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Moderating Effect of Environment on Software Piracy: Exploring Determinants of Softlifting Attitude and Intention

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ABSTRACT

Software piracy is a persistent and serious problem. In recent years, progress has been made to reduce software piracy. However, computer software is greatly susceptible to theft and market influences have recently contributed to a staggering \$48 billion worldwide loss due to piracy (BSA, 2008). This paper outlines research in progress that will provide insight into software piracy attitude and intention. The purpose of the research is to investigate the moderating effect of environment on the relationship between behavioral beliefs and attitudes toward softlifting (i.e. the illegal duplication of copyrighted software by individuals) in three unique settings work, home, and school. This study promises to make several important contributions. The work should demonstrate the importance of including environment in theoretical models of the antecedents that influence softlifting attitude and intention. Results may also prove helpful to information systems professionals and educators in implementing measures to discourage software piracy.

Keywords

Computer Crime, Software Piracy, Softlifting, Intellectual Property Rights, Software Ethics, Attitude, Behavioral Intention.

INTRODUCTION

Software piracy, the unauthorized copying of computer software, is a persistent and serious problem. Intellectual property, such as computer software, is highly vulnerable to theft. Although, progress has been made in recent years to reduce software piracy, the significant increase in market size and the decrease in the value of the U.S. dollar contributed to an \$8 billion increase in software piracy in 2007, with total worldwide loss close to \$48 billion (BSA, 2008). According to a recent Global Software Piracy Study (BSA, 2008), nearly half of the personal computers in the world have pirated software on them, over 500 million computers worldwide. Reducing software piracy would have a positive impact on the economy. If the U.S. alone were to reduce software piracy by 10 percent over the next four years, the International Data Group (IDC) believes the result would be (a) \$41 billion in economic growth; (b) \$6.7 billion in additional tax revenues for federal, regional, and local governments; and (c) the creation of over 32,000 new jobs. In countries with higher piracy rates, the impact would be even greater (2008).

According to the World Intellectual Property Organization (WIPO), intellectual property law is intended to protect creators and other producers of intellectual goods and services (2004). Of the two branches of intellectual property identified by WIPO, violation of copyright is the primary interest in this study. Software piracy occurs when computer software is copied without permission from the owners, in direct violation of copyright and intellectual property rights legislation (e.g. the U.S. No Internet Theft Act, the Digital Millennium Copyright Act, and the Digital Theft Deterrence and Copyright Damages Improvement Act). Moores and Chang (2006) suggest that although legislation is in place, enforcement can be challenging; they suggest there is a need to “explore alternative ways to prevent infringement of intellectual property rights and theft of digital goods” (p. 168).

The Software and Information Industry Association (SIIA) identifies ten ways individuals intentionally or unintentionally pirate software, this study is concerned with *softlifting* which “occurs when a person purchases a single licensed copy of a software program and loads it on several machines, in violation of the terms of the license agreement” (2009, p. 3). A typical example of softlifting is sharing a single-user license copy of a software program with friends and coworkers.

The motivation to pirate software is often framed on a national or international level. This study will investigate the problem at an individual level and determine the extent to which the relationship between behavioral beliefs (i.e. perceived risks and perceived consequences) and attitude and intention to softlift vary across environment (i.e. work, home, and school). Given

the current world economic climate, “software piracy has clear negative consequences for local economies” (BSA, 2008, p. 5). Exploring determinants of softlifting attitude and intention in various settings will provide insight into this prevalent issue and may help in the development of measures to reduce this wide-reaching problem.

This work in progress paper is organized as follows. Theoretical background and research hypotheses are presented along with the research model. Since this paper outlines research in progress a detailed methodology section is presented prior to concluding remarks.

THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

This study seeks to investigate behavioral beliefs of the individual and the individual’s environment in explaining software copying attitude and intention. Software piracy can be conceptualized as a behavior (Limayem, Khalifa and Chin, 2004). Behavioral intention research is often studied holistically using comprehensive models. Yet, looking at intention to pirate software in this manner can be crippling. Harrison, Mykytyn and Riemenschneider (1997) suggest that information systems research focusing on behavioral intention should refine and tailor a theory to fit a specific research context. Liang and Yan (2005) recommend the use specific models to develop further understanding of pirating behaviors. Recent studies on software piracy have customized accepted behavioral intention models and have concentrated on a subset of constructs (Goles, Jayatilaka, George, Parsons, Chambers, Taylor and Brune, 2008; Limayem, et al., 2004; Rahim, Seyal and Rahman, 2001; Tang and Farn, 2005; Workman and Gathegi, 2007). Many researchers have framed their research within the area of attitude and intention to pirate software (Goles, et al., 2008; Lending and Slaughter, 1999; Lending and Slaughter, 2001; Peace and Galletta, 1996; Rahim, Rahman and Seyal, 2000; Rahim, et al., 2001; Workman and Gathegi, 2007).

Ajzen (1991) developed a behavioral intention model that is widely cited and tested empirically. This study focuses on the attitude component of Ajzen’s Theory of Planned Behavior (TPB). Behavioral beliefs according to the TPB refer to the beliefs about consequences of a particular behavior; they “produce a favorable or unfavorable attitude toward the behavior” (Ajzen, 2006a, p. 1). This study focuses on two such variables, behavioral beliefs related to *perceived usefulness* and *perceived risks*. As with Ajzen’s comprehensive model (2006b), this model suggests attitude toward the behavior leads to behavioral intention. Intention is defined as the cognitive representation of an individual’s subjective probability to perform a given behavior and in Ajzen’s model (2006b), intention is assumed to be the immediate antecedent to behavior. This study will not examine actual behavior since examining piracy intentions rather than the actual behavior is considered an acceptable and preferable research approach since people tend to understate their *actual* illegal and/or unethical behavior in self report survey methodologies (Rahim, et al., 2001).

Figure 1 summarizes the research model. Each variable included in the research model, as antecedents of softlifting intention, are described below along with the associated research hypothesis. Hypotheses are stated in alternative form.

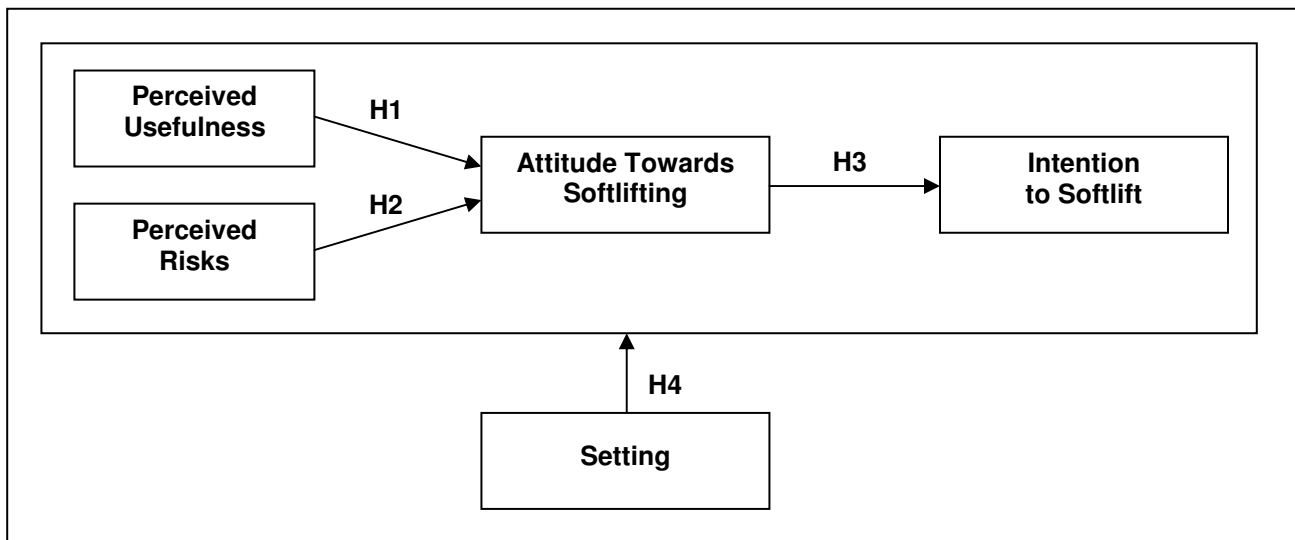


Figure 1. Research Model

Perceived Usefulness

Derived from the word *useful* (i.e. capable of being used advantageously), Davis (1989) defined perceived usefulness as the degree to which a person believes that using a particular system or technology will improve performance. In relationship to software piracy, recent studies have looked at perceived usefulness as the positive consequences of copying software illegally. Goles, et al. (2008), found a significant positive relationship between perceived usefulness and attitude toward softlifting, suggesting “it further confirms the perceived usefulness -- attitude path. Future researchers can use this with an even greater degree of confidence” (p. 491). Limayem, et al. (2004) found that beliefs about consequences of software piracy (both positive and negative) were found to significantly influence intentions; favorable scale items included possessing more software, saving money, improving quality of life, and improving productivity and performance. Relative to the general TPB, Taylor and Todd (1995) decomposed the attitude component to include perceived usefulness as an antecedent to attitude. This study will explore the relationship between perceived usefulness and attitude toward softlifting.

Hypothesis 1 (H1): The greater an individual perceives the usefulness of softlifting, the more favorable his or her attitude is toward softlifting.

Perceived Risks

The term perceived risks is defined as the degree to which a person believes that a certain behavior will result in negative consequences. Researchers have applied the concept of perceived risk in the study of software piracy behavior and have identified several important aspects of risk including performance, social, and prosecution (Ang, Cheng, and Lim, 2001; Ratnasingam and Ponnu, 2008; Tan, 2002). Individuals face performance risk when there is no guarantee that the software will work. They will have no access to technical support, upgrades, and are at risk for malfunctions and viruses (Ratnasingam and Ponnu, 2008; Tan, 2002). Social risk, occurs when individuals are concerned with the image they project to their peer groups (Ratnasingam and Ponnu, 2008; Tan, 2002). Peer attitude toward software piracy has been found to be significantly related to attitude toward software piracy (Logsdon, Thompson, and Reid 1994). Prosecution risk is the probability that pirating software would subject the individual to legal prosecution (Chiou, Huang, and Lee, 2005; Tan, 2002). Chiou, et al. (2005) suggest “prosecution risk is very important in influencing consumer piracy attitude” (p. 164). In recent studies, perceived risks have been found to predict intention to pirate software (Ratnasingam and Ponnu, 2008; Tan, 2002). This study will explore the relationship between perceived risks and attitude toward softlifting.

Hypothesis 2 (H2): The greater an individual perceives the risks of softlifting, the less favorable his or her attitude is toward softlifting.

Attitude

The theory of planned behavior contends that attitude toward the behavior leads to behavioral intention (Ajzen, 2006b). Liang and Yan (2005) state “attitude is generally defined as a psychological tendency of evaluating a specific entity and generating certain favorable or unfavorable responses” (p. 119). In a review of software piracy literature, Liang and Yan (2005) found extensive research suggesting attitude toward piracy is a predictor of piracy intention. Recent studies also support the assertion that software piracy attitude is a determinant of software piracy intention (Goles, et al., 2008; Peace & Galletta, 1996; Rahim, et al., 2000; Rahim, et al., 2001). This study will build upon these works and explore the relationship between attitude toward softlifting and intention to softlift.

Hypothesis 3 (H3): The more favorable an individual’s attitude is toward softlifting, the greater his or her intention will be to softlift.

Setting

In prior software piracy research, assumptions were often made that an individual’s attitude, intention, and behavior are invariable at the time the research was conducted, regardless of context or environment. Results were often generalized without regard to setting. Researchers have called for more studies into the influence of environmental factors on software piracy (Glass and Wood, 1996; Goles, et al., 2008). Goles, et al. (2008) proposed attitude toward softlifting and intention to softlift vary based on the environment and “that when examining software piracy behavior, setting matters” (p. 495).

Behavioral beliefs, attitudes, and intentions may vary depending on the setting due to the perception of real consequences (both favorable and unfavorable). In relationship to perceived risks, Goles et al. (2008) suggest that at home or at work an individual’s attitude toward softlifting will be more favorable due to the distant possibility of negative consequences (e.g. in a work setting, employees may believe that the company is responsible for the illegal behavior), however, “unlike in the home

and work environments, softlifting in the school environment carries the real threat of negative consequences” (p. 493). In a recent review of software piracy research among college students, Liang and Yan (2005) cite eleven research studies that confirm software piracy behavior is pervasive and worrisome, with an average of 70% of college students reporting the use of pirated software, copying someone else’s software illegally, and/or allowing someone else to copy their own software. These studies did not, however, investigate the actual setting in which the piracy occurred. In differing environments, the perceived usefulness and perceived risks of softlifting may vary. For example, in home and school settings individuals may feel copying software would allow them to save money, yet the same individual may not view “saving money” as a benefit to illegally copying software in a work setting.

This study will build upon the work of Goles, et al. (2008) and will investigate the role of setting in relationship to the proposed behavioral intention model. Several researchers suggest that software piracy models should focus on various direct and indirect paths including moderating effects (Liang and Yan, 2005; Limayem, et al., 2004). This study will look at setting as a moderating effect. Work, home, and school will be tested as categorical moderators since each of these settings provide frequent opportunities for softlifting. Investigating a moderated relationship will provide information about under which conditions the relationships are likely to be stronger or weaker (Aguinis, 2004).

Hypothesis 4 (H4): Setting moderates the relationship between behavioral beliefs, attitude, and intention to softlift.

METHODOLOGY

This study seeks to gather evidence from management information systems (MIS) students that will lead to general conclusions about whether relationships between behavioral beliefs, softlifting attitude, and intention to softlift change based on environment using a correlational, quantitative research design.

Sampling Procedure

Undergraduate students taking MIS courses at a public university in the western United States will comprise the accessible population. In order to facilitate the comparison with prior software piracy research, the sampling frame will include students from undergraduate MIS courses. Students are often used in software piracy research since they readily engage in software piracy (Moores & Chang, 2006). Studies suggest that student participation in softlifting research is reasonable since attitude toward softlifting is shaped prior to entry into the workforce and these attitudes will likely follow the students into the workforce (Cheng, Sims, & Teegan, 1997; Goles et al., 2008). Since this study focuses on environments to which students belong, responses will be directly linked to real world context in two settings (school and home). The percentage of students who work will be reported to provide a link to the third setting. Bivariate correlations between demographic data and dependent variables will be calculated to further explore possible bias resulting from the use of students. A sample size of 200 was determined for this study. The sample size is based on power analysis and by reviewing methodologies of related research. To insure the sample size will be reached the study will assume a 70% response rate and thus approximately 300 individuals will be selected to participate.

Data Collection

Participants will be solicited from undergraduate MIS classes. With cooperation of professors, questionnaires will be distributed during normal class sessions. Class lists will be checked to ensure minimal overlap. Also, students will be asked not to complete the survey if they have already done so in another class. Selected participants will be asked to complete a survey which includes demographic information and a software copying section. The survey includes questions based on three settings including work, home, and school. Since the sample frame was carefully selected and based on relevance to the research goals, the anticipated salience of the survey’s content to respondents is high. Information about the students who completed the survey will be provided to make it easier to identify the appropriate group to whom inferences apply.

Instrumentation

A three-page questionnaire will be used to collect data for this study. The instrument was carefully developed based on Ajzen’s Theory of Planned Behavior (1991, 2006a, 2006b) and by following the recommendations in *Constructing Theory of Planned Behaviour Questionnaires: Manual for Researchers* (Francis, Eccles, Johnston, Walker, Grimshaw, Foy, Kaner, Smith, and Bonnetti, 2004). Items will be interspersed prior to data collection and 25% of the survey questions will be reverse-scaled in order to protect against positive response bias. The survey items use 7-point likert scales. As suggested by Goles, et al. (2008) softlifting is labeled *copying software* to avoid a negative connotation. The term *copying software* is clearly defined to participants at the beginning of the survey. Items to measure *perceived usefulness* (strongly disagree to strongly agree) were generated based on the positive items in the perceived consequences scale used by Limayem, et al.

(2004) and perceived usefulness scales used by Goles, et al. (2008). The *perceived risks* measure (strongly disagree to strongly agree) was designed by the author based on scales proposed by Tan (2002) including performance, social, and prosecution risks. The *attitude* scale was developed based on the scales of Lending and Slaughter (1999) and in accordance with the TPB instrument development manuals (Ajzen, 2006a; Francis, et al., 2004). The behavioral *intention* scale was developed using scales designed by Limayem, et al. (2004). Appendix A lists the items in each scale.

Data Analysis

Various techniques will be used to analyze the data, including reliability analysis and factor analysis to assess construct validity. Correlational analysis will be used to investigate relationships between behavioral beliefs, attitude, and intention to softlift (Hypotheses 1 – 3). Moderated multiple regression will be used to determine whether the relationship between behavioral beliefs, attitude toward softlifting, and intention to softlift change based on environment (Hypothesis 4). A card sort has been conducted on ten respondents to test face validity. Results will be triangulated with exploratory factor analysis performed on approximately fifty students participating in a pilot test.

CONCLUSION

This study promises to make several important contributions to theory, practice, and education. Aguinis (2004) suggests that “regardless of the outcome, the study of moderator variables has implications for both theory and practice because it provides information on the boundary conditions for the relationships of interest” (p. 4). This study will contribute new knowledge to the field and enhance the educational quality of MIS programs.

This work should demonstrate the importance of including environment in theoretical models of the antecedents that influence softlifting attitude and intention. If setting is not found to be a moderator, software piracy researchers may continue to generalize results based on environment. On the other hand, positive results may help researchers improve the fit of their models, given that main effects alone may not provide sufficient accuracy in prediction (Aguinis, 2004).

In relationship to practice, demonstrating that different settings can moderate softlifting attitude and intention has many implications for IS professionals. If certain settings, such as work, facilitate illegal software copying attitude and intention then individuals who are inclined to pirate software may be even more likely to exhibit this behavior. Even those who are typically reluctant to pirate software may exhibit the softlifting behavior when they are in these settings. Results may prove helpful to information systems managers in implementing measures to discourage software piracy in work settings.

This study will survey management information systems students. The academic community is responsible for shaping the attitudes of these future information systems professionals and preparing them to become ethical, contributing members of the business world. Understanding student attitudes concerning illegal software copying behaviors in various settings may lead to thoughtful and innovative educational strategies to deal with this serious and pervasive problem.

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APPENDIX A. MEASURES

<p>The survey will contain the following definition of copying software.</p> <p>The phrase copying software is intended to encompass these behaviors:</p> <ul style="list-style-type: none"> • You purchase a single license copy of a software program and load it on several machines. • You purchase a single license copy of a software program and give copies to your friends, coworkers, or other students. • Your friend, coworker, or other student provides you a copy of software. • Your friend, coworker, or other student allows you to copy software. <p>The phrase copying software does not include:</p> <ul style="list-style-type: none"> • The making of a single backup copy, or • The acquisition of shareware, freeware, or open-source software requiring no licensing or payment. 	
<p><i>Measurement Items – 7 point Likert scales</i></p>	
<p><i>Perceived Usefulness (Strongly Agree to Strongly Disagree)</i></p>	
PU1	Copying software would allow me to have more enjoyment out of my computer.
PU2	Copying software would allow me to get more value out of my computer.
PU3	Copying software would help improve my performance.
PU4	Copying software would help improve my quality of life.
PU5	Copying software would save me money.
PU6	Copying software would allow me to possess more software.
PU7	Copying software would help me to be more productive.
<p><i>Perceived Risks (Strongly Agree to Strongly Disagree)</i></p>	
PR1	Copying software would put me at risk for legal action.
PR2	Copying software would deteriorate my sense of ethics.
PR3	Copying software would put me at risk for being penalized.
PR4	Copying software would cause my friends, relatives, or associates to look down on me.
PR5	Copying software would put me at risk for computer viruses and other malfunctions.
PR6	Copying software would deny me access to useful technical support.
PR7	Copying software would prevent access to useful software upgrades.
<p><i>Attitude</i></p>	
<p>My unauthorized copying of software would be:</p>	
AT1	Harmful – Beneficial
AT2	Good – Bad
AT3	Worthless – Useful
AT4	The right thing to do – The wrong thing to do
<p><i>Intention (Strongly Agree to Strongly Disagree)</i></p>	
IN1	I intend to copy software in the future.
IN2	I expect to copy software in the future.
IN3	I will likely copy software in the future.