Factors Affecting Undergraduate Students' Intention towards Digital Piracy of Software in Sri Lanka: with special reference to Undergraduates in Kotelawala Defence University

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Abstract : *The development of easy and affordable internet access has led to a growth of Digital Piracy of Software (DPS). DPS has resulted in losses to the Software industry and convictions for some of the people who practice DPS. Therefore, the author identified that it is important to find the factors that affect DPS from a digital consumer's viewpoint. The purpose of this study was to identify the factors that affect the intention of undergraduate students of Sri Lanka towards DPS. The theory that was used for this study is the theory of planned behavior. To reach the purpose of this study, a model was developed which included 4 independent variables: Attitude, social influence (SI), perceived behavioral control (PBC), moral obligation (MO) and one dependent variable (DV): Intention towards DPS. The population of the study comprised of undergraduates in Sri Lanka and non-probability sampling technique was used for selecting the sample for the study. Data collection for the analysis was done using a web- based questionnaire survey which resulted in a sample size of 165 responses. The collected data were analyzed using quantitative analysis techniques with the help of IBM SPSS software. In the analysis process, the reliability and significance of the data were checked first, and then the impact of independent variables on the DV was measured. The results showed that only the MO factor had an impact on IDPS of undergraduates of Sri Lanka from the four factors proposed by the author.*

Keywords: *Digital piracy, Software, Intention, Copyrights*

1. Introduction

Digital Piracy (DP) refers to reproducing, using or Distributing information products such as software, music, eBooks, and movies in digital formats without the consent or authorization of the legal owners of those products (Belle and Peitz, 2014). Digital piracy of software (DPS) refers to reproducing using or distributing software without the authorization of the product owners. License agreement of software states how that software can be used and distributed. Digital Piracy behavior goes against the guidelines of a software's license agreement. The noun pirate refers to a person who is committing Digital Piracy. In the context of this study, a pirate is a person that commits Digital Piracy. Operating System software like Microsoft Windows and Applications Software like Adobe Suite, Office Suite and IDM are examples for some software that are pirated by many people.

A. Background of the Study

Within the last decade, technology has been developing which resulted in fast and affordable internet connections. This has broken the physical barriers of the world and has made the world one cyber village. But this also resulted in digital piracy which is a big problem for copyrights. Digital piracy existed before the internet was easily accessible, but the development of better facilities for Accessing the internet has made the foundation for the sharing of digital products on a large scale. Since it is hard to create limitations for the sharing of digital products over the internet, those digital products started being shared over the internet against their copyrights. The efforts that the Digital product industry has taken against the act of Digital Piracy have not had an important impact on minimizing Digital Piracy. MarkMonitor.com, which is an internet security firm, selected 43 of the websites that provide digital material to be illegally downloaded and measured the number of visits per year, which was 53 billion (Xanthidis and Aleisa, 2012) . This goes to show that Digital Piracy is being used by a lot of people around the world.

Losses that digital product manufacturers have to face because of digital piracy have been growing throughout the last few years. According to the Business software Alliance (BSA), software piracy caused the highest annual loss in 2007 in USA which was $48 billion. BSA also estimated that about 1 billion computers (Around half of all PC's) contained software that was not licensed, in other words, pirated software. BSA states that in 2011, the global piracy rate was at 42% and the commercial value of software theft was $63.4 billion. In 2011, it has been found that pirates in emerging economies install more pirated programs per PC than pirates in mature markets (Business Software Alliance, 2012).

Sri Lanka is a country with an emerging economy in the software market. So, digital piracy of software has an effect

on the software market of Sri Lanka that results in losses for the software manufacturers in Sri Lanka who manufacture targeting the local market. Online Piracy of Software has a negative effect on the Software manufacturers whose target market is the Global market, resulting them in losing some nu of potential sales and customers. Software manufacturers all over the world suffer from financial losses that are caused by the act of digital piracy of software. Therefore, against this background, the researcher is prompted to investigate and find out the factors Affecting people's Intention towards the Digital Piracy of Software in Sri Lanka.nka.

B. Research Problem

Business Software Alliance states that Sri Lanka is a country with an emerging economy (Business Software Alliance, 2012). People who are in emerging technologies are the majority of the people who use digital piracy in the world (Arli, Tjiptono and Porto, 2015). Considering these situations, the number, and the diversity of studies on piracy behaviour in Sri Lanka seems to be lacking.

C. Research Question

What are the factors that affect undergraduate students' Intention towards digital piracy of software in Sri Lanka?

D. Research Objective

To identify the factors that affect undergraduate students' intention towards digital piracy of Software in Sri Lanka

E. Importance of this Study

Since Undergraduate Students are a portion of the lost potential customers of software due to digital piracy, this study is important in identifying factors that Influence digital piracy of software. These factors can be important to the software industry for identifying the factors that affect their sales losses.

F. Research Scope

The study focuses on software from the digital products that are pirated. The scope of this study is limited to undergraduates in Sri Lanka due to practical limitations and time constraints. The rationale for selecting undergraduates is, because they have become a large portion of software users. To sum up, this study is concentrated on undergraduates' intention towards digital piracy of software in Sri Lanka.

2. Literature Review

3. Digital Piracy of Software

Digital piracy is a vast area and it can be looked at from different angles. The main 2 angles are the industry's viewpoint and the consumers' viewpoint. There is a clash between the interests of the above-mentioned viewpoints. This clash has resulted in financial losses for the industry and legal problems for pirates (People who practice digital piracy). As an example, a website named gamato.info which was a website with torrents (peer-to-peer files) was shut down and its administrators were imprisoned in

Greece. Digital Piracy affects different categories of digital products such as Software, Movies, Music, and eBooks. There is main 3 types of people or organizations that participate in the act of Digital Piracy. They are, Organizations or people who distribute pirated products for commercial gains, Organizations or individuals who distribute pirated products without expecting any commercial gain and individuals who consume digitally pirated products. The consumption of these products can be done through the internet or other means like USB drives, CD's, and DVD's (Xanthidis and Aleisa, 2012).

This study will use the viewpoint of the consumer for identifying the Factors that Impact digital piracy behaviour and will select software as the digital product of focus throughout the study

4. Theory of Planned Behaviour (TPB)

Ajzen (1991) proposed adjunct of the "Theory of Reasoned Action" called the "Theory of planned Behaviour" (TPB) which is broadly used in several various fields to clarify intention and behaviour (Taima, Robin and Nathalie, 2019). Three suggested factors of the TPB model affecting on intention and behaviour of a person consist of attitude, subjective norms, and perceived behavioural control. Based on the theory of planned behaviour and previous literature, three core factors could be summarized which impinge on digital piracy named, attitude towards behaviour, environment influence and social influence. These three categories could be utilized to predict consumers' digital piracy behaviour in this context (Pham, Dang and Nguyen, 2020).

5. Factors Affecting Intention towards Digital Piracy

1) Attitude: Attitude is what gives meaning to the feelings of an individual with respect to a particular behaviour. These feeling could be happiness, relaxation, pleasure, discontentment, and distaste. Attitude has been acknowledged as the main construct in social psychology. Through studies, it has been found that Attitude has a big impact on intentions of individuals based on the Theory of Planned Behaviour (TPB). In Malaysia, attitude has a positive relationship with digital piracy behaviour among undergraduate students meaning when there is a positive attitude towards digital piracy, the digital piracy behaviour increases (Kassim and Kasuma, 2017). Among the majority of Asians commencing digital piracy has become an accepted act because they have an easy-going attitude towards it than Americans .They tend to duplicate software material, buy illegal pirate material and not criticize those who do so (Arli, Tjiptono and Porto, 2015).

2) Social Influence (SI): Social influence can be explained as how other people of the society influence convictions, emotions, and behaviour of a person. People gain social influence through observations, perceptions and expectations about a decision made by others. Social class,

culture and subculture are important sub factors that affect social influence. There is significant and positive relationship between social influence and digital piracy behaviour. When the social influence increases, the digital piracy behaviour will also increase (Kassim and Kasuma, 2017).

3) Perceived Behaviour Control (PBC): Perceived Behaviour control can be stated as the level of control or easiness of action depending on his/her capability or technology. PBC has a strong impact on intention towards Digital Piracy. (Pham, Dang and Nguyen, 2020)

4) Moral Obligation (MO): Moral obligation can be defined as the personal perception about whether an action is considered right or wrong. (Pham, Dang and Nguyen, 2020)

3. Methodology

To delve into the purpose of this study, the researcher proposed a conceptual framework based on peer-reviewed research articles and developed four hypotheses by reviewing existing theories. Inductive and deductive are two types of research approaches. The inductive method goes from more specific to more general, which is developed a theory during the survey process. The deductive approach goes from more general to more specific. Quantitative researches highlight data perfection than qualitative research ((Taima, Robin and Nathalie,2019). Accordingly, it is convenient to analyse data in quantitative method. Moreover, the quantitative method can aid to construct reliable clarifications and assist to make correct and faithful comparisons. Hence, deductive approach was used for this study with the quantitative method. ding (2012) stated that non-probability sampling can be used when it is the choice of participating in the survey is left up to each individual. The population of this study comprised of undergraduates in Sri Lanka where the sample size was selected according to the non-probability sampling technique considering convenience to reach sources and time constraints. Sample size is usually determined from the following equation: $n >= 50 + 8m$, in which n equals to number of variables used in the model. In this study, there are 4 variables. So, the minimum size of the sample must be 82. Further, online questionnaire survey, which included five demographic questions and twelve Likert scale questions were utilized as research technique in this study.

Based on the web-based questionnaire 165 responses were collected as primary data to generate useful information through analysis. The researcher initially carried out a pilot test with 20 respondents to ensure the items used in the questionnaire were reliable and appropriate. Results acquired from the pilot test were used in addition to improve the final questionnaire. Finally, gathered data was

analysed using IBM SPSS software. During the process of analysis to achieve the research purpose, reliability, validity, correlation and multicollinearity of data were checked.

A. Conceptual Framework

Based on peer-reviewed studies on digital piracy, this study proposes a conceptual framework showing factors affecting intention towards digital piracy of software suggested by previous authors. Kassim and Kasuma (2017) have found that attitude and social influence affected the digital Piracy behaviour among undergraduate students. Arli et al. (2015) stated their findings show that Attitude towards software piracy positively affected software consumers' digital piracy behaviour. Moreover, Pham et al. (2020) has shown that perceived behaviour control strongly influences the intention to pirate digital products through their study. Further, Pg and Rmmd (2017) state that attitude and social influence positively affected the intention of students' intention to use pirated software in Sri Lanka while moral obligation had a negative effect on it.
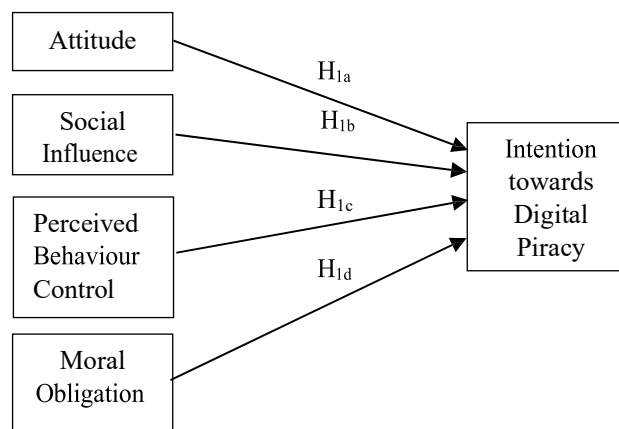

Figure 1. Conceptual Framework
Source: Author (2020)

According to the conceptual framework illustrated in Figure 1, Attitude, SI (social influence), PBC (perceived behavioural control) and (MO) moral obligation were independent variables (IV) and intention towards DPS (digital piracy of software) has been considered as the dependent variable (DV). Corresponding to Figure 1, four hypotheses were developed in order to conduct the research.

H_{1a}: Attitude has an influence on undergraduates' intention towards DPS

H_{1b}: Social Influence has an influence on undergraduates' intention towards DPS

H_{1c}: Perceived behavioral control has an influence on undergraduates' intention towards DPS

H_{1d}: Moral Obligation has an influence on undergraduates' intention towards DPS

4. Results

With respect to identifying the factors affecting DPS, some demographic characteristics were analyzed in the questionnaire in order to present information in a conspicuous method. The majority of responses were from the computing faculty (58.8%), from the total 165 responses while 18.2% account for engineering faculty. The half portion of respondents were male respondents (50.9%). Out of the 165 respondents, 97% of them have their own internet connection to get in touch with new technology. The most significant finding from the results of the demographic questions was that almost all the respondents (99%) have a personal computer. Finally, to identify the factors influence on DPS, Likert scale questionnaire was analyzed using 'IBM SPSS (Statistical Package for the Social Sciences) Version 21'.

A. Reliability Test

The Cronbach Alpha is used to determine the level of reliability of the collected data and the study. To have a greater reliability, the value should be greater than or equal to the accepted level of 0.6.

Table 1. Reliability Test

Variable	Cronbach' Alpha	No of items
Attitude	.701	3
SI	.715	3
PBC	.063	3
MO	.699	2
DV	.839	3

Source: Author (2020)

According to the Table 1, Cronbach alpha is greater than 0.6 for all independent variables and the dependent variable, which indicates the greater reliability of studied constructs (variables).

B. Validity Test

To validate research instruments the Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test was used. KMO and Bartlett's Test value exceeded the accepted level of 0.5, indicating greater validity of the study.

Table 2. Validity Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.785
Bartlett's Test of Sphericity	Approx. Chi-Square	352.369
	df	10
	Sig.	.000

Source: KMO Output - IBM SPSS Statistics Viewer 2020

C. Pearson Correlation-Relationship between independent variables and dependent variable

Pearson correlation is used to calculate correlation between independent variables and dependent variable. It ranges between -1 and +1. +1 implies positive relationship while -1 sign implies negative relationship. And 0 value or very close to zero, implies no linear relationship so it means uncorrelated.

Table 3. Correlation Test

	Pearson Correlation	Sig. (2-tailed)
Attitude	.412	.000
SI	.458	.000
PBC	.478	.000
MO	.621	.000

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Author (2020)

As Table 3 shows, all the variables indicate (+) positive correlation. Moreover, MO (moral obligation) scored the highest Pearson correlation coefficient (0.621).

D. Model Summary

Model summary interprets the strength of the relationship between the model and the dependent variable. R, multiple correlation coefficient determines the correlation between independent variables and dependent variable. R^2 which is known as the coefficient of determinant describes at which amount, dependent variable is measured by the independent variables or in other ways, it explains the proportion of variance in dependent can be explained by independents. Adjusted R^2 is known as the adjusted coefficient of the determinant. R^2 value should be straightforward, and it should always stand between 0 and 1.0. Standard error in the model summary reveals how much the mean of the sample deviates from the mean of the population.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.645[a]	.416	.402	.600

a. Predictors: (Constant), MoralObligation, Attitude, PerceivedBehaviouralControl, SocialInfluence

Source: Regression Analysis Output - IBM SPSS Statistics Viewer 2020

According to Table 4, R value shows 0.645 correlation with dependent variable. Adjusted R^2 is 0.402, which indicates independent variables explain 40.2% of dependent variable. In other way it suggests regression model is significant.

Further, it suggests that the variance of independent variables determines a value of 40.2% for the variance of intention towards DPS.

E. ANOVA- The Impact of Independent Variables on Dependent Variable

ANOVA (Analysis of Variance) is used to test the overall match of the model (developed conceptual framework). F value and p-value (Sig) can be used to predict whether hypotheses are accepted or rejected. Accepted sig value, p-value<0.05.

Table 5. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.089	4	10.272	28.521	.000[b]
	Residual	57.627	160	.360		
	Total	98.716	164			
a. Dependent Variable: IDPS						
b. Predictors: (Constant), MoralObligation, Attitude, PerceivedBehaviouralControl, SocialInfluence						

Source: Regression Analysis Output - IBM SPSS Statistics Viewer 2020

According to Table 5, p-value (sig) is 0.000, which indicates at least one of the independent variables has influence on intention towards DPS. That means at least one hypothesis is accepted. Hence, the researcher can proceed to test hypothesis individually. Further, having F-value of 28.521 proves the significance of the relationship at confidence level of 95%.

F. Coefficient Table

This is another output of regression analysis which interprets the standardized beta coefficients that interprets the relative importance of independent variables on the dependent variable.

As Table 6 shows, MO has a 0.000 sig value where p-value<0.05. So, it is significant. Except MO, all other independent variables sig value is more than 0.05 and they are insignificant. Attitude, SI, PBC and MO have (+) positive beta coefficient values. That indicates a predictor variable with a coefficient value between 0 and +1, portraying a positive effect on the dependent variable. Attitude has a beta coefficient value of 0.123 which indicates if the other independent variables were held

constant, attitude would increase by 1, then intention towards DPS would increase by 0.123. Similarly, all other independent variables will change.

Table 6. Coefficients

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.660	.192	[16]	3.438	.001
	Attitude	.126	.076	.123	1.650	.101
	SocialInfluence	.056	.103	.052	.547	.585
	PerceivedBehaviouralControl	.114	.098	.108	1.166	.245
	MoralObligation	.472	.082	.468	5.763	.000
a. Dependent Variable: IDPS						

Source: Regression Analysis Output - IBM SPSS Statistics Viewer 2020

G. Hypothesis Testing

Table 7. Hypothesis Testing

Independent variables	Standardized coefficient Beta	Sig(p-value)	Decision
Attitude	0.123	0.101	Rejected
SI	0.052	0.585	Rejected
PBC	0.108	0.245	Rejected
MO	0.468	0.000	Accepted

Source: Author (2020)

To test hypothesis p-value was used. Taima et al. (2019) states that the significant level for p- value is 0.05. If the significant value for a variable is more than 0.05, it is not supported

H_{1a}: Attitude has an influence on undergraduates' intention towards DPS.

Sig value of attitude, which is 0.101, is higher than significant level of 0.05. So, H_{1a} is not supported, that means H_{1a} is rejected.

H_{1b}: Social Influence has an influence on undergraduates' intention towards DPS

SI shows a sig value of 0.585 which is higher than accepted level of 0.05. H_{1b} also not supported. It is rejected.

H_{1c}: Perceived behaviour control has an influence on undergraduates' intention towards DPS

0.245 is the sig value that is shown for PBC. That means H_{1c} also not supported. It is rejected.

H_{1d}: Moral Obligation has an influence on undergraduates' intention towards DPS

MO has a sig value of as 0.000. Which is lower than sig level of $p<0.05$. So, this is supported and accepted.

5. Discussion

The main objective of this research is to understand the factors that could affect the intention of undergraduate students towards Digital Piracy of Software in Sri Lanka. In order to achieve this, a model was proposed using the TPB and previous literature which included attitude, SI, PBC and MO as the independent variables and intention of undergraduates' towards DPS as the dependent variable. The model summary and ANOVA suggests that the relationship between the model and the dependent variable is significant, $F_{(4,160)}=28.521, p<.001, R^2=.402$. Statistics show that Attitude, SI and PBC have sig values (P-values) smaller that the significant level value which is 0.05 while MO has a sig(P-value) bigger than 0.05. These statistics express that only MO has an influence on undergraduates' intention towards DPS whilst Attitude, SI and PBC do not.

A non-probability sample was used in this analysis and a minimum of 82 responses were required. So, the 165 responses used in the analysis can be considered as an acceptable sample.

6. Conclusion and Reccomendations

Over the years, many studies have been done on the topic of piracy. Some of them have attempted to find the factors that affect Piracy behaviour. Attitude, awareness, religiosity, social influence, computer experience, digital media cost and moral obligation are some of the factors those studies have found out. The TPB was the theory that was used for this study. Its main suggested factors are attitude, subjective norms and perceived behavioural control. Based on previous findings and the TPB the author proposed 4 factors that could affect the intention of undergraduates in Sri Lanka towards DPS which are attitude, SI, PBC and MO. According to the results of the quantitative analysis of this study, attitude, SI and PBC have sig values (P-values) smaller that the significant level

value which is 0.05 while MO has a sig(P-value) bigger than 0.05. These values suggest that attitude, SI and PBC do not have a significant effect on undergraduates' intention towards DPS. The only factor among the considered factors that has a sig(P-value) bigger than 0.05 is MO. This suggest that MO has a significant effect on undergraduates' intention towards DPS.

As this study covers the intention of undergraduates' towards DPS, further studies can be conducted on different populations such as employed adults. Also, the scope of this study can be further expanded to include two or more categories of digital piracy such as movies, music, and eBooks.

References

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes,50(2), 179-211. doi:10.1016/0749-5978(91)90020-t

Arli, D., Tjiptono, F. and Porto, R. (2015) 'The impact of moral equity, relativism and attitude on individuals' digital piracy behaviour in a developing country', *Marketing Intelligence and Planning*, 33(3), pp. 348–365. doi: 10.1108/MIP-09-2013-0149.

Belle, P. and Peitz, M. (2014) 'The Intellectual Property (IP) Protection of Information Products The Basic Economics Analysis : Digital Piracy Decreases Profits', pp. 1–8. doi: 10.1007/978-1-4614-7883-6.

Business Software Alliance (2012) 'Shadow market 2011'. Available at: http://globalstudy.bsa.org/2011/downloads/study_pdf/2011_BS A_Piracy_Study-Standard.pdf.

Fielding, N (2012) 'Sampling Methods for Web and E-mail Surveys', *The SAGE Handbook of Online Research Methods*, pp. 195–216. doi: 10.4135/9780857020055.n11.

Kassim, S. K. and Kasuma, J. (2017) 'A Study of Digital Piracy Behavior among Undergraduate Students in the Context of Higher Education , Universiti Teknologi MARA A Study of Digital Piracy Behavior among Undergraduate Students in the Context of Higher Education , Universiti Teknologi MARA', (March), pp. 957–968.

Pg, M. and Rmmd, P. (2017) 'Students ' Intention to Use of Pirated Software in Rajarata University of Sri Lanka', 19(12), pp. 52–58. doi: 10.9790/487X-1912015258.

Pham, Q. T., Dang, N. M. and Nguyen, D. T. (2020) 'Factors affecting on the digital piracy behavior: An empirical study in Vietnam', *Journal of Theoretical and Applied Electronic Commerce Research*, pp. 122–135. doi: 10.4067/S0718-18762020000200108.

Taima, A., Robin, G. & Nathalie, S., 2019. Factors Driving Purchase Intention for Cruelty-free Cosmetics. A study of

female millennials in Jonkoping, Sweden, s.l.: Jonkoping University

Xanthidis, D. and Aleisa, E. (2012) 'Internet piracy from a digital consumer's viewpoint', *International Journal of Communications*, 6(4), pp. 153–165. Available at: https://www.researchgate.net/publication/267447970.

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