Software piracy among IT professionals in organizations

Alok Mishra, Ibrahim Akman, Ali Yazici

Abstract

This paper reviews and discusses software piracy issues from a global perspective. It also reports the findings of a survey concerning the impact of demographic factors on software piracy among IT professionals in Turkey. Although the impact of these factors on software piracy has long been attracting the interest of academics, no quantitative research has ever been realized in this field in the country. Elsewhere also, most of the software piracy-related studies are limited to students and academics and very few have reported findings related to IT professionals in different organizations. The survey was conducted among IT professionals from government and private sector organizations. Based on this survey, the results indicated that gender, age and experience have significant impact on software piracy. The implications of these findings are discussed and compared with other related studies.

Keywords: Software piracy; Software; Piracy; Gender; Age; Income; Type of education; Experience; Mood’s median test

1. Introduction

The proliferation of computers in today’s society has spawned new ethical dilemmas for the software industry (Simpson, Banerjee, & Simpson, 1994), which employs over 2 million people and generates over $140 billion in annual revenues (BSA, 1999). Software piracy has become a major concern over the past two decades (Peace, Galletta, & Thong, 2003; Tang & Farn, 2004). It generally refers to the illegal use of software by corporations, businesses and individuals for personal use (Athey, Susan, & Plotnicki, 1994). Software piracy includes unauthorized copying of software by the end users, illegal installation of software on computer hard disks, counterfeiting, breaches in a channel of sales, Internet piracy and the practice of loading several machines with software licensed for use on one machine only (Belousov, 2004; Prasad & Mahajan, 2003).

Today, the existing literature on software piracy mainly consists of conceptual discussions, descriptive surveys, analytical modeling and most of the empirical literature uses demographic data to explain why piracy occurs.

In a recent study, Jaeger (2003) reported that, in general, demographic factors have significant impact on individuals’ attitudes towards the use of IT. Rahim, Rahaman, and Seyal (2000) and Seale, Polakowski, and Schneider (1998) also studied the relationship between demographic factors and piracy. They both concluded...
that gender and experience have a direct effect on self-reported piracy. Kini, Ramakrishna, and Vijayaraman (2004) observed moral intensity among students regarding software piracy in culturally different countries and reported a relationship between moral intensity and some important demographic factors. A recent study by Lau (2003) investigated the detailed basic elements of software piracy and social and environmental influences on the software piracy problem in Hong Kong and indicated some gender differences and the effect of education. According to Gupta Pola, Gould, and Pola (2004), age is one of the determinant factors influencing software piracy. Some studies identified the importance of pricing strategies for piracy (Husted, 2000; Sims, Cheng, & Teegen, 1996). Seale et al. (1998) reported that peoples sense of the proportional value of software has an indirect effect on piracy while Peace et al. (2003) indicated the direct effect of software cost. In a more recent study, Gupta et al. (2004) presented a comparative study of ethical versus other influences on consumers’ software acquisition mode. They found that perception of economic loss plays a dominant role in software piracy. Tang and Farn (2004) studied the effect of interpersonal influence on softlifting intention and behavior in Taiwan. They concluded that financial gains become dominant when there is group pressure directed towards purchasing. Another observation is that, the type of tasks for which the pirated software is used is not limited to the area of specialization of the user (Gupta et al., 2004). This view is also supported by Rahim et al. (2000), who indicated that approximately half of the individuals used pirated software for their personal purposes.

Regarding the type of piracy, to the best of our knowledge, the available literature does not provide exploratory analysis and there are indications of the existence of a relationship between demographic factors and type of piracy (Rahim et al., 2000). Similarly, demographic factors and the use of the Internet have attracted special interest in the literature recently (see for example Cagiltay, Ogan, & Yildiz, 2001; Levy, 2002; Losh, 2003). However, the impact of the Internet on software piracy needs to be explored.

Available studies had generally focused on student and academic populations (see for example Ang & Lo, 1998; Im & Koen, 1990; Kini et al., 2004; Rahim, Seyer, & Rahaman, 1999, 2000; Solomon & O’Brien, 1990). Further observations show that it is also clear that there is very limited study of software piracy among IT professionals in various organizations (see for example Banerjee, 1992; Gupta et al., 2004; Oz, 2001). Despite the huge resources that society spends on the work of IT professionals, the research conducted on the ethical behavior of these practitioners (Oz, 2001) is quite limited. As such, software piracy among IT professionals and managers in organizations of different sectors still remains unexplored. The use of pirated software among IT professionals is entirely different from the academic community. This is also a matter of concern for the future growth of the IT community in general and software development organizations in particular. Furthermore, most of the software piracy-related studies were conducted either in the USA or South East Asia and their findings may not be applicable to the other parts of the world due to existence of social, economic and cultural differences (Rahim et al. 2000). Also research on software piracy among IT professionals may expand the important philosophical debate on intellectual property (Seale et al. 1998).

Turkey is a relatively highly populated young republic and is the world’s 17th most industrialized nation. Turkey has undergone a series of major changes during the last decade, such as entrance into customs union with the European Union (EU) in 1996 and inclusion on the list of candidate countries in 1999. These changes have had a certain impact on organizations and society (Aycan, 2001) and organizations are investing significant resources in the development of their human resources and IT. Due to the proliferation of IT among organizations, the impact of software piracy on the economy and the IT community will be far reaching. Most of the previous research in the country was devoted to either general human resource issues such as national profile and regional differences in using IT (Aycan & Fikret-Pasa, 2000), impact of culture in using IT (Aycan et al., 2000), social aspects (Bugra, 1990) and individual tendencies towards new technologies (Goregenli, 1997) or current figures related to software piracy (BSA Turkey, 2004). These studies do not address lenient attitudes of individuals towards piracy in the society and do not provide a systematic exploratory analysis on software piracy.

Against this backdrop, we have investigated the use of pirated software among IT professionals of government and private sector organizations in Turkey with reference to important concerned demographic factors such as gender, age, income, type of education and experience. In this study, we have also undertaken a comprehensive survey of the existing literature on software piracy.
The remainder of this paper is organized as follows: The following section introduces a discussion of various software piracy-related studies through a review of related literature. The next section describes the worldwide piracy scenario and software piracy in Turkey. Afterwards the research method and research designs are clearly stated. The results of the analysis are then presented and discussed. Finally, the paper concludes with the conclusions and directions for future research in this area.

2. Literature review

Software piracy was raised as a major issue of concern in the academic literature in the mid-1980s, when Mason (1986) presented the four major ethical issues of the information age, specifically mentioning intellectual property rights as an area for greater study. Much of the initial research into illegal software copying consisted of descriptive surveys measuring the attitudes and practices of individuals (Ang & Lo, 1998; Kowalski & Kowalski, 1990; Rahim et al., 1999, 2000; Simpson et al., 1994; Sims et al., 1996; Solomon & O’Brien, 1990; Wong, Kong, & Ngai, 1990). Other empirical research focused on ethical and legal aspects (Im & Koen, 1990; Johnson, 1985) and social costs (Conner & Rumlet, 1991; Mason, 1986). Software piracy has been investigated from other varied disciplinary perspectives also, such as level of moral development (Logsdon, Thompson, & Reid, 1994), gender (Banerjee, 1992; Solomon & O’Brien, 1990; Wong et al., 1990), age (Nyaw & Ng, 1994; Sims et al. 1996), experience (Kini, Rominger, & Vijayaraman, 2000; Christoph et al., 1987; Kowalski & Kowalski, 1990) and legislation (Koen & Im, 1997; Malhotra, 1994).

An important dimension in the study of piracy is the magnitude of the loss for software development organizations in terms of loss of sales (Givon, Mahajan, & Muller, 1995). Besides, consumers who do not pirate must pay extra to help cover those losses (Takeyama, 1997). According to an estimate 4 out of 10 business software applications installed worldwide in 1998 were pirated, resulting in revenue losses of $11 billion (BSA, 1999). Interestingly enough, few researchers have reported that, although organizations should protect their software as much as possible against piracy, it acts as an alternative distribution stream for software and may lead to an increase in sales, as more people will be aware of the product. According to Givon et al. (1995), software piracy may be responsible for more than 80 percent of new software buyers. Katz and Shapiro (1986) also supported this observation, stating that protecting against piracy may actually hurt a software firm’s profitability as the resulting lower base of users would reduce the software’s value.

Apart from being an illegal activity, piracy is also an ethical issue (Givon et al., 1995; Simpson et al., 1994; Sims et al., 1996; Wagner & Sanders, 2001) and Cogner, Loch, and Helft (1995) reported that ownership of information is one of the five crucial ethical issues in the information society. Simpson et al. (1994) list some of the motivating factors for piracy and note that pirating is often not considered to be unethical behavior. Therefore, merely increasing the awareness that piracy is a serious crime has benefits as a protective measure. The ethical justifications for protecting intellectual property are reviewed by Steidlmeier (1993). His analysis focuses on the western cultural values as the bases for restricting the use of property, including intellectual property. According to Steidlmeier (1993), two rights claims are used to legitimate copyright protection. The first one is the fundamental right to personal liberty on which all rights to private property are based. The second is the right to livelihood which is referred to as the right to get the result of one’s labor. If authors are not assured of the exclusive use of their innovation, there would be no incentive to develop them (Abbott, 1990; Samuelson, 1989). Therefore, only effective intellectual property rights protection can encourage software companies to be interested in staying in the business and contributing to the prosperity of the industry. However, many philosophers and economists contend that intellectual property rights should not be protected by law (Davidson, 1989). According to their view such protection is anti-competitive, monopolistic and stifling to innovation.

Regarding copyright protection and the impact of culture Eining and Christensen (1991) found that business students lacked an understanding of the laws regarding copying software. However, Swinyard, Rinne, and Kau (1990) observed that knowledge of copyright laws does little to discourage unauthorized copying and for people the benefits outweigh the legal concerns. Further, they argue that moral judgments may differ according to culture or national origin. Tang and Farn (2004) also supported the viewpoint that culture plays an important role and researchers have tried to discover the cultural differences in the ethical dimensions. Reasonable explanations in terms of different cultural dimensions have been proposed (Eining &
Christensen, 1991; Nyaw & Ng, 1994; Swinyard et al., 1990; Vitell, Nwachukwu, & Barnes, 1993). Gopal and Sanders (1998) also stated that there is need to study the cross-cultural aspects of software piracy. Studies by Moores and Dhillion (2000) in Hong Kong and Moores and Dhaliwal (2004) in Singapore state that even in culturally similar markets different approaches may be required to combat software piracy. Other studies by Shore, Venkatachalam, and Solorzano (2001), Husted (2000) and Goodwin and Goodwin (1999) also observed the effects of culture on software piracy, while meta-analysis done by Ford and Richardson (1994) indicates that reference groups influence a person’s ethical decision making in most studies. Al-Jabri and Abdul-Gader (1997) also confirm the influence of group belief on software piracy behavior. Social pressure is a powerful determinant of behavior (Lau, 2003).

Some studies reported the importance of the cost and financial gains as crucial factors in motivation towards pirating software (Simpson et al., 1994; Swinyard et al., 1990). Moores and Dhaliwal (2004) concluded that cost is a dominant factor but software vendors are least likely to address this in their fight against software piracy. In this regard Gopal and Sanders (2000), proposed a strategy for combating piracy using price discrimination. Chen and Png’s (1999) findings also support the use of price discrimination strategies to reduce illegal software copying. While currently not part of the strategy of organizations such as the BSA and the SIIA, the cost factor may have to be taken into account by developers in setting a price for their software (Peace et al. 2003). According to Peace et al.’s (2003) empirical study higher the cost of software; the more likely it is that the individual will copy the software illegally. Swinyard et al. (1990) proposed a trade-off analysis regarding influence of ethical decision-making under different financial gains. Another aspect common to intellectual property is that its retail price often does not reflect its production cost (Seale et al. 1998). Perceptions of price and value are important to consumers (Zeithaml, 1988), and our sense of proportional value requires that the price of our purchase be reflected in its cost (Hettinger, 1989). Similarly, material consequences (the perceived value of gains and losses associated with software piracy, including punishment factors) have been found to have a significant effect on illegal software copying behavior (Eining & Christensen, 1991).

3. Worldwide piracy scenario and Turkey

The piracy rate is defined as the amount of software pirated as a percent of total software installed in each country. According to international planning and research for the BSA/SIIA, the difference between software applications installed (demand) and software legally shipped (supply) equals the estimate of software applications pirated (Cuciz, 2004). The piracy rates vary from country to country, but they can be summed up at a world region level. Research conducted by the SIIA (Software and Information Industry Association) shows how the phenomenon is worldwide. According to the BSA, Russia and Asia have the most active pirate markets, with peaks of up to 90% of all their software being illegitimate copies. The software piracy rate in Asia in the year 2000 was 51% with a worldwide average of 37%. According to the latest research conducted by the BSA the Asia-Pacific region (China, Thailand, Taiwan, Philippines and other countries) was the only region to see an increase in its piracy rate for 2001 (BSA, 2002). In 2000 alone, the software industry in Europe lost $3 billion to pirates.

There is good news in that the global piracy rate for commercial software has decreased 10 points over the last 8 years, in all regions of the world (www.bsa.org/globalstudy2003/). According to this report, intensified education efforts are critical to shrinking the piracy problem further. According to the BSA, the global software piracy rate declined to 39% in 2002, from its 1994 all-time high of 49%. The Middle East/Africa region is the most improved region with a 31-point reduction in piracy, from 80% in 1994 to 49% in 2002. At 23% in 2002, the US piracy rate decreased eight points from 31% in 1994, and is still the lowest of all the countries worldwide (BSA, 2004).

Turkey’s efforts to protect intellectual property rights date back to 1951. However, rapid developments in hardware and software technologies, especially the introduction of PCs in the early 1980s, made it essential to adopt major amendments to the existing law. To this effect, in June 1995, in line with a European Council Software Directive, important amendments improved the 1951 law by adding protection for software and sound recording media. Those amendments increased the penalties by considerable amounts. In February 1998, the Turkish prime minister signed a circular requiring all government offices to adopt measures designed
to legalize their software. Those measures include auditing and separate budgeting for software purchases (BSA Turkey, 2004).

Meanwhile, BSA Turkey (www.bsa.org.tr) was formed in December 1995 with 15 member software companies to protect the software vendors. According to BSA research conducted by International Data Corporation (IDC), if the 58% piracy rate (2001) in business software applications can be reduced by 10 points, the Turkish Informatics market size can increase from $1.4 billion to $3.8 billion by 2006. Intellectual property rights law had further amendments approved by the Turkish Government on 12 March 2004, modifying the amount and type of penalties. As a positive impact of these amendments, the desire to comply with the EU proposals and the increase in public awareness, a decrease in piracy levels is expected.

4. Hypotheses

To be in parallel with the existing literature the present study performs a detailed investigation of the population of IT professionals in Turkey. Rather than focusing on their profile, we use a systematic and exploratory analysis approach to investigate the impact of demographic factors on selected software piracy factors. The demographic factors constitute independent variables and the piracy factors constitute dependent variables.

The dependent variables were categorized into three empirical factors as follows:

- personal attitudes towards software piracy,
- technical aspects of software piracy,
- effect of the Internet.

The justification for each empirical factor and the corresponding hypotheses that were extracted based on prior literature are provided below.

4.1. Personal attitudes towards software piracy

The attitudes and behaviors of individuals are influenced by factors such as gender, age, income, type of education and experience (Jaeger, 2003) and engaging in a behavior relatively frequently makes it likely that an individual will repeat it (Gupta et al., 2004). Rahim et al. (1999, 2000) reported a significant relationship between some demographic factors and use of pirated software. The present study therefore proposes the following hypothesis.

**H1.** Demographic parameters have impact on the “use of pirated software.”

The level of use of pirated software depends on various factors such as pricing strategies, sense of urgency for original software, availability of original software and existence and knowledge of computer software copyright law (Lau, 2003). Such factors influence professionals’ likelihood of participating in software piracy (Rahim et al., 2000; Simpson et al., 1994). Against this backdrop, we propose the following hypothesis.

**H2.** Demographic parameters have impact on the “reason for using pirated software.”

4.2. Technical aspects of software piracy

The type of tasks for which the pirated software is being used was not limited to the field of specialization of these users (Ang & Lo, 1998; Gupta et al., 2004; Lau, 2003). More specifically, Rahim et al. (1999, 2000) reported that students used pirated software for non-academic applications and half of the academics used pirated software for their personal use. These findings lead to the following hypothesis.

**H3.** Demographic parameters have impact on the “type of pirated software used.”

Although most of the existing literature provides either qualitative or descriptive information for the type of piracy rather than a systematic and exploratory analysis (Dakin & Karl, 1997; Shore et al., 2001; Tang & Farn, 2004), the literature provides some evidences for the relationship between demographic factors and
types of piracy (Rahim et al., 2000). The present study therefore proposes the following hypothesis for the types of piracy.

**H4.** Demographic parameters have impact on the “type of piracy.”

### 4.3. Effect of the Internet

The Internet is defined as the use of technology as a means to deliver services to citizens, businesses and other entities (Tambouris, 2001). Various studies reported a relationship between demographic factors and use of the Internet (Levy, 2002; Losh, 2003). The impact of demographic factors on the effect of the Internet on piracy is an area which has not been studied yet and our fifth hypothesis is therefore:

**H5.** Demographic parameters have an impact on the “effect of the Internet on piracy”

### 4.4. Research design

#### 4.4.1. Research instrument and the data

A survey approach was adopted for this study and the data were obtained by means of a questionnaire prepared in Turkish. We developed a pilot version of the research instrument and distributed it to a group of IT professionals to get their suggestions and clarifications, and tried to integrate their suggestions as much as possible.

The questionnaire contains 10 questions which involve 10 variables as given in Table 1. The proposed independent variables of this study are gender, age, income, type of education and experience level whereas the dependent variables are “the use of pirated software”, “the reason for using pirated software”, “the type of pirated software used”, “the type of piracy” and “the effect of the Internet on piracy”. It is important to note at this point that, except for “use of pirated software,” the other piracy variables have not been used by any other known study at least in this context. For questions 7–9 respondents are asked to choose one or more of the alternatives.

The respondents were IT professionals from major government and private sector organizations who were the attendees of the annual 1 day meeting on issues (problems and recent developments) in the use of IT in organizations, organized by the Turkish Informatics Association (TIA). The numbers of invitations were limited to 250 organizations using “judgment sampling” and a total of 162 completed survey questionnaires were received. Thus, the approximate response rate was 65 per cent.

#### Table 1

<table>
<thead>
<tr>
<th>Quest.</th>
<th>Var.</th>
<th>Definition</th>
<th>Range of values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>Gender of respondent</td>
<td>Male/female</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>Age of respondent</td>
<td>&lt;=30, 31–40, 41–50, &gt;50</td>
</tr>
<tr>
<td>4</td>
<td>Education</td>
<td>Education type of respondent</td>
<td>Graduate of comp./IT, graduate of comp./IT related, graduate of comp./IT related and having an IT certificate, none of these</td>
</tr>
<tr>
<td>5</td>
<td>Experience</td>
<td>Years of experience of respondent in computer/IT</td>
<td>&gt;=10 years, 11–20 years, &gt;20 years</td>
</tr>
<tr>
<td>6</td>
<td>Piracy</td>
<td>Respondent’s use of pirated software</td>
<td>Yes/no</td>
</tr>
<tr>
<td>7</td>
<td>Reason</td>
<td>Respondent’s reason for using pirated software</td>
<td>Economic, bureaucratic, type of work, personal attitudes</td>
</tr>
<tr>
<td>8</td>
<td>Software type</td>
<td>Type of pirated software used by respondent</td>
<td>Application, professional/research, system, entertainment</td>
</tr>
<tr>
<td>9</td>
<td>Piracy type</td>
<td>Type of piracy used by respondent</td>
<td>Downloading, unauthorized access to sites/documents, unauthorized copying/illegal purchasing of licensed software</td>
</tr>
<tr>
<td>10</td>
<td>Internet</td>
<td>Does the Internet have effect on piracy?</td>
<td>Yes/no</td>
</tr>
</tbody>
</table>
Mood’s median test was selected to investigate the impact of demographic factors (H1–H5) for each empirical category. Mood’s median test provides a nonparametric alternative to the one-way analysis of variance and is robust against the outliers and errors in the data relative to the usual normal theory $F$ test (Mendelhal & Sincich, 1989). The $\chi^2$ test method is used whenever there is a need to examine the relationship between the dependent and independent variables.

5. Results

5.1. Descriptive results

The background profile of respondents is provided in Table 2.

The male respondents were observed to be dominant (82%) in this survey. This is expected because it is generally observed in the society that the majority of professionals working in the field of IT are males. This observation is especially true for rural areas. Of the males, 18% used pirated software and this percentage for females was 14%.

An inspection of Table 2 shows that the observations were accumulated around 31–50 years of age and the average age of respondents was calculated to be 39.7.

The income distribution showed a high percentage for the group of 1000–2000 YTL (52%). This is to be expected because the majority of respondents were from government organizations (71%) and the salary standards in the government sector are lower than that of the private sector.

The results showed that IT graduates (27%) are heavily outnumbered by those of other fields (73%). This is not surprising because, as noted above, most of the respondents were from the government sector and government organizations generally employ graduates of other fields in their IT departments due to their lower salary demands. The $\chi^2$ test results did not show any significant relationship between the type of education and use of pirated software ($\chi^2 = 0.00$, $df = 3$, $p$-value = 1.000).

![Table 2](image-url)
The distribution of experience was found to be in parallel with the age distribution, as expected. The experience of respondents was clustered around 11–20 years (79%) and the average number of years of experience was 16.9.

5.2. Test results

Mood’s median test results are summarized in Table 3.

5.2.1. Personal attitudes towards software piracy

The inspection of $p$-values in Table 3 indicated that there is no sufficient evidence to accept $H_{1i}$ ($i = 1, 2, \ldots, 5$). This means that demographic factors do not have any impact on the use of piracy. Besides, it can also be observed from the second column of Table 3 that, except for hypotheses $H_{23}$ and $H_{24}$, all the remaining ones were supported by the survey results. In other words, gender, age and experience have significant impact on the reason for using the pirated software.

5.2.2. Technical aspects of software piracy

The third column of Table 3 shows that, except for hypothesis $H_{31}$, all the remaining ones were not found to be significant at 5 percent significance level in this category. This means that gender has significant impact on the type of pirated software. On the other hand, the fourth column in Table 3 shows that $p$-value is 0.014 for $H_{41}$ and we accept this hypothesis. This means, gender data do not come from identical populations in terms of type of piracy. This may also be interpreted as gender having significant impact on the type of piracy.

5.2.3. Results for effect of the Internet

The inspection of the last column in Table 3 indicated that there is no sufficient evidence to accept $H_{5i}$ ($i = 1, 2, \ldots, 5$). This concludes that demographic factors do not have any impact on the effect of the Internet in piracy.

Table 3

Summary of test results$^a$

<table>
<thead>
<tr>
<th>Test var.</th>
<th>Independent variables</th>
<th>Piracy</th>
<th>Reason</th>
<th>Software type</th>
<th>Piracy type</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Hyp: $H_{11}$</td>
<td>$\chi^2$: 0.60</td>
<td>$\chi^2$: 8.00</td>
<td>$\chi^2$: 4.80</td>
<td>$\chi^2$: 6.00</td>
<td>$\chi^2$: 2.40</td>
</tr>
<tr>
<td></td>
<td>d.f.: 1</td>
<td>d.f.: 1</td>
<td>d.f.: 1</td>
<td>d.f.: 1</td>
<td>d.f.: 1</td>
<td>d.f.: 1</td>
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<tr>
<td></td>
<td>$p$-val: 0.439</td>
<td>$p$-val: 0.005$^a$</td>
<td>$p$-val: 0.028$^a$</td>
<td>$p$-val: 0.014$^a$</td>
<td>$p$-val: 0.121</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Hyp: $H_{12}$</td>
<td>$\chi^2$: 0.00</td>
<td>$\chi^2$: 12.95</td>
<td>$\chi^2$: 6.00</td>
<td>$\chi^2$: 4.00</td>
<td>$\chi^2$: 0.00</td>
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<tr>
<td></td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
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<tr>
<td></td>
<td>$p$-val: 1.000</td>
<td>$p$-val: 0.005$^a$</td>
<td>$p$-val: 0.112</td>
<td>$p$-val: 0.261</td>
<td>$p$-val: 1.000</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>Hyp: $H_{13}$</td>
<td>$\chi^2$: 0.00</td>
<td>$\chi^2$: 5.33</td>
<td>$\chi^2$: 2.00</td>
<td>$\chi^2$: 3.00</td>
<td>$\chi^2$: 0.54</td>
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<tr>
<td></td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
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</tr>
<tr>
<td></td>
<td>$p$-val: 1.000</td>
<td>$p$-val: 0.149</td>
<td>$p$-val: 0.572</td>
<td>$p$-val: 0.392</td>
<td>$p$-val: 0.910</td>
<td></td>
</tr>
<tr>
<td>Educ.</td>
<td>Hyp: $H_{14}$</td>
<td>$\chi^2$: 0.00</td>
<td>$\chi^2$: 2.00</td>
<td>$\chi^2$: 6.00</td>
<td>$\chi^2$: 4.00</td>
<td>$\chi^2$: 1.54</td>
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<tr>
<td></td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
<td>d.f.: 3</td>
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<td>d.f.: 3</td>
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<tr>
<td></td>
<td>$p$-val: 1.000</td>
<td>$p$-val: 0.572</td>
<td>$p$-val: 0.112</td>
<td>$p$-val: 0.261</td>
<td>$p$-val: 0.673</td>
<td></td>
</tr>
<tr>
<td>Exp.</td>
<td>Hyp: $H_{15}$</td>
<td>$\chi^2$: 0.00</td>
<td>$\chi^2$: 8.95</td>
<td>$\chi^2$: 0.69</td>
<td>$\chi^2$: 3.60</td>
<td>$\chi^2$: 0.00</td>
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<tr>
<td></td>
<td>d.f.: 2</td>
<td>d.f.: 2</td>
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<tr>
<td></td>
<td>$p$-val: 1.000</td>
<td>$p$-val: 0.012$^a$</td>
<td>$p$-val: 0.710</td>
<td>$p$-val: 0.165</td>
<td>$p$-val: 1.000</td>
<td></td>
</tr>
</tbody>
</table>

$^a$Indicates statistically significant at 5 per cent significance level.
6. Discussions

6.1. Gender

The present study revealed that gender does not have any impact on the use of pirated software. Although it was found that male IT professionals (18%) were using more pirated software than female IT professionals (14%), this difference between genders was not found to be statistically significant in terms of using pirated software ($\chi^2 = 0.093, \text{df} = 1, p\text{-value} = 0.761$). One plausible explanation for this result may be that, regardless of gender, respondents having similar background are likely to show similarities in ethical behavior. Our finding is consistent with that reported by Banerjee (1992), who did not find any disparity in gender. Similarly, Sacco and Zureik (1990) claim that gender has a negligible effect. Lau (2003), however, reports contradictory findings, and Sims et al. (1996), Wood and Glass (1995) and Solomon and O’Brien (1990) also concluded that female respondents have a lower tendency towards software piracy than males. This view is also supported by Rahim et al. (1999) who found that a significantly higher proportion (80%) of male respondents used pirated software as opposed to that of (53%) female respondents. The contradictory results may be because culture influences preferences and there are differences among different cultures from the human–computer interaction (HCI) point of view (Tang & Farn, 2004).

Our results do, however, indicate that gender has significant impact on the “reason for using pirated software”. This finding was also supported by the $\chi^2$ test results ($\chi^2 = 21.12, \text{df} = 7, p\text{-value} = 0.045$) that there is significant relationship between gender and the reason for using pirated software. For purely economic reasons, however, we found that females (39%) and males (35%) were almost equally lenient in using pirated software.

This study further found that gender has significant impact on “the types of pirated software”. Regardless of gender, system software (36%) and entertainment software (35%) are identified to be most pirated software types. These figures disagree with Rahim et al. (1999) who reported that, of the respondents using pirated software, 95% pirate entertainment software and only 21% pirate others. Gupta et al. (2004) also reported similar results (71% for entertainment and 13% for others). The conflicting results may be explained by the difference in the characteristics of the populations from which the samples were drawn. On the other hand, although IT professionals have more experience than other professions with regard to piracy, the level of their moral orientation and awareness of ethical issues and copyright laws deter their piracy.

In our study, the unauthorized copying of software was found to be the most common form of piracy for males (47%) and for females (56%). However, this association was not observed to be significant. These figures are much lower than those of Hong Kong (Wong et al., 1990) and much higher than those of Brunei Darussalam (Rahim et al., 1999). The contradictory results may be an interesting indication of effect of cultural, social and economic circumstances in different countries as noted by Tang and Farn (2004) and Cakir, Bichelmeyer, and Cagiltay (2002).

6.2. Age

The test results indicated that age has significant impact on the reason for using pirated software. In general, the percentage of the younger group of IT professionals using pirated software (16%) is higher than the older ones (11%). The $\chi^2$ test results ($\chi^2 = 26.09, \text{df} = 15, p\text{-value} = 0.023$) also showed that the reason for using pirated software changes significantly with the age of respondents. A similar result was reported by Gopal and Sanders (1997) and Nyaw and Ng (1994), who concluded that younger people were more likely to engage in software piracy than older people. This view was also supported by Kini et al. (2000) who reported that there is an “attitudinal tendency among younger people” to hold a less moral attitude towards piracy. All these may be an indication of the fact that older people exhibit more idealistic and stronger business ethics attitudes than younger people. In a somewhat contrary finding, Sims et al. (1996) indicated that older students were more likely to engage in software piracy than younger students. This may be due to greater degree of experience and opportunity of older students.
6.3. Income

Prior literature on the influence of income on lenient attitudes towards software piracy produced conflicting results. For instance, Husted (2000) indicated that the higher the level of economic development, the lower the rate of software piracy and Sims et al. (1996) found a significant relationship between household income and softlifting. In contrast, Rahim et al. (2000), Solomon and O’Brien (1990) and Wong et al. (1990) did not find any relationship between income and software piracy. The present study indicated that income groups are identically distributed in their population in terms of selected piracy factors. However, it is interesting to note that the relationship between income level and the reason for using pirated software was found to be significant ($\chi^2 = 28.98$, df $= 15$, p-value $= 0.015$). As noted before, in our study most of the respondents (71%) were from the government sector and their income level was reported to be clustered around the average (52%). Considering their income level, IT professionals using pirated software are likely to give higher priority to their basic needs and to find the price of original software expensive.

6.4. Education

Surprisingly, we have observed that type of education has no significant impact on software piracy. This finding is also supported by Logsdon, Thompson, and Reid (1994), who tested the hypothesis that the higher the level of personal development, the less likely the individual will hold the attitude that unauthorized software copying is acceptable. They did not find a strong relationship between these factors. A plausible explanation for our finding may be that most of the IT professionals included in the survey have similar educational background (72% of the respondents are graduate of either IT or IT related). Another explanation may be based on Logsdon et al. (1994). They argued that moral behavior cannot be predicted on one factor alone and that other factors also influence moral behavior.

6.5. Experience

The present study defines experience as the number of years at work. We observed significant diversity in the distribution of experience and no significant association for piracy factors in this category. Other studies that did not find a relationship between work experience and software piracy attitude/ethical behavior include Cohen and Cornwell (1989), Christoph et al. (1987), Kini et al. (2000), Kowalski and Kowalski (1990), Shore et al. (2001) and Wood and Glass (1995). Interestingly, Wong et al. (1990) found greater software piracy among computer-experienced students. This is also supported by Rahim et al. (1999) who found that computer experience is related to the use of pirated software.

An important finding is that use of the Internet has helped in the proliferation of piracy. This view was supported by 80% of the respondents to the study. Accordingly, 42% of the respondents were in favor of the downloading of software as their second most preferred type of piracy after unauthorized copying of licensed software (49%).

7. Conclusions

This paper presents an extensive literature review on software piracy and then reports the findings of an empirical study on the impact of demographic factors on software piracy factors among IT professionals in Turkey.

The analysis revealed that gender is one of the key factors for the tendency towards selected software piracy factors, except in the “the use of pirated software” and “effect of the Internet” categories. Besides this, age and experience were found to have an impact on the “the reason for using pirated software” only. However, income and type of education have no impact on software piracy.

$\chi^2$ tests showed that the younger professionals are more likely to engage in software piracy and the lack of knowledge of the consequences of software piracy among IT professionals therefore seems to be a key factor. This suggests that efforts to reduce software piracy should be directed to increasing the ethical awareness of IT professionals. It was also found that pricing of original software is a driver for lenient attitudes to software
piracy and keeping the price of original software at a reasonable level might help to deter software piracy (Lau, 2003).

The reader is referred to one of the author’s web site (www.atilim.edu.tr/~iakman) for the extended version of this paper.

Finally, for the followers of this paper, we propose to use larger samples which may lead to more insight into the reasons for piracy attitudes among IT professionals. Probably, an extension of the content of the survey will interest the reader in this direction. Last, the comparison and analysis of lenient attitudes of IT professionals from different sectors, such as government and private, will be of great value since the demographic factors such as income, education type/level and experience may show different structures for IT professionals in these sectors.

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