

## AN EMPIRICAL STUDY ON DETERMINING FACTORS FOR CONSUMERS' ONLINE STREAMING AND PEER-TO-PEER FILE SHARING

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### ABSTRACT

*We are living in the world easily getting access to the Internet through desktops, laptops, I-Pad type of touchscreen devices, and smartphones without having any constraint in terms of time and place, which is obviously transforming our lives. In the entertainment world, it is a common phenomenon that we can get music and movies through online streaming, downloading, posting, and file sharing through file to file (P2P) networks. The explosion of the Internet and the ease of sharing digital files raise a serious ethical question; how do copyright holders deal with consumers who have the attitude toward P2P file sharing as one of sources getting free and unlimited access to vast libraries of copyrighted music and video files? The study examined four determining factors of consumers' online streaming and P2P file sharing, 1) consumers' ethical/moral attitude toward P2P file sharing, 2) consumers' sympathetic attitude toward victims, the music/movie industry and artists, of consumers' unauthorized sharing of copyrighted files through P2P networks, 3) consumers' attitude toward the music/movie industry as excessive profit makers, having too few good songs/movies on a CD/DVD, and 4) consumers' attitude toward online purchasing. Survey results showed that consumers' ethical/moral attitude toward P2P file sharing was significant in determining consumers' experience with P2P file sharing of copyrighted music/movie. Consumers' sympathetic attitude toward the music/movie industry, but not artists as a victim of unauthorized P2P file sharing was also significant even though consumers' negative attitude toward the music/movie industry was not significant, and consumers' attitude toward online purchasing of music/movie was not significant to determine P2P file sharing. Furthermore, consumers' P2P file sharing experience had a significant relationship with consumers' online purchasing experience of music/movie and more collections of music/movie files.*

**Key Words:** Peer to Peer Systems (P2P), Online Streaming, File Sharing, Copyright, Consumer Ethics

### INTRODUCTION

Technological innovations have presented the copyright material to the mass customers effortlessly which provides opportunities to increase revenues. However, at the same time, these technologies have been employed to simply replicate and distribute content without the consent of copyright holders. Recently, U.S. Congress discussed a new bill called Stop Pirating Act (SOPA) to restrict consumers' growing trend of illegal pirating of copyrighted music/songs. Advances in the digitalization of content paired with the widespread adoption of the broadband Internet have shaped a new and formidable threat with the emergence of P2P file sharing networks [5]. Since the inception of copyright law grants intellectual property owners a temporal monopoly on their works, the ability to capture value by copyright holders has persistently been threatened by unauthorized reproduction of content [10]. Because unethical consumer practices can cut greatly into company profits, one of the current concerns about the unethical consumer behavior centers on the entertainment industry as evidenced by users' augmented frequency of sharing streaming music and videos without paying.

With the astronomical increase of Internet users worldwide, downloading, online streaming and file sharing are here to stay. A sizable number of Internet users rips music from their own CDs or download legally from music subscription sites. However, many customers may be tempted by illegal P2P file-sharing networks such as bearShare, Ares Galaxy, and bit Torrent where they can obtain music or video files for free. This is particularly attractive to individuals who don't have their own iTunes credit account and are tempted to turn to the web for free music and videos. Furthermore, muddying the ethical waters is the advent of social networking sites, which allows budding musicians to offer their music to the world free of charge. It is now common occurrence that after watching interesting movies customers post them on YouTube for the world to watch free of charge.

According to ComScore, a global source of digital intelligence, the global Internet audience surpassed 1 billion in year 2008 [3] and in the year 2012, 84.4 % of U.S. audience viewed online video like YouTube [2]. However, it

was in the year 1999 that Internet users started using their home computers for more than web browsing. They were directly connecting and collaborating with each other and forming groups through the P2P system [15]. File Sharing solutions like Napster and Gnutella institutionalized the use of P2P leading to illegal usage of copyright protected work [9, 11].

With various laws and technological deterrents that obviously failed to protect digital contents, the objective of the study is to find out factors determining online streaming and P2P file sharing of copyrighted music and videos, and examine ways to develop practical solutions or at least stem the tide of these illegal activities. The main focus of this study is to explore why individuals are involved in online streaming and P2P file sharing of copyrighted music and videos and find overall solutions to these activities.

## LITERATURE REVIEW

P2P file sharing is one of the leading Internet applications. Millions of users use P2P file sharing systems daily to search for and download files, which accounts for a large portion of the Internet traffic. The technology enabling P2P networks became a prevailing trend in 1999 with the release of a music file sharing application called Napster. Contrary to a client-server model, in which all communications take place through a central server, P2P architectures allow every computer running the same software in the same network to directly communicate with each other without going through intermediaries. This network topology increases scalability and robustness for a wide range of applications. File sharing has been one of the most disruptive and widespread applications of P2P architectures.

Earlier studies will underscore the importance of P2P systems as a platform of file sharing. The study titled “A view of the Data on P2P File-sharing System” authored by Yee et al. focused on how P2P network systems work [19]. The author asserted that the ability to publish and copy data easily and dynamically makes P2P file sharing systems a popular means of file exchange. The main objective of the research was to understand how P2P systems are engineered and used, and address issues of efficiency in P2P systems. According to Klingberg, Gnutella systems mainly focused on network level characteristics such as the number of users, node uptime, number of queries, and number of shared files [7, 8, 12, 16, 18]. The study highlighted limitations of earlier studies as only applicable to the understanding and improvement of the underlying network infrastructure that connects the participating peers, while the author’s study dealt with characterization of how data are searched for and described for optimization of application-level search techniques and higher level network design. The study was concluded by revealing important characteristics of queries and shared data in Gnutella, by confirming it as one of the largest P2P file-sharing systems. The study compared the query rate of September 2006 with the query rate in April 2007 and found an 80% increase; it also found that 135% was increased in September 2008. This overwhelming evidence of the increasing peer-to-peer file-sharing gives a background for this study on the role of P2P systems as medium for file sharing and the accompanying ethical issues as it relates to online streaming and file sharing.

The second study worth reviewing on P2P file sharing was done by Casadesus-Masanell and Hervas-Drane. The paper titled, “Peer-to-peer file sharing and the market for digital information goods” was about the competitive interaction between two alternative models of digital content distribution over the Internet: P2P file sharing and centralized client-server distribution [7]. The study explored micro foundations for a stylized model of P2P file sharing where all peers are endowed with standard preferences and the endogenous structure of the network is conducive to sharing by a significant number of peers even if sharing is costlier than free. The summary of the study was that the effects of P2P file sharing on content providers are significant. By eliminating the physical support restrictions, P2P file sharing technology has increased the accessibility and attractiveness of unauthorized content replication.

This study will employ an earlier research made by Levin et al. (2004) in the Journal of Marketing Theory Practice [13], in order to address two following questions. Firstly, what is the relationship between consumer ethical perceptions and attitudes towards music/movie industries? Secondly, does downloading/streaming/posting and file sharing of music/movie relate to customers’ purchasing pattern of music/movie CD? In the year of 2000, the

Recording Industry Association of America (RIAA) conducted a survey against 2,155 college students on their downloading behavior. As the result of the survey, it was found that respondents using Napster purchased fewer CD than respondents not using Napster (The Register, June 15, 2000). The result of the survey was compared with another study by the Gartner Group, which found 41% of the respondents said they downloaded files to sample music before buying the CD (The Register, August 17, 2000). A clear message from the record companies was that downloading music from websites like Napster was unethical and eroded companies and artists of profits and royalties by allowing users to pirate copyrighted material. A recent study showed that online music service companies like Spotify and various P2P file sharing software were detrimental to music purchasing by consumers [4, 17]. A majority of these consumers that used a service or software to download music, movies and software were not aware of their illegal or unethical behavior. Moreover, most of them were mainly downloading files with no contribution to the sharing process by uploading files [1].

The definition of consumer ethics in this study is consistent with that of Muncy and Vitell (1992) [14]. The authors defined consumer ethics as moral principles and standards that guide behavior of individuals or groups as they obtain, use, and dispose of goods and services. According to Levine et al. [13], the framework for consumers' ethical decision making consists of following factors: 1) consumers' ethical attitude being subsequently aligned with the consumer behavior, 2) consumers' perception of the impact of ethical decision on the level of harm and degree of consequences, 3) consumers' relationship with the potential victim and consumers' ethical actions toward those with a favorable association, and 4) consumers' opportunity to engage in the act.

## RESEARCH MODEL AND HYPOTHESES

As shown in the Figure 1, the above four factors are applied to generate hypotheses, consumers' ethical attitude toward P2P sharing, consumers' sympathetic attitude toward music/movie industry and artists as victims of unauthorized copyrighted file sharing, their attitude toward music/movie industry as excessive profit maker while having too few favorite music/movie on a CD/DVD, and their attitude toward online purchase through the Internet, which can be cheaper in spite of the same quality product. And another concern is the relationship between P2P file sharing and consumers' purchasing behavior of music/video CD/DVD and files.

H1: Consumers' ethical/moral attitude has the relationship with P2P file sharing.

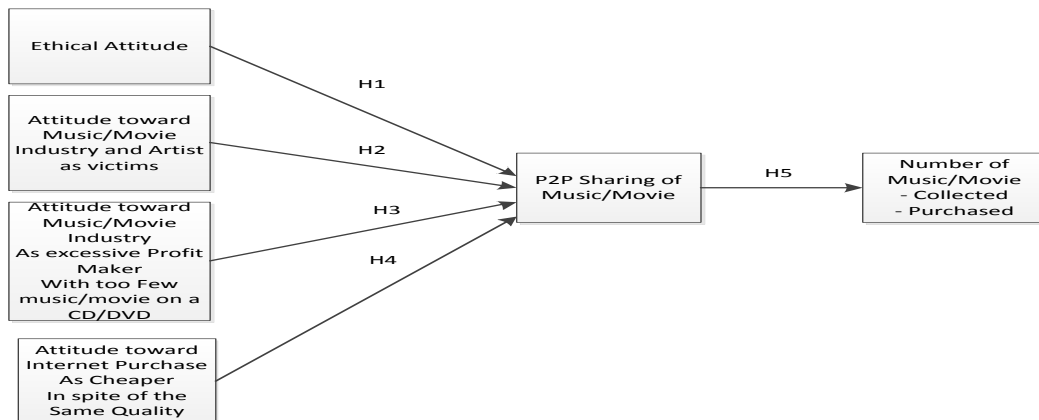
Consumers who think it is ethical to listen/watch, download, and post copyrighted music/movie through P2P networks have a higher chance to share music/movie files through P2P networks.

H2: Consumers' sympathetic attitude toward music industry and artists as victims of unauthorized copyrighted file sharing has the negative relationship with P2P file sharing.

H3: Consumers' unfavorable attitude toward music/movie industry in terms of excessive profit making by having too few songs/movies on a CD/DVD has the positive relationship with P2P file sharing.

H4: Consumers' friendly attitude toward the online purchase through the Internet has the positive relationship with P2P file sharing.

H5: Consumers' P2P file sharing has the negative relationship with the purchasing of music/movie online as well as in-store purchase.



**Figure 1. Research Model**

## RESEARCH METHODOLOGY

Survey instrument was designed to have twenty four (24) items to measure P2P file sharing, four (4) major factors determining P2P file sharing, consumers' purchasing and collection behavior, and demographics on gender, age, and education level of respondents. Out of 24 items, ten (10) items were designed to measure four (4) factors determining P2P file sharing, that is, ethical attitude, attitude toward music/movie industry and artists as victims of unauthorized sharing of copyrighted music/movie files, attitude toward music/movie industry as excessive profit maker with too few songs/movies in a CD/DVD, and attitude toward online purchase. The ten (10) items were statements for respondents to reply on a 5 point Likert scale, 1 for Strongly Disagree and 5 for Strongly Agree. Four (4) items were designed separately to find P2P file sharing experience. One (1) item was to ask a yes/no type question on the experience of P2P file sharing while the other three (3) items were interval type questions (1: None, 2: 1-10, 3: 11-20, 4: 21+) about recent P2P file sharing experience in terms of downloading, posting, and listening/watching files. Three (3) items were about the number of collected music/movie CD/DVD and files while two (2) items were about recent online as well as in-store purchasing experiences.

The survey questionnaire was sent to 177 college students who were undergraduates and postgraduates to assess relationships between P2P file sharing and four (4) factors, that is, ethical attitude, attitude toward music/movie industry and artists as victims, attitude toward music/movie industry as excessive profit maker with too few songs/movies in a CD/DVD, and attitude toward online purchase. Out of 177, 76 responses were discarded because of the incompleteness of the survey so that 101 responses were used to be analyzed for the study.

## DATA ANALYSIS AND DISCUSSION

As shown in the Figure 2, out of 101 respondents, 62 were male and 39 were female. In terms of age, 25 respondents were in the age group of 18-25, and 32 respondents were in the age group of 26-32. And 44 respondents were in the age group of 32+. In terms of the education level, 28 respondents were high school graduates, and 42 respondents were college graduates. And 31 respondents were postgraduates. 54 respondents stated they had shared copyrighted music/videos on P2P sites, and 47 respondents stated they had never shared copyrighted music/videos from P2P sites.

As shown in the Table 1, as a result of factor analysis with Varimax rotation method, 10 items of instrument measurement were grouped into 3 factors. Thus, remaining factors were ethical attitude, sympathetic attitude toward music/movie industry and artists as victims, and negative attitude toward music/movie industry as excessive profit maker with too few songs/movies in a CD/DVD. Consumers' attitude toward online purchase was not counted as

factor because BOC measurement item (consumers buy a music/movie online if it costs less than store) was grouped into consumers' negative attitude toward music/movie industry, and NDQ (consumers think there is no difference of music/movie quality whether buying in store/online or streaming and sharing) had very low factor loading. Therefore, consumers' attitude toward online purchase was not considered as a factor in the study, and BOC measurement item was considered as a measurement for consumers' attitude toward music/movie industry.

**Table 1.** Results of Factor Analysis

Factors	Measurement Instrument	Factor Loading
Ethical Attitude	Ethical to post movie/music on the streaming site such as YouTube, Hulu or etc (EPO)	0.73091
	Ethical to copy copyrighted movies/music for free for commercial (ECC)	0.69484
	Ethical to copy copyrighted movies/music for free for personal use (ECP)	0.43760
	Ethical to share copyrighted movie/music with others (ESH)	0.72072
Sympathetic Attitude toward Victims of P2P Sharing	Online Streaming Music or Movie on the Streaming site such as YouTube, Hulu, or etc. harm Music or Movie industry (HAI)	0.55393
	Online Streaming Music or Movie on the Streaming site such as YouTube, Hulu, or etc. harm Artists (HAA)	0.68481
Negative Attitude toward Music/Movie Industry	Movies/music are expensive /overpriced (OPD)	0.70627
	Music CD contains only few good song(s) (FGS)	0.52133
	Buy movies/music online if it cost less than store (BOC)	0.57580
Attitude toward the Internet Purchase	<del>Buy movies/music online if it cost less than store (BOC)</del> (This measurement item was grouped into the other factor, negative attitude toward music/movie industry.)  <del>No difference of music/movie quality whether buying in store/online or streaming and sharing (NDQ)</del> (This measurement item was not used to do analysis because of low factor loading score.)	0.06637

After the factor analysis, discriminant analysis was conducted. As shown in the Table 2, the result of discriminant analysis indicated that three factors as independent variables in the analysis were not statistically significant to predicted P2P file sharing experience because Wilks' Lambda was 0.7662 and p-value was 0.0054 that was more than 0.0004 as criteria to be statistically significant.

**Table 2.** Discriminant Analysis

Statistic	Value	F-Value	Numerator DF	Denominator DF	Pr > F
Wilks' Lambda	0.7662	2.75	10	90	0.0054

According to univariate  $R^2$  analysis in the Table 3, 4 variables (EPO, ECC, ECP, ESH) belonging to ethical attitude factor showed significant difference at the 0.05 level. While 1 variable (HAI) categorized as Sympathetic Attitude toward victims factor showed significance, the other variable (HAA) was not significant. Three (3) variables (OPD , FGS, BOC) for attitude for the online purchasing factor were not significant.

**Table 3.** Univariate Analysis, R-Square, and Probability

Factors	Variables	Univariate Analysis		
		R-Square	F-Value	Pr>F
Ethical Attitude	. EPO	0.1137	12.70	0.0006*
	. ECC	0.0857	9.29	0.0030*
	. ECP	0.0481	5.01	0.0275*
	. ESH	0.0969	10.63	0.0015*
Sympathy on Victims by P2P Sharing	. HAI	0.0942	10.29	0.0018*
	. HAA	0.0039	0.39	0.5363
Perception of Music/Movie Industry's Business Practice	. OPD	0.0315	3.22	0.0757
	. FGS	0.0001	0.01	0.9431
	. BOC	0.0274	2.79	0.0978

Note: \* indicates variable is significant at .05 level

After the discriminant analysis, correlation analysis was conducted to test the relationship between consumers' P2P file sharing and purchasing/collection behavior. As shown in the Table 4, consumers who had experience with P2P file sharing had significant relationships with consumers' online purchasing of music/movie (BON) and their collection of music/movie files, however, the relationship between consumers' P2P file sharing experience and their collection of CD/DVD was not significant.

**Table 4.** Correlation Coefficient

		BON	NCO	NSO	NVO
Have you shared copyrighted music/movie from P2P sites before?	Coefficient	-0.21043	-0.17657	-0.29724	-0.26633
	P-value	0.0347*	0.0773	0.0025 *	0.0074*

Note: \* indicates variable is significant at .05 level

Past 6 months #of movie/music you have bought online (BON)

# of CD/DVD owned by consumers (NCO)

# of Music as a file (mp3, wma, etc.) owned (NSO)

As the result of data analysis, H1 was supported so that consumers' ethical attitude has a close relationship with P2P file sharing. H2 is partially supported because consumers' attitude toward music/movie industry as victims was significantly related to P2P file sharing while artists as victims were not significant. H3 was not supported and H4 was not tested because consumers' attitude toward online purchasing was not considered as a factor. H5 was mostly supported because customers who did P2P file sharing bought more music/movie online rather than in-store shopping and collected more files. However, their collection of CD/DVD was not significant even if they shared files through P2P networks. Customers who do file sharing may purchase more music/movie files online than those who don't do file sharing in the form of downloading specific music/movie files from the licensed websites like iTunes Store or subscribing to music streaming service websites like Spotify. Consumers who are avid fans of music/movie may not impulsively purchase music/movie CD/DVD, which lessens the purchasing of music/movie.

However, they are still purchasing music/movie files to conveniently enjoy listening and watching music/movie of the higher quality.

## CONCLUSION

The study examined four determining factors of consumers' online streaming and P2P file sharing, 1) consumers' ethical/moral attitude toward P2P file sharing, 2) consumers' sympathetic attitude toward victims as music/movie industry and artists by consumers' unauthorized sharing of P2P files, 3) consumers' attitude toward the pricing of music/Movie CD/DVD with too few good songs/movies on CD/DVD, and 4) consumers' attitude toward online purchasing. Survey results showed that consumers' ethical/moral attitude toward P2P file sharing was significant to determine consumers' experience with P2P file sharing of copyrighted music/movie files. Consumers' sympathetic attitude toward music/movie industry rather than artists as victims of unauthorized P2P file sharing was also significant even though consumers' negative attitude toward music/movie industry as excessive profit maker was not significant, and consumers' attitude toward online purchasing of music/movie was not significant determining consumers' P2P file sharing. Furthermore, consumers' P2P file sharing experience had a significant relationship with consumers' online purchasing of music/movie rather than in-store shopping, and a significant relationship with more collection of music/movie files.

The limitation of the study was that the number of usable responses, 101 was relatively small so that the ratio of female (39%) was not near 50% and the age group younger than 18 years old was not included in the study, which might have biases in the study result.

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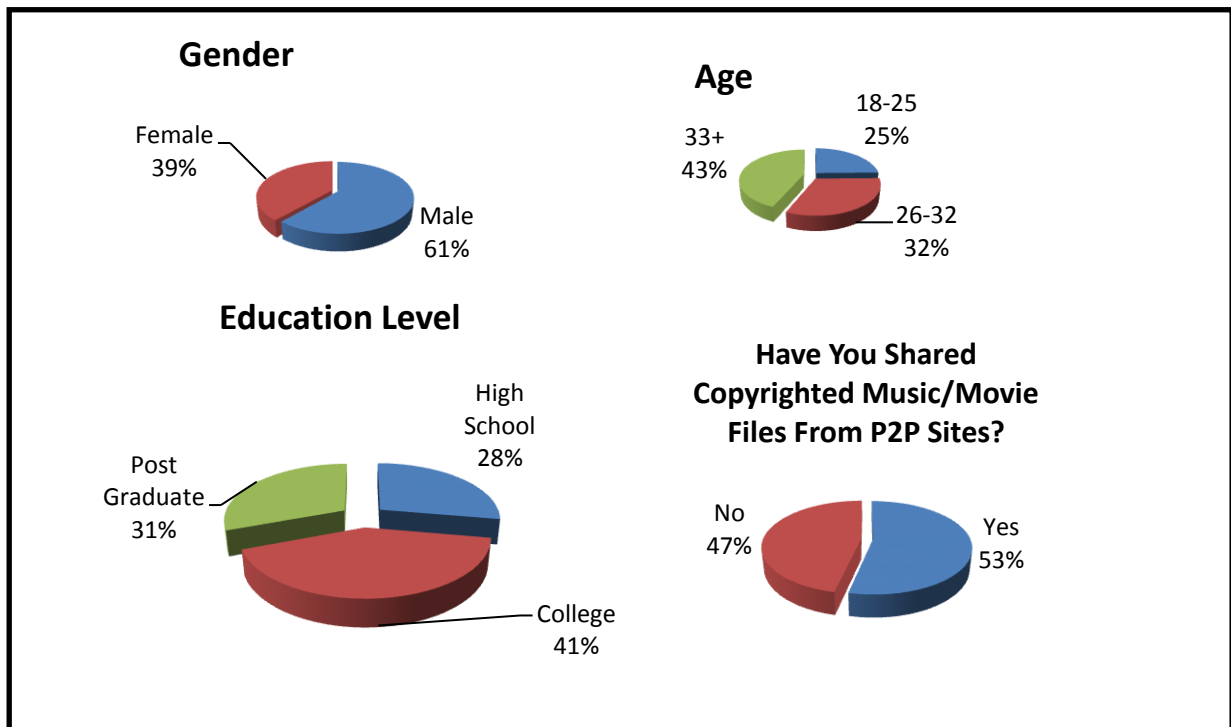


Figure 2. Demographics of Respondents and their P2P File Sharing Experience