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Managing Dwindling Online Music Sales: Analyzing Factors Affecting Global Music Piracy

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MANAGING DWINDLING ONLINE MUSIC SALES : ANALYZING FACTORS AFFECTING GLOBAL MUSIC PIRACY

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Abstract

Piracy adversely impacts online music sales. This paper aims to investigate the factors that affect global music piracy directly and e-business indirectly. The factors can be clubbed into four categories, (i) economic, (ii) technological, (iii)legal/regulatory, (iv) behavioral/cultural. On analyzing the data of 55 countries, Intellectual Property Protection, trade freedom, income inequality and individualism/collectivism index of a country emerge as the most significant factors affecting music piracy. Hence, a nation can reduce its music piracy rate and enhance e-business by devising stricter laws to safeguard intellectual property, allowing more free trade with other countries and bridging the income inequality within a country.

Keywords: *Music piracy; Individualism-collectivism, Intellectual property protection; online music sales; Trade freedom; broadband.*

1. INTRODUCTION

Online music stores like iTunes, Amazon, HMV, Best Buy offer consumers legitimate alternatives to music piracy at affordable competitive prices. Yet the online music industry continues to suffer losses due to piracy. The global music sales fell by 30% between 2004 and 2010 primarily due to music piracy. [23]. Every year approximately 71,060 U.S. jobs and $2.7 billion workers' earnings are lost due to music piracy. The national exchequer suffers a loss of $422 million in tax revenues, $291 million in personal income tax and $131 million in lost corporate income and production taxes. Global music piracy causes $12.5 billion of overall economic losses every year [15]. 'Music piracy' is committed by individuals who illegally upload or download music online, criminals who mass manufacture counterfeit CDs for sale on street corners or retail stores or online companies who thrive on music theft by encouraging users to break laws. This takes a toll on the sales and talent of the entire music community [22] [28]. The profit margins of firms engaging in online music sales dwindle due to music piracy for the following reasons, (i) peer-to-peer(P2P) sharing using programs like BitTorrent and Kazaa, (ii) illegal websites which allow users to download music for free or at a very nominal charge, (iii) Local Area Network(LAN) based sharing in university campuses or in business organizations, (iv) smart mobile phones like iPhones and Androids, and (v) burning CDs [14].

In this paper, we focus on music piracy particularly because (i) Music files have a small size facilitating piracy (ii) the quality of pirated music files is comparable to that of the original music file. (iii)Digitalized music files, in the format of MP3, have the distinctive characteristics of digital goods like, (a)The first copy of digital goods requires a high-fixed cost to produce. The subsequent copies are almost inexpensive to reproduce and distribute, (b)Sharing music with others does not reduce the consumption utility of the product [5] [9]. These features of music files have facilitated their illegal distribution worldwide.

With the development of Information and Communication Technology(ICT) primarily through broadband technology, e-business activities of countries have flourished. Broadband has transformed businesses by enabling companies to engage in e-business and thus helping them to become more productive and innovative[36, 37]. On the other hand, broadband internet penetration within countries also facilitates piracy [38]. However, increase in the level of internet piracy threatens e-business [35].

This paper aims to determine if broadband penetration and easy access to high speed internet is the primary factor that affects music piracy trend across countries. We also explore what other forces, (i.e., legal, technical, behavioral and economic

factors) influence global music piracy directly and e-business indirectly.

This paper has 7 sections. Section 2 is a survey on the previous studies in the area of music piracy. Section 3, introduces our model. It also elucidates in detail the factors chosen in our model. In Section 4, we discuss the source of the data. Section 5 details the methodology used in this study. In Section 6 we show the data analysis and results. Discussion and Concluding remarks are found in Section 7.

2. LITERATURE REVIEW

Several studies have been conducted regarding factors that affect music piracy and e-business.

Bhattacharjee, Gopal and Sanders(2003) found that online behavior(purchase/pirate) towards music depends on Demographics(age, gender), Economic factors(value, income, price/distribution strategy) and Technology(connection speed, quality perception). In developing countries the growth in easy access to the internet has contributed significantly to increased piracy rates. In developed countries, it had no significant impact [3].

Bhattacharjee et al, 2005 noted that certain music industry specific factors impact music piracy. These include (i) debut rank of an album, (ii) reputation of the artist, (iii) major or minor label promoting and distributing the album, (iv) artist descriptors (solo female/solo male/group) and (v) holiday month debut on album performance [11].

Ki, Chang and Khang(2006) found that income level, income inequality, and market size directly impact music piracy, whereas education level, music CD price, and market size influence music piracy indirectly through intellectual property protection.[24].

Papadopoulos(2003) suggested a significant positive relationship between sound recording piracy market share and price-earnings(PE) ratio. He also predicted a directly proportional relationship between level of corruption and black market activity and music piracy. [25]

Bagchi, Kirs and Cerveny(2006) studied the causes of global software piracy and identified four broad categories of factors(economic, technical, regulatory, and social/cultural). Nations with low corruption and weak collectivism had low piracy over a long period of time. Factors such as strong economic growth, high uncertainty avoidance, low Internet usage, better Information and Communication Technology(ICT) laws and strong IT infrastructure also caused low piracy in countries, within the time frame of the study. Another important aspect suggested by this study was that not just economic factors but a combination of non-economic and economic factors that best explain piracy.[2].

From the above literature the factors that affect countrywise digital music piracy can be broadly be grouped into the following categories namely, (i) economic, (ii) technological, (iii) legal/regulatory, (iii) behavioural/cultural. Our focus in this paper is to emphasize factors that affect music piracy at a national level. Hence we ignore factors like demographics(age, gender) which affect online behavior at an individual level.

3. PROPOSED FRAMEWORK

Figure 1 shows our framework of the factors affecting global music piracy, like (i) economic, (ii) technological, (iii) behavioural/cultural and (iv)regulatory. If piracy reaches epidemic proportions, it threatens and often hampers e-business. Hence such factors directly influence music piracy but also indirectly influence e-business of a nation.

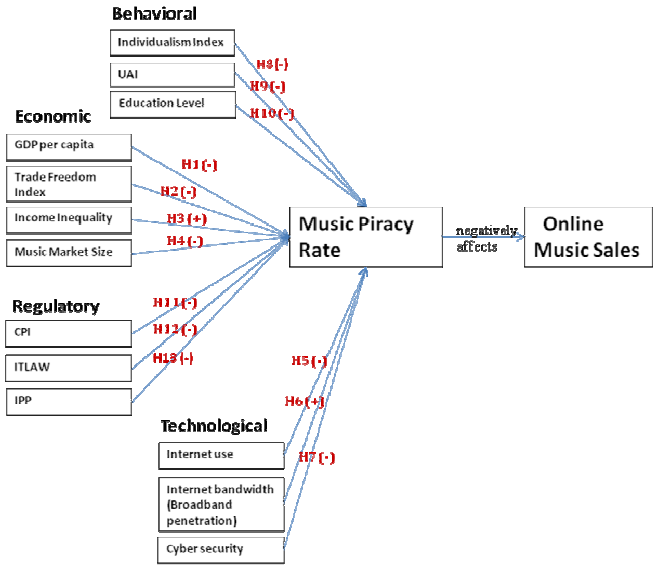


Figure 1. Framework of the Factors affecting Global Music Piracy and Online Music Sales

Music piracy rate = *f* (economic factors, technological factors, behavioral factors, regulatory factors)

3.1 Economic Factors

From the literature studied it has been found that the economic factors are among the most influential variables affecting music piracy.

3.1.1 GDP per capita: GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products[34]. GDP per capita is inversely related to software piracy level [17]. The higher the level of economic development of a nation, the lower is the music piracy rate[24]. Therefore the following hypothesis is formed

H1: Low GDP countries tend to indulge in piracy more.

3.1.2 Trade Freedom: This measures the degree to which a country allows traders to act and transact without intervention from government. Interventions include subsidies, taxes and tariffs, non-tariff barriers and even inter-government managed trade agreements[2]. Countries which are more open to trade and exports need to safeguard their competitive advantages in the international arena, hence they respect intellectual property rights of other nations. Thus, piracy rates are negatively related to a country's level of export and trade [26]. Based on this we can hypothesize that

H2: A country that is high on TFI will have lower piracy rates.

3.1.3. Income Inequality: In developing countries where income inequality is highly pronounced the higher income groups consume music more than the lower income groups. Lower income groups have a higher tendency to pirate music. Gini Index is used to measure income inequality as it measures the unequal distribution of income among consumers. Accordingly, the following hypothesis is drawn

H3: The higher the level of income inequality, the greater the rate of music piracy.

3.1.4. Market Size of the Music Industry: There is a significant relationship between a country's domestic software market and level of software piracy[7] [8]. Large markets which are attractive locations for foreign direct investments(FDIs) have better intellectual property protection as FDIs are not attracted to markets having weak intellectual property protection[10] [26]. Moreover, in countries with a large music market, music is usually considered to be of large social value and hence copyright protection is strongly enforced to protect against music piracy[24]. Therefore, it can be hypothesized that

H4: The bigger the music market size, the lower the music piracy rate.

3.2 Technological Factors

The technological factors that affect music piracy are are:

3.2.1 Internet Use: This is determined by the number of Internet Service Providers (ISPs) per capita [19]. More access to the internet means easy availability of software and music, piracy might actually decline [27]. Based on this, we form the following hypothesis

H5: Countries with easy access to Internet have lower rates of piracy.

3.2.2 Internet Bandwidth: Internet bandwidth is measured in megabytes per second (MB/s) per 10,000 population. It refers to the transmission speed or the throughput of the connection to the internet. The inclination to pirate music increases manifold as the internet bandwidth increases enabling easier download [3]. Therefore, the following hypothesis is drawn

H6: Countries with higher internet bandwidth have higher music piracy rates.

3.2.3 Cyber security: Lack of enforcement of cyber security measures increases the likelihood of piracy and intellectual property violations [43]. Moreover, piracy and cyber security threats go hand in hand. The use of illegal software or music often provides an entry point for computer malware and viruses. Hence proper enforcement of cyber measures help in reducing piracy [42]. Hence, the following hypothesis is formed

H7: Countries with greater cyber security enforcement measures have lower music piracy rates.

3.3. Behavioural/Cultural factors

At a national level different cultural factors actually determine what attitude people of the nation will be having towards intellectual property right and piracy.

3.3.1 Individualism/Collectivism Index: Hofstede's Individualism/Collectivism Index distinguishes between an individualistic society, where individual freedom and benefits are emphasized over societal benefits and a collectivist society, where individuals tend to form groups and take care of each other. Hence sharing of software or music among the members of the piracy club is desirable in such nations. Countries low on the Individualism index, tend to pirate more [13]. Hence, we hypothesize that

H8: Countries high on individualism index tend to pirate music less.

3.3.2 Uncertainty Avoidance Index (UAI): Hofstede's UAI focuses on the level of tolerance for uncertainty and ambiguity within the society [13]. A high Uncertainty Avoiding society is a rule-oriented society that institutes laws, regulations, and controls in order to reduce the amount of uncertainty that might be caused due to piracy [2]. People in such societies would be more comfortable in obtaining software and music by legal means. Therefore, the following hypothesis is formed

H9: Countries high on UAI tend to indulge in lower music piracy.

3.3.3. Education level: Education level plays an important role in music piracy because more educated people develop ethical and moral values due to which they view piracy as an unethical behavior. Thus, countries with better educated population have better enforcement of intellectual property rights and stricter ethical standards against music piracy [24]. Accordingly, the following hypothesis can be formed

H10: The higher the education level of the nation, the lower the music piracy rates.

3.4 Regulatory Factors

Legal and regulatory factors are essential in determining piracy as they determine access to and usage of digital content and also specify the rights granted to the consumers when they access digital content[29].

3.4.1 Corruption Perceptions Index (CPI): Transparency International has generated a Corruption Perceptions Index (CPI), which reports perceptions of corruption (as seen by business people, risk analysts, and the general public) within a range between 10 (highly uncorrupt) and 0 (highly corrupt)[18]. It is believed that CPI is negatively related to piracy as countries high on CPI (highly uncorrupt) tend to pirate less [2]. Therefore, it can be hypothesized that

H11: Countries high on CPI tend to pirate music less

3.4.2 Laws related to Information and Communication Technology (ITLAW): This index examines the quality of the national legal framework with particular regard to ICT development and the extent to which intellectual property is protected. [19]. It is assumed that nations that are high on this index tend to pirate less as the copyright protection of information and communication content is stringent. Accordingly, the following hypothesis is formed

H12: Countries with stringent information and communication technology laws (ITLAW) have lower music piracy rates.

3.4.3. Intellectual Property Protection(IPP): Laws protecting Intellectual Property Rights(IPR) could be an effective measure in discouraging piracy[10] [24]. Hence we hypothesize that

H13: The stricter a country's intellectual property rights protection enforcement, the lower is the level of music piracy.

4. DATA

Table 1 lists the variables, their definitions along with their sources.

Table 1. Variables, Descriptions and Data Sources

Variable	Definition/ Measured Through	Data Source
Music Piracy Rate(PIR)	Measured as a percentage of total (legitimate and pirate) unit sales	Institute for Policy Innovation (IPI) report [14]
E-Business Readiness(RBR)	e-Business Readiness Index	Economist Intelligent Unit site[40]
GDP	GDP per capita	World Bank [20]
UAI	Uncertainty avoidance Index	Hofstede's index [13]

IND	Individualism/ collectivism	
CPI	Index Corruption Perception Index	Transparency International [18]
ITLAW	Laws relating to Information and Communication technology(ICT)	Global Information Technology Report, 2004-05 [33]
TFI	Trade Freedom Index	Heritage Foundation [12]
Internet Bandwidth(BAND)	International Internet bandwidth (MB/s) per 10,000 population	Global Information Technology Report, 2008-09/Nationmaster site [19] [21]
Internet Usage(ISP)	Number of Internet Service Providers per billion of population(ISP per capita)	Nationmaster site [21]
Cyber security initiative(CS)	Number of secure internet servers per million of population	Global Information Technology Report, 2008-09 [19]
Education level(EDU)	Education Index	United Nations Development Program(UNDP) Report, 2005 [32]
Intellectual Property Protection(IPP)	Property Rights Index	Economic Freedom of the World, Annual Report 2007 [30]
Income Inequality(GINI)	GINI Index	World Bank [31]
Music Market Size(SIZE)		The music industry in the 21st century: Facing the digital challenge [34]

For some countries we did face the problem of missing values for certain factors. We have tried to gather the most complete dataset. We finally selected 55 countries based on availability of data for all the factors for the year 2007.

5. METHODOLOGY

We grouped the 55 countries into broader zones according to their geographical locations. Then we compared their music piracy rates and also the factors that affected them. Next we found out the correlation amongst the dependent and independent variables. We then performed Multiple Regression Analysis on our data set in order to test the suggested thirteen hypotheses. The regression model is:

$$\text{Music Piracy Rate} = \alpha + \beta_1 GDP + \beta_2 TFI + \beta_3 GINI + \beta_4 SIZE + \beta_5 ISP + \beta_6 BA + \beta_7 IND + \beta_8 UAI + \beta_9 EDU + \beta_{10} CPI + \beta_{11} ITLAW + \beta_{12} IPP + \beta_{13} CS \ldots \text{Eq (1)}$$

Finally we classify the 55 countries into 5 classes based on the level of music piracy exhibited by them.

6. DATA ANALYSIS AND RESULTS

6.1. Descriptive Statistics

A relation between e-business readiness rank and music piracy rate of countries was observed. Figure 2 shows a graph plotted of the music piracy rate against the e-business readiness of each country. The data labels represent the number of countries plotted at each point.

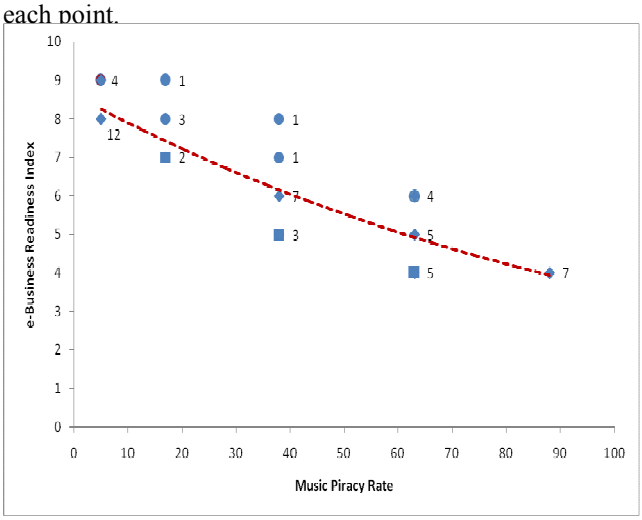


Figure 2. Graph of the music piracy rate against the e-business readiness of each country

The graph trend shows clearly that high e-business readiness ranked countries have low rate of music piracy and vice versa. Enforcement of Intellectual IPR and reduction in piracy promote the local IT industry of a country. e-business is associated with the IT sector of a country. Countries with strong IT sector engage in more e-business activities. 33 countries out of the 55 in the sample fall on the trend line.

These 55 countries were grouped into broader regions as per their geographical locations. A region-wise comparison of the music piracy rates and the factors affecting them was conducted.

There was great variation among the regions in all aspects. Some of the findings are shown in Figures 3a, 3b and 3c. These figures are obtained by plotting the means of the variables affecting global music piracy across seven zones formed by geographical proximity. It is observed that Australia, Europe and North America have higher than average e-Business readiness while Asia, Central and Latin America, Africa and Eastern Europe have lower than average e-Business readiness. At the same time, Africa, Central and Latin America, Asia and Russia and East European regions have higher than average music piracy rates whereas Australia, North America and Europe have lower than average music piracy rates. It is observed that continents with higher than average e-business readiness have lower than average music piracy rates.

EDU, IPP, TFI, GDP, CPI, IND, ISP, CS, ITLAW, BAND and SIZE are lower for Africa, Asia, Central and Latin America and Russia and Eastern Europe compared to North America, Europe and Australia. This seems to support hypotheses H10, H13, H2, H1, H11, H8, H5, H7 H12, H4. Hypothesis H6 is not supported from the data. Central and Latin America, Africa and Russia have higher GINI index compared to North America, Australia and Europe. This supports hypothesis H3.

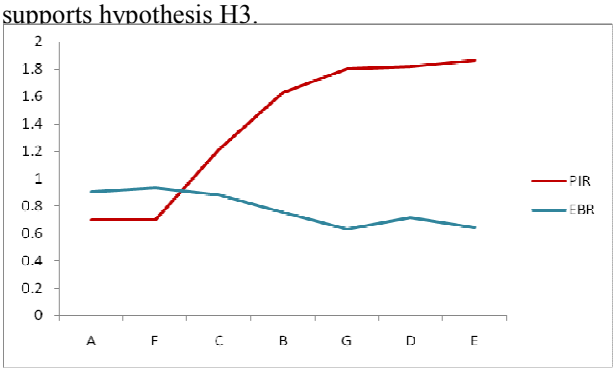


Figure 3a. Region-wise mean of PIR and EBR

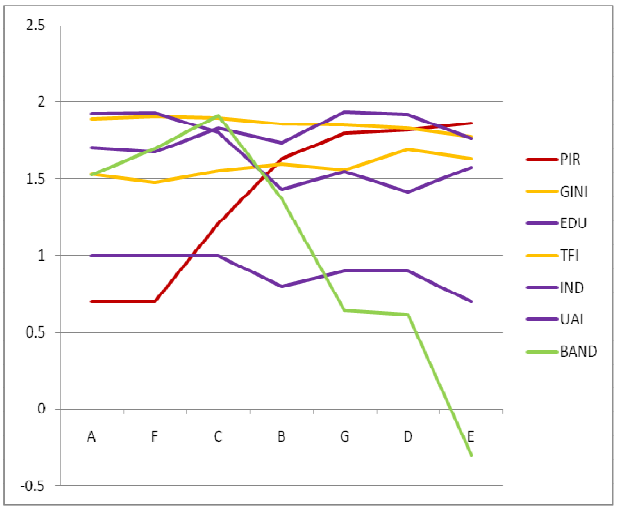


Figure 3b. Region-wise mean of some factors affecting PIR

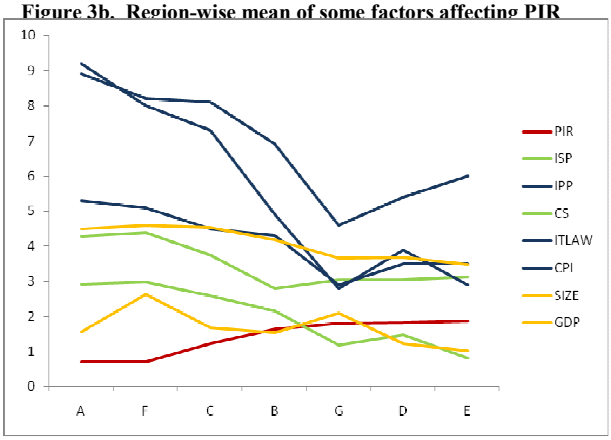
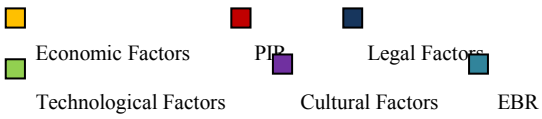


Figure 3c. Region-wise mean of some other factors affecting PIR



Geographical Zones:

A = Australia; B = Asia; C = Europe; D = Central and Latin America; E = Africa; F = North America; G = Russia and Eastern Europe

6.2. Correlation Analysis

We conduct a correlation analysis between PIR and EBR of countries. Table 2 shows that the two variables have very high significant (1% level) negative correlation (.916). Hence, PIR and EBR are inversely proportional. We ignore EBR in further

analyses as the results can be easily inferred due to strong negative correlation with PIR. We also conduct correlation analysis of all the independent variables and the dependant variable (PIR). As shown in Table 3 all the independent variables except UAI and SIZE have significant association with the dependant variable, PIR. Hence we exclude these two factors from further analysis. Moreover, all the variables have the same signs as predicted by the hypotheses except BAND which contrasts H6 that higher the internet bandwidth available i.e. higher the ease of downloading music, higher is music piracy rate. It also shows that CS, CPI, IPP, GDP, IND, TPI have a higher correlation with music piracy rate compared to the other factors.

Table 2. Correlation matrix between PIR and EBR

	PIR	EBR
PIR	1	-.916(**)
EBR	-.916(**)	1

** p < 0.01

Table 3. Correlation matrix between the dependent and independent variables.

	A	B	C	D	E	F	G	H	I	J	K	L	N
A	1												
B	-.75**	.44**	1										
D	-.38**	.59**	-.36**	1									
E	-.59**	.53**	-.11	.31*	1								
F	-.83**	.68**	-.29*	.30*	.40**	1							
G	-.71**	.5**	-.24	.27*	.65**	.59**	1						
H	-.79**	.74**	-.35	.35**	.43**	.79**	.56**	1					
I	-.87**	.8**	-.36**	.38**	.59**	.87**	.70**	.81**	1				
J	-.69**	.71**	-.47**	.58**	.53**	.57**	.39**	.53**	.64**	1			
K	.26	-.45**	.08	-.19	.10	-.38**	-.09	-.56**	-.36**	-.24	1		
L	-.82**	.8**	-.45**	.36**	.56**	.75**	.64**	.69**	.86**	.70**	-.31*	1	
M	-.56**	.63**	-.26	.28*	.38**	.56**	.41**	.51**	.65**	.49**	-.46**	.66**	1
N	-.26	.39**	-.25	.31*	.22	.13	.12	.26	.17	.36**	-.04	.25	.02

* p < 0.05 , ** p < 0.01

A = PIR; B = CS; C = GINI; D = ISP; E = EDU; F = IPP; G = TFI; H = ITLAW, I = CPI; J = IND; K =UAI; L = GDP; M = BAND; N = SIZE

6.3. Regression Analysis

Table 4 shows the results of ordinary least square regression analysis on the dataset. The first four models show the results of the regression analysis on the data by eliminating the highly insignificant variables at each stage. The last model shows the results of stepwise regression on the dataset. Model 1 includes all the variables except SIZE and UAI because as per the correlation analysis, they do not have significant correlation with the dependant variable, PIR. Model 2 is obtained by simplifying model 1 by eliminating the least significant variables (highest p-value and lowest t-statistic); ISP, CS and BAND. Model 3 is obtained by simplifying model 2 by eliminating the next two least significant variables; CPI and GDP. CPI also had a VIF score of 9.48, hence its best to remove this variable from the model. Model 4 is obtained by simplifying model 3 by eliminating the next least significant variable; ITLAW.

The coefficient of determination R^2 explains the amount of variation in the dependant variable explained by the regression model. Model 4 explained 84.3% variance in the PIR and Model 3 explained 85%. The F- ratio represents the improvement in results from fitting the model relative to the inaccuracy that still exists in the model. All the models have high F-ratios which are significant($p<.001$). Model 3 and Model 4 have F-ratios of 45.29 and 52.46. Finally the Durbin Watson statistic for models were close to 2. This satisfies the assumption of regression analysis that the errors are uncorrelated.

The stepwise regression analysis generated four models of which only the final model has been reported in the last column of Table 4 as it has the highest R^2 value(.838) of all the four models generated. It has a high F-value of 64.56 and a Durbin Watson score close to 2.

Table 4. The models with β coefficients(t-statistics in brackets)

	Model 1	Model 2	Model 3	Model 4	Stepwise
CS	-.108 (.49)				
GINI	.11 (1.49)	.10 (1.50)	.12* (1.78)	.14** (2.06)	
ISP	.03 (.47)				
EDU	-.109 (-1.19)	-.11 (-1.25)	-.14 (-1.59)	-.15* (-1.74)	
IPP	-.323** (-2.46)	-.332** (-2.59)	-.42*** (-4.02)	-.52*** (-6.41)	-.32*** (-2.04)
TFI	-.17* (-1.82)	-.17* (-1.85)	-.20** (-2.32)	-.21** (-2.41)	-.24*** (-2.96)
ITLAW	-.12 (-1.14)	-.12 (-1.14)	-.15 (-1.53)		
CPI	-.14 (-.76)	-.11 (-.66)			-.29** (-2.97)
IND	-.14 (-1.39)	-.12 (-1.32)	-.15* (-1.81)	-.15* (-1.8)	-.22*** (-2.72)
GDP	-.09 (-.66)	-.09 (-.70)			
BAND	.033 (.424)				
R^2	.86	.85	.85	.84	.84
Adjusted R^2	.82	.83	.83	.83	.82
F-test	26.31	34.01	45.29	52.46	64.56
Durbin Watson	1.72	1.69	1.74	1.58	1.64

*p <0.10, ** p < 0.05 , *** p < 0.01

Considering all the statistics we select Model 3, Model 4 and the stepwise regression model for further analysis. Hypothesis Testing is conducted based on the regression results of these models. All the three models show that IPP is the most significant variable (at 1% level) and has a moderately high negative correlation with PIR. Thus, we can confirm H13. TFI is highly significant (1% level) in the stepwise regression analysis and moderately significant (5% level) in Models 3 and 4 of the Linear Regression Analysis. TFI has a negative correlation with PIR. Hence, hypothesis H2 is confirmed. IND is highly significant (1% level) in the stepwise regression analysis and weakly significant (10% level) in Models 3 and 4 of the Linear Regression Analysis. Hence, we can conclude that it is an important variable in predicting piracy. IND has a negative correlation with PIR, this supports H8. GINI Index has a moderate significance (at 5% level) in Model 4 and a weak significance (at 10% level) in Model 3. It is positively correlated with PIR. Hence hypothesis H3 is confirmed. CPI is found to be moderately significant (at 5% level) in the stepwise regression. It is negatively correlated PIR. However as seen in Table 5, it has significant high correlation with IPP(.872) and ITLAW(.813) and the VIF score for CPI is also very high. Hence, we cannot conclusively prove the relationship between CPI and PIR. Therefore, H11 cannot be conclusively proved. EDU is found to be weakly significant(at 10% level) in Model 4. Hence no conclusive evidence was found for the correlation between EDU and PIR. Thus H10 cannot be conclusively proved. The other hypotheses i.e. H1, H4, H5, H6, H7, H11, H12 are rejected by the regression analysis. Let us provide some probable explanations for the rejections. Though GDP played an important role in determining the music piracy rate earlier, its impact has been declining over the years and other regulatory and social factors have gained more importance. This is why GDP (H1) did not emerge as a significant factor affecting music piracy. Technological factors (H5, H6 and H7) also emerge insignificant due to similar reasons. CPI (H11) and ITLAW (H12) are important regulatory and deterrent factors for any criminal activities. However, in the context of music piracy, intellectual property protection and punishment for IPR violations assume greater importance.

Table 5. Supported Hypotheses to determine the factors which affect music piracy

Variable	Hypothesis	Relation with piracy	β coefficient (Model 4)	t-statistic (Model 4)	Level of support
GDP	H1	(-)			Not supported
TFI	H2	(-)	-.21	-2.41	Supported
GINI	H3	(+)	.14	2.06	Supported
SIZE	H4	(-)			Not supported
ISP	H5	(-)			Not supported
BAND	H6	(+)			Not supported
CS	H7	(-)			Not supported
IND	H8	(-)	-.15	-1.81	Supported
UAI	H9	(-)			Not supported
EDU	H10	(-)	-.15	-1.74	Moderately supported
CPI	H11	(-)			Not supported
ITLAW	H12	(-)			Not supported
IPP	H13	(-)	-.52	-6.41	Supported

(-) inverse relation, (+) positive relation

6.4. Classification

Based on the data the music piracy rates of the countries broadly fall into five levels: 5, 17, 38, 63 and 88. Table 6 classifies the countries into 5 classes based on their music piracy rates.

Table 6: Classification of countries based on music piracy rate

VLow(5)	Low(17)	Mid(38)	High (63)	VHigh (88)
Australia	Finland	Brazil	Argentina	China
Austria	Hong Kong	Czech Republic	Chile	Indonesia
Belgium	Netherlands	Greece	Colombia	Kenya
Canada	Portugal	Hungary	Costa Rica	Libya
Denmark	South Korea	Italy	Egypt	Nigeria
France	Spain	Malaysia	India	Venezuela
Germany		Philippines	Kuwait	Paraguay
Ireland		Poland	Mexico	
Japan		South Africa	Pakistan	
New Zealand		Taiwan	Panama	
Norway		Thailand	Russia	
Singapore		UAE	Turkey	
			Uruguay	
Sweden			Ukraine	
Switzerland				
United Kingdom				
United States				

Table 7 represents the number of countries in each class. It also shows the mean value of each of the significant parameters arrived from the correlation and regression analysis.

Table7. Class Means of the significant variables

Piracy Class	Frequ-ency	IPP	TFI	IND	GINI
Very Low	16	8.78	80.62	69.68	34.46
Low	6	8.23	80.73	44.00	38.23
Medium	12	6.72	75.63	43.33	41.9
High	14	5.75	67.02	29.85	40.92
Very High	7	4.44	59.54	23.85	46.5

In Figure 4, we plot the piracy classes on the x-axis. On the y-axis we plot class means of the 4 significant variables, namely (i) IPP, (ii) TFI, (iii) IND and (iv) GINI Index, obtained from Table 7.

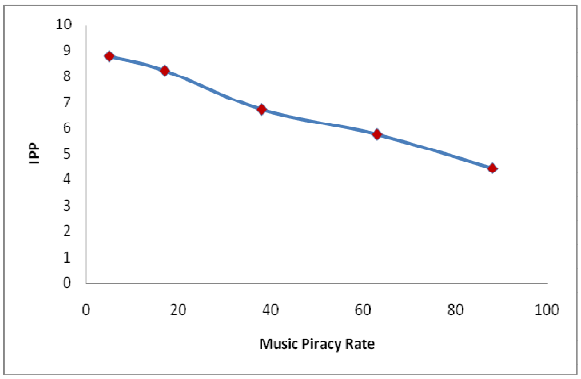


Figure 4(a). Music Piracy Rate vs IPP

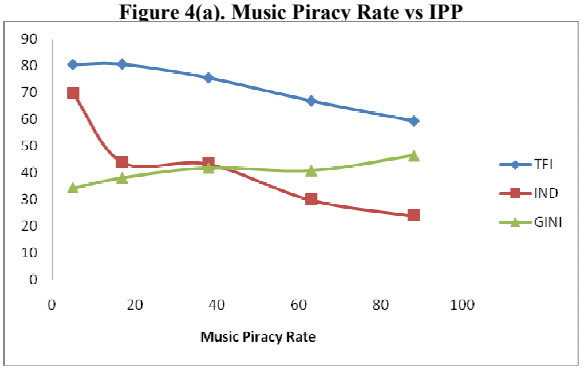


Figure 4(b). Music Piracy Rate vs TFI, IND and GINI

The figures 4(a) and 4(b) show that music piracy rates increase with decrease in intellectual property protection, trade freedom and individualism index and increases with increase in income inequality(GINI Index).

7. DISCUSSION AND CONCLUSION

Music piracy is a serious menace that most countries encounter globally. With the increase in broadband penetration music piracy has also increased. So have e-business and e-commerce. However, piracy has a negative effect on e-business. This study is aimed to gain a better understanding of the various factors that affect global music piracy rates directly and e-business indirectly. The factors were grouped into four broad categories: (i) economic(GDP per capita, trade freedom, income inequality and music market size), (ii) technological(usage, internet bandwidth and cyber security implementation), (iii) behavioural (Individualism/collectivism index and Uncertainty Avoidance Index) and (iv) regulatory(Corruption Perception Index, laws related to ICT and intellectual property protection).

Intellectual Property Protection emerges as the most significant variable that affects music piracy rate negatively. Countries which have more stringent protection of intellectual property, including copyrights, patents, trademarks etc. have lower music piracy rates. Trade freedom is also found to have significant negative impact on the music piracy rate of a country. This is because countries which engage in more trade with other countries are concerned about their image and fear the repercussions if caught in acts of piracy and copyright violations. Countries that offer little protection of copyrights are therefore not attractive destinations for business activities [10]. The individualism-collectivism index of a country also has significant negative impact on the music piracy rate. Countries high on the individualism index have a population that would not be willing to participate in activities like music piracy and sharing through the formation of piracy clubs. They would prefer to have a copy of the music for themselves. Furthermore, the GINI index which shows the level of income inequality that exists in a country also has a significant positive impact on the music piracy rate. Education level of the population of a country also emerges as a weakly significant factor affecting music piracy rate.

Thus we can conclude that economic, regulatory and behavioral factors play an important role in predicting music piracy rate across countries. Technological factors like the available bandwidth, security measures employed and internet usage do not emerge as significant variables in determining music piracy rate. This shows that socio-economic and regulatory factors or a combination of them bypass the influence of technological factors. Hence increase in broadband penetration alone does not increase piracy. Broadband penetration and bandwidth is higher in regions like North America, Australia etc. Such regions are also highly individualistic in nature and have high intellectual property protection enforcement which act as deterrent controls to prevent piracy. The technological factors may also appear insignificant because the sample size of 55 countries is not large enough or because most of the countries in the sample belong to the middle to low income group where internet penetration was not very high in 2007.

The behavioral factor, individualism/collectivism of a nation is inherent within the population it is not easy to change it in a go. However, in order to control music piracy rate and enhance e-business, the legal and economic factors can be controlled. A nation can go a long way in reducing its music piracy rate by devising stricter laws to safeguard intellectual property and by punishing intellectual property violations more severely. Also, by allowing more free trade with other countries and bridging the income inequality within a country the music piracy rate can be reduced. Increasing the level of education and awareness among the population can also aid in reducing music piracy. Also implementing effective educational and regulatory campaigns to educate users about copyright laws and inspiring attitudinal changes about inappropriate copying behaviour can help curb music piracy.

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