A Cross-National Experimental Examination of Software Piracy Behavior

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Abstract

Software piracy has been a problematic issue for several decades. While there is a significant body of research attempting to identify reasons why individuals pirate software, some factors influencing software piracy have yet to be studied completely. One such factor, addressed herein, is differences across countries. Cross-country comparisons of self-report rates of software piracy and aggregate rates of piracy have been published. Such studies have shown that software piracy rates vary by country. Explanations of these differences have been based on country level variables, such as gross national product (GDP). However, we are not aware of any study that has examined the role of social and individual factors to explain cross-country differences. We plan to examine the role of social desirability bias (SDB) as a possible explanatory factor for differences in reports of software piracy behavior in two countries: the United States and the United Arab Emirates.

Keywords

Software piracy, intellectual property theft, social desirability bias.

Introduction

Software piracy, which is the unauthorized use, or copying, of software products protected by legal intellectual property rights, such as copyrights, patents, and trade secrets, has been a problematic issue for several decades (Chavarria, Andoh-Baidoo, Midha, and Hughes 2016; Mishra, Akman, and Yazici 2007). According to statistics developed by the Business Software Alliance, there is an annual revenue loss of over $63 billion throughout the entire global industry (Moores and Esichaikul 2011; Odilova, Andrés, and Salahodjaev 2016). It is estimated that the average worldwide piracy rate is 42% and that roughly for every two dollars customers spend on legally obtaining software products, another dollar's worth of software is acquired illegally. Thus, an understanding of issues related to global software piracy continues to be of importance.

Much of the research on software piracy views the phenomenon from an ethical perspective, seeking to understand why individuals pirate (e.g.: King and Thatcher, 2014). In such research, responses are subject to social desirability bias (SDB) (King and Bruner 2000). SDB is the under- or over-estimation of responses by a respondent with the aim of projecting a socially acceptable image (King and Bruner 2000; Paulhus 2002). SDB is an acknowledged phenomenon in software piracy literature in the Information Systems discipline (e.g.: Jamwal and Gupta 2015). In the proposed study, we plan to examine if reported piracy rates in different countries are attributable to social acceptability of the behavior. In countries where software piracy is socially disapproved, self-reports are susceptible to SDB and lead to lower reported rates, in comparison to countries where software piracy if less socially disapproved and lead to more open and honest admissions of piracy, thus creating a false picture of cross-country behaviors. We plan to conduct experimental studies in two countries. Since behavior is directly observed in experiments, the influence of SDB is expected to be minimal or non-existent. The countries of study are the United States (USA) and the United Arab Emirates (UAE). These countries were chosen for the differences in

published reports of their respective software piracy rates. In the USA, there is a 19% piracy rate, with 31% of the population admitting to pirating software (Business Software Alliance 2012). On the other hand, in the UAE the piracy rate is 37% with a reported 84% of the population admitting to pirating software (Business Software Alliance 2012). The differences in the self-admitted rates of piracy between the USA and UAE raise the issue - are the differences real, or are they a reflection of SDB? A direct observation of piracy in a controlled experimental setting provides one way of answering this question.

This article will be organized as follows. First, the literature pertaining to the global phenomenon of software piracy will be discussed. Next, the proposed study will be outlined and potential outcomes detailed. Finally, brief conclusions will be offered.

Global Software Piracy

It is estimated that over half of the world's computer users claim to have pirated software, and the average worldwide piracy rate is 42%, varying from as little as 19% in North America (Business Software Alliance, 2012) to as high as 76% in Singapore (Moores and Dhaliwal, 2004) and 93% in Hong Kong (Moores and Dhillon, 2000). These differences have piqued the curiosity of many researchers and led to a body of work examining cross-national differences. This body of work has been referred to as the global school of thought (Gergely and Rao 2013).

The key findings of the global school are shown in Table 1.

	Source	Conclusion
1	Goodman (1991) Weisband and Goodman (1992)	Piracy is widespread in developing countries because their citizens had little respect for intellectual property rights, and this is further aggravated by the ease of duplication and little risk of punishment.
2	Malhorta (1994)	Few U.S.-based software companies protect their products legally outside the United States.
3	Gabella and Picasso (1995) Douglas et al. (2007)	Piracy rates vary across countries, ranging from about 35% in the U.S. and some of Europe to over 90% in nations like China, Thailand, and Russia. Several factors identified which to explain the differences in piracy rates across countries, including: the state of the software industry in a country, gross national product (GNP), collectivism, and governmental corruption.
4	Gopal and Sanders (1998)	Countries in which the software industry was not well established had weak laws and enforcement mechanisms, presumably to give the domestic software companies ability to gain a foothold in the market. Alliances between foreign and domestic publishers might increase copyright enforcement, through this, governments can enhance the welfare of their country, and help establish a strong domestic software industry.
5	Gopal and Sanders (2000)	Piracy is much more pronounced in countries with per capita GNPs of less than $6,000.
6	Bagchi et al. (2006)	Piracy could also be due to moral differences, not just income level; countries with lower corruption rates had lower piracy rates.
7	Bagchi et al. (2006) Shin et al. (2004)	Significant positive relation between collectivism and software piracy.
8	Dakin (1997)	If piracy were to be enforced more strictly, non-industrialized nations would lose access to software to a large extent because they would not be able to afford the U.S.-based pricing, thus further increasing the digital divide.
9	Hood (2005)	Global software piracy is inevitable, local low-income governments will do whatever is necessary to develop.
10	Odilova et al. (2016)	Software piracy is inversely correlated with a country's average intelligence (national IQ).

Table 1. The Key Findings of the Global School of Thought

While the consensus of these studies is that there are differences in software piracy behavior between countries (e.g.: Douglas, Cronan, and Behel 2007), the rationales for the differences are diverse. Differences have been found based on cultural issues (e.g.: Bagchi, Kirs, and Cerveny 2006), economic

factors (e.g.: Gopal and Sanders 2000), as well as individual factors (e.g.: Odilova et al. 2016), to name a few. However, until now, no one has evaluated whether the social acceptability of the act in different nations may lead to differences in respondent willingness to admit to the act. In countries where software piracy is frowned upon, SDB may influence responses to a greater extent than in countries where the act is not considered unacceptable.

To further examine this, 12 articles were found that conducted survey-based behavioral research on individuals' software piracy behavior, reported piracy rates, and listed the study's country. These articles, along with some key information, are listed in Table 2.

	Source	Sample Size	Study Location	SDB Reduced?	Piracy Rate
1	Cronan et al. (2006)	519	USA	No	34%
2	Moores et al. (2009)	103	USA	No	35%
3	Mishra et al. (2007)	162	Turkey	No	23%
4	Moores & Dhaliwal (2004)	462	Singapore	No	76%
5	Seale et al. (1998)	523	USA	Yes	44%
6	Christensen & Eining (1991)	269	USA	Yes	52%
7	Solomon & O'Brien (1990)	266	USA	Yes	53%
8	Woolley & Eining (2006)	481	USA	Yes	54%
9	Reid et al. (1992)	108	USA	Yes	59%
10	Peace et al. (2003)	201	USA	Yes	59%
11	Siponen & Vartiainen (2005)	249	Finland	Yes	73%
12	Moores & Dhillon (2000)	243	Hong Kong	Yes	93%

Table 2. Studies with Direct Measure of Software Piracy Behavior Data

The examination of the table suggests that there is a substantial difference between software piracy rates amongst the different countries. Furthermore, a pattern surfaces when the piracy rates are compared across studies. First, in the U.S., studies that reduced SDB report piracy rates in the range of 44% to 59% In contrast, studies in the same region, which did not take steps to reduce SDB, report piracy rates of about 35% (see Table 2). SDB is usually reduced by asking for reports of peer behavior in contrast to asking for self-reports of piracy behavior. This pattern would suggest that when steps are not taken to reduce SDB, subjects under-report piracy (i.e.: the self-reports of low piracy rates may be biased). Similar patterns are observed in studies conducted in the East Asia region. In studies that reduced SDB, piracy rates of over 90% are reported in Hong Kong, while lower piracy rates of about 76% are reported in Singapore when SDB is not reduced (Moores and Dhaliwal 2004; Moores and Dhillon 2000). The difference in the piracy rates between Western countries and countries in East Asia is generally attributed to differences in ethical values and incomes levels across the regions. They could also be attributed to differences in social acceptability of piracy in the two regions. In Western countries, piracy is less socially acceptable, so there may be a greater unwillingness to admit to such behavior.

The evidence presented does not conclusively indicate one way or the other, whether differences in software piracy behavior between countries are attributable to SDB. It does suggest that there is a need for systematic empirical examination of software piracy behavior between countries, while attempting to eliminate SDB, in order to increase the reliability of the reported results. Accounting for SDB may also help us understand the wide variations in software piracy rates reported (between 23% and 93%) across studies.

Proposed Study

The study envisaged is as follows, with the first study taking place in the USA, and the second study taking place in the UAE. Subjects will be required to visit a simulated website for purchasing software, but use actual money to execute a transaction. Direct observation of behavior with actual money at stake is expected to give a truer picture of software piracy rates, in contrast to studies using surveys and scenarios, which are easier to conduct than those using actual money, but are limited to determining the likelihood of pirating and therefore subject to response biases. Subjects are tasked with acquiring a software program for their class. They are given a bank card worth $20 in local currency. The software costs $5. They are instructed that any money remaining after they buy the software is theirs to keep. Thus, they

could make $15 if they legitimately purchased the software, since the software price is $5. Otherwise, they could make $20 if they pirated the software. Pilot tests have shown that piracy behaviors do surface at the software costs chosen.

Subjects are provided a link to a website, which is a legal source for the software. When they visit the website, there is a prominent advertisement with a link to get the same software for free from a different pirate site. A confederate actor in the subject group loudly points out to the presence of the link to the pirate site in order to increase saliency of the pirate link. The dependent variable is piracy behavior - the subject either gets the software from the legitimate site or from the pirate site. Thus, the subjects' actual behavior is observed, in contrast to survey studies in which the self-reported intent to pirate is measured, which self-reported values are subject to SDB.

In addition, a 40-point SDB scale, known as the Balanced Inventory of Desirable Responding (Paulhus 2002), will be used to assess if the subjects are prone to behave in a socially desirable manner.

The following analysis will be conducted. First, the proportion of subjects who pirate in the USA sample will be compared to the proportion of subjects who pirate in the UAE sample, using a chi-square analysis. If the proportions are equal, then it would indicate that there is no difference in the piracy rates between two samples. This result would eliminate explanations based on ethicality of individuals in the two countries. If the chi-square test shows significant differences between the two sample groups, we can conclude that differences in piracy rates exist between the USA and the UAE, and are attributable to differences in ethicality.

Next, the correlations between the observed individual piracy behaviors and the SDB scale will be calculated for each of the two samples: USA and UAE. If the correlations are not statistically significant, then it implies that the observed behavior is not influenced by SDB. As actual money is used for the experiment, it is anticipated that neither country's actual money behavior will be highly correlated to the SDB scale (i.e.: measured piracy behavior is not influenced by SDB), thus the measurement of the differences in piracy behavior between the two countries should be unbiased.

If the correlations are statistically significant, then it implies that the observed behavior is in fact influenced by SDB. In this case, the piracy rates will be adjusted using techniques described by Saunders (1991). This way, valid cross-country comparisons can still be made. However, one limitation of this study is that explanations based on other factors that could cause differences in software piracy behavior by country, such as affordability of software or enforcement of intellectual property laws, could still be valid, as the current study does not address those issues.

Conclusion

Despite an abundance of literature claiming differences in software piracy rates between countries, until now, no researcher has examined the possibility that differences in published software piracy rates between countries could be due to SDB. We begin to examine the role of SDB, and thus clarify the observed data further. Also, controlled experiments have not been used as a means to compare software piracy behavior between countries. We believe that they could contribute to a better understanding of differences in behaviors in the cross-national context.

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