

DOES INTERNET HARMS MUSIC SALES? A CONSTRUCTIVE PERSPECTIVE

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ABSTRAK

Masalah utama yang dibawa oleh penelitian ini adalah apakah internet sebagai media dan penggunaannya sebagai aktor di balik jatuhnya pendapatan industri musik selama tahun-tahun ini - banyak orang berdiri di sudut pandang ini - atau bisa menjadi fasilitator pembelian musik. Penelitian ini menggunakan data panel dari 16 negara mulai dari 1999 sampai 2004 untuk membuktikan apakah internet dan pengguna mereka merugikan pendapatan dari industri musik, dan mempekerjakan empat variabel dummy, termasuk tingkat pembajakan, pembangunan ekonomi, ukuran pasar, dan individualisme / kolektivisme. Hasil penelitian menunjukkan bahwa internet melalui pengguna mereka di Amerika Serikat tidak merugikan industri sebanyak diklaim sebelumnya, hanya 2,1 persen. Selanjutnya, hasil data panel menunjukkan bahwa tingkat tingkat pembajakan dirilis oleh IFPI tahun 2001 didukung sebagian, dan mengejutkan, internet pengaruh positif signifikan terhadap penjualan musik untuk negara itu dengan tingkat pembajakan di kisaran 25 sampai 50 persen. Selain itu, pengguna internet berinteraksi dengan pembangunan ekonomi dan individualisme / kolektivisme, dan telah menunjukkan bahwa pengguna internet memiliki dampak positif yang signifikan terhadap penjualan musik. Namun, ukuran pasar tidak mendukung model yang dikembangkan dalam penelitian ini. Implikasi manajerial, keterbatasan penelitian dan arah untuk penelitian lebih lanjut juga disajikan.

Keywords: internet, pembajakan, penjualan musik, tingkat pembajakan, pembangunan ekonomi, ukuran pasar, individualisme / kolektivisme.

ABSTRACT

The main issue brought by this study is whether internet as medium and their users as actors behind the fall of music industry's revenue during these years - many people stand on this point of view - or could be the facilitator of music purchasing. This study used data panel from 16 countries ranging from 1999 to 2004 to prove whether internet and their users harm the revenue of music industry, and employs four dummy variables, including piracy rates, economic development, market size, and individualism/collectivism. The results indicated that internet through their users in the USA does not harm as much as industry claimed before, only 2.1 percent. Furthermore, the panel data results indicate that level of piracy rates released by IFPI in 2001 partially supported, and surprisingly, the internet positively significant influences on the music sales for country's with piracy level in the range of 25 to 50 percent. Moreover, the internet users interact with economic development and individualism/collectivism, and it has shown that internet users have positively significant impacts on the music sales. However, market size does not support the model developed in this study. The managerial implications, limitations of the study and directions for further research are also presented.

Keywords: internet, piracy, music sales, piracy rates, economic development, market size, individualism/collectivism.



1. RESEARCH BACKGROUND

The relationship between the music industry and technology has long been a close and intimate one. The industry emerged around the turn of the century in the wake of innovations in sound reproduction and, particularly, "electrification" (Frith, 1987). Thereafter, the industry has evolved in lockstep with, although not determined by, a range of technological advances, from the development of vinyl as a reproductive medium, to the introduction of magnetic audiotape, up to the digitalization of music and the creation of formats such as compact disc (CD), digital audiotape, and minidisk (Leyshon, 2001). In 1995, this virtuous circle of technological development began to enter a new phase when the internet opens to commercial traffic (Allen and Kim, 2005). Initially, the industry welcomed this vision of a world of digital distribution (Sadler, 1997).

As predicted by Alexander (1994), the digital nature of today's music offers convenience and portability, but also raises the specter of piracy and lost sales. The impact of new copying technology on the music industry has been hotly debated since the launch of the first file-sharing software - Napster - in 1999, and MP3 format. After long battle with major labels, Napster was found guilty of copyright infringement by facilitating the distribution of piracy music to the public and shut down in 2001. However, dozens more software programs had sprung up to replace Napster, such as Kazaa, Lime Wire and so on; which more advanced capability without central database and create difficulties for major labels to sue and shut it down (Marino and Jackson, 2006). Based on that, it

is necessary to emphasize the impacts of internet on the music industry.

There are two perspectives has been drawn about the impacts of internet, destructive or constructive. The first perspective originally from the claim of music industry that files sharing is the main reason of the decrease of music sales. For example, retail sales of recorded music dropped from \$14.323 billion in 1999 to \$11.854 billion in 2003 in the US (Table 1). This claim supported by many empirical studies which indicate that internet through file sharing harm the revenue of music industry. Zentner (2005) finds that cross-country aggregate data support a 14 to 23 percent reduction in CD sales (in the U.S.) from file sharing. Hong (2004) uses a two-sample instrumental variable approach and finds that file sharing significantly decreased music purchases for households with children aged 6 to 17. Liebowitz (2004a) examines the impact of file sharing using aggregate U.S. data and estimates that file sharing may have decreased album sales by as much as 30 percent. Rob and Waldfogel (2006) use microlevel data on college students' downloads and music purchases and find that downloads do displace music purchases (by varying degrees). Zentner (2003) finds that file sharing usage reduces the probability of purchasing music by 30 percent. By micro-level expenditure data from the Bureau of Labor Statistics' (BLS) Consumer Expenditure Survey (CEX), Michel (2006) found that some U.S. music consumers could have decreased their CD purchases (prior to 2004) by about 13 percent due to Internet file sharing.

Table 1.
The Music Sales and Internet Users in USA (1995-2004)

Year	Music sales (in millions)	Internet users (in thousands)
1995	12,320	58,549
1996	12,534	75,462
1997	12,237	92,374
1998	13,724	109,287
1999	14,585	135,159
2000	14,323	142,823
2001	13,741	167,197
2002	12,614	172,250
2003	11,854	201,661
2004	12,338	203,824

Source: Recording Industry Association of America (RIAA, 2006)

The second perspective proposed by Hui and Png (2003) that piracy might not damage the music industry as large as claimed. Piracy may actually boost the demand for legitimate information products

through positive demand-side externalities. By increasing the provision of recorded music, higher piracy might increase the ownership of CD players, which in turn stimulates the demand for legitimate

music CDs (Hui and Png, 2003). Other proposition from Liebowitz and Watt (2006) constituted that file sharing might become free advertising for unknown new artists, and such copyright infringement through peer-to-peer network may create a positive impact for newcomers, since the costs of distribution are so much cheaper compare to conventional distribution (major labels). This proposition parallels with the argument that pirated items may facilitate sampling of the information product (Fader, 2000; Hall, 2000). Similar proposition noted by Bhattacharjee, Gopal, Lertwachara, et al. (2003) that it is not necessary to eliminate online music piracy in order to achieve revenue maximization strategies for the seller. Thus, the second perspective suggested that piracy is necessary to reach potential consumers which often to use internet, and in the long term could be expected to maintain the music industry revenues or even enlarge it. However, only one empirical study which tested the impact of internet which facilitates file sharing claimed to find a positive impact to the sales of music (Oberholzer and Strumpf, 2004).

This study purposely to demonstrate the proposition of Hui and Png (2003) and Bhattacharjee et al. (2003) that the internet effects might not decrease the music industry's revenues as large as the current claim promoted by music industry. Moreover, this study offers alternative views by using data panel from 16 countries on 4 levels of piracy in order to present the effects of internet on the music industry comprehensively. Additional four dummy variables, such as piracy rates, income level, market size, and individualism/collectivism culture will be tested in this study. The rest of this paper is organized as follows: First, this study provides a brief review of the literature in the music industry to the digitalization, and the effects of internet on the music industry's revenue as well as the background of some dummy variables included in this study. Second, linkages between the literatures are examined, which lead to a series of model development. Third, the theoretical and practical contributions of this study are discussed and finally, limitations of this research and suggestions for future research are provided.



2. LITERATURE REVIEW

Music and the internet

During the 1990s, the Internet facilitated the exchange of digital commodities, in the form of picture and sound files. The release of the Netscape browser for PCs (1994) and the opening of the Internet to commercial traffic (1995) led to a dramatic shift in PC usage towards networking (Allen and Kim, 2005). These exchanges developed around internet relay chat (IRC) networks, which made it possible for users to transfer digital files of all kinds between one another. According to Cooper and Harrison's study (2001), the music files (MP3) trading via IRC existed during the mid-1990s. The audio-piracy subculture becomes world-wide phenomenon since the development of peer-to-peer network, such as Napster.com or mp3.com; which popularized the online music sharing (Leyshon, 2001).

The exchange facilitates by internet is largely supported by the MP3 format. MP3 is a compression program, which reduces the size of digital audio files, making them quicker to make and easier to distribute without disrupting the audio quality (Alexander, 2002). It originally developed as an international standard for the coded representation and combination of moving pictures and audio to facilitate the development of an interactive television industry (The

Economist, 1999). According to Boshoff (1998), it was estimated that about 26,000 Internet sites used music illegally in 1998, and some commentators claim that MP3 is now the most searched for category on the Internet and that over 500,000 different MP3 files may be accessed through it (Dempsey, 1999; Moody, 1999). From the industry, the Record Industry Association of America (RIAA) see MP3 as directly responsible for the decline in the share of US music sales generated by the 15 - 24 age group, a share which fell from 32% in 1996 to 28% in 1998 (Moody, 1999). Their argument based on the facts that MP3 enable this age group to access music more cheaply and conveniently. More worryingly, the development of MP3 is also considered as one of factors which erode the music industry size through illegal copying. In addition, the International Federation of Phonographic Industries has estimated that there are three million downloads of MP3 files each day, and that many of these download are of illegal copies of copyrighted material (Leyshon, 2001). Indeed, the internet is the convenient medium to exchange music files which encrypted by using MP3 format, since it is able to compress the music files to 10 percent from the original size, and easy to uploaded and downloaded to and from personal computers (Leyshon, 2003).

Music and piracy rates

USA is the biggest music market in the world, which accounts steadily on 36 percent from 1999 to 2005; followed by Japan which occupied around 16 percent in 2005, and UK occupied around 10 percent in 2005, increase moderately from 7 percent in 1999 (IFPI, 2004). In terms of region, European market and North American market are the duo biggest market size - 74.95 percent in 2004. The Asian's and Latin America's market size slightly shrink by 2 percent, whereas Australasia increase slightly 0.5 percent from 1999 to 2004 (IFPI, 2004).

Despite of promising progress of music sales in the global market, there is single problem which undoubtedly make the major executives of the music industry can not sleep well - piracy. Music piracy is pervasive in every corner of the globe and is a key threat the music industry is facing today (Ki, Chang, and Khang, 2006). Music piracy has created a significant drain on revenues and has retarded continued growth of the music industry. Long before internet going publicly, many previous studies indicated that home taping as the major reasons of big losses for music industry during 1980s (Besen, 1987). In the internet era, for example, an estimated 40% of all music CDs and cassettes sold around the globe were pirated, and the estimated value of the pirated market for 2002 was \$4.6 billion (International Federation of Phonographic Industry - IFPI, 2003). Music piracy rates have continued to increase. In 2001, an estimated 28% of all CDs sold were pirated, which was up from 20% in 2000 (IFPI, 2004). As results, there is a decrease of nearly 13.1 percent within 5 years, a big loss which exclusively addressed to internet and its peer-to-peer network as the major media who distribute music pirates.

Music and economic development

One of the most commonly cited to determine the piracy factors is economic variable. At the country level, some software piracy studies have applied economic factor and found that economic differences at country level differentiate rates of software piracy across the globe. For example, Rapp and Rozek (1990) examined the relationship between economic development and protection of patents and found that patent protection strongly correlates with economic development. In addition, they found that stronger law enforcement of copyrights or patents exist in the country that has high income. Other study conducted by Husted (2000) found that there is significant relationship between the level of economic development and the rate of software piracy. The recent study

conducted by Ki et al. (2006) supported the idea that economic development significantly influences the level of music piracy.

At the individual level, piracy is closely related to economic status since the rich have no need to obtain pirated copies, whereas the poor may (Husted, 2000; Rapp & Rozek, 1990). According to Cheng, Sims, and Teegen (1997), they found that lower household income has greater possibility to illegally copying software, wince their money limited to buy original ones. Thus, it can be assumed that when the internet users lived in the country with high level of income, the probability to consume the illegal music will be low compare to lower income countries. In other words, the music sales in the lower income countries tend to decrease compare to highly income countries due to music piracy.

Music and market size

This study adopted the market size of the music industry as other explanatory variable of music piracy. According to Gopal and Sanders (1998), the size of the domestic software industry is closely related to software piracy rates. Their assumption based on the facts that the bigger market size of particular industry which closely related with copyrights (such as software or music), the probability of people to infringe the copyrights law tend to be smaller than small market size. Moreover, they proposed that people might recognize music as a social value and might provide an environment of increased copyright enforcement to protect against music piracy. Other study conducted by Ki et al. (2006) also found that market size directly influences on the level of music piracy. Thus, the lesser probability of music or software infringement in particular country could be expected will not reduce the revenue of current players in the music industry.

Music and collective behavior

Despite the reasonable explanation for piracy prevalence in predominantly less developed countries, a significant number of anomalies continuously occur in the global piracy phenomenon. For instance, in 1999, the rates of software piracy among average per capita annual income countries such as Hong Kong (\$22,185) and Singapore (\$26,460) were 56% and 51%, whereas the rates of relatively lower income countries, such as New Zealand (\$17,210) and Israel (\$16,438), were 31% and 44% (Ki et al., 2006). This phenomenon, therefore, cannot simply be explained by economic variables. In order to provide comprehensive view of the underlying phenomenon, it is

requires to include the role of cultures in this economic phenomenon.

Apparently, particular cultural norms or values may either encourage or discourage piracy behavior because they can possibly influence the perception of copyright protection. The Western perspective views that individual freedoms and benefits are emphasized over societal benefits, and they valued highly on the individual creative works and how to retain it. It is not surprising since the intellectual property protection is deeply rooted in Western culture (Steidlmeier, 1993). On the contrary, Eastern cultures have traditionally emphasized sharing individual creative works because Asian culture emphasizes social harmony and cooperation (e.g., Donaldson, 1996; Swinyard, Rinne, & Kau, 1990). Moreover, in general they believe that copyright or patent created by Western to maintain their monopoly over the distribution and production of knowledge and knowledge-based products (Altbach, 1988), thus, the probability to infringe the copyright laws tend to be higher in the Eastern culture compare to Western culture.

Following Ki et al. (2006), this study employs individualism-collectivism, one of five dimensions of socio-cultural variability from Hofstede (1983,

2001) to measure cultural perspective related to ethical sensitivity on piracy. Hofstede defined individualism as individual's preference to take care of themselves and their close family, whereas collectivism is referred to as individual's expectations from relatives or social group to look after them, in exchange for unquestioning loyalty (Hofstede, 1983). Within individualistic culture, people tend to use social institutions or laws to protect individual rights, including ownership. Glass and Wood (1996) suggested that equity theory helped explain decisions made by individuals to share pirated software. That is, piracy is considered as an exchange associated with an evaluation of the outcomes compared with the inputs of the exchange. This kind of calculation would be predominant in the individualistic society. On the contrary, in a collectivistic culture, greater emphasis on sharing exists within a group (Hofstede, 1997; Swinyard et al., 1990). Studies also supported the concept as finding that software piracy rates are significantly higher in collectivistic countries than in individualistic countries (e.g., Husted, 2000; Shore et al., 2001). This study adopted this perspective and assumed that in the collectivistic country, the music sales tend to decrease since the internet users willing to share their audio files, vice versa.



3. MODEL DEVELOPMENT

Internet as single determinant of music revenues

Many previous studies reported that internet is the single media which responsible on the declining of music industry revenues, particularly by extending the opportunity of file sharing and the digital standard format software, MP3 (e.g. Michel, 2006; Gopal et al., 2006). Indeed, the impacts of file sharing network depend on the number of internet users, the actors who employed internet as medium to do file sharing through peer-to-peer network. Therefore, it is necessary to start this study from the year of internet serve commercial publicly - 1995 - and ended in 2004, a year before the music industry gain substantial revenues from their online distribution. The data of internet users in this study gathered from Internet World Stats (2006). This study use music industry revenue in the USA from the data released by Recording Industry Association of America - RIAA (RIAA, 2006). In order to test the impacts of internet on music industry's revenue, the

regression model has been developed:

$$Y = a + b_i X_i + u_i \dots \dots \dots (1)$$

Y = music sales

X_i = internet users

Surprisingly, the result indicates that internet does not significantly influence on the revenues of music industry. Moreover, the coefficient of determination is low ($R^2 = 0.003$) as well as Adjusted $R^2 = -0.121$. In order to test autocorrelation, the D-W test score indicate far lower than 2 - 0.657, which indicates the model has autocorrelation. By using Klein's method (Gujarati, 2006), the multicollinearity does not exist in this model ($R^2 = 0.001$, Adjusted $R^2 = -0.122$). The regression results as follows:

$$\bar{Y} = 13,173.92 - 0.001 \text{Internet}_i$$

se = (957.779) (0.007)

t = (13.755) (-0.163)

p = (0.000) (0.875)

$R^2 = 0.003$ Adj. = -0.121 F = 0.027

Internet with dummy variables as determinants of music revenues

Even the file sharing began in the mid 1990s through IRC (Cooper and Harrison, 2001), undoubtedly, Napster is the network who gains popularity among internet users and music downloader's which began their services in 1999. In March 2000, there had been 5 million downloads (majority is MP3 music files) and increase to 20 million per day 3 months later through Napster server. Thus, this study will use the year of 1999 as cut point when the internet suspects to the flourishing digital music piracy. The regression model was presented in Model (2) below:

$$Y = a + b_1D_{it} + b_2X_{it} + u_i$$

Y = music sales

D_{it} = dummy variable (0 = prior 1999; 1 = after 1999)

X_{it} = internet users

The results indicates the internet influences negatively significant on music sales when this study separate the year before peer-to-peer network began to serve internet users marked by Napster in 1999. By using Chow test, it is indicates that the internet users prior and after 1999 is significantly different (F-value=25.969; $p < 0.001$). Surprisingly, the internet only reduces 2.1 percent ($t = -2.009$; $p < 0.10$) which far away from the previous claims made by the industry - RIAA and IFPI. It is concordance with the proposition by Hui and Png (2003) that publishers' losses to piracy might not be as large as claimed. The D-W test score of this model indicates that autocorrelation moderately exist - 1.182. The following are the regression results:

$$\bar{Y} = 14,526.960 + 2,419.848 D_1 - 0.021 Internet_i$$

Piracy rates as dummy variable

In order to extend the results, this study intentionally tested the internet influence by using data panel based on the piracy rate for each country released by IFPI (2004). There are four country classifications: piracy rate below 10 percent, 10 to 25 percent, 25-50 percent, and above 50 percent. This study used 4 countries for each classification which selected randomly, and the complete lists are presented on

$$\begin{aligned} \bar{Y} &= -3,117.406 + 0.326 Internet_i + 21,084.160 D_2 + 1,506.293 D_3 + 2,447.315 D_4 \\ se &= (10,029.300) \quad (0.156) \quad (15,609.580) \quad (13,936.620) \quad (13,970.73) \\ t &= (-0.311) \quad (2.091) \quad (1.351) \quad (0.108) \quad (0.175) \\ p &= (0.757) \quad (0.039) \quad (0.180) \quad (0.914) \quad (0.861) \\ R^2 &= 0.135 \quad Adj. R^2 = 0.097 \quad F = 3.566 \end{aligned}$$

Table 2 below:

Table 2
Level of Piracy for Each Country (IFPI, 2001)

	<10%	10 - 25%	25 - 50%	> 50%
1	USA	Singapore	Israel	China
2	UK	South Korea	India	Philippines
3	Japan	Spain	Colombia	Malaysia
4	New Zealand	South Africa	Taiwan	Russia

A total of 16 countries were included for final analysis. The data set of music sales for each country gathered from the data released by IFPI (2005), whereas the internet users obtained from Internet World Statistics (IWS-2007). Since the database from IWS only provide the internet users from the year of 2000 and the current year (2007), this study calculated internet users based on the compound growth rate provided by IWS. The analysis started from the year of 1999 used to represents the birth of peer-to-peer network motorized by Napster and ended in 2004. The dummy variables will use to test whether internet users has influence on the music sales on different level of piracy country by using Model 3. The highest country piracy level (above 50 percent) will be use as the reference country, although any country piracy level can serve as the reference (Gujarati, 2006).

$$Y = a + b_1X_1 + b_2D_{2t} + b_3D_{3t} + b_4D_{4t} + u_i \dots\dots\dots (3)$$

Y = music sales

X = internet users

D_{2t} = country with piracy rate less than 10 percent

D_{3t} = country with piracy rate from 10-25 percent

D_{4t} = country with piracy rate from 25-50%

Surprisingly, by using panel data the results indicates that internet has positive significant effect on the music sales. The additional one internet user could increase the sales of music \$0.326. However, the coefficient determination a bit low ($R^2 = 0.135$; Adjusted $R^2 = 0.097$). The D-W value of this model is 1.641, which reflects that autocorrelation exist modestly. The multicollinearity tested by using Klein's method, and the results indicated that multicollinearity does modestly exist in the Model 3 ($R^2 = 0.115$; Adjusted $R^2 = 0.105$). The regression results are presented below:

In order to answer the research question "Can the piracy levels influence the music sales?", this study will test the internet's impact by using each country in one piracy level as dummy. The highest amount of internet users in particular country will be used as reference (piracy rate below 10 percent = USA, 10 to 25 percent = South Korea, 25-50 percent = Taiwan, and above 50 percent = China). The regression model is presented below:

$$Y = a + b_1X_1 + b_2D_{2t} + b_3D_{3t} + b_4D_{4t} + u_t \dots\dots\dots (4)$$

Y = music sales
 X = internet users
 D_{2t} = country other than USA, South Korea, Taiwan, and China

\bar{Y} =	-88,125.940	+ 0.939	Internet _i	+ 85,514.560	D _{2t}	+ 109,882.700	D _{3t}	+ 87,714.700	D _{4t}
se =	(380,321.800)	(2.426)		(336,922.300)		(253,524.600)		(379,796.300)	
t =	(-0.232)	(0.387)		(0.254)		(0.433)		(0.231)	
p =	(0.819)	(0.703)		(0.802)		(0.669)		(0.819)	
R ² =	0.102		Adj. R ² =	-0.087		F =	0.541		

D_{3t} = country other than USA, South Korea, Taiwan, and China
 D_{4t} = country other than USA, South Korea, Taiwan, and China

1. For country with piracy less than 10 percent, the internet indicates positively influences the sales of music in particular countries, however, it does not reach significant level of influence. Moreover, the results indicate that there are no significant differences on the influences of internet on the sales of music among countries. Finally, the results also reported low coefficient determinant (R² = 0.102; Adjusted R² = -0.087). The autocorrelation in this model also modestly exist - 1.575. The following are the regression results:

2. For country with piracy from 10 to 25 percent, the internet again does not indicate has significant effects on the declining of music sales in these particular countries. Furthermore, among countries which classified in this category, the results showed no significant differences of

internet influences on the music sales. The coefficient determinant of the regression results is modest (R² = 0.069; Adjusted R² = -0.126). This high autocorrelation exist in this study (D-W value = 0.509). The following are the regression results:

\bar{Y} =	-458.198	+ 0.072	Internet _i	+ 845.388	D _{2t}	+ 1,874.307	D _{3t}	+ 1,142.256	D _{4t}
se =	(5,198.381)	(0.235)		(4,959.963)		(3,616.925)		(4,674.901)	
t =	(-0.088)	(0.304)		(0.170)		(0.518)		(0.244)	
p =	(0.931)	(0.765)		(0.867)		(0.610)		(0.809)	
R ² =	0.069		Adj. R ² =	-0.126		F =	0.355		

3. Contrary to all our expectations, internet has positive impacts on the music sales in the country with piracy level ranging from 25 to 50 percent. The results indicates that an additional internet users has probability to increase the sales up to \$0.474 (t=4.285; p<0.001). In this category, Taiwan is reference country and only Colombia

has indicates significant different with the reference country. In addition, the coefficient of determination of regression model also high on this category (R² = 0.537; Adjusted R² = 0.440). The autocorrelation in this model are modestly exist (D-W value=1.476). The regression results are as follows:

\bar{Y} =	-3,158.716	+ 0.474	Internet _i	+ 1,869.261	D _{2t}	- 179.753	D _{3t}	+ 5,005.904	D _{4t}
se =	(1,982.815)	(0.111)		(2,277.204)		(2,086.057)		(2,297.037)	
t =	(-1.593)	(4.284)		(0.821)		(-0.086)		(2.179)	
p =	(0.128)	(0.001)		(0.422)		(0.932)		(0.042)	
R ² =	0.537		Adj. R ² =	0.440		F =	5.511		

4. For country with piracy above 50 percent, this study expected that the internet will highly influence on the sales of music. However, the results indicated that the internet does not have significant influence on the infringements of copyrighted music. Moreover, there are no significant differences among these countries on

the influences of internet on the music sales. In addition, the coefficient determination also quite low ($R^2 = 0.119$; Adjusted $R^2 = -0.067$). The D-W value of this study is 1.890, it indicates that autocorrelation exist modestly in this model. The regression results are presented below:

$$\begin{aligned} \bar{Y} &= 2,307.985 + 0.018 \text{ Internet}_i - 1,940.940 D_{2i} - 1,806.822 D_{3i} - 1,765.324 D_{4i} \\ \text{se} &= (3,338.039) \quad (0.085) \quad (3,387.234) \quad (3,245.700) \quad (3,206.980) \\ t &= (0.611) \quad (0.214) \quad (-0.573) \quad (-0.557) \quad (-0.550) \\ p &= (0.549) \quad (0.833) \quad (0.573) \quad (0.584) \quad (0.588) \\ R^2 &= 0.119 \quad \text{Adj. } R^2 = -0.067 \quad F = 0.640 \end{aligned}$$

Economic development as dummy variable

In the previous section, the economy status closely tight with piracy level, since poor may not afford the legitimate music and pirates as alternatives for them to enjoy current music (Husted, 2000, Ki et al., 2006; Rapp and Rozek, 1990). The data set of GDP used to represents the economic development level, which gathered from Penn World Tables 6.2 (University of Pennsylvania, 2006). The Model 5 developed and dummy variables will use to test whether internet users in rich country behave differently in doing piracy. The highest income level country (above \$20,000) employ as the reference country.

D_{2i} = country with GDP ranging from \$10,000 to \$19,999
 D_{3i} = country with GDP below \$10,000

Again, internet has shown positively significant influences the music sales ($t=3.086$; $p<0.01$), even there are no significant differences on the level of economic development on the music purchasing in three different types of countries. An additional internet user predicatively generates \$0.419 of music sales. The coefficient determination (R^2) is 0.121 and Adjusted R^2 is 0.092, with F-value is 4.202. The autocorrelation test indicates that the model has moderately autocorrelation (D-W value=1.557). The regression results are presented below:

$$Y = a + b_1 X_{1i} + b_2 D_{2i} + b_3 D_{3i} + u_i \dots\dots\dots (5)$$

Y = music sales
 X_{1i} = internet users

$$\begin{aligned} \bar{Y} &= 5,492.619 + 0.419 \text{ Internet}_i - 8,476.790 D_{2i} - 7,406.457 D_{3i} \\ \text{se} &= (8,658.877) \quad (0.136) \quad (14,287.080) \quad (11,317.95) \\ t &= (0.634) \quad (3.086) \quad (-0.593) \quad (-0.654) \\ p &= (0.527) \quad (0.003) \quad (0.554) \quad (0.515) \\ R^2 &= 0.121 \quad \text{Adj. } R^2 = 0.092 \quad F = 4.202 \end{aligned}$$

Market size as dummy variable

There are two empirical studies which used market size as predictor of the level of music piracy (Gopal and Sanders, 1998; Ki et al., 2006) and found that market size can be the determinant of music piracy. Following this idea, Model 6 has been developed to test whether internet users who live in the big music market size behave differently on music piracy compare to smaller one. The market size data panel gathered from IFPI report (2005) and use each country sales divided by total sales in each year.

D_{2i} = dummy variables (0 = market size > 10%, 1 = market size < 10%)

The results have shown that internet users in different market size behave differently. However, the internet users do not indicate significant influences on the music sales, even it still influence the music sales in the positive manner. The coefficient determination (R^2) is 0.149 and Adjusted R^2 is 0.131, whereas F-value is 8.154. Again, the autocorrelation test reflected by D-W score is moderately exist (D-W score=1.484). The following is the regression results:

$$Y = a + b_1 X_{1i} + b_2 D_{2i} + u_i \dots\dots\dots (5)$$

Y = music sales
 X_{1i} = internet users

$$\bar{Y} = 32,709.200 + 0.209 \text{ Internet}_i - 33,426.52 D_{2t}$$

se =	(17,540.200)	(0.177)	(17,329.69)
t =	(1.865)	(1.184)	(-1.929)
p =	(0.065)	(0.239)	(0.057)

$R^2 = 0.149$ $\text{Adj. } R^2 = 0.131$ $F = 8.154$

$$Y = a + b_1 X_{1t} + b_2 D_{2t} + u_t \dots\dots\dots (7)$$

Y = music sales
 X_{1t} = internet users
 D_{2t} = dummy variables (0 = individualistic country, 1 = collectivistic country)

Individualism/collectivism score as dummy variable

The previous literatures proposed that individualistic countries tend to use social institutions or laws to protect individual rights, whereas collectivistic countries emphasize greatly on sharing behavior (Hofstede, 1997; Swinyard et al., 1990). By adopting this perspective, the Model 7 is developed by using dummy variables to represents two types of country, individualistic or collectivistic. The data panel of individualism/collectivism score gathered from the study of Geertz Hofstede - the pioneer of this concept - which displayed in his consultant firm's website (2007).

Once again, the internet users positively significant influence the level of music sales in 16 countries that this study observed ($t=3.563$; $p<0.001$). However, there are no significant differences between two types of country. The coefficient determination (R^2) is 0.124 and Adjusted R^2 is 0.105, whereas F-value is 6.600. Moreover, the autocorrelation in this study might be moderately exist (D-W score=1.566). The following is the regression results:

$$\bar{Y} = -2,888.626 + 0.459 \text{ Internet}_{it} + 10,445.770 D_{2t}$$

se =	(6,598.357)	(0.129)	(10,605.420)
t =	(-0.438)	(3.563)	(0.985)
p =	(0.663)	(0.001)	(0.327)

$R^2 = 0.124$ $\text{Adj. } R^2 = 0.105$ $F = 6.600$

Table 3

The Panel Data of Music Sales and Internet Users from 4 Region based on Piracy Rate (1999-2004)

Year	Country	Sales	Internet Users	Area	Econ Dev	Market Size	Ind/ Coll	Year	Country	Sales	Internet Users	Area	Econ Dev	Market Size	Ind/ Coll
1999	USA	14,251	135,159	1	32,767	0.369	91	2001	USA	13,412	150,921	1	35,108	0.402	91
	UK	2,909	13,556	1	23,288	0.075	89		UK	2,809	17,494	1	25,703	0.084	89
	Japan	6,437	43,177	1	23,009	0.166	46		Japan	5,258	51,336	1	24,475	0.158	46
	New Zealand	99	684	1	19,541	0.003	79		New Zealand	83	1,008	1	21,719	0.002	79
	Singapore	46	1,087	2	25,710	0.001	20		Singapore	45	1,325	2	27,327	0.001	20
	South Korea	247	17,519	2	1,355	0.006	18		South Korea	266	20,693	2	1,453	0.008	18
	Spain	640	4,489	2	18,456	0.017	51		Spain	613	6,464	2	20,661	0.018	51
	South Africa	181	978	2	7,756	0.005	65		South Africa	121	2,674	2	8,707	0.004	65
	Israel	55	1,089	3	20,631	0.001	54		Israel	47	1,481	3	22,120	0.001	54
	India	217	3,715	3	2,541	0.006	48		India	229	6,730	3	2,785	0.007	48
	Colombia	131	675	3	5,809	0.003	13		Colombia	99	1,141	3	6,098	0.003	13
	Taiwan	307	5,589	3	18,225	0.008	17		Taiwan	170	7,011	3	19,281	0.005	17
	China	94	17,469	4	3,591	0.002	20		China	84	28,980	4	4,389	0.003	20
	Philippines	59	1,646	4	3,526	0.002	32		Philippines	33	2,430	4	3,681	0.001	32
	Malaysia	53	3,165	4	10,602	0.001	26		Malaysia	41	4,325	4	11,478	0.001	26
	Russia	153	2,319	4	7,626	0.004	39		Russia	223	4,145	4	9,916	0.007	39
2000	USA	14,042	142,823	1	34,365	0.380	91	2002	USA	283,628	159,478	1	35,945	0.398	91
	UK	2,829	15,400	1	24,666	0.077	89		UK	76,639	19,874	1	26,831	0.092	89
	Japan	6,497	47,080	1	23,971	0.176	46		Japan	407,649	55,977	1	24,753	0.148	46
	New Zealand	88	830	1	20,423	0.002	79		New Zealand	3,664	1,223	1	22,742	0.003	79
	Singapore	46	1,200	2	29,434	0.001	20		Singapore	2,696	1,463	2	27,761	0.002	20
	South Korea	300	19,040	2	1,379	0.008	18		South Korea	5,472	22,489	2	1,483	0.007	18
	Spain	563	5,387	2	19,536	0.015	51		Spain	8,693	7,757	2	21,574	0.018	51
	South Africa	150	2,400	2	8,226	0.004	65		South Africa	4,400	2,978	2	9,180	0.004	65
	Israel	52	1,270	3	22,237	0.001	54		Israel	870	1,727	3	21,789	0.001	54
	India	237	5,000	3	2,644	0.006	48		India	200	9,059	3	2,927	0.006	48
	Colombia	108	878	3	6,080	0.003	13		Colombia	561	1,484	3	6,235	0.002	13
	Taiwan	244	6,260	3	19,184	0.007	17		Taiwan	17,748	7,853	3	20,192	0.005	17
	China	80	22,500	4	4,002	0.002	20		China	15,497	37,326	4	4,847	0.003	20
	Philippines	37	2,000	4	3,826	0.001	32		Philippines	709	2,952	4	3,842	0.001	32
	Malaysia	53	3,700	4	11,406	0.001	26		Malaysia	1,704	5,056	4	12,215	0.001	26
	Russia	197	3,100	4	9,263	0.005	39		Russia	836	5,541	4	10,809	0.008	39

Year	Country	Sales	Internet Users	Area	Econ Dev	Market Size	Ind/Coll
2003	USA	11,848	168,521	1	37,313	0.347	91
	UK	3,216	22,576	1	28,102	0.105	89
	Japan	4,910	61,037	1	25,526	0.154	46
	New Zealand	111	1,485	1	24,281	0.004	79
	Singapore	49	1,615	2	27,803	0.001	20
	South Korea	162	24,441	2	1,527	0.005	18
	Spain	596	9,309	2	22,530	0.019	51
	South Africa	160	3,318	2	9,630	0.006	65
	Israel	41	2,013	3	21,981	0.001	54
	India	145	12,193	3	3,213	0.004	48
	Colombia	48	1,929	3	6,458	0.002	13
	Taiwan	140	8,795	3	20,701	0.004	17
	China	198	48,076	4	5,321	0.006	20
	Philippines	28	3,587	4	3,922	0.001	32
	Malaysia	33	5,911	4	13,318	0.001	26
	Russia	326	7,409	4	12,218	0.010	39

Year	Country	Sales	Internet Users	Area	Econ Dev	Market Size	Ind/Coll
2004	USA	12,153	178,076	1	39,535	0.362	91
	UK	3,509	25,647	1	29,462	0.104	89
	Japan	5,168	66,555	1	26,658	0.154	46
	New Zealand	117	1,803	1	26,097	0.003	79
	Singapore	46	1,783	2	31,709	0.001	20
	South Korea	133	26,562	2	26,562	0.004	18
	Spain	573	11,170	2	23,481	0.017	51
	South Africa	237	3,696	2	10,078	0.007	65
	Israel	45	2,347	3	22,670	0.001	54
	India	153	16,412	3	3,310	0.005	48
	Colombia	49	2,508	3	6,572	0.001	13
	Taiwan	143	9,850	3	21,446	0.004	17
	China	212	61,922	4	5,772	0.006	20
	Philippines	25	4,358	4	4,344	0.001	32
	Malaysia	32	6,910	4	13,676	0.001	26
	Russia	491	9,906	4	9,906	0.015	39

Note:

1. Music sales based on the data released by IFPI (2005) in millions
2. Internet users' growth each country based on compound rate growth from Internet World Statistics (2007) in thousands
3. Area 1: Piracy < 10%; Area 2: Piracy = 10-25%; Area 3: Piracy =25-50%; Area 4: Piracy > 50% (based on categorization of IFPI (2001))
4. Economic development data gathered from Penn World Tables 6.2 (2007)
5. Market size is the music sales in particular country divided by total music sales
6. Individualism/Collectivism collected from Hofstede (2007)



4. DISCUSSION

The impact of internet which facilitates file sharing and peer-to-peer network demonstrates in this study is not as large as the claim by the industry. It is concordance with the study results of Hui and Png (2003) which indicated that the demand for music CDs decreased with piracy, even the impact was considerably less than estimated by industry (6.6% compare to industry estimates, 42%). It is also parallels with the results of Boorstein (2004) that file sharing is not the cause of the recent decline in record sales. Even it reduces the willingness to buy music for younger people (because of economics reasons), but it increase the music consumption by older people. In spite of the effects from the substitute products (which discussed in the next section), the decrease of music sales might be addressed internally. Following Fox (2004), the lack of "blockbuster" albums could become the reasons behind the decreasing music revenues or other entertainment products as direct substitutes of recorded music.

By using piracy rates in order to determine whether in the higher piracy rates country, the internet has negative impacts on the music industry revenues, this study tested by using the piracy rates as dummy variables. The results indicate that the negative influences does not exist in the higher piracy rates

country, surprisingly, internet has positively significant influences to the music sales, particularly in the country with piracy rates ranging from 25 to 50 percent. Thus, this study empirically supports the proposition of Hui and Png (2003) as well as Bhattacharjee et al. (2003) that internet might be contributing positively to the music industry by letting music listeners enjoy the free music and induce them to enjoy the original music.

Interestingly, the significant positive influences also exist when this study tested through the economic development and individualism/collectivism country. Even there is no significant different among three level of economic development (above \$20,000, \$10,000 to \$19,999, and below \$10,000), but the internet showed significantly impacts on the music sales in the positive way. Moreover, there is no significant different of internet users behavior in order to test whether collectivistic country more permissive on the infringement of copyrighted music. Again, the existing internet contributes positively significant into the revenue of music industry in 16 countries as unit analysis of this study. Finally, even the market size does not interact with internet users in significant manners, but still internet has positive contribution the sales of music.



5. CONCLUSION AND MANAGERIAL IMPLICATIONS

There are two perspectives which exist regarding to the role of internet for music industry, destructive and constructive. This study uses the second perspectives by following the proposition of Hui and Png (2003) and Bhattacharjee et al. (2003). By using the internet users as the main variables to represents them as actors behind the file sharing of music infringement, some additional dummy variables, such as piracy rates, economic development, market size and individualism/collectivism; are expected have explanatory power to the decrease of music revenue after peer-to-peer network service released by Napster in 1999.

Based on the results, it can be conclude that the damage impacts of internet as medium to sharing illegal music through peer-to-peer network do not as large as industry claimed before. In the Model 2, only 2.1 percent of the decrease of music sales in USA can be addressed to the internet. The results also indicated that the year 1999 - the year of Napster began their network - can be used as cut point to reflect the impact of internet. In fact, by using data panel from 16 countries, internet contributes significantly positive to the music sales, particularly in the country who categorized as 25-50 percent of piracy rates (see Model 4). Moreover, Model 5 which employs economic development as dummy variable has positive significant impacts to the sales of music. Finally, regardless the individualistic or collectivistic country, Model 7 showed that internet contributes positively to the sales of music.

The result demonstrates the empirical results of the proposition of Bhattacharjee et al. (2003) that it is not necessary to eliminate online music piracy in order to achieve revenue maximization strategies for the seller. Moreover, the results of this study parallels with the results of Hui and Png (2003) that the decrease of music sales does not as large as industry claimed before. Indeed, internet can penetrate music to the new segment market, digital consumers. On top of that, the internet actually can boost the sales of music based on the positive slope demonstrate in the Model 4, Model 5, and Model 7 of this study. The results strengthened the claim of Oberholzer and

Strumpf (2004) that file sharing through internet has positive impacts to music sales.

Several managerial implications can be drawn from this study. First, the internet and their file sharing do not harm the revenues of their industry as large as argued before. Thus, it is not necessary to put many resources to sue people who infringe the copyright laws. Second, the internet and peer-to-peer network contributed positively to the music sales. Therefore, the managers should focus to transform some their business operation by selling legal digital music as part of technology transformation impacts. Moreover, focusing on the country with piracy rates ranging from 25-50 percent will rewards handsomely compare to less piracy rates, since the growth offered by this market could be high. Third, selling the music does not heavily rely on the level of economic development. Fourth, it is not necessary to discriminate the individualistic and collectivistic country, since they do not behave differently. In fact, the internet has positive impact on the music sales.

Some limitations should be noted when interpreting the findings of this study. First, this study use country as unit analysis which might be less precise to determine individual consumer behavior. Even it can appraise strategic level of the analysis, but it needs additional studies which employ individual consumers as unit analysis. Second, the use of internet users to represents internet impacts on the music sales might be questionable. However, this study assumes that each individual who use internet has similar probability to do infringement of copyright music. The future studies should be precisely indicates which internet users who are actual downloaders of illegal music and which internet users less tend to consume illegal music from the internet. Finally, the impacts of substitute products in the entertainment products domain, such as movie, TV, video/computer games; should be explore in order to balance the view that might be the downturn of music sales during these years has correlation with other products. Such research could also provide valuable information about the relationship between individual copying behavior and music piracy across countries.



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