FACTORS MOTIVATING SOFTWARE PIRACY: A LONGITUDINAL STUDY

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1. INTRODUCTION

Software piracy, the unauthorized use or illegal copying of computer software, continues to be a major drain on the global economy. The Business Software Alliance (BSA) and the Software Publishers Association (SPA) estimate that worldwide losses due to software piracy totaled as much as $11.4 billion in 1997, up from $11.2 billion in 1996 (Software Piracy Report 1997). The same report suggests that, worldwide, four out of ten business software applications were pirated in 1997. North America, Asia, and Western Europe account for approximately 84% of the losses due to software piracy. Software piracy is considered as prevalent a problem in companies, academic institutions, and among individuals (Cheng, Sims and Teegen 1997). Gopal and Sanders (1997; 1998) and Givon, Mahajan and Muller (1995) suggest that this problem is by far the worst problem threatening the software industry. Research investigating this serious problem has been rather descriptive in nature and empirical studies are scarce (Gopal and Sanders 1997; Thong and Yap 1998). The existing literature still does not shed enough light on the factors motivating individuals to pirate software.

This study has two primary objectives. The first objective is to use current behavioral theories in the elaboration of a model that can identify key factors influencing software piracy. Such a model should also explain the relationship between individuals' intentions to pirate software and the actual behavior of software piracy. The second objective is to conduct a longitudinal study to empirically test the validity of the proposed model. This study, therefore, enhances our understanding of the software piracy problem and leads to valuable implications for software vendors, managers, the academic community, and governmental agencies on how to develop effective measures to deal with software piracy.

2. RESEARCH MODEL AND HYPOTHESES

Software piracy can be conceptualized as a behavior. The Theory of Reasoned Action (TRA), as suggested by Azjen and Fishbein (1975), has been among the most popular of all behavioral models. This model was later refined by Ajzen (1991) and named the Theory of Planned Behavior (TPB). Another model that is relatively overlooked, but arguably more comprehensive in the sense

that it includes all the components of the other two models plus additional ones, was developed by Triandis (1980). Thompson, Higgins and Howell (1991, 1994) have proved the value of Triandis' model in predicting usage of computers at the individual level. They found Triandis' model to be at least as powerful as TRA in terms of prediction and superior to TRA in other respects. Triandis' model explains individuals' behavior in terms of what they have usually done (habits) by what they think they should do (social norms) and by the consequences that they associate with a behavior (perceived consequences/beliefs). It contains aspects that are directly related to an individual (genetic factors, personality, habits, attitudes, behavioral intentions, and behavior) and others that are related to an individual's environment (culture, social situation, social norms, facilitating conditions, etc.).

Since the focus of the study is to determine factors affecting software piracy intentions and behavior, we applied that subset of Triandis' model that is directly related to this context. Factors such as the history, culture, ecology, and social situation are not included since they do not directly influence the two phenomena of interest in this study: software piracy intentions and behavior. Instead, these factors are presented by Triandis to be fully mediated by other more immediate factors in the model. Thus, while these factors may influence software piracy intentions and behavior, they would not add any additional explanatory power (i.e., in a predictive sense) when the more immediate factors are included. Moreover, personality, biological, and genetic factors were excluded because they did not have well established measures and are not immediate antecedent factors to intentions and behavior. Therefore, the resulting model, still using the construct labels developed by Triandis, is presented in Figure 1.

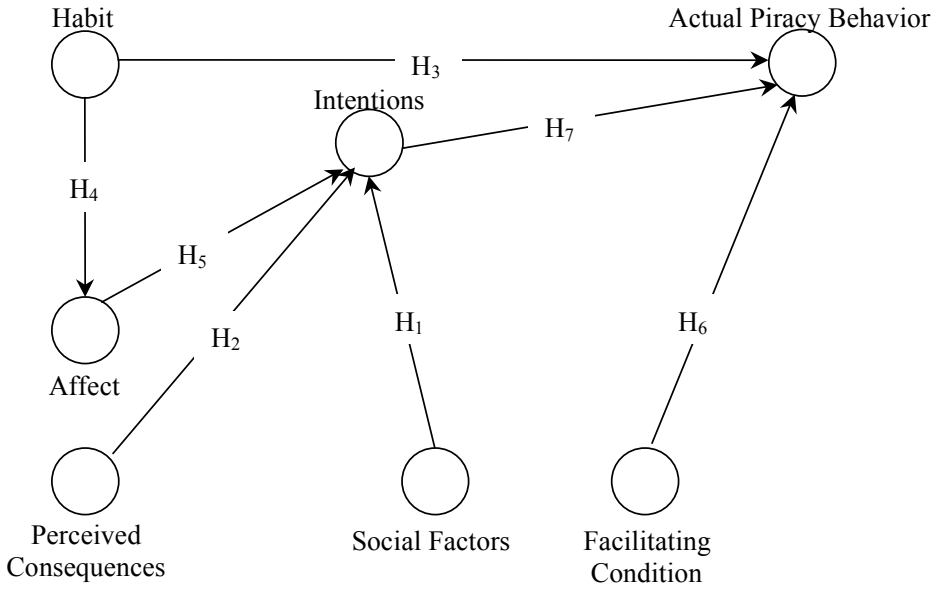

Figure 1. Research Model

Social Factors: Perceived social pressure to perform or not to perform a behavior affects intentions (Ajzen and Fishbein 1975; Triandis 1980). Perceived social pressure refers to an individual's perception of whether most people important to them think that the behavior should be performed or not. Therefore, we view social factors as those norms, roles, and values at the societal level that influences an individual's intentions to pirate software. In this context, the norms and values that are conveyed through interaction with friends, colleagues, and family members are all examples of social factors. These interactions can be in the form of comments, suggestions or directives. Eining and Christensen (1991), Loch and Conger (1996), Simpson, Banerjee and Simpson (1994), and Al-Jabri and Abdul-Gader (1997) all emphasize the importance of considering social norms as a separate factor that influences intentions of unethical behavior. More recently, Cheng , Sims and Teegen (1997) found that the individuals surveyed evoked "*most people I know copy software*" as a top reason for pirating software. We, therefore, expect that there will be a positive relationship between social factors and intentions to pirate software:

H1: There is a positive relationship between social factors and intentions to pirate software.

Perceived Consequences/Beliefs: According to Triandis, each act or behavior is perceived as having a potential outcome that can be either positive or negative. An individual's choice of behavior is based on the probability that an action will provoke a specific consequence. Similarly, a person's intention to pirate a software is influenced by the potential outcomes (Hunt and Vitell 1986; Thong and Yap 1998).

For example, Simpson, Banerjee and Simpson found that the benefits that individuals associate with software piracy are improved acquisition time, financial gain, and the challenge of copying. Similarly, Cheng, Sims and Teegen found that the following reasons were evoked by individuals as factors leading to piracy: *software too expensive, want to try out software,* and *can't afford the software.* Finally, Banerjee, Cronan and Jones (1998) suggest that the degree to which an individual perceives that a reward follows from his/her behavior affects the intention to behave ethically or unethically. Therefore, we hypothesize that

H2: There is a positive relationship between perceived consequences and intentions to pirate software.

Habits: Triandis postulates that habits are situation-behavior sequences that are or have become automatic and that occur without self-instruction. Habits affect not only an individual's behavior but attitude as well. Habits are a function of an individual's past experience and ability to accomplish specific tasks. Hunt and Vitell argue that personal experiences affect ethical behavior. We expect habit to influence individuals' piracy of software and to enhance their affect regarding such a behavior. Therefore:

H3: There is a positive relationship between habit and software piracy behavior.

H4: There is a positive relationship between habit and affect for the intentions to pirate software.

While the linkage between habit and behavior, on the surface, may seem obvious, the inclusion of habit is necessary to determine the relative impact/predictiveness it has on behavior when contrasted to the other factors in the model. Furthermore, except for Thompson, Higgins and Howell (1994) and Bergeron et al. (1995), habit has not been used in IS research.

Affect: According to Triandis, affect refers to an individual's feelings of joy, elation, pleasure, depression, distaste, discontentment, or hatred with respect to a particular behavior. Triandis argues that literature shows a profound and substantial relationship between affect and behavior. Bergeron et al. observed that there was a positive relation between affect and senior management's use of executive information systems. In an ethical context, individuals are unlikely to intend to pirate a software if they feel that pirating software is wrong (Loch and Conger 1996). Logsdon, Thompson and Reid (1994) found that a high level of tolerance toward software piracy leads to this behavior. Similarly, Al-Jabri and Abdul-Gader found that individual attitudes have a significant effect on ethical intention to pirate software. Consistent with the theoretical model presented by Hunt and Vitell, Thong and Yap found that moral intention to pirate software is primarily influenced by the ethical judgement. Finally, Banerjee, Cronan and Jones hypothesized that moral judgement and attitude toward ethical behavior influence intention to behave ethically or unethically.

H5: There is a positive relationship between individuals' affect towards software piracy and their intentions to pirate software.

Facilitating Conditions: Triandis suggests that facilitating conditions are objective factors in the environment that make an act easy to do. Similar to Ajzen's notion of perceived behavioral control, facilitating conditions are important in explaining human behavior since an individual who has the intention of accomplishing a certain action may be unable to do so because his environment prevents the act from being performed. Triandis hypothesizes that facilitating conditions affect directly the actual behavior rather than intentions because he argues that one might have the intention to perform a certain act, but if the environment does not support this behavior then the act will most likely not be executed. We define facilitating conditions as those factors in an individual's environment that facilitate the act of pirating software. Examples of factors that could be considered facilitating conditions for this behavior are the absence of penalties, availability of software to pirate, the absence of a code of ethics, and organizational ethical climate (Banerjee, Cronan and Jones 1998; Harrington 1996; Pierce and Henry 1996). Similarly, Cheng, Sims and Teegen found the ease of piracy and the low risk of being caught are among the main factors that facilitate piracy. We, therefore, expect facilitating conditions to have a positive influence on software piracy behavior:

H6: There is a positive relationship between facilitating conditions and software piracy behavior.

Intention to Pirate Software: This construct is a central factor in Triandis' model. In this context, it refers to an individual's intention to pirate (or not to pirate) software. Triandis postulates that intentions are determined by perceived consequences, social factors, and affect. Intentions are indicators of the degree to which an individual is willing to try and how much effort he/she is willing to exert in order to perform a behavior. Together with facilitating conditions, intentions are usually hypothesized as an accurate predictor of actual behavior (Triandis 1980). Intentions are viewed as an antecedent of actual behavior—the actual act of pirating software in this case (Al-Jabri and Abdul-Gader 1997; Ajzen 1991; Banerjee, Cronan and Jones 1998; Loch and Conger 1996; Thong and Yap 1998).

H7: There is a positive relationship between an individual's intentions to pirate software and the actual act of piracy.

3. METHODOLOGY

The research methodology consisted of three stages: (1) belief elicitation, (2) survey of intentions and beliefs, and (3) survey of behavior (piracy). The purpose of the first stage was to elicit beliefs regarding the consequences of piracy and social factors influencing such behavior as well as the facilitating conditions. The elicited beliefs were used to develop the measurement models of these constructs. A survey instrument was then constructed, pretested and validated in a longitudinal study consisting of stages 2 and 3. The first survey was aimed at testing hypotheses H1, H2, H4, and H5 (explaining intention), while the second one targeted hypotheses H3, H6, and H7 (explaining behavior) and was administered 3 months after the first survey.

Belief Elicitation: The belief elicitation was done through a questionnaire and focus groups involving a total of 26 undergraduate students in a Canadian university. Such a procedure guarantees a more salient and relevant set specific to the population being studied. The students were asked to perform three tasks: (1) to specify possible consequences, both positive and negative, of piracy; (2) to enumerate conditions that would facilitate the act of piracy; and (3) to identify the people that would influence such a behavior (social factors). The purpose of the belief elicitation was to complete a list of formative items measuring the "perceived consequences," "facilitating conditions," and "social factors" constructs that was initially compiled from the literature. Chin and Gopal (1995) urged researchers to consider whether the items form the "emergent" first-order factor or constitute reflective, congeneric indicators tapping into a "latent" first-order factor. Although, we could have used reflective items validated in previous studies, we opted for formative measures in order to gain a better understanding of the specific consequences, social factors, and facilitating conditions that affect intentions and subsequently the act of piracy.

Survey 1: In the first survey a questionnaire, aimed at measuring intentions of piracy, habits, attitudes, perceived consequences, and facilitating conditions, was administered to 127 students doing a Bachelor of Business in a Canadian university. The respondents were told that they would be asked to answer a second questionnaire in three months time and that, in order to match the first questionnaire with the second one, they had to specify the last four digits of their phone number. This method allowed us to keep the survey anonymous while being able to match the answers of the same individual. The response rate was slightly over 77% with 98 returned questionnaires.

Survey 2: The second questionnaire was administered three months after the first one to the same 127 students. It included only two questions intended to measure the level of software piracy done by the respondents since answering the first questionnaire. The same 98 students that responded in the first round returned the second questionnaire (as indicated by the last four digits of their phone numbers).

3.1 Measures

To insure measurement reliability while operationalizing our research constructs, we tried to choose those items that had been validated in previous research. This was possible for most reflective items. The constructs "attitude," "intentions," "habit," and "level of piracy" were measured with reflective items while the constructs "social factors," "perceived consequences," and "facilitating conditions" were measured with formative items. As explained earlier, the usage of formative items was intentional,

as it allowed us to identify the specific facilitating conditions, perceived consequences, and social factors that drove intentions and the act of piracy.

3.2 Data Analysis

The analysis of the data was done in a holistic manner using Partial Least Squares (PLS). The PLS procedure (Wold 1989) has been gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes (Chin 1998; Chin and Gopal 1995; Compeau and Higgins 1995). It allows the researcher to both specify the relationships among the conceptual factors of interest and the measures underlying each construct. The result of such a procedure is a simultaneous analysis of (1) how well the measures relate to each construct and (2) whether the hypothesized relationships at the theoretical level are empirically true. This ability to include multiple measures for each construct also provides more accurate estimates of the paths among constructs, which is typically biased downward by measurement error when using techniques such as multiple regression. Furthermore, due to the formative nature of some of the measures used and non-normality of the data, LISREL analysis was not appropriate (Chin and Gopal 1995). Thus, PLS-Graph version 2.91.02 (Chin 1994) was used to perform the analysis. Tests of significance for all paths were conducted using the bootstrap resampling procedure (Cotterman and Senn 1992). For reflective measures, all items are viewed as parallel (i.e., congeneric) measures capturing the same construct of interests. Thus, the standard approach for evaluation, where all path loadings from construct to measures are expected to be strong (i.e., 0.70 or higher), is used. In the case of formative measures, all item measures can be independent of one another since they are viewed as items that create the "emergent factor." Thus, high loadings are not necessarily true and reliability assessments such as Cronbach's alpha are not applicable. Under this situation, Chin (1998) suggests that the weights of each item be used to assess how much it contributes to the overall factor. For the reflective measures, rather than using Cronbach's alpha, which represents a lower bound estimate of internal consistency due to its assumption of equal weightings of items, a better estimate can be gained using the composite reliability formula (Chin 1998).

4. RESULTS

Figure 2 provides the results of testing the proposed research model using PLS analysis. The test of each hypothesis can be mapped to each specific path in the figure. The estimated path effects (standardized) are given along with the associated t-value. All significant paths ($p < 0.01$) are indicated with an asterisk.

For the hypotheses connecting the antecedent factors to intentions, all were verified except for hypothesis H5 (the path coefficient of the link between affect and intentions was not significant). Perceived consequences had a substantial effect on intentions with a path coefficient of 0.551. Habits had a strong effect on affect at 0.59. Social factors had a significant but moderate effect on intentions at 0.308. The antecedent constructs explained a rather substantial part of the variance in the intentions construct (over 69%). In explaining piracy, however, only facilitating conditions and habits had a significant effect with path coefficients of 0.349 and 0.32 respectively (hypotheses H3 and H6 were verified). Intentions, on the other hand, did not affect piracy significantly (hypothesis H7 was not verified). Furthermore, only 17% of the variance in piracy was explained by the model.

For all constructs with multiple reflective measures, most items have reasonably high loadings (i.e., above 0.70) with the majority above 0.80, therefore demonstrating convergent validity. In the few situations where the loadings were below 0.70, they were complemented by other more reliable measures. Furthermore, all reflective measures were found to be significant ($p < 0.01$).

In the case of formative measures, three out of five items for facilitating conditions, two out of three items for social factors, and six out of 12 items for perceived consequences were found to contribute significantly to the formation of their respective construct. For social factors, while family and friends' influences were significant, colleagues' influence did not make a difference. For perceived consequences, the items that did not make a difference included overcoming challenge, demonstrating competence, causing little damage for the piracy gains, improving quality of life, contributing to higher software prices, and improving the individual's performance. For facilitating conditions, the items that were not significant were insufficient software protection and lack of awareness campaigns.

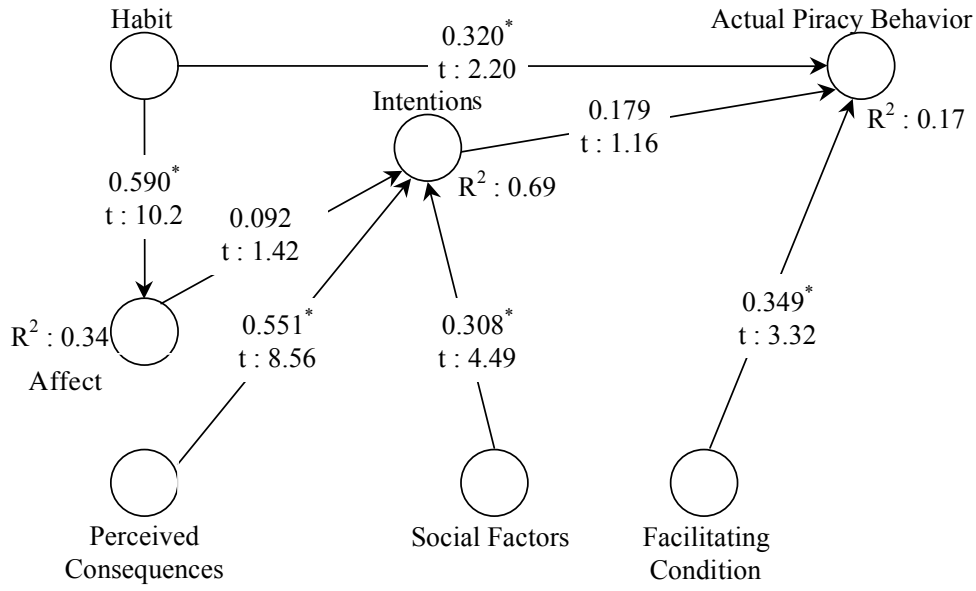

Figure 2. Results

5. DISCUSSION

In this study, Triandis' model was used as a conceptual framework to operationalize factors that influence software piracy intentions and actual behavior. Hypotheses H1, H2, and H4, which analyze factors that influence software piracy intentions were accepted. In fact only H2 was found not to have a substantial impact. Contrary to other studies of software piracy (e.g., Al-Jabri and Abdul-Gader 1997; Loch and Conger 1996), affect did not have an important influence on intentions to pirate software. Instead, social factors and perceived consequences were influential. Moreover, to our surprise, even though facilitating conditions and habits significantly affected the actual behavior of software piracy, intentions did not have significant influence on behavior.

The insignificant impact of affect (H5) suggests that, even though individuals perceive piracy as wrong and unethical, they might still intend or expect to pirate software. Therefore, any attempt to change attitudes toward piracy to increase the awareness that illegal copying of software is unethical may fail in discouraging piracy. Simpson, Banerjee and Simpson (1994) argue that just teaching ethical considerations to students or employees in a few lectures or a training session will not change their behavior. Oz (1990), for instance, found that there were no significant differences in the ethical perceptions of students who took a course on ethics and those who did not. To remedy to this problem, such training should be coupled with strong software copying policies clearly stating assignments of penalties and criminal liabilities (Straub and Nance 1990). Our results confirm this recommendation because one of the perceived consequences that had a significant impact on intentions was *the low risk of being penalized*.

Social factors were found to significantly influence intentions to pirate software (H1). Specifically, only friends affected the respondents' intentions. This implies that awareness campaigns and antipiracy policies should try to cover employees' friends who might have more weight than colleagues in influencing individuals' intention to pirate software. These policies should specifically specify that copying software from a friend is illegal. Moreover, beliefs of consequences of software piracy (H2) were found to significantly influence intentions (i.e., *possessing more software, low risk of being penalized, saving time in acquiring software, deteriorating a person's sense of ethics, saving money,* and *no support for pirated software*). Therefore, policies about software piracy should explicitly emphasize the consequences of this unethical behavior (Thong and Yap 1998). Furthermore, the findings presented here suggest several implications for software manufacturers to reduce piracy. Perceived consequences such as *saving time in acquiring software* influence intentions to pirate software. Therefore, manufacturers should revise their distribution strategies. Simpson, Banerjee and Simpson argue that intensive distribution of software packages and reduced prices should provide potential software pirates with availability and ease of purchase of these products and, therefore, significantly reduce the likelihood to pirate the software from other convenient sources.

Habits were also found to affect actual behavior and reinforce attitudes (H3 and H4). This result raises the possibility that the importance of beliefs and actual behavior may vary depending on how long an individual has been pirating software. In other words, the saying "once a thief, always a thief" applies very well in the context of software piracy. We believe that the inclusion of this construct should be seriously considered for other behavioral models. Otherwise, its absence might lead to a false attribution concerning the impact of other factors.

As stated in H6, facilitating conditions (i.e., *inappropriate antipiracy measures, availability of help to pirate,* and *access to software that can be pirated*) were found to significantly affect the actual software piracy behavior. Once again, this result calls for effective antipiracy measures in order to reduce this behavior.

Finally, contrary to our expectations, intentions did not lead to the actual act of pirating software. This result suggests that this relationship is rather complex. However, further research is needed to better explore this link before we start questioning the merit of prior IS research that stopped at studying intentions assuming that they will certainly lead to actual behavior. Further research should include moderating variables such as demographic factors (Gopal and Sanders 1997), perceived alternatives (Thong and Yap 1998), denial of responsibility (Harrington 1996), deindividuation (Loch and Conger 1996), and organizational ethical climate (Banerjee, Cronan and Jones 1998).

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