaign, also started in 2003, was directed at uploading peers using P2P networks. By using their IP address as a means of identification, some 35,000 *John Doe* suits were filed against 'egregious' file sharers over a 5-year time span. According to the RIAA, these suits were targeted at infringers who were simultaneously uploading more than 1,000 songs [37]. Unfortunately, due to the indiscriminate nature of these actions, litigants included single mothers, a thirteen year old girl, and even people who were deceased [44]. People caught up in these cases were typically offered a chance to pay a lump-sum settlement between $3,000 and $5,000 [45]. Many people chose to fight the charges, and won due to the complexity of proving that the content being shared actually constituted a copyright infringement, or that the named defendant was the actual pirate [44]. The *John Doe* lawsuits were a public relations disaster for the recording industry [27]. As was pointed out by Norm Coleman (R-MN) in Congress, attempting to sue your customers into compliance is bad business. Instead of reducing piracy, the *John Doe* lawsuits encouraged pirates to move from older generation P2P networks to less visible and harder-to-track new generation P2P networks [13] [27]. However, a positive result of the *John Doe* lawsuits was that they did ultimately help change consumer perception that file sharing was actually piracy [28] [32]. Although the RIAA announced in December 2008 that no new *John Doe* suits would be filed, a number of these suits were still being contested in 2009 [43].

Piracy's impact went far beyond the rise and fall of Napster and other P2P networks. Pirate sites popularizing file transfer technologies, they increased awareness of the true demand for online music consumption, and helped to define market trends. They also created a market which could be exploited by a legitimate seller, and forced the recording industry to innovate, which ultimately created substantial economic value for all parties concerned [27].

Legitimate download music sites had a less auspicious start than Napster. The music industry tried to enter the download market in 2001 with PressPlay.com and MusicNet.com, which were joint ventures between Sony and Universal, and AOL, EMI, and Bertelsmann respectively. Both sites used subscription pricing and sold only songs they held copyrights for. The sites offered streamed music that commonly expired after a certain number of plays, or a certain period of time [43]. These files could not be played on a portable MP3 player and typically could not be format shifted for even legitimate use. Both sites closed shortly after opening [27], ensuring that this effort by the recording industry was rated ninth on the list of the *25 Worst Tech Products of All Time* by *PC World* [46].

The iTunes store opened in 2003 with some 200,000 titles in their library, initially coming from only two of the five major recording labels, though they quickly gained access to most songs from all major labels. iTunes sales in their first year were the equivalent of some 50 million songs, at a price of $0.99 each. Restrictions on iTunes store's music were more equitable than those of PressPlay.com and MusicNet.com.

Apple incorporated the FairPlay DRM system into their files which allowed songs to be transferred to as many as three Apple computers, burned on up to 10 CDs, and placed on an unlimited number of iPods. By August 2005, iTunes accounted for more than 80% of legal download market, the same year that it reached annual sales of 1 billion songs [27]. A recent survey commissioned by [47] found that the iTunes store customer base still holds 80% of music consumers, but due to increased competition, they now account for only 63% of online music sales. On February 6, 2013, Apple announced their 25 billionth sale, representing an average sales volume of 2.5 billion songs per year over the 10-year life of the iTunes store. Today, Apple uses a 3-tiered pricing system of $0.69, $0.99, and $1.29 per single, with new releases, popular songs, and songs by popular artists selling at the highest rate [48].

F. *Expected Value of Punishment*

Economic issues have been theorized as important reasons consumers choose piracy over purchasing [27]. Standard economic theory assumes that consumers select the acquisition method that has the best mix of benefits and costs, so long as the total costs are less than the maximum that a consumer is willing to pay for the good [49]. In the case of digital music, a pirated and purchased copy of a song are exactly the same, so long as both songs use the same file type and the bitrates of the files are the same, which is usually the case. For the purpose of this analysis, it will be assumed that a pirated song is an exact copy of a purchased song, and therefore, a pirated song is an exact substitute for purchased music.

Piracy and purchasing both share some common fixed costs, such as the cost of the computer, Internet connection, and electricity. These common costs will not be considered in this analysis as they impact on purchasing and piracy equally. The monetary costs and benefits associated with purchasing are fairly clear. The cost of a song will be assumed to be $1.29, which is the most common price used for standard songs at the iTunes store. At this time, the main non-monetary cost to using the iTunes service is that the desired song may not be available, though this situation is much less likely to occur than in prior times.

The costs and benefits of piracy are less clear because they are all non-monetary. Expected Utility Theory is a fundamental concept used in the analytical modeling for software piracy which states that a rational person maximizes their expected utility when faced with a choice that includes risk [50]. In the case of music piracy, since a purchased and pirated song are literally the same good, the economic decision on which to acquire primarily revolves around the difference in expected costs associated with the two methods of obtaining music. The expected cost of piracy can be calculated by multiplying the expected value of any fine paid by the likelihood of being caught [50]. [51] theorized that the expected value for pirated music was 30 cents per song. His non-empirical analysis was based on a likelihood of a pirate being involved in one of the early J*ohn Doe* lawsuits as being 1 in 10,000 along with an estimated settlement amount of $3,000. The actual penalty allowed by U.S. courts may include up to five years of jail time and a fine ranging between $750 to $250,000 per song [52], although it is extremely rare that individuals are required to pay a maximum fine.

G. *Willingness to Pay*

Due to their monopoly-like standing, the price of music is set to maximize revenue, and WTP is an important component in that strategy [22] [53]. WTP describes the maximum amount that a consumer is willing to spend to acquire a good. A sale occurs only if the selling price is less than or equal to the WTP that the consumer places on the music. Because music is an experience good, each consumer will have a different WTP for each song [54], adding uncertainty to the WTP calculation for each individual song and introducing error in any average WTP calculation.

Because the music market is not competitive, the recording industry is able to set the price of music equal to the consumer's willingness to pay. This pricing ability generates 'super profits' for the recording industry when compared against the price charged in a competitive marketplace. Charging the monopolist's price creates additional revenue for the labels, but it also causes consumers to feel unfairly treated and to look for alternative methods to acquire music. Many consumers believe this inequitable exchange or price gouging by the recording industry [55] is sufficient justification for file sharing [56]. Other than digital entertainment goods as likely substitutes, the main competitor for purchased music is most likely to be pirated music. P2P networks gave consumers easy access to pirated music at no out-of-pocket expense, and little expected costs for moderate piracy. The price differential between purchased and pirated music is almost certainly an important component in the decision to pirate music for a sizeable portion of the downloading population [13].

WTP can be calculated using revealed or stated preferences, it can be based in market data, experiments, or direct or indirect surveys. WTP data can be gathered using field or laboratory experiments, or by using customer surveys or expert judgments [53]. Two commonly-used customer survey methods to determine WTP are the opportunity cost method, which theorizes that the cost of the substitution good sets the WTP, or by finding WTP through direct questioning.

The literature discusses several different potential problems with using direct surveys to determine WTP. These problems include: an unnatural emphasis on price without consideration for other product attributes, a hiding of true WTP by the respondent, and perceived valuation changes in the product. Since music is an entertainment good with a limited number of attributes when compared to other products, any over-emphasis of price for music should be limited. Respondents in this study have little reason to hide their true WTP because the survey was not commissioned by the recording industry and it is very unlikely that the study will have any significant impact on recording industry policy or pricing. The issue of price valuation changes is legitimate for music, since it is an experience good [53]. A further issue with WTP is that marginal WTP decreases as additional units are purchased and consumed. The problem of declining WTP on

volume purchases should be especially applicable to the music industry, where consumers are much more likely to buy many songs at once. Purchasing from subscription or volume-based sites helps compensate consumers for the marginal WTP issue, but per-song sites typically do not give volume discounts to compensate for the reduced marginal WTP the consumer feels. As the number of songs purchased increases, decreasing marginal WTP should become a factor leading the consumer away from purchasing and towards piracy.

H. *Calculating the Demand Schedule*

One purpose of this study is to develop a demand schedule for music. Demand schedules can be determined by performing live market testing or by using some type of approximation. To develop a more accurate system to measure demand, Juster [57] researched the effectiveness of approximating demand for the sale of automobiles using purchasing probabilities instead of customer buying intentions and attitudes. The Juster Scale was found to be extremely accurate in the prediction of automobile sales due its suitability for capturing low probability data [58]. The Juster Scale uses an 11-point Likert scale to represent the likelihood of a respondent making a purchase during the stated time frame. The most likely to purchase option was assigned a likelihood of 99.99%, and the least likely, 0.01%. Scores in between were ranked using increments of 10%. The main advantages to using such a system are that it is relatively easy for the researcher to gather and analyze data, and it is also easy for the consumer to properly select the correct option because the decision is made probabilistically [58]. However, the Juster Scale has been found to be less accurate in predicting purchasing volumes when used on lower-priced durable goods and lower-priced, frequently-purchased services [61].

The effectiveness of the Juster Scale's use in this study is somewhat limited because the scale was validated as a prediction instrument for durable goods, rather than to predict purchasing volume of low-cost entertainment goods. A second potential limitation is that the Juster Scale was designed to predict sales volume over a period of time, while in this study it was used to determine different levels of demand over several different prices at the same time. A final potential limitation is that the data for this study was gathered using a 5-point scale instead of using the finer-grained 11-point scale. The use of a coarser-grained tool could be a problem for predicting high-priced durable goods sales, but the precision of the tool is still probably reasonably accurate given the low price of music, and it also allows the scale used in this questions on willingness to pay to match the other questions in this study.

III. The Sample and Data Analysis

The data used in this study comes from a nationally-drawn sample of SurveyMonkey respondents taken between August 13, 2012 and August 21, 2012. The original invitation to participate was sent to 3,271 adults in the United States who were part of the SurveyMonkey targeted audiences that had downloaded music in the past 30 days, or listened to Internet radio. Minors were excluded due to ethical considerations. 536 invitees completed a portion of the survey and 460 invitees completed the entire survey. Six of the completed surveys were determined to be unsuitable because the invitees had neither purchased nor pirated music in the past year, leaving a final sample size of 454 respondents (n=454). The use of a national sample in this study is important because most piracy studies use samples drawn from pools of university students. A literature review performed by [61] found only one piracy sample drawn from a national audience out of approximately 400 studies reviewed.

Because there are no published population statistics for music acquirers, the sample was compared against the 2010 U.S. Census data [62] [63] to determine whether the sample was representative of the population. Census data was used due to the large size of the music market, with more than 44 million Americans buying at least one song in 2012 [47] and an estimated piracy activity of 20 billion songs annually [52]. The sample closely approximated the U.S. population in terms of age and geographic distribution, and appeared to have slightly increased levels of education and income. The gender mix of this sample was 59% male and 41% female. This is not uncommon with SurveyMonkey samples [64]. The impact that a respondent's age, location, education, income, and gender have on their piracy behavior is debated in the literature, with studies finding varying degrees of significance and correlation between the variables and piracy rates. Based on the literature, these variables may add at most a very slightly negative bias to the sample's piracy rates. Age is generally considered to be the most predictive demographic and this sample's age distribution was very close to the 2010 U.S. Census data, with an age range from 18 to 80 years old, with a mean of 37.4 and a median of 35.

The total number of songs acquired by the sample was 87,824. Acquisition volume was not normally distributed because a small number of respondents acquired large numbers of songs; especially by piracy. The sample had a mean of 193.4 songs acquired with a median of 50. Purchases averaged 84.3 while the piracy average was 109.1 songs. While this study did not track whether a purchase was per-song or subscription, the variance between mean and median may indicate that at least some of the purchasers used a subscription service. The average piracy rate for this sample was 56.4%, which is significantly lower than the piracy rate reported by [52], but much closer to the piracy rates reported by [47].

One issue with the data collection was that 17 respondents answered some of the monetary questions using what appeared to be cents instead of dollars. For example, the respondent answered '99' instead of '.99'. This issue was resolved by analyzing any monetary question with a value that was greater than five, meaning five dollars per song. The analysis used the survey question about the likelihood of purchasing a song at a price of 99 cents per song and $1.29 per song as the basis for updating any price answers. If the respondent stated that they were less than extremely interested in purchasing music at

0.99 and $1.29 per song, then any numeric value that was greater than 5 was divided by 100 (99 was converted to 0.99). In the vast majority of the cases, the data that was changed was '99'. In the case of the two questions about the maximum price that the respondent is willing to pay for highly-prized songs. Answers that were greater than 15 were scrutinized to determine whether they accorded with other responses.

The survey data was collected using 43 questions, most of which used a five or six choice Likert scale. Normalcy of the data was tested for age and income, and assumed for other data due to the large sample size (n=454). The data was analyzed using Excel 2010 and SPSS version 20 when appropriate.

IV. Results

A. *Theoretical Demand Schedule*

For this study, the demand for music was identified for six different prices (in cents) per song of: 19, 39, 59, 79, 99 and $1.29. Demand was predicted based on respondents reported likelihood that they would buy a song at each given price using a 5-point Likert scale that ranged from "Not interested" to "Extremely interested." Each of the different levels of demand was then stated as a percentage of likelihood to purchase using a system similar to the one suggested by Juster [57]. "Not interested" was associated with a likelihood of purchase of 0% and "Extremely interested" was associated with a likelihood of purchase of 100%. Interest was calculated using an unweighted method that gave all respondents equal input into the total demand calculation, and a weighted method, that gave respondents a proportional input into the total demand calculation based upon the respondent percentage of total sales. Total demand for the sample at each price was calculated by summing each respondent's demand multiplied by their interest factor. The theoretical demand and the revenue produced by selling the demanded quantity at each price point studied are shown in Table 1.

TABLE I. THEORETICAL DEMAND SCHEDULE FOR ONLINE MUSIC

	Unweighted			Weighted	
Price	***Demand***	***Revenue***		***Demand***	***Revenue***
0.19	36,319	6,900.57		34,952	6,640.96
0.39	34,356	13,399.00		32,036	12,493.85
0.59	31,283	18,457.21		28,849	17,020.80
0.79	27,582	21,789.62		25,139	19,860.16
0.99	22,318	22,094.82		20,756	20,548.08
1.29	16,540	21,336.60		15,090	19,466.63

The price elasticity of demand over the entire demand curve for the unweighted sample is 0.094 and the weighted sample had a price elasticity of demand of 0.098, indicating inelastic demand over the entire range for both demand curves. The unweighted demand schedule created a demand curve that is fairly close to linear. The demand curve had a least squares linear regression calculation of Quantity = 41200.396 + (-18585.938 * Price). The weighted demand schedule created a demand curve that is very close to linear, with a least squares linear regression of Quantity = 39067.426 + (-18297.773 * Price). These demand schedules are shown graphically in Figure 1.

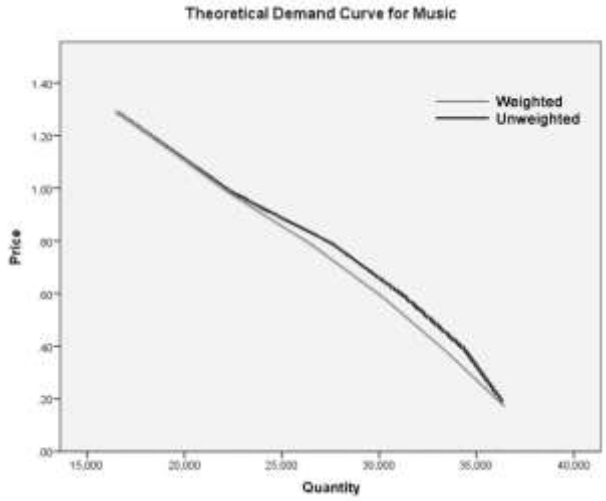

Figure 1. Theoretical Demand Curves for Online Music

The total revenue calculation was performed by multiplying the calculated theoretical demand at each of the studied prices by the price itself. While the weighted and unweighted demand volumes generated slightly different total revenues, their overall performance was essentially the same, as is detailed in Figure 2. In both cases, the 99 cent price optimized revenue. The price with the second best total revenue generation was the 79 cent price, while the $1.29 price was the third-best producer of revenue.

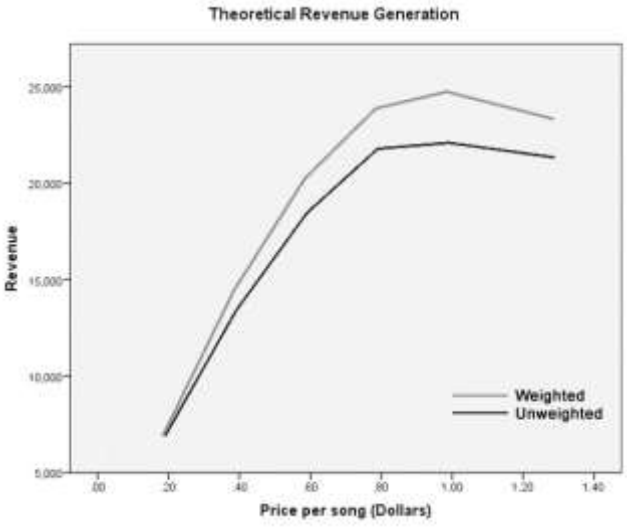

Figure 2. Theoretical Revenue Curves for Sample

B. Calculating Willingness to Pay

Due to the lack of accessible data for the recording industry in the academic literature, willingness to pay was calculated in this study using a direct customer survey to determine stated preferences [53]. Two different questions in two parts were used to calculate the willingness to pay and each question collected data using a fill-in response measured in dollars. Questions asked included: the maximum price the respondent would pay for a song that they were moderately interested in (old and current) and the maximum price the respondent would be willing to pay for a song that they were extremely interested in (old and current). The mean and median for the sample was then calculated for each of the four WTP questions, with those averages being shown in Table 2. The mean average of all eight different WTP averages was 99.9 cents per song.

The literature suggests that the price of digital music is a major justification for piracy [32]. This in part may be because of the difference between the selling price and the consumers idea of a fair price. While it is recognized that the idea of a fair or just price falls more into the area of consumerism than economics, the idea that all products have a fair or just selling price is based in the notion that the price of a product should be based in the cost to produce the product plus some reasonable level of profit. A just price might be described as a selling price that excludes any super profits that the recording industry attempts to gather through their monopoly position. A price that is considered to be unjust by consumers increases interest in substitute and alternate goods. In the case of online music, the charging of a price that is considered unjust is likely to lead consumers to decide to pirate instead of purchase [55] [56].

The respondent's just price for music was collected using a single fill-in question. The sample's just price for music had a mean of 64 cents per song, a median of 50 cents and a standard deviation of 35.5. The responses were not normally distributed, but most responses fell between a price of zero and one dollar. A frequency analysis of WTP responses showed a grouping of responses at the price levels of 50 cents and $1. The value of the respondent-selected fair price was able to account for 9.9% (R^2=0.099) of the variance in piracy rates, which is a fairly robust predictive ability for a piracy study. The mean and median for the just price question is also shown in Table 2. The average of these two just price estimations was 57 cents per song.

TABLE II. WILLINGNESS TO PAY FOR CURRENT AND OLD MUSIC AND JUST PRICE

	Willingness to Pay				Just Price
	Current Music		*Old Music*		
Interest	***Moderate***	***Extreme***	***Moderate***	***Extreme***	
Mean	0.89	1.25	0.76	1.07	0.64
Median	0.99	1.25	0.79	0.99	0.50

As predicted by [65], current music supports a higher value than older music, and extremely desired music supports a higher price than moderately desired music. In no case was the sample's average WTP equal to or greater than the most common selling price of $1.29 per song. For currently-popular music that was extremely desired, mean average WTP was relatively close to the selling price, but the $1.29 selling price exceeded respondent WTP for 50.9% of the respondents. For extremely desired older music, 66.3% of the respondents identified a WTP lower than the current selling price.

Interest in purchasing was also investigated for each pricing level. The mean, median, and standard deviation for the level of interest for each price is shown in Table 3. Interest in purchasing was rated using a Likert Scale where a score of "1" was associated with no interest in purchasing at that price level, and a "5" was associated with an extreme interest. As expected, interest in purchasing falls as the price increases. Extreme interest in purchasing was stated at all price levels, with 19 respondents stating an extreme interest in buying songs at a price of $1.29. However, 216 respondents had no desire to purchase at this price. 365 respondents were extremely interested in buying music at a price of 19 cents per song, but even at this low price, 21 respondents had no desire to purchase.

TABLE III. EXPRESSED INTEREST IN PURCHASING AT EACH PRICING LEVEL TESTED

Price (Dollars)	Mean	Median	Mode	Deviation
0.19	4.57	5	5	1.020
0.39	4.19	5	5	1.174
0.59	3.77	4	5	1.280
0.79	3.28	3	3	1.342
0.99	2.71	3	3	1.300
1.29	1.97	2	1	1.148

For all price levels tested, the level of interest at the price level of 59 cents per song was best able to account for the variance in piracy rates with an R^2 of 19.8% (R^2=0.198) and a significance of p<0.001. Further evidence that WTP is less than the current selling price comes from the piracy rates themselves. Even at the lower rates of piracy reported by the [47], a majority of music being transferred online is still pirated, meaning that consumers are willing to accept the risks associated with piracy rather than pay for music.

C. Calculating the Substitution Price for Pirated Music

The price that can be charged for a good is constrained by the price of any goods which can effectively be used in place of the original good. The main substitution good in the case of purchased music is pirated music. It is an exact duplicate of the MP3 version of a legitimate copy of a song, but without DRM, which may be included in purchased music. Pirated music has no direct monetary cost. However, it does include

some non-monetary costs, most importantly, the risk of being caught pirating music.

This study gathered empirical data on consumer perceptions to determine what role the threat of legal sanction played in the consumer piracy behavior to compare them against the value for expected punishment of piracy of 30 cents per song theorized by [51]. The data used to determine the consumer's threat from legal sanction asked consumers to rate the likelihood of being caught and sued for pirating 100 songs in a year and a follow-up question that asks their opinion about the likely fine for this level of piracy. The data for the likelihood of detection leading to legal action question was captured using a 6-point Likert scale, and each point alternative stated the odds of being caught in powers of 10 (1:1,000,000, 1:100,000, 1:10,000, etc.). Based on statements by the RIAA, there is literally no risk today of a *John Doe*-style suit being filed at this level of piracy, but the respondents in this study were much more cautious in their assessment. Their most frequent answer was that there was 1:100,000 odds of detection leading to legal action and a surprising number of respondents believed that the odds of detection were lower than 1:1,000.

The follow-up question of the likely fine for pirating one hundred songs was captured using a 5-point Likert scale. Each selection defined a per-song penalty range starting at a value of less than $100 and ending at a value greater than $10,000. The data was captured by using the midpoint of the fine range given. If anything, the respondents here underestimated the likely penalty, given the settlement range of $3,000 to $5,000 in many of the *John Doe* cases, and the range of sanctions available to the courts.

The mean and median for expected punishment is shown on Table 4. 55.9% of the respondents in this study had an expected punishment of piracy that was less than or equal to Fetscherin's theoretical expected punishment value of 30 cents, and 77.8% of the respondents had an expected value of punishment that was less than $1.29 per song. Based on this information, the use of median scores to predict expected punishment is warranted and the expected punishment of 1 cent or less per song is a legitimate market-based substitution price today when moderate amounts of pirated music are involved. The stark difference between the selling price and the price of the substitution good places consumers in a position where the economic components of the piracy behavior tend to favor this option.

The Pearson Correlation Coefficient between the expected punishment for each respondent and their piracy rates was tested. The finding was that there was no correlation ($r < 0.001$) between a respondent's expected punishment and their piracy rate. Even with the heightened fear of detection, a hypothesis stating that a significant relationship exists between piracy rate and expected punishment is rejected for this sample.

TABLE IV. THEORETICAL VALUATIONS FOR LEGAL SANCTION OR THE COST OF PIRATED MUSIC

	Detect Mean (0.01111)	**Detect Median (0.0001)**
Punish Mean (1780.07)	$19.78	$0.0178
Punish Median (475.00)	$5.28	$0.00475

D. Disposable Income

The disposable income of respondents was tested using a single question which asked the respondent to describe the impact on their budget of a $20 expenditure for online music. Data was collected using a 5-point Likert scale, with "1" meaning no impact and "5" meaning an extreme impact. The data gathered for disposable income was reasonably close to being normally distributed, with "a small impact" (2) being the most frequent answer. The question had a mean of 2.8 and a median of 3 (a moderate impact). Respondent values for disposable income were able to account for 2.5% (R^2=0.025) of the variance in piracy rates, and had a significance of p<0.001.

v. Discussion and Future Work

The complexity of the piracy behavior is shown by the large number of different variables used in piracy prediction models, and the low correlative and predictive strength that each of these variables carries. The complex nature of the piracy behavior means that each consumer bases their purchase/pirate decision on a unique combination of criteria. This makes the modeling of piracy extremely difficult. Age is generally thought of as being one of the most efficient predictors of the piracy behavior, and its correlation to piracy in this sample was a very weak 9.1%. Researchers also theorize that economic considerations are important in the decision to purchase or pirate. While just price and WTP both perform better than many of the demographics commonly used in piracy studies, their correlative strength would be considered very weak in a typical social science study. Of all those tested in this study, the variable that describes intended future piracy behavior had the highest correlation to present piracy behavior, suggesting that current behavioral choices, whatever they are, will be continued into the future. Respondents seem to know whether they will purchase or pirate, even if researchers are unable to predict it with great accuracy.

Based on this sample, economic issues are significant components in the decision to pirate online music, but they are generally no different in their ability to predict piracy behavior than many other variables discussed in the literature. Table 5 shows a listing of selected variables, divided into economic and non-economic groupings. Economic variables have a predictive range from 1% to 19.8% while other variables used

in piracy studies ranged from 0.2% to 62.2% predictive effectiveness.

TABLE V. VARIABLES USED IN PIRACY STUDIES AND THEIR PREDICTIVE EFFECTIVENESS

Variable	Predictive Strength (R^2)	Significance
WTP:Current-Moderate	0.097	<0.001
WTP:Current-Extreme	0.054	<0.001
WTP: Old-Moderate	0.051	<0.001
WTP: Old-Extreme	0.003	0.282
Just Price	0.099	<0.001
Disposable Income	0.025	0.001
Legal Sanction	0.010	<0.001
Demand at 59 cents per song	0.198	<0.001
Future Plans	0.622	<0.001
Age	0.091	<0.001
Gender	0.002	0.396
Moral Intensity	0.264	<0.001
Purchase Important Songs	0.125	<0.001
Social stigma	0.079	<0.001

For the recording industry, this study suggests that their current pricing strategy appears to be non-optimal. Unlike with durable goods, WTP for music is impossible to calculate accurately because the value of a specific song varies between consumers and between songs. However, overall WTP appears to not be sufficient for even half of the consumers to be willing to buy music that they are even extremely interested in acquiring. This means that over half the market is left with the choices of non-acquisition, moving to a subscription site, or piracy.

The recording industry appears to use monopoly pricing in a market where substitution goods are present. The socially optimistic hope is that the recording industry would select a pricing strategy that maximizes profit by encouraging pirates to become purchasers. However, the current price of $1.29 per song is unlikely to achieve this goal. With the current pricing strategy, the best result the recording industry can hope for is to curb piracy, but lose those pirates as customers.

While no data was collected to support this position and this discussion is anecdotal, the price of albums appears to have fallen since 2006, while the per-song price has risen from 99 cents per song in 2003 to $1.29 per song in 2009. In 2006, albums with currently-popular music were commonly priced between $15 and $20. Today, typical album pricing on iTunes appears to have fallen to the $10 to $15 range. Whether this anecdotal price change is due to pressure caused by consumer preference for singles rather than albums is not directly addressed by this study, although this seems to be a logical inference. The marketing of singles instead of albums represents a fundamental change for the recording industry, which since the 1950s, has used albums with one or two 'big hits' as the inducement to purchase the entire album. Today, consumers demand the big hit without the rest of the album, which creates a potential revenue problem and a challenge for the recording industry. This consumer demand for singles was little known and unmet until competitive pressure created by the innovation of Napster and the other similar pirate sites identified and exploited it as a consumer preference.

Future research needs to shift the emphasis of piracy studies away from building demographic-driven models to predict piracy towards identifying its main causes. While age can be used to predict piracy, this factor is not the main reason for the decision. Future work in the piracy area should look towards identifying and measuring the potential reasons for behavioral choices.

A second area that needs further research is the reasons for purchasing music. When modeling piracy rates, purchasing and piracy rates act in a complementary manner; their sum is always 100%. However, the motivations that are behind purchasing and piracy are not complementary. Therefore, a model describing the reasons for pirating online music will be different from a model describing the reasons for purchasing.

A third lightly explored topic in piracy suggested by this study is to investigate the motives of people who acquire music using both purchasing and piracy. General models for piracy do not perform well in part because of the large number of respondents who are pure purchasers or pure pirates, leaving the data widely dispersed. Understanding how mixed acquirers make their behavioral choices through qualitative research may lead us to a better understanding of piracy by identifying how the reasons that people commit piracy interact to form behavioral intention. The piracy situation cannot be curbed with more predictive models, but it can be ameliorated when consumers and the recording industry participate in a functional market.

A fourth area of research in piracy suggested by this study is to investigate the non-acquirers, and the ways in which they differ from acquirers. Non-acquirers do not buy music, nor do they pirate music and therefore, they are not counted in piracy studies. By ignoring non-acquirers, piracy rates and predictions of market WTP are inflated, resulting in an incomplete and inaccurate picture of the music market.

A final topic that this study identifies for future research is Internet radio. According to [47], its emergence has led to a significant reduction of piracy. Internet radio appears to be yet another disruptive technology affecting the music industry. However, the role that Internet radio plays in the acquisition of digital music needs to be clearly identified. Again, this research may best be done qualitatively.

The music market in many ways is a reflection of the digital entertainment industry as a whole. Music has been the trailblazer for Internet-delivered entertainment. The reasons that people pirate music will likely be similar to those for the piracy of e-books, computer games, movies, and television shows in the future. The lessons learned today regarding piracy will likely reap significant benefits for digital entertainment industries in the future.

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References

[1] Warwick, S. (1994). Abstraction, ethics and software: Why don't the rules work? *Ethics in the Computer Age,* 10-14. doi: 10.1145/199544.199551

[2] Kwong, T., & Lee, M. (2002). Behavioral intention model for the exchange mode internet music piracy. *Proceedings of the 35th Annual Hawaii International Conference on System Sciences (HICSS'02) 7,* 191-200.

[3] Bhattacharjee, S., Gopal, R., Lertwachara, K., & Marsden, J. (2002). No more shadow boxing with online music piracy: Strategic business models to enhance revenues. *Proceedings of the 36th Hawaii International Conference on System Sciences*, 6-9. doi: 10.1109/HICSS.2003.1174455

[4] Gopal, R., Sanders, G., Bhattacharjee, S., Agrawal, M., & Wagner, S. (2004). A behavioral model of digital music piracy. *Journal of Organizational Computing and Electronic Commerce, 14*(2), 89-105.

[5] Woolley, D. (2010). The cynical pirate: How cynicism effects music piracy. *Academy of Information and Management Sciences Journal, 13*(1), 31-43.

[6] Fetscherin, M. (2009). Importance of cultural and risk aspects in music piracy: A cross-national comparison among university students. *Journal of Electronic Commerce Research, 10*(1), 42-55.

[7] Gopal, R., & Sanders, G. (2000). International software piracy: Analysis of key issues and impacts. *Information Systems Research, 9*(4), 380-397.

[8] Gupta, P., Gould, S., & Pola, B. (2004). "To pirate or not to pirate": A comparative study of the ethical versus other influences on the consumer's software acquisition-mode decision. *Journal of Business Ethics, 55*(3), 255-274.

[9] Holsapple, C., Iyengar, D., Jin, H., & Rao, S. (2008). Parameters for software piracy research. *The Information Society, 24*(4), 199-218. doi: 10.1080/01972240802189468.

[10] Easley, R. (2005). Ethical issues in the music industry response to innovation and piracy. *Journal of Business Ethics, 62*(2), 163-168. doi: 10.1007/s10551-005-0187-3

[11] Sousa, J. (1906, August). The menace of mechanical music. *Appleton's Magazine, 8*: 278-284.

[12] Camp, L. (2002). DRM: Doesn't really mean digital copyright management. *Proceedings of the 9th ACM Conference on Computer and Communications Security*, 78-87. doi: 10.1145/586110.586122

[13] Samuelson, P. (2009). When a "license" is really a sale? *Communications of the ACM, 52*(3), 27-29.

[14] Lesk, M. (2003, Sept-Oct). Chicken little and the recorded music crisis. *Security & Privacy, IEEE, 1*(5), 73-75. doi: 10.1109/MSECP.2003.1236239

[15] Liebowitz, S. (2006). File sharing: Creative destruction or just plain destruction? *Journal Law Economics, 49*(1), 1-28.

[16] Davis, R. (2001). The digital dilemma. *Communications of the ACM, 44*(2), 77-83.

[17] Fowler, T. (2002). Technology's changing role in intellectual property rights. *IT Professional, 4*(2), 39-44. doi: 10.1109/MITP.2002.1000459

[18] Altschuller, S., & Benbunan-Fich, R. (2009). Is music downloading the new prohibition? What students reveal through an ethical dilemma. *Ethics and Information Technology, 11*(1), 49-56. doi: 10.1007/s10676-008-9179-1

[19] Khouja, M., & Park, S. (2008). Optimal pricing of digital experience goods under piracy. *Journal of Management Information Systems, 24*(3), 109-141. doi: 10.2753/MIS0742-1222240304

[20] Dubosson-Torbay, M., Pigneur, Y., & Usunier, J. (2004). Business models for music distribution after the P2P revolution. *Proceedings of the Fourth International Conference on Web Delivering of Music, 172-179* doi: 10.1109/WDM.2004.1358115

[21] Ahn, I., & Yoon, K. (2009). On the impact of digital music distribution. *CESifo Economic Studies, 55*(2), 306-325.

[22] Khouja, M. & Rajagopalan, H. (2009). Can piracy lead to higher prices in the music and motion picture industries? *Journal of the Operational Research Society, 60*: 372-383. Doi: 10.1057/palgrave.jors.2602552.

[23] Lang, K., Shang, R., & Vragov, R. (2009). A pricing mechanism for digital content distribution over computer networks. *Journal of Management Information Systems, 22*(2), 121-139.

[24] Volz, I. (2006). The impact of online music services on the demand for stars in the music industry. *Proceedings of the 15th International Conference on World Wide Web*, 659-667. doi: 10.1145/1135777.1135874

[25] Bhattacharjee, S., Gopal, R., Lertwachara, K., & Marsden, J. (2006). Piracy and file sharing: Impact of legal threats on online music sharing activity: An analysis of music industry legal actions. *Journal of Law & Economics, 49*(91), 91-114.

[26] Clemons, E., Gu, B., & Lang, K. (2002). Newly vulnerable markets in an age of pure information products: An analysis of online music and online news. *Journal of Management Information Systems, 19*(3), 17-39.

[27] Choi, D., & Perez, A. (2007). Online piracy, innovation, and legitimate business models. *Technovation, 27*(4), 168-178. doi: 10.1016/j.technovation.2006.09.004

[28] Groennings, K. (2005). An analysis of the recording industry's litigation strategy against direct infringers. *Vanderbilt Journal of Entertainment Law & Practice, 7*(3), 389-398.

[29] NPD Group (2012). Music File Sharing Down Significantly. Retrieved from: https://www.npd.com/wps/portal/npd/!ut/p/a0/04_Sj9CPykssy0xPLMnMz0vMAfIjC3Kt8jNTrKLM4928TU0tfUOMDf2dLCwMPM2NQoO8vJ09Td0NHcAqzHCrMNAPTs3TL8h2VAQA7H5Ukg!!

[30] Ouellet, J. (2007). The purchase versus illegal download of music by consumers: The influence of consumer response towards the artist and music. *Canadian Journal of Administrative Sciences, 24*(2), 107-119. doi: 10.1002/CJAS.16

[31] Amberg, M., & Schroder, M. (2007). E-business models and consumer expectations for digital audio distribution. *Journal of Enterprise Information Management, 20*(3), 291-303. doi: 10.1108/17410390710740745

[32] Green, H. (2007). Digital music pirating by college students: An exploratory empirical study. The Journal of American Academy of Business, 11(2), 197-204.

[33] Wang, C., Chen, C., Yang, S., & Farn, C. (2009). Pirate or buy? The moderating effect of idolatry. *Journal of Business Ethics, 90*(1), 81-93. doi: 10.1007/s10551-009-0027-y

[34] Chiou, J., Huang, C., & Lee, H. (2005). The antecedents of music piracy: Attitudes and intentions. *Journal of Business Ethics, 57*(2), 161-174. doi: 10.1007/s10551-004-5263-6

[35] Kunze, O., & Mai, L. (2006). Consumer adoption of online music services: The influence of perceived risks and risk-relief strategies. *International Journal of Retail & Distribution Management, 35*(11), 862-877. doi: 10.1108/09590550710828209

[36] Swatman, P., Krueger, C., & van der Beek, K. (2006). The changing digital content landscape: An evaluation of e-business model development in eurpoean online news and music. *Internet Research, 16*(1), 53-80. Doi: 10.1198/10662240610642541

[37] LaRose, R., & Kim, J. (2007). Share, steal, or buy? A social cognitive perspective of music downloading. *CyberPsychology & Behavior, (10)*2, 267-277. doi: 10.1089/cpb.2006. 9959

[38] Chiang, E., & Assane, D. (2008). Music piracy among students on the university campus: Do males and females react differently? *Journal of Socio-Economics, 37*(4), 1371-1380.

[39] International Federation of Phonographic Industry (2001). IFPI music piracy report. http://www.ifpi.org/content/library/piracy2001.pdf

[40] Jackson, M., Singh, S., Waycott, J., & Beekhuyzen, J. (2005). DRMs, fair use and users' experience of sharing music. *Proceedings of the 5th*

ACM Workshop on Digital Rights Management, 8-16. doi: 10.1145/1102546.1102549

[41] Fetscherin, M. & Zaugg, S. (2004). Music piracy on peer-to-peer networks. *IEEE International Conference on e-Technology, e-Commerce, and e-Service*, 431-440. doi: doi: 10.1109/EEE.2004.1287343

[42] International Federation of Phonographic Industry (2006). The Recording Industry Piracy Report: Protecting Creativity in Music. http://www.ifpi.org/content/library/piracy-report2006.pdf

[43] Moseley, W. (2010). A new (old) solution for online copyright enforcement after *Thomas* and *Tenenbaum*. *Berkeley Technology Law Journal*, *25*(311), 312-346.

[44] McBride, S., & Smith, E. (2008, December 19). Music Industry Abandons Mass Suits. Wall Street Journal, Retrieved from http://online.wsj.com/article/SB122966038836021137.html

[45] Dannenberg, R. (2006). Copyright protection for digitally delivered music: A global affair. *Intellectual Property & Technology Law Journal*, *18*(2), 12-16.

[46] Tynan, D. (2006, May 26). 25 Worst Tech Products of All Time. *PC World*, Retrieved from www.pcworld.com/article/125772/worst_products_ever.html.

[47] NPD Group (2012). Annual music study. Retrieved from: https://www.npd.com/wps/portal/npd/!ut/p/a0/04_Sj9CPykssy0xPLMnMz0vMAfIjC3Kt8jNTrKLM4928TU0tfUOMDQ0CXZwNPP38fF08Dd2MPQ0MHcAqzHCpMAoz0Q9OzdMvyHZUBABhml5q

[48] Apple, Inc. (2013). iTunes stores sets new record with 25 billion songs sold. Retrieved from: http://www.apple.com/pr/library/2013/02/06iTunes-Store-Sets-New-Record-with-25-Billion-Songs-Sold.html

[49] Becker, J. & Clement, M. (2004). The economic rationale of offering media files in peer-to-peer networks. *Proceedings of the 37th Hawaii International Conference on System Sciences*, 1-9. doi: 10.1109/HICSS.2004.1265471

[50] Peace, A., Galletta, D., & Thong, J. (2003). Software piracy in the workplace: a model and empirical test. *Journal of Management Information Systems*, *20*(1), 153-177.

[51] Fetscherin, M. (2006). Economics of online music and consumer behavior. Proceedings of the 8th International Conference on Electronic Commerce: The New e-commerce: Innovations for Conquering Current Barriers, Obstacles and Limitations to Conducting Successful Business on the Internet, 599-604. doi: 10.1145/1151454.1151468

[52] International Federation of Phonographic Industry (2011). Digital music report 2011: Music at the touch of a button. http://www.ifpi.org/content/library/dmr2011.pdf

[53] Breidert, C., Hahsler, M., & Reutterer, T. (2006). A review of methods for measuring willingness-to-pay. *Innovative Marketing*, *2*(4), 8-32.

[54] Plowman, S., & Goode, S. (2009). Factors affecting the intention to download music: Quality perceptions and downloading intensity. *Journal of Computer Information Systems*, *49*(4), 84-97

[55] Kwong, T., & Lee, M. (2004). Understanding the behavioral intention to digital piracy in virtual communities: A propose model. *2004 IEEE International Conference on e-Technology, e-Commerce and e-Service (EEE'04)*, 223-226. doi: 10.1109/EEE.2004.1287313

[56] Hill, C. (2007). Digital piracy: Causes, consequences, and strategic responses. Asia Pacific Journal of Management, 24(1), 9-25. doi: 10.1007/s10490-006-9025-0

[57] Juster, F. (1966). Consumer anticipations and models of durable goods demand. In J. Mincer (Eds.). *Economic Forecasts and Expectations*. National Bureau of Economic Research (pp. 167-242). Cambridge, MA, USA. NBER.

[58] Day, D., Gan, B., Gendall, P., & Esslemont, D. (1991). Predicting purchase behavior. *Marketing Bulletin*, *3*, 18-30.

[59] Gan, B., Esslemont, D., & Gendall, P. (1985). A test on the accuracy of the Juster Scale as a predictor of purchase behaviour. *Market Research Centre Report No. 45*, Massey University, New Zealand.

[60] Clawson, C. (1971). How useful are 90-day purchase probabilities. *Journal of Marketing*, *35*(4), 43-47.

[61] Williams, P., Nicholas, D., Rowland, I. (2010). The attitudes and behavior of illegal downloaders. *New Information Perspectives*, *62*(3), 283-301. doi: 10.1108/00012531011046916.

[62] Howden, L., & Meyer, J. (2011, May). Age and sex composition: 2010. U.S. Census Bureau. Retrieved from http:// *www.census.gov/prod/cen2010/briefs/c2010br-03.pdf*

[63] Ryan, C., & Siebens, J. (2012, February). Educational Attainment in the United States: 2009. U.S. Census Bureau. Retrieved from http://*www.census.gov/prod/2012pubs/p20-566.pdf*

[64] SurveyMonkey (2012). Retrieved from http://help.surveymonkey.com/app/answers/categorylist

[65] Hoffman, L. (2009). Content Control. *Communications of the ACM (52)*6. 16-17. doi: 10.1145/1516046.1516052

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