Comparative Analysis of Software Piracy Determinants among Pakistani and Canadian University Students: Demographics, Ethical Attitudes and Socio-Economic Factors

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ABSTRACT

Software piracy is widespread in many parts of the world. P2P websites such as Kazaa have made it easier to access pirated software, which has resulted in increased emphasis on the issue of software piracy in both the software industry and research community. Some factors that determine piracy include poverty, cultural values, ethical attitudes, religion, and education. Empirical studies have looked at software piracy as an intentional behaviour. This study explores the demographic, ethical and socio-economical factors that can represent software piracy as an unintentional behaviour among a developing country's university students. The author has conducted a comparative analysis of university students from Pakistan and Canada, two countries that differ economically and culturally. The results of the study indicate that software piracy behaviour is different in both groups of students, but that there are also some similarities. Future research directions and implications are also presented.

Keywords

intellectual property; software piracy behaviour; social norms; student attitude; ethics; culture; developing countries; Pakistan; Canada; structural equation models

To my daughter, Elma

You have given a new meaning to my life...

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1 INTRODUCTION

According to Husted (2000), knowledge and information are now more important factors in a national economy than the traditional physical assets that used to indicate economic well-being. Therefore, the protection of intellectual property (IP) has received increased attention in the recent past. Intellectual property refers to "the results of intellectual activity in the industrial, scientific, literary or artistic fields" (Forester & Morrison, 1990, p. 31) and a government plays its role to protect the rights of owners by preventing unauthorised use of this intellectual property for a limited period of time (Seyoum, 1996) by using different measures such as copyrights, trade agreements and patents.

Software is also an intellectual property and any unauthorized duplication of computer software is a crime. However, the practice of making illegal copies of software amounts to high rates in various parts of the world. Cheng, Sims & Teegen (1997) discovered *"can't afford software"* and *"software too expensive"* to be two of the top three reasons given by university students for pirating software (p.55). Cheng et al. (1997) found that these reasons considerably covaried with low household income of the research participants (students). Husted (2000) also suggested that level of economic development was inversely proportional to the rate of software piracy. However, studies have also shown that low national income and low personal incomes are not the only reasons for which software is pirated as Swinyard, Rinne, & Kau (1990) observed that attitudes towards software piracy are affected by cultural standards and customs.

Therefore, "the neglect of culture as an explanation of software piracy seems odd given the fact that cultural values have such a significant impact on a wide array of business practices in different countries" (Husted, 2000, p. 200).

1.1 Research Question

This research not only looks into the relationship between economic factors and software piracy, but also reflects on the cultural and ethical values and social norms that affect the trends of software piracy amongst students. The current study focuses on software piracy amongst university students – specifically with regard to its occurrence over the Internet, sharing (copying or borrowing) software on physical media such as floppy disks and CD-ROMs and buying pirated software from retail outlets. The research question for this project is to find whether software piracy behaviour among university students of a developing country can be conceptualized in terms of social and cultural norms and customs rather than in terms of intentions as has been described (for piracy amongst university students) in most of the literature (Lin, Hsu, Kuo & Sun, 1999; Kwong & Lee, 2002; Rahim, Seyal & Rahman, 2001; Limayem, Khalifa & Chin, 1999; Simpson, Banerjee, Simpson, Jr., 1994; Rahim, Rahman & Seyal, 2000; Tang & Farn, 2005; Gopal, Sanders & Bhattacharjee, 2004).

1.2 Research Justification

Empirical studies have been done on the subject of software piracy in different developing countries such as Saudi Arabia (Al-Jabri & Abdul-Gader, 1997), Thailand (Kini, Ramakrishna & VijayaRama, 2003; Leurkittikul, 1994), People's Republic of China (Wang, Zhang, Zang & Ouyang, 2005) Malaysia (Rahim, Rahman & Seyal, 2000),

India (Gopal & Sanders, 1998) and Jordan (El-Sheikh, Rashed & Peace, 2005). Theoretical studies involving some of the above and many other developing countries are also present in the literature (Shin, Gopal, Sanders & Whinston, 2004; Proserpio, Salvemini & Ghiringhelli, 2004; Moores, 2003; Gopal & Sanders, 1998, 2000; Husted, 2000; Andrés, 2006). Although Husted (2000) and Proserpio et al. (2004) included Pakistan as one of the countries in their respective analytical studies of software piracy, empirical studies on the software piracy issues of Pakistan do not exist in the literature. This seems odd considering the fact that the software piracy rate[1] in Pakistan is one of the highest in the world and the International Intellectual Property Alliance (IIPA) (2005a) has also recommended for many years that Pakistan should be a high priority on the watch list of countries for uncontrolled piracy of intellectual property including software. Moreover, most of the software piracy literature treats the act of piracy as an intentional behaviour. This research aims to identify those factors in regards to software piracy in a developing nation that can contradict this notion of intentional piracy behaviour and explain piracy as a behaviour that is the result of social norms creating a piracy favourable environment in a developing country's society. A comparative study can provide a means of highlighting differences and possible similarities of software piracy determinants between a developed and developing country. Therefore Canada was chosen for this purpose as it is culturally and economically different from Pakistan and can provide a contrasting view. Moreover, there hasn't been any recent Canadian

[1] The percentage of pirated software out of total software installed in a country is the software piracy rate for that country.

scholarly literature[2] in this context. This research can therefore help fill a part of that void and the results can provide a better understanding of a developing country's software piracy issues that can help the policy makers to address the problem more effectively.

1.3 Thesis Breakdown

This thesis is divided in multiple chapters. Chapter 2 begins with a discussion of intellectual property and then describes different forms of software piracy. It then presents a brief overview of software piracy levels across the world followed by a description of piracy situations in Canada and Pakistan. Chapter 3 begins with a discussion of empirical studies and the behavioural research models that have been employed in the literature to study software piracy. This chapter then provides a description of the research model developed for this study; the research question and hypotheses are also presented in this chapter. Chapter 4 details the adopted research methodology. Analysis of the collected data is presented in Chapter 5, followed by a discussion and implication of the results in Chapter 6. The appendices include the survey instruments used for this study and some of the statistical computations done for this study.

1.4 Chapter Review

This chapter introduced different factors that could determine software piracy with an emphasis on cultural elements. The research question and its justification have

[2] There was only one Canadian empirical (scholarly) study found in the literature (see Limayem et al., 1999). This study however relied on 98 research participants only and therefore cannot be considered very extensive.

been discussed briefly as well. The individual hypotheses of this study and the research model will be discussed in detail in subsequent chapters.

2 LITERATURE REVIEW

2.1 Background

The factors that have the potential to create an environment of software piracy in a developing country's society can be different[3] from those of a society in a developed country. This chapter will therefore provide a survey of previous attempts at understanding these factors. It is however necessary to look at two concepts that are vital to this research, i.e. intellectual property and software piracy.

2.1.1 Intellectual Property

> *If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively posses as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density at any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Invention then cannot, in nature, be a subject of property.*
>
> - Thomas Jefferson

> *Congress shall have power ... to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.*
>
> - The Constitution of the United States, Article 1, Section 8, 1788

[3] This is an assumption that will be examined in later parts of this thesis.

According to Merriam-Webster's Dictionary of Law, Intellectual property (IP) is a "property that derives from the work of the mind or intellect". Basically IP "refers to a legal entitlement which sometimes attaches to the expressed form of an idea, or to some other intangible subject matter" (Wikipedia, 2006a, para. 1). Also, "this legal entitlement generally enables its holder to exercise exclusive rights of use in relation to the subject matter of the IP" (Wikipedia, 2006a, para. 1). IP can also be defined as "the ownership of ideas and control over the tangible or virtual representation of those ideas" (Free On-Line Dictionary of Computing [FOLDOC], 2005). Moreover, IP law "regulates the ownership and use of creative works, including patent, copyright and trademark law" (Nolo, 2006).

Simply put, intellectual property is a realization of someone's idea or thought. Composed music, lyrics, paintings, published written work, and software are the intellectual property of the artists or the professionals that produced or developed them. This research, for instance, is the author's intellectual property. Authors, however, still debate the justifiability of the intellectual property laws (Siponen, 2004; Hettinger, 1989; Ladd, 1997; Stallman, 1995; Weckert, 1997). Although detailed discussion on their arguments is out of the scope of this research, it is important to have a broad view of the concepts.

Ethicist Richard Mason (1986) identified four main ethical issues of the information age: privacy, accuracy, property and accessibility. It has been suggested that Mason's work was very significant in the field of Management Information Systems (MIS) ethics (Freeman & Peace, 2005). Mason (1986) considered intellectual property "as one of the most complex issues we face as a society" (p. 9). Mason identified

bandwidth as the real threat in the digital world and viewed it as a scarce and fixed commodity at the time. However, with the rapid progress of hardware and software technology, bandwidth has increased immensely and has therefore given rise to peer-to-peer (P2P) technology. More on this technology will be discussed in the next section.

There are a number of organizations (national and international) that are working towards the protection of intellectual property rights. Some of the prominent ones are:

- Recording Industry Association of America (RIAA) (http://www.riaa.com/default.asp): It represents the U.S. music recording industry's intellectual property rights.
- Business Software Alliance (BSA) (www.bsa.org): It "is a watchdog group dedicated to fighting software piracy, educating computer users about software copyrights and cyber-security, and advocating public policy for electronic commerce, international trade, intellectual property protection, export controls, and emerging technology issues" (SearchWebServices.com, 2006, para. 1)
- Canadian Alliance Against Software Theft (CAAST) (www.caast.org): CAAST is based in Canada. It works with BSA and shares common objectives.
- International Intellectual Property Alliance (IIPA) (www.iipa.com): It "is a private sector coalition formed in 1984 to represent the U.S. copyright-based industries in bilateral and multilateral efforts to improve international protection of copyrighted materials" (IIPA, 2005b, para. 1).
- Software & Information Industry Association (SIIA) (www.siia.net): It is an international organization. It "protects the intellectual property of member companies,

and advocates a legal and regulatory environment that benefits the entire industry" (SIIA, 2006, "Principal Mission", para. 2).

- World Intellectual Property Organization (WIPO) (www.wipo.int): It is one of the United Nation's specialized agencies and promotes the use and production of intellectual property.

- World Trade Organization (WTO) (www.wto.org): In WTO's own words, it "is the only global international organization dealing with the rules of trade between nations. At its heart are the WTO agreements, negotiated and signed by the bulk of the world's trading nations and ratified in their parliaments" (WTO, 2006, para 1). One such agreement is Trade-related aspects of intellectual property rights (TRIPS) which aims at bringing the IP rights around the world under common international rules.

Besides these organizations working towards their objectives nationally or internationally, many countries have their own intellectual property laws protecting the rights of individuals and organizations alike. However, as is the case with the justification of having IP rights and laws in the first place, some of these established laws are also considered debatable. For example, the Digital Millennium Copyright Act (DMCA) is usually seen as a controversial law approved by the U.S. Congress in 1998[4] (SearchCIO.com, 2006). The Copyright Act of Canada (Department of Justice Canada, 2006) provides protection to intellectual property in Canada. It considers computer programmes (or software) to be literary work and therefore has several laws controlling their unauthorized copying and distribution. Similarly, computer programmes are

[4] For more discussion on the controversial aspects of DMCA, see http://www.eff.org/IP/DMCA/20020503_dmca_consequences.pdf; http://chronicle.com/free/v48/i47/47b00701.htm

considered literary work under the Copyright Ordinance, 1962 of Pakistan. A significant amendment was made to this ordinance in 1992 called the Copyright (Amendment) Act, 1992. This amendment addressed the copyright issues of computer software in more detail than the original Copyright Ordinance.

With society's transition to a digital world, copyright protection has become an important area of IP law (Blanke, 2004). It is evident from the discussion above that intellectual property rights hold immense importance in today's world. However, justification of IP rights and laws continues to be a debate among the subject experts. "On one hand are those who believe that anything they conjure up, anything that transforms an idea into form, is intellectual property. On the other are the individuals who believe just as passionately that the entire notion of intellectual property is at best a farce, at worst just another way to suck profits out of the ether" (Gantz & Rochester, 2004, p. xxiii). For example, Hettinger (1989), Ladd (1997), Stallman (1995) and Weckert (1997) view software as an intangible commodity and therefore favour its copying. Weckert reflected on intellectual property rights concerning software as unjustifiable. Hettinger holds similar views on IP rights and their protection. Hettinger suggested that patents and trade secrets are more difficult to justify than copyrights which "restrict only copying an expression of an idea" (Hettinger, 1989, p. 52). Siponen however argues that "it is fair and just for people to claim financial rewards for their creations" (Siponen, 2004, "Concluding remarks" section) and that respecting IP laws and rights is necessary for the society to live in harmony.

2.1.2 Software Piracy

Sims, et al. (1996) define software piracy as "the illegal copying of computer software" (p. 839). Copying software is easy and can be carried out in many forms. Moores (2003) identified common forms of software piracy as counterfeiting, Internet piracy, and softlifting (see below for the definition). He further noted, that "counterfeiting and Internet piracy both involve creating bootlegged copies of licensed software for sale or distribution. Internet piracy makes use of the Internet to distribute the software, and has become a particular concern for vendor organizations" (Moores, 2003, p. 208). Softlifting is also a very common type of software piracy among businesses that install single-user licensed software on multiple machines (Rahim, Seyal, & Abdul-Rahman, 2001; Simpson, Banerjee, & Simpson, 1994). Another kind of software piracy involves software installation by retailers onto the hard disk drives of customers' personal computers (PCs) in order to encourage the sale of hardware. Software & Information Industry Association (SIIA) describes 10 types of software piracy. The following are direct quotes from SIIA website (SIIA, 2005) about those types that are relevant to this research[5].

- **Softlifting:** Softlifting 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. Typical examples of softlifting include, "sharing" software with friends and co-workers and installing software on home/laptop computers if not allowed to do so by the license. In the corporate environment, softlifting is the most

[5] Forms of software piracy other than the ones described here also exist, e.g. "Key sharing" which refers to the use of different serial numbers or cracked installation keys for the same software. However, this study has only looked into the four types of software piracy that are discussed in this chapter.

prevalent type of software piracy - and perhaps, the easiest to catch.

- **Hard-disk Loading:** Hard-disk loading occurs when an individual or company sells computers preloaded with illegal copies of software. Often this is done by the vendor as an incentive to buy certain hardware.
- **CD-R Piracy:** CD-R piracy is the illegal copying of software using CD-R recording technology. This form of piracy occurs when a person obtains a copy of a software program and makes a copy or copies and re-distributes them to friends or for re-sale. Although there is some overlap between CD-R piracy and counterfeiting, with CD-R piracy there may be no attempt to try to pass off the illegal copy as a legitimate copy - it may have hand-written labels and no documentation at all.
- **Internet Piracy:** Internet piracy is the uploading of commercial software (i.e., software that is not freeware or public domain) on to the Internet for anyone to copy or copying commercial software from any of these services. Internet piracy also includes making available or offering for sale pirated software over the Internet. Examples of this include the offering of software through an auction site, IM, IRC or a warez site. Incidences of Internet piracy have risen exponentially over the last few years.

2.2 Why is Software Piracy an Important Issue?

Software piracy directly affects the earnings and profitability of the software industry, especially American software industry as it produces about 80% of the world's software (SIIA, 2005). "Countries have concerns about loss of jobs (software industry

plus distribution and support businesses)" (Simmons, 2004, p. 1). Software piracy also causes loss of earnings to the firm and loss of tax revenue to the economy of the country (Simmons, 2004; Givon, Mahajan & Muller, 1995). The second annual Business Software Alliance (BSA) and IDC global software piracy study claims that "For every two dollars' worth of software purchased legitimately, one dollar's worth was obtained illegally" (BSA, 2005, p. 3). The same study reports that over $90 billion[6] worth of software was installed through out the world in 2004 but legitimately obtained software amounted to more than $59 billion only. This kind of loss due to software piracy hampers software developers' and vendors' incentives to invest in research and development and consumers eventually bear the cost of software piracy in the form of increasing cost of commercial software (Hinduja, 2003; Takeyama, 1997; Glass & Wood, 1996) and job losses (BSA, 2001). Such estimates of software piracy indicate that it prevails globally and causes software manufacturers billions of dollars in loss annually (Peace, Galletta, & Thong, 2003; Seale, Polakowski, & Schneider, 1998). Software is easy to copy. This makes software piracy almost impossible to stop (Britz, 2004), making the issue immensely important for software industry.

2.3 Justifying Software Piracy

As is the case with intellectual property, issues surrounding software piracy are debated as well. For example, worldwide software piracy figures reported by BSA are cited by almost every published article on software piracy. However, many authors consider BSA's methodology for calculating the levels of software piracy and the amount of reported monetary losses incurred as highly controversial (Locklear, 2004; *Dodgy*

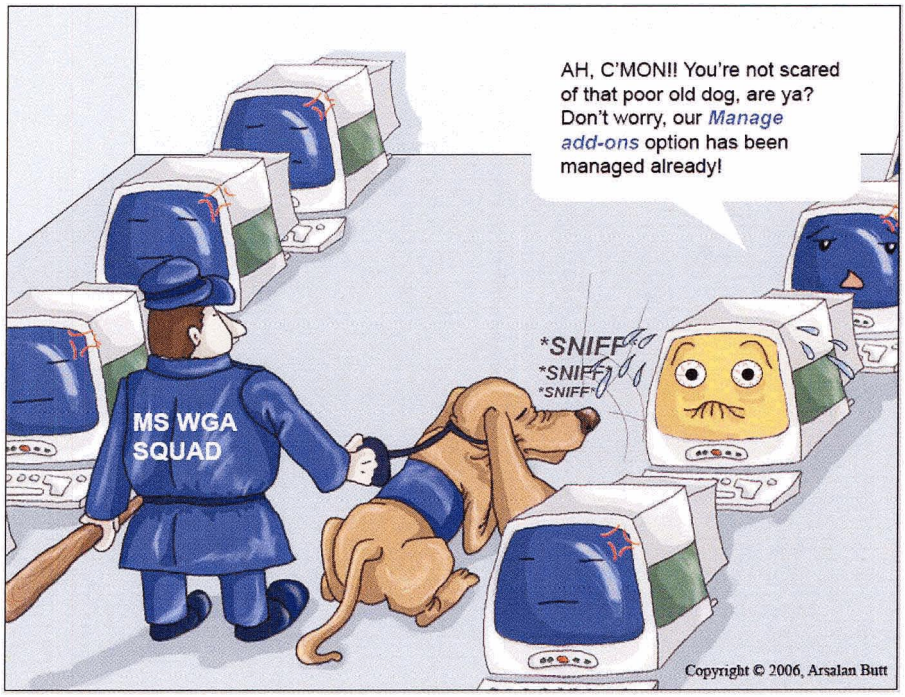
[6] All amounts reported are in U.S. dollars, unless stated otherwise.

software piracy data, The Economist, 2005). Even IDC (www.idc.com), an organization which has worked for BSA on the latter's 2004 and 2005 world software piracy reports, has commented that the conclusions presented in the 2004 BSA study were exaggerated (Locklear, 2004). Some authors, however, have argued that software piracy increases the popularity of the product itself as suggested by (Slive & Bernhardt, 1998) that "a software manufacturer may permit limited piracy of its software. Piracy can be viewed as a form of price discrimination in which the manufacturer sells some of the software at a price of zero" (p. 886).

A similar opinion was voiced by Microsoft Founder, Chairman, and Chief Software Architect Bill Gates in 1998. Gates reportedly said, "Although about three million computers get sold every year in China, people don't pay for the software. Someday they will, though. And as long as they're going to steal it, we want them to steal ours. They'll get sort of addicted, and then we'll somehow figure out how to collect sometime in the next decade" (CNN.com, 2001). This may also suggest that software manufacturers can allow initial piracy of their product as a strategy to enter or monopolize the market by making consumers attached to a particular software only (as could be the case for Microsoft's operating system Windows), since the purchasing power of the average consumer does not allow him/her to purchase the legal product at full price. Bill Gates faced a lot of criticism for his comments as Microsoft itself is probably the strongest advocate of the anti-software piracy campaign, the company's products being widely pirated all around the world. Microsoft adopts several ways (including legal actions) to curb software piracy and pirates (see: BetaNews 2006a; Pakistan Link, 2005a). In the year 2005, Microsoft launched a Windows Genuine

Advantage (WGA) program as a means to identify pirated version of windows. According to this program, users wishing to download non-critical updates have to first get their windows authenticated as genuine (legitimate) copies. Buckler (2005) views this policy is invasive to personal property. However, as many other anti-piracy mechanisms have failed, this particular one was cracked within 24 hours of its launch (Kerner, 2005; BoingBoing.net, 2005). An even easier method to bypass WGA was eventually found by the online community. This simple process requires disabling one of the add-on options in Internet Explorer (Wikipedia, 2006c).

Figure 2-1 Bypassing WGA – A matter of few clicks



Givon, et al. (1995) stated that "software piracy permits the shadow diffusion of a software parallel to its legal diffusion in the marketplace, increasing its user base over time. Because of this software shadow diffusion, a software firm loses potential profits,

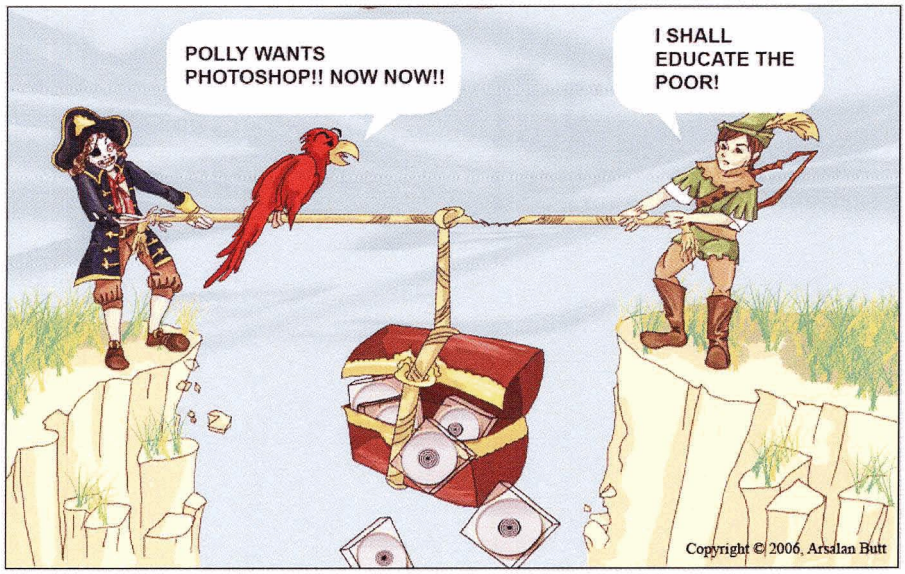
access to a significant proportion of the software user base, opportunities for cross-selling, and marketing its other products and new generations of the software. However, shadow diffusion may influence the legal diffusion of the software. Software pirates may influence potential software users to adopt the software, and some of these adopters may become buyers" (p. 1). LaRue (1985) also suggested that software publishers could eventually benefit by adopting a shareware marketing strategy of their software. This strategy is currently adopted by many software manufacturers and as Karon (1986) noted, the idea of such marketing strategies has also been supported by the president of an education software firm who believes that some pirates may eventually buy their products due to value-added benefits. Slive and Bernhardt (1998) also stated that piracy of software by home users can be viewed as a price discrimination strategy by the manufacturer (selling software for free) which will eventually increase the demand for the software by business users.

According to The Linux Information Project [LINFO] (2006), the critics of the concept of software piracy argue that the terminology associated with this concept is deliberately manipulated by the major commercial software developers. "That is, use of the term piracy itself is also highly controversial in a software context" (The Linux Information Project [LINFO], 2006, "Inappropriate Terminology" section, para. 1). And "this is also because it implies that people or organizations that create or use copies of programs in violation of their [end user licensing agreement] EULAs are similar to *pirates*. Pirates are violent gangs that raid ships at sea in order to steal their cargoes and rob their crews; they also frequently injure or kill the crews and sink their ships. Critics of this terminology claim that it was chosen for its dramatic public relations value rather

than because of any relationship to the traditional use of the word" (LINFO, 2006, "Inappropriate Terminology" section, para. 2).

Another factor that has been shown to associate directly with computer abuse is called the Robin Hood Syndrome (Forester & Morrison, 1990; Perrolle, 1987; U.S. Department of Justice, National Institute of Justice, 1989a, 1989b). Harrington (2002) describes the Robin Hood syndrome as "the belief that harming a large organization to the benefit of an individual is the right behavior" (p. 180). In her study of software piracy, Harrington found that people high in Robin Hood Syndrome are more likely to pirate software as this syndrome allows an "individual to neutralize ethical judgments about software piracy and copy software offered for sale by large organizations" (p.181). The Robin Hood Syndrome could be applied in the context of developing countries as well, where software piracy is justified on the grounds "that it is unfair to charge prices in low income countries that are comparable to those in the higher income countries, and thus virtually unaffordable by most citizens and many businesses in such countries" (LINFO, 2006, "Reasons and Justifications For" section, point 4).

Figure 2-2 Can Software Piracy be Justified?



The purpose of this research is not to justify software piracy in a developing country such as Pakistan or any other part of the world. The author believes that software piracy is illegal and an unethical behaviour. However, it is equally important to stress the fact that depending upon the circumstances, individuals either inevitably *have to* indulge in this behaviour, reasons for which will be discussed later; or they have the option of pirating software, that is to say they do it because they *can.* Another important clarification that needs to be established at this point is that this research mainly focuses on individual piracy rather than commercial piracy (organizations producing pirated software on a large scale for selling purposes) which is purely done for profit. Commercial piracy however is a crucial element that creates a piracy facilitating environment in a society and will therefore be discussed where relevant. However as stated earlier, the focal point of this research is individual piracy by university students.

2.4 The Dilemma of Online Piracy

Faster internet speeds and the availability of more bandwidth have made online piracy of intellectual property very easy. Songs, videos, books, software, images, PC and console based games are swapped between online users. "May 1999 is a noteworthy month in the history of the Internet for it is during this month that Napster, the music sharing program, made its appearance and grew in use in an extraordinary fashion" (Rosenberg, 2004, p. 426). As Rosenberg discussed, file sharing and especially sharing of music files has been around for many years but the case of Napster proved to be a landmark in the history of P2P technology in two ways. First, it introduced a whole new way of music sharing by providing a central resource for searching for distributed files. Second, it stirred the American music industry to such an extent that the RIAA sued Napster on December 7, 1999 on grounds of copyright infringement. After about two years of legal battle, Napster lost the case and filed for bankruptcy.

However, newer programs based on P2P technology started to emerge on the Internet. Kazaa and Morpheus are two such prominent programmes. Owners of Kazaa and Morpheus have also been sued by RIAA and similar agencies in various countries, with some of the cases going in favour of Kazaa and Morpheus (Borland, 2003a, 2003b; Cha, 2002). More recently BitTorrent websites have emerged on the scene and are rapidly gaining popularity. "According to British Web analysis firm CacheLogic, BitTorrent accounts for an astounding 35 percent of all the traffic on the Internet -- more than all other peer-to-peer programs combined" (Pasick, 2005). Developed by Bram Cohen, BitTorrent is a content distribution protocol that enables distribution of large amounts of data. It is an efficient P2P file sharing protocol because its use does not

require valuable server and bandwidth resources (Wikipedia, 2006b; SearchMSB.com, 2006). Instead the "distributor or holder of content sends it to one customer who in turn sends it to other customers who together share the pieces of the download back and forth until everyone has the complete download. This makes it possible for the original server to serve many requests for large files without requiring immense amounts of bandwidth" (SearchMSB.com, 2006). Irrespective of the creator's intentions, such programs end up being used by thousands of consumers for illegal file swapping. Some examples of websites that provide links to available torrents are: The Pirate Bay (http://thepiratebay.org/), BiteNova (http://www.bi-torrent.com/) and Supernova (www.supernova.org)[5]. According to its website, the Pirate Bay has also received several legal threats by major companies such as Microsoft, Electronic Arts (EA), Warner Bros., DreamWorks and SEGA (The Pirate Bay, 2006). The website in question however still continues to function.

Besides bittorrent based websites, Internet Relay Chat (IRC) channels and several warez groups' websites are used for illegal transfer of copyrighted material. An example of a website providing links to several eBooks is Bookwarez.org (www.bookwarez.org/e-books.html). Some of these groups are very well organized. An electronic version (illegal) of J. K. Rowling's book, Harry Potter and the Half-Blood Prince was made available on several IRC channels within 12 hours of the book's release in stores (Dunstan, 2005). All previous Harry Potter books were also pirated in a similar fashion.

[7] As of this writing, Supernova.org has been shut down permanently in response to legal threats for copyright infringements.

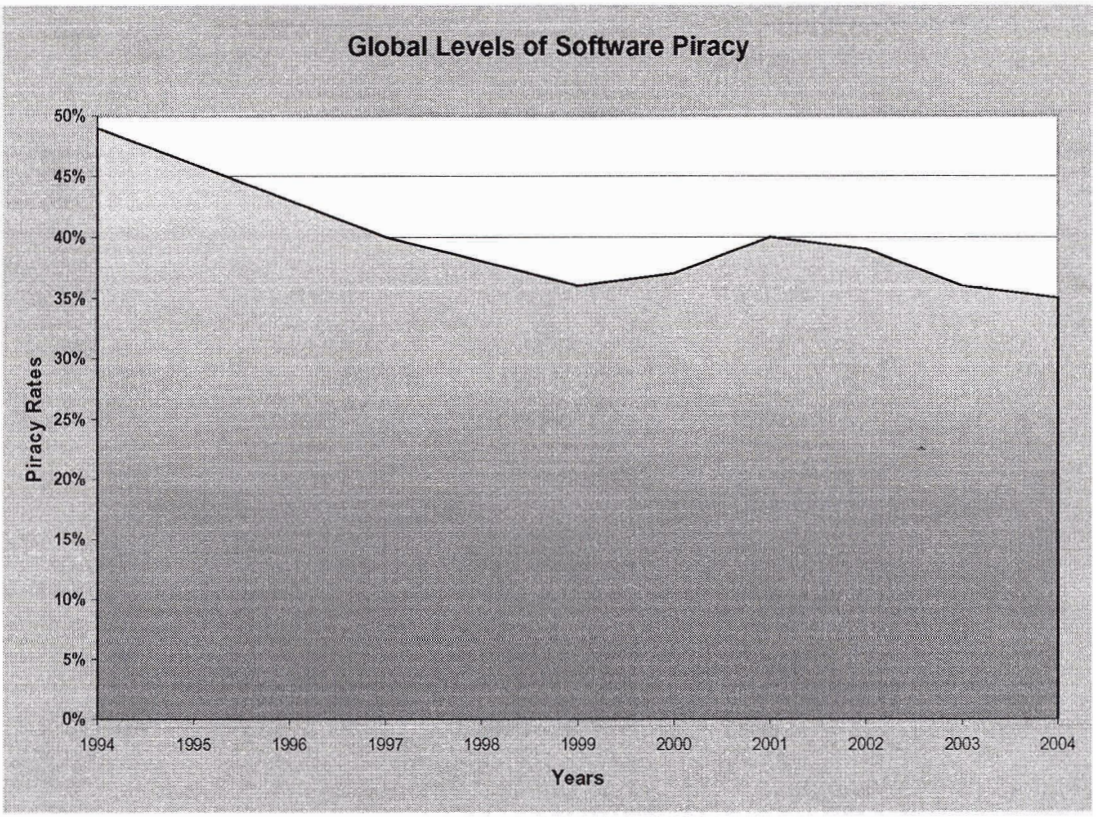
2.5 Levels of Software Piracy

According to the most recent Global Software Piracy Study (BSA, 2005), 35 percent of the software installed on personal computers throughout the world was pirated. According to this study, the worldwide revenue of PC operating systems, consumer software and local market software was $59 billion while $90 billion in software was actually installed on computers in the year 2004.

2.5.1 Global Levels of Software Piracy

Swinyard et al (1990) note that software piracy has been an important issue ever since the existence of personal computers, because it takes the efforts of many individuals, including a huge amount of investment in time and money, to produce a piece of software, and "software pirates can single-handedly destroy the work of software developers, who invest millions of dollars in software development projects" (Shin et al., 2004, p. 103). According to BSA (2001b) by 2008, the losses incurred in the U.S. due to software piracy would grow to 175,000 jobs, $7.3 billion in lost wages, and $1.6 billion in lost tax revenues. Shin et al (2004) point out that many mechanisms, including special coding and fingerprinting are used to prevent counterfeiting of software. Such measures have however not yet been able to stop the alarming rates of piracy throughout the world. Figure 2-3 shows world piracy rates from 1994 to 2004.

Figure 2-3 Global Levels of Software Piracy



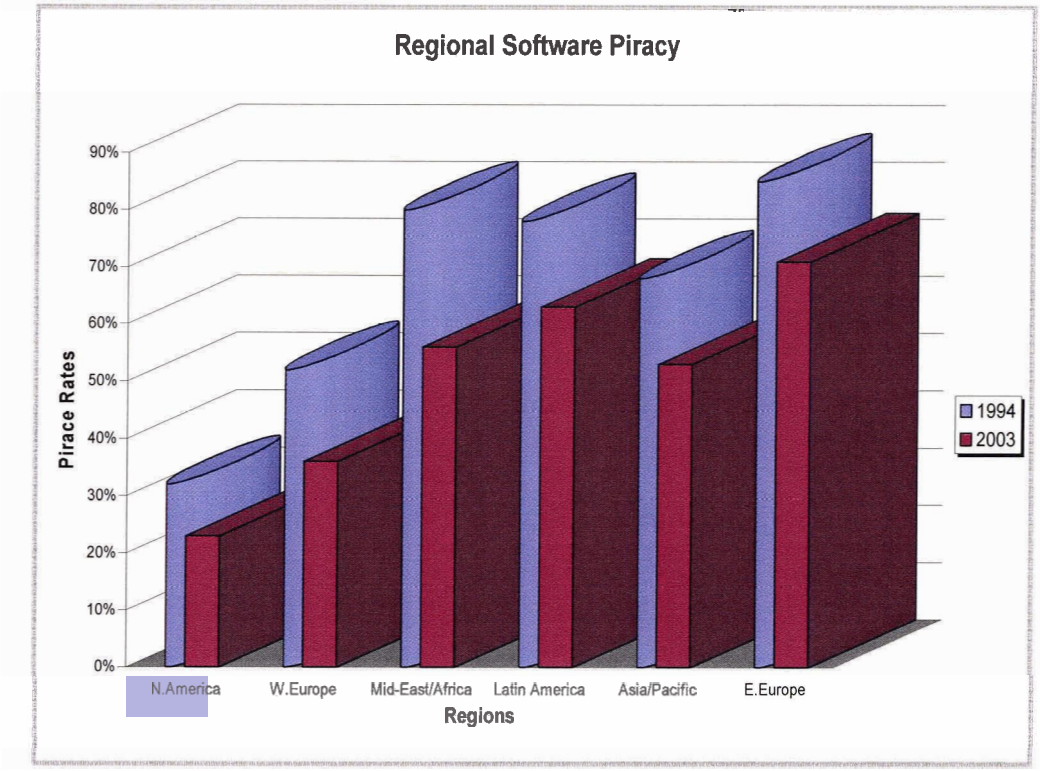
Source: BSA (2004, 2005).

2.5.2 Regional Levels of Software Piracy

Piracy varies across the different regions of the world. Eastern European and Latin American countries had the largest piracy rates in the year 2003. This situation was similar in the year 2004. Much of this is attributed to the absence of strong copyright and intellectual property protection agencies. Pacific Asian countries surpass others (except European Union) in terms of the money lost by the industry due to piracy (BSA, 2004). One very important factor that is the major contributor to this high piracy rate is the ever-increasing population of countries lying in this region. China and Pakistan, for example, have some of the highest piracy rates in the world. High piracy rates in these regions can

also be attributed to the absence of strong copyright and intellectual property protection agencies (Al-Jabri et al., 1997). The following chart depicts a comparison of piracy rates for different regions in the years 1994 and 2003.

Figure 2-4 Regional Software Piracy



Source: BSA (2003, 2004).

In its 2004 study, BSA named the European regions differently than it had done in previous studies and reports. The following charts present the regional piracy rates and monetary losses to the industry incurred by software piracy in the year 2004.

Table 2-1 Regional Software Piracy Rates and Losses in Millions

Countries	Piracy Rates	Dollar Losses (in Millions)
N.America	22%	7,549
European Union	35%	12,151
Mid-East/Africa	58%	1,239
Latin America	66%	1,546
Asia/Pacific	53%	7,897
Rest of Europe	61%	2,313

Source: BSA (2005).

2.5.3 Software Piracy in Pakistan

The IT industry in Pakistan is progressing, though not at a rapid pace. Kalia believes that rapid advancement in the field of IT for the economic development of Pakistan is the need of the hour (Kalia, 1999). However, the IT industry is still in its infancy and began with the introduction of the Internet in Pakistan in 1996 (Economic Review (Pakistan), 2002). "The industry is basically handicapped because of the standards of education that are falling all the time" (Economic Review (Pakistan), 1998). Pakistan's software industry relies mostly on exports which amounted to $48.5 million in the fiscal year 2004-05 (Pakistan Software Export Board [PSEB], 2005). The situation is similar in Pakistan's neighbouring country India, whose software industry mostly consists of firms involved in exports. However, unlike Pakistan, India's software exports amounted to $12,400 million in the year 2004-05 (Heeks, 2006). This huge difference between the two countries is attributed to many factors such as, but not limited to, superior educational facilities and better educational policies. A discussion of these factors is beyond the concept of this research. It is however necessary to emphasize a similarity between the two countries that is relevant to this research. The software

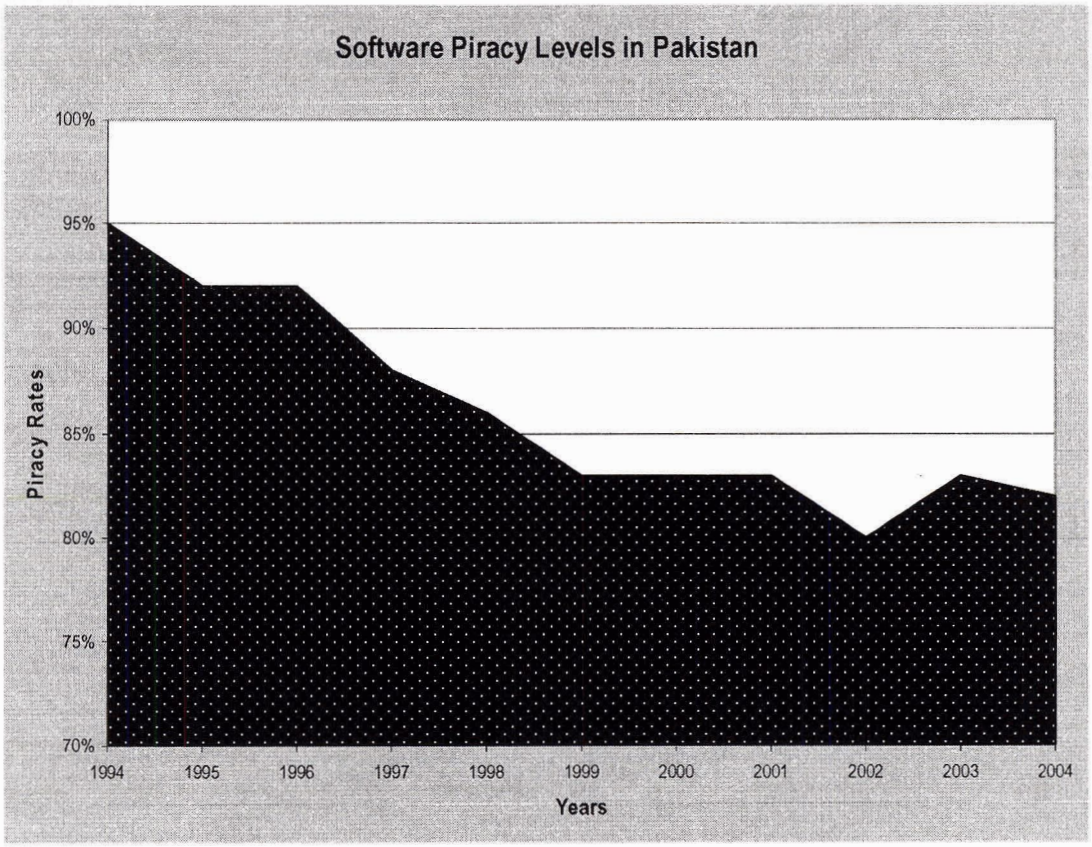
industries in both countries do not produce software for the local market on a large scale[8]. The major factor that could explain this phenomenon is the lack of IP rights protection in both the countries.

Developed nations of the world such as U.S. or Canada have anti-piracy policies and organizations to control unauthorized publishing or copying of software. However, "developing countries are passive in addressing computer ethics in general and intellectual property rights in particular" (Al-Jabri et al., 1997, p. 335). Al-Jabri et al. also suggested that developing countries lack interest groups such as the Business Software Alliance (BSA) (www.bsa.org), the Federation Against Software Theft (FAST) (www.fast.org), the Software and Information Industry Association (SIIA) (www.siia.net), and Software Publishers Association (SPA) that combat software piracy. However, it has also been observed that even the presence of these organizations and the existing copyright laws of the country cannot make a significant difference in developing countries such as Pakistan (IIPA, 2004; Aslam, 2000). With the help of the local police force, BSA-Middle East officials have conducted raids on prime business locations of software piracy in Lahore, Pakistan, confiscated pirated CDs in each case, and made some arrests with small fines (PakTribune, 2003; Daily Times, 2003). Over the last few years, similar raids have been conducted in other major cities of Pakistan such as Rawalpindi and Karachi (Pakistan Link, 2005b). In the year 2005, similar efforts resulted in the shut down of six of the nine factories that produced about 230 million pirated CDs in Pakistan in the year 2004 (Daily Times, 2005). According to the IIPA "Special 301" recommendations report (IIPA, 2004), two more raids were conducted in Pakistan in

[8] In Pakistan for instance, local software houses/firms produce custom applications (e.g. EPR applications) for local organizations but do not manufacture commercial products such as operating systems, productivity software, etc.

October 2002. Both of these raids were against large end-users using unlicensed software, and resulted in civil court cases, decisions of which are yet to be announced. The presence of BSA officials in Pakistan has not made a significant impact on the software piracy industry. As indicated in figure 2-5, only a small decline in the software piracy rate over the years has been seen.

Figure 2-5 Software Piracy Levels in Pakistan



Source: BSA (2003, 2004, 2005).

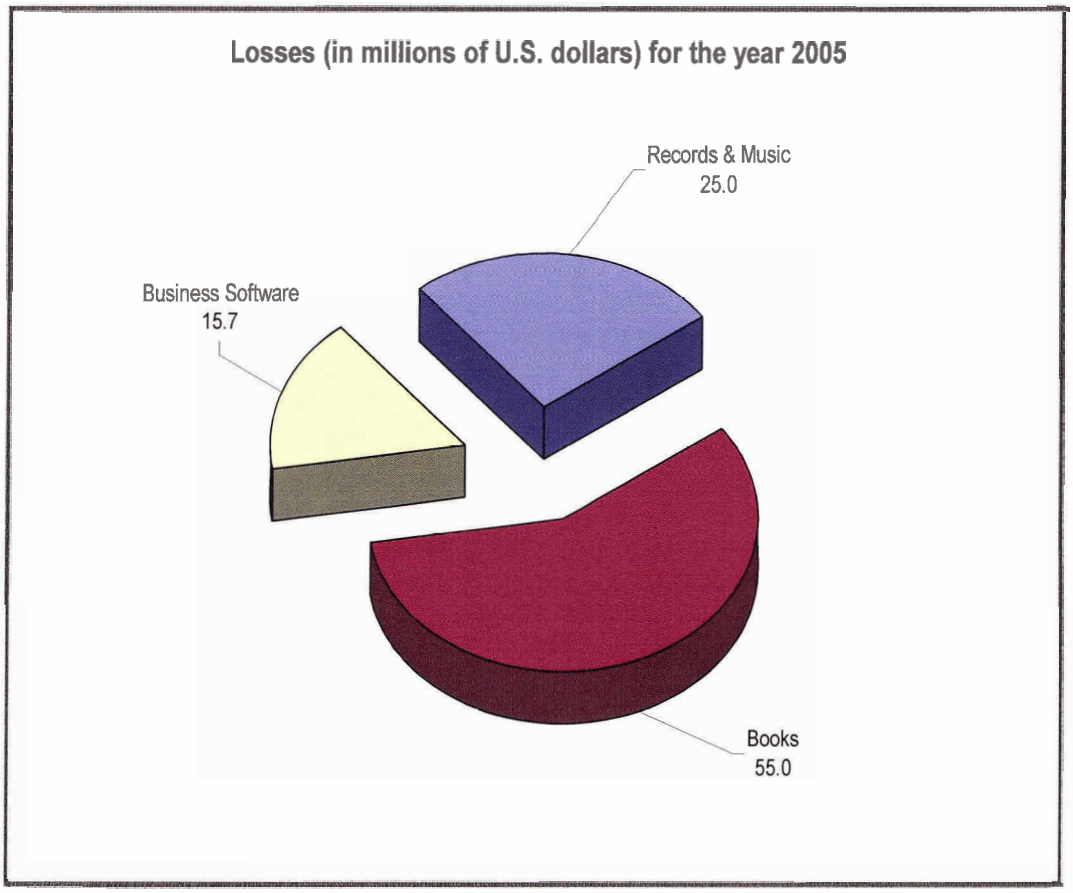
According to the above figures, eight in every ten software programs installed on PCs are pirated. However, there are no IPR protection policies in place in Pakistan. The Federal Cabinet of Pakistan approved legislation in the year 2004 which resulted in the creation of Pakistan Intellectual Property Rights organization (PIPRO). The bill for the

approval of PIPRO was presented in the parliament in May 2005 and is still pending (PSEB, 2006). The various copyright laws of Pakistan have already been discussed earlier in this chapter. According to a study prepared by the Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology (SZABIST), (Economic Review, 2002), the condition of Pakistan's IT industry has worsened in the post 9/11[9] era with the lack of opportunities for Pakistani IT engineers and the lack of potential business opportunities for software production houses in Pakistan. However, on the IP front, the U.S. has dropped its sanctions threat on Pakistan in response to the steps taken by the latter towards curbing piracy of U.S. music, movies and software (Bilaterals.org, 2006). Every year, "IIPA works closely with the U.S. Trade Representative in the annual "Special 301" reviews on whether acts, policies or practices of any foreign country deny adequate and effective protection of intellectual property rights or fair and equitable market access for U.S. persons relying on intellectual property protection" (IIPA, 2005b). As a result of these reviews, IIPA issues lists of countries that have to be watched for the lack of their intellectual property protection mechanisms, i.e. countries where IP related benefits of U.S. companies cannot be protected. There are two different types of lists put forward by IIPA every year; Priority Watch List, which includes countries with the least amount of IP protection and Watch List, which includes countries with policies in place for IP protection. The Watch List countries have IP protection policies and/or regulations but may not necessarily have a strong inclination towards enforcing them or the policies may not be strong enough to control the prevailing environment of piracy. As IIPA correctly identifies, "the laws in Pakistan remain a weak link, since there are no mandatory minimum sentences; as a result, judges impose only nominal fines which have no

[9] This refers to the events of September 11, 2001

deterrent value, and actually embolden pirates" (IIPA, 2006a). However, after recommending Pakistan as a Priority Watch List country for three years in a row, IIPA has now made recommendations to lower Pakistan's status as a Watch List country. The following chart shows the estimated trade losses in Pakistan due to copyright piracy. According to IIPA, these losses amounted to more than $95.7 million in the year 2005.

Figure 2-6 Losses (in millions of U.S. dollars) for the year 2005 in Pakistan due to copyright piracy



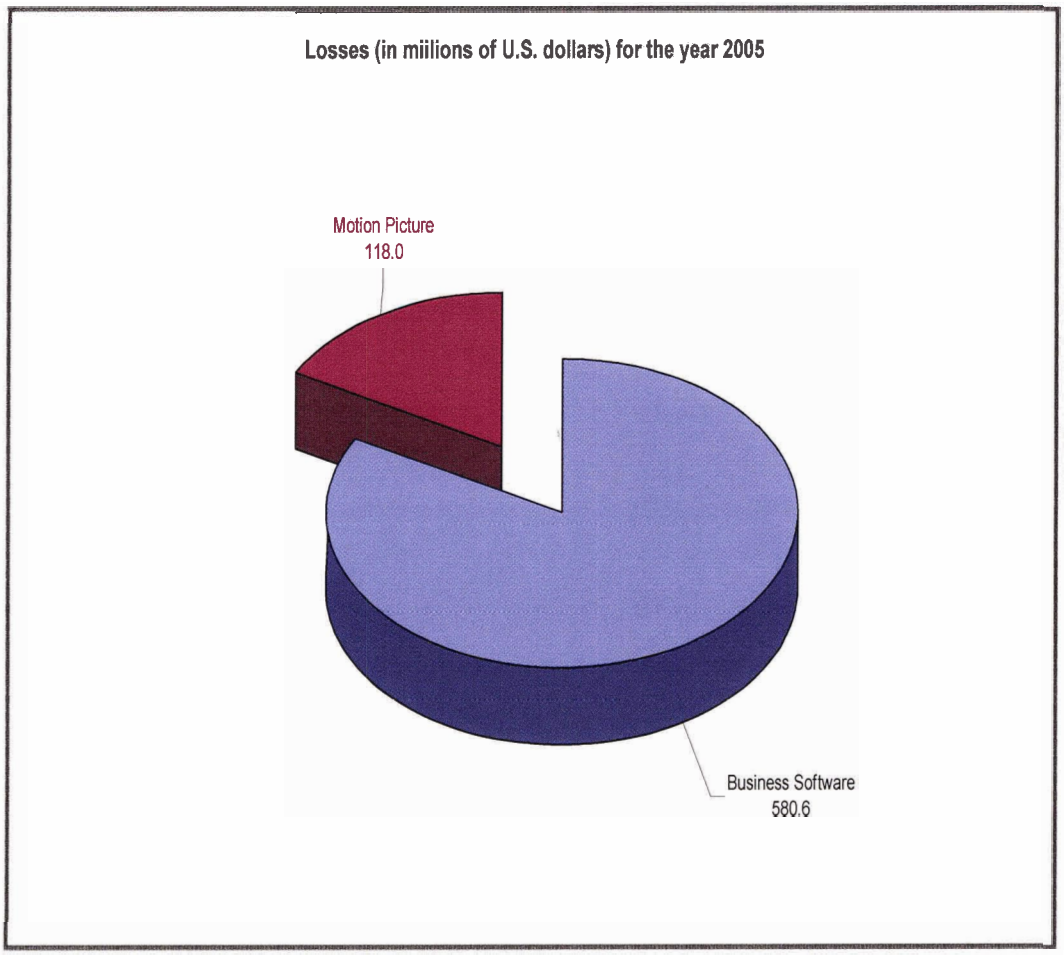
Source: IIPA (2006a).

2.5.4 Software Piracy in Canada

According to IIPAA (IIPA, 2006b) Canada falls short in meeting the objectives laid down in the WIPO Copyright Treaty (WCT) and the WIPO Performances and

Phonograms Treaty (WPPT). IIPA notes that the Canadian government introduced Bill C-60 in order to comply with these treaties but the bill eventually died as a result of a call for federal elections in November 2005. IIPA further points out that "Canada remains far behind virtually all of its peers in the industrialized world with respect to its efforts to bring its copyright laws up to date with the realities of the global digital networked environment. Indeed, most of the major developing countries have progressed further and faster than Canada in meeting this challenge" (IIPA, 2006b, p. 2). As per the IIPA recommendation, Canada remains on the Watch List of countries. The following chart shows the estimated trade losses in Canada due to copyright piracy. According to IIPA, these losses amounted to more than $698.6 million in the year 2005.

Figure 2-7 Losses (in millions of U.S. dollars) for the year 2005 in Canada due to copyright piracy



Source: IIPA (2006b).

According to a study by CASST, a reduction in Canada's software piracy rate by "10 percentage points could create 14,000 new jobs in the IT sector, CDN $8.1 billion in economic growth and CDN $2.3 million in tax revenues over a four year period" (Canadian Alliance Against Software Theft [CAAST], 2005a, para. 1). In 2005, CAAST conducted an online survey of university students from universities across Canada. According to this survey, more than half of the Canadian students (53 percent) swap computer disks among friends and forty-seven percent download pirated software from the Internet (CAAST, 2005b). Canada has a 35 percent rate of software piracy, unlike its

neighbouring country U.S. which, at 21 percent, has the lowest rate of software piracy in the world. This highlights the difference between the copyright protection enforcement policies of Canada and U.S. However, there are many cases where copyright infringement has been met with strict legal implications in Canada. Recently, as a result of a joint effort by CASST and BSA against corporate software piracy (i.e. software piracy by corporations), five Canadian companies agreed to pay a combined total of Canadian 212, 365.99 dollars to settle legal claims that they had pirated software installed on their computers (CAAST, 2005c). In another case, an Ontario court sentenced a distributor of counterfeit software to a jail term of 60 days in addition to significant fines (Microsoft Canada, 2006).

2.6 Chapter Review

This chapter reflected on the debate on intellectual property and the justification of software piracy. It also presented an overview of the global software piracy scenario and particularly the situation in Canada and Pakistan, the two countries included in this research. The above discussion has also shown that software piracy is widespread. The next chapter continues with the literature with an emphasis on the empirical studies conducted on the subject at hand. It will also present the research model developed for this study along with the latter's hypotheses.

3 RESEARCH MODEL, RESEARCH JUSTIFICATION AND HYPOTHESES

In a time span of fifty years, "computers have become central to the operations of industrial societies" (Forester and Morrison, 1990, p. 1).This new economy is "characterized by information, intangibles and services and a parallel change toward new work organizations and institutional forms" (Sharma, 2005, p. 3). Knowledge and information have therefore become the core factors in a national economy rather than the traditional physical assets that used to indicate the economic well-being of industrial societies (Husted, 2000). Several new terms have been used for this new economy in the literature such as "digital economy", "the information-based economy", "knowledge-based economy" and "networked economy" (Sharma et al., 2004; Woodall, 2000). This new economy has given birth to an Information Society which is defined by Goyder (2005, p. 261) as:

> A postindustrial form of society in which the generation, passing, and storing of information becomes the salient feature, eclipsing such traditional industrial activities as mass production manufacturing. Such information includes both highly sophisticated technical knowledge and less profound items such as systems for inventory control information for businesses.

The shift in the structure of the economy from industrial to digital brought many benefits for the society as well as many unforeseen legal, ethical and moral problems. "Ethics is the philosophical study of morality, a rational examination into people's moral beliefs and behavior" (Quinn, 2005, p. 48). The "study of computer ethics is the study of the ethical questions that arise as a consequence of the development and deployment of

computers and computing technologies" (Moor, 1995, p. 1). The study of ethics in today's economy is therefore important and there is a vast literature on different aspects of computer ethics and morality. Software piracy is also viewed as an important ethical and moral issue in the field of computer ethics. A complete discussion of theories presented to explain all aspects of the ethical and moral dilemmas associated with software piracy is outside of the scope of this research. In the context of this research, the author regards software as an ethical issue as have been by many other authors (Vijayaraman, Ramakrishna & Kini, 2001; Wagner & Sanders, 2001; Seale et al., 1998; Lending & Slaughter, 1999, 2001; Swinyard et al., 1990; Kini, Ramakrishna & Vijayaraman, 2003; Wagner & Benham, 1995; Calluzzo & Vante, 2004; Im & Van Epps, 1991; Siegfried, 2004; Quinn, 2005; Forester & Morrison, 1990; Rosenberg, 2004; Rahim, et al., 2000; Siponen & Vartiainen, 2004; Al-Rafee & Cronan, 2006; Gupta, Gould & Pola, 2004; Shim and Taylor, 1991).

3.1 Empirical Literature on Software Piracy

As noted by Seale (2002, p. 121), "software piracy has been studied from varied disciplinary perspectives, including: (1) economics (Gopal & Sanders, 1998; Bologna, 1982); (2) those that attempt to detect would-be-offenders (Holsing & Yen, 1999; Jackson, 1999; Sacco & Zureik, 1990); (3) as a risk-taking phenomenon (Parker, 1976); (4) or simply by the failure of society's morals to keep up with the growth in technology (Johnson, 1985)". Software piracy can be perceived as an intentional behaviour. Several behavioural, intentional and ethical decision making models have been proposed in the literature that have been utilized to assess the intentional piracy behaviour. Eining and Christensen (1991) and Simpson et al. (1994) also stated that one of the approaches to

studying software piracy focuses on the building of a behavioural model. Jones (1991) introduced an ethical decision-making model that was an integration of several similar models. It included four main components: awareness, judgement, intention, and behaviour. Ajzen & Fishbein (1975) suggested a behavioural model called the Theory of Reasoned Action (TRA). Ajzen (1991) later refined this model and called it the Theory of Planned Behavior (TPB). Another behavioural model was developed by Triandis (1980). Besides including all the components of TRA and TPB models, Triandis' model included additional components that were put to empirical testing by Thompson, Higgins, & Howell (1994) in order to predict the usage of computers at the individual level. Theories such as expected utility theory (EUT), self-control theory (Gottfredson & Hirschi, 1990)[10] which argues that pleasurable acts (this theory uses crime as an example of a pleasurable act) attract rational individuals more than painful acts, and social learning theory (Akers, 1985, 1998) which is a general theory applicable to criminal behaviour have also been employed by software piracy studies. Research has also been conducted to see whether certain types of software piracy acts are ethical or unethical (Oz, 1990; Im & Van Epps, 1992; Taylor & Shim, 1993). The purpose served by studies based on the models such as the ones described above are to predict the intentions or anticipate the behavioural attitudes of research participants of a study. The following table shows some piracy studies that employed one or more of the above theories and models.

[10] This theory was originally called General Theory of Crime.

Table 3-1 Software Piracy Studies that are based on Behavioural and other Models.

Study	Theory or Model study based upon
Kwong & Lee (2004)	Theory of Planned Behavior
Leonard, Cronan & Kreie (2004)	Theory of Planned Behavior and Theory of Reasoned Action
Hsu & Kuo (2003a)	Theory of Planned Behavior
Tang & Farn (2005)	Theory of Reasoned Action
Glass & Wood (1996)	Equity Theory Perspectives
Leurkittikul (1994)	Theory of Reasoned Action
Peace (1997)	Theory of Planned Behavior
Igbaria, Guimaraes & Davis (1995)	Technology Acceptance Model (TAM) and Theory of Reasoned Action
Peace, Galletta & Thong (2003)	Theory of Planned Behavior, Expected Utility Theory and Deterrence Theory
Al-Rafee & Cronan (2006)	Theory of Planned Behavior
Al-Jabri & Abdul-Gader (1997)	Theory of Reasoned Action, Technology Acceptance Model and Differential Association Theory[11]
Rahim, Rahman & Seyal (2000a)	Theory of Reasoned Action
Seale, Polakowski & Schneider (1998)	Theory of Planned Behavior
Hsu & Kuo (2003b)	Theory of Planned Behavior
Oarthasarathy & Mittelstaedt (1995)	Theory of Reasoned Action
Holm (2003)	Economic Theory
Rahim, Seyal & Rahman (2001)	Theory of Reasoned Action
Fukukawa (2002)	Theory of Planned Behavior
Higgins & Makin (2004)	Social Learning Theory

Although an extensive discussion of all of the above theories is outside of the scope of this research, it is essential to present a brief discussion of two theories that stand out in terms of being extensively used in empirical studies and which are significant to the justification of this research. The two theories are the theory of reasoned action and the theory of planned behaviour.

[11] Sutherland & Cressey (1970).

3.1.1 Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB)

The Theory of Reasoned Action suggests that an individual's behavioural intention is predicted by the individual's attitude towards subjective norms and behaviour. An individual develops his/her attitude towards a behaviour based on its outcome; that is, a positive result of an action will lead to actual behaviour by the individual. An individual's perception of social norms is referred to as peer norms in TRA.

Theory of reasoned action was refined by Ajzen (1991). The factor of perceived behavioural control was added to TRA and as a result, the theory of planned behaviour was formed. According to TPB, behavioural intentions instigate one's behaviour, and a union of attitude toward the behaviour, subjective norms and perceived behavioural control can predict the behavioural intentions. Intentions refer to the subjective probability of one's engagement in any behaviour (Fishbein & Ajzen, 1975). A strong behavioural intention leads to a stronger execution of the behaviour. According to Loch and Conger (Loch & Conger, 1996) if an individual's perspective on stealing software does not abide by an ethical context, then that individual is less likely to steal it. Subjective norms and perceived behavioural control are two terms that are vital towards the application of TPB and are therefore briefly described below.

- **Subjective norms:** An individual is more likely to behave according to group expectations the more affiliated the user is to that group. In a business milieu such subjective norms consist of social, organizational, departmental and peer norms (Mathieson, 1991). For example, an instance of such a norm towards behaviour would be where a student assumes that his/her professor would approve of using

unauthorized software in order to complete assignments. Another example in the same context would be of an employee who assumes that the employer would approve of the use of unauthorized software in order to solve problems at work (Lin, Hsu, Kuo & Sun, 1999).

- **Perceived Behavioural Control:** Ajzen argues that an individual's belief in the ease of executing behaviour is that individual's perceived behavioural control (Ajzen, 1989). That is, the more resources and opportunities an individual possesses, the stronger the individual feels to execute his/her behaviour. Referring to the student and employee examples both will have a higher perceived behavioural control over their acts of piracy if they believe that the use of unauthorized software will go unnoticed. External variables, besides attitude, subjective norms, and behavioural control, also exist.

TPB, according to Ajzen (1985), mediates between external variables and actual behaviour. Such external variables consist of character traits, social factors, technical factors, and attitude towards objects, while attitude, subjective norm, and perceived behavioural control are regarded as internal variables. Triandis (1980) developed a model based on both TRA and TPB. Limayem et al. (1999) argue that Triandis' model is overlooked even though the model not only incorporates TRA and TPB but has additional components too. Thompson, Higgins and Howell (1991, 1994) found Triandis' model as useful as TRA in predicting usage of computers at the individual level. Limayem et al. (1999) developed a model of software piracy behaviour based on the constructs of Triandis' model and found it satisfactory in assessing intentions and predicting behaviour.

3.1.2 Other Empirical Studies

Several studies that are not based on any of the above models have been done on the subject of software piracy. However, the basic assumption of these studies is that the piracy behaviour is intentional. These studies develop and measure variables in order to predict the software piracy pattern or behaviour among the research participants. For example, Moores & Dhaliwal (2004) suggested that "*high-availability of pirated software*", "*high price of legal software*" and "*low censure (absence of legal punishments)*" are three important factors leading to alarming software piracy rates in Hong Kong. Another study conducted in Thailand, with university students as the target population, concluded that demographic factors such as income level, age, gender, and computer proficiency have a direct impact on the morality of students regarding software piracy (Lin et al., 1999). Lending & Slaughter (2001) developed their own model based on the assumption that age, gender, and ethical climate are directly related to software piracy intention and behaviour. Al-Jabri & Abdul-Gader (1997) found that individual and peer ethical beliefs were positively associated with the intention to copy software, and Moores (2003) found that three of the four cultural dimensions[12] proposed by Hofstede (1983) have a direct impact on a country's software piracy rate[13]. The following table provides a brief overview of empirical studies (along with their major findings) that are not based on any of the behavioural models.

[12] Moores (2003) found that out of power distance (PDI), individualism (IDV), uncertainty avoidance (UAI) and masculinity (MAS), the first three were directly related to the software piracy of a country.
[13] Hofstede's cultural dimensions with respect to Canada and Pakistan will be discussed later in this chapter.

Table 3-2 Overview of Empirical Studies of Software Piracy

Studies	Subjects	Methodology	Major Constructs	Major Findings
Moores & Dhillon (2000)	243 Information Systems students at a Univeristy	Self administered survey consisting of 6 context items	Availability of pirated software; cost of original software; legal implications	81% respondents bought pirated software on a regular basis; males pirate more than females; high piracy rates attributed to high availability of pirated software and high cost of original software
Lau (2003)	263 visitors to an Information Infrastructure Expo	Self-administered survey consisting of 30 items.	Social acceptance; original software price; need of software; knowledge of copyright laws	Lack of knowledge of legal implications & IPRs; socially acceptable behaviour; price of original software
Im & Van Epps (1991)	241 respondents ranging from Dean to Faculty members of business schools	Field survey – 2 paged survey	Extent of unauthorized software copying in business schools; awareness of legal responsibility; anti-piracy security procedures in place by business schools	75% schools acknowledged prevalence of software piracy; 95% schools recognized legal responsibilities;

Studies	Subjects	Methodology	Major Constructs	Major Findings
Depken & Simmons (2004)	Not Applicable	Cross-country study based on available statistical figures	Traditional economic influences; institutional social mores	Economic variables and power-distance are significant in an individual's intent to pirate software
Gopal & Sanders (1998)	118 and 124 graduate students from India and U.S. respectively	Cross-country analytical study based on various established figures; empirical study of behaviour and ethical model using a self administered survey	Economical, behavioural and ethical factors	there is a need for stronger copyright protection policies; alliances between foreign and domestic publishers is necessary; the ethical behaviour model does not suit the cultural situations in India
Swaidan, Rawwas & Al-Khatib (2004)	283 African American university students	Forsyth ethical position questionnaire (EPQ) and Muncy-Vitell consumer ethics questionnaire (MVQ) were used	Idealism vs relativism and gender variables were analyzed against different types of consumer behaviour	A higher score on idealism indicated the higher possibility of rejection of questionable consumer activities; females scored higher on the idealism scale than the males

Studies	Subjects	Methodology	Major Constructs	Major Findings
Whitman, Townsend & Hendrickson (1990)	924 business students from nine countries	Self administered survey instrument	Ethical attitudes towards software license infringement; use of virus programs; misuse of corporate computing resources	Significant differences were identified I ethical values among nationalities
Rahim, Rahman & Seyal (2000)	114 academics from a university and technical/vocational colleges	Two-part self administered questionnaire	Relationships between use of pirated software and computer exposure, demographics, job profile and the academics' support for copyright laws	69% admitted use of pirated software; lack of institutional licenses for required software and high price of original software were directly related to the use of pirated software
Moores & Dhaliwal (2004)	462 undergraduate and postgraduate students	Self administered questionnaire	Availability of pirated software; cost of original software; legal implications	Culturally similar markets may require different anti-piracy approaches; 48% of the respondents admitted buying pirated software on a regular basis
Siegfried (2005)	224 students from a nondenominational suburban university and a Catholic urban college	Self-administered questionnaire	An older study is replicated with additional questions about online music piracy	Positive attitudes toward software among students; other IP related unethical activities were considered acceptable by a majority of respondents

Studies	Subjects	Methodology	Major Constructs	Major Findings
Kini, Ramakrishna & Vijayaraman (2003)	669 undergraduate and graduate students from a private university	Self administered questionnaire containing 51 items	Relationship between demographics and the level of moral development in the context of software piracy	Students' level of moral intensity is influenced by their immediate community, other students and university employees
Simmons (2004)	80 students from 400 students from five countries (80 from each country)	Self administered online questionnaire	Long term orientation, power distance and individualism-collectivism were tested as cultural predictors of software piracy	All cultural traits proved to be significant predictors of software piracy, long term orientation being the strongest
Moores (2003)	Not applicable	Cross country study of 45 countries based on available statistical data	Hofstede's four cultural dimensions; software piracy rates; economic wealth	All conturcuts showed a significant impact on software piracy rate except Masculinity (MAS); wealthier nations have lower piracy rates.
Husted (2000)	Not applicable	Analytical study	Impact of level of economic development, income inequality, and cultural variables on software piracy rate at a national level	Country level software piracy significantly correlated to individualism, GNP per capita and income inequality

Studies	Subjects	Methodology	Major Constructs	Major Findings
Gupta, Gould & Pola (2004)	689 responses from an online survey – respondents were recruited through postings on various USENET groups	Comparative analysis of ethical versus other influences on consumer's software acquisition-mode decision	Ethics, economic aspects, perceptions of manufacture loss, legal perspectives, consumer equity, ease of piracy, piracy as a diffusion activity and demographics	Economic loss, legal-ethical attitude and age of the respondents provided most significant relationships
Cheng, Sims & Teegen (1997)	73 resident M.B.A., 27 executive M.B.A and 240 undergraduate business students	Self administered questionnaire	Identification of reasons for which software is pirated by individuals	Nine reasons were identified for pirating software including affordability, lack of legal implications, and restrictive software licenses
Sims, Cheng & Teegen (1996)	73 resident M.B.A., 27 executive M.B.A and 240 undergraduate business students	Self administered questionnaire	Relationships of software with gender, education and familiarity with computers	Males and older students were found to pirate more than females and younger ones respectively

3.2 Research Question & Its Justification[14]

While it is true that the literature on software piracy has helped in understanding various aspects of the matter, there have been no empirical studies to prove that software piracy can be conceptualized as an ***unintentional behaviour or as a behaviour that is the product of the social and cultural environment within which the behaviour is carried out.*** The only study to look at software piracy as a causal phenomenon was conducted by Proserpio et al., (2004). They conducted a quantitative analysis of available statistical figures and indices on several countries (including Pakistan), and their study was therefore not survey based. This study is therefore an attempt to contribute to research on software piracy in the following ways.

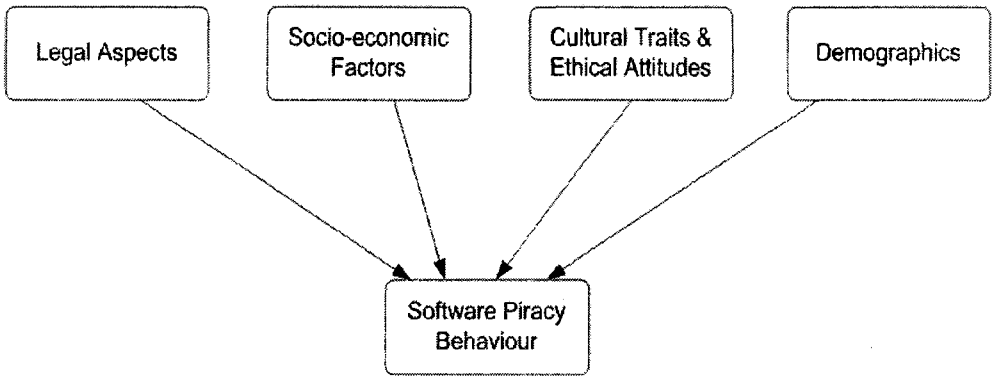
First, the current literature argues for intentional behaviour towards software piracy (mainly based on TRA and TPB). This study tries to determine those factors that would explain unintentional software piracy in developing countries (e.g. Pakistan) where piracy of software (or any other form of IP) can prevail easily. Prior research has also used subjective and social norms to test attitudes and behaviour towards piracy (e.g. Parthasarathy, et al. 1995). The model developed for this research[15] (shown in fig. 3.1) therefore includes social norms as one of the variables. The basic structure of this model has been adopted and modified from a model that was used by Proserpio et al. (2004). Their model was based on a multi-causality approach to determine software piracy

[14] Individual research hypotheses will be presented in a later section.

[15] It is important to emphasize here that the model shown in Fig. presents a very basic structure which represents the theoretical base of this research. Once the data is collected, structural equation modeling will be used to create a model that would be the *'best fit'* for the data and would test the hypothesis effectively.

factors in 76 countries (including Pakistan and Canada) and is therefore appropriate for this research[16].

Figure 3-1 Software Piracy Behaviour Model



Source: Butt (2006)

Second, this study includes respondents from Pakistan and Canada. There have been many studies on software piracy from a developing country's perspective but an empirical study on Pakistan is absent, even though the International Intellectual Property Alliance (IIPA, 2005a) has recommended for many years that Pakistan should be on the high priority watch list of countries for uncontrolled piracy of intellectual property including software. Moreover, Pakistan also has one of the highest rates (82 percent) of software piracy in the world, which increases the importance of understanding the factors leading to this situation.

Several authors have concluded that in developing countries (such as Pakistan), the collectivistic nature of the society is one factor that leads to high piracy rates. Although Canada has an individualistic society like its neighbour the U.S., the software

[16] This model is an adaptation from this author's earlier work (Butt, 2006) which was submitted for publication at a very early stage of the research. The dependent variable of the model was actually shown as *'Software Piracy Levels'* in the author's earlier work. With the progress of this research, the hypothesized variables were refined. As a result of this, the dependant variable was changed to *'Software Piracy Behaviour'*.

piracy rate is still relatively high at 36 percent as compared to other developed nations of the world such as the U.S.A. (21 percent) and United Kingdom (27 percent). Moreover, there is a lack of recent empirical studies of software piracy issues in Canada. Moores and Dhaliwal (2004) stated that "even in culturally similar (software) markets, different approaches may be required to software piracy" (p. 1). Gopal and Sanders (1998) found that their model of ethical attitudes towards software piracy was applicable to the conditions in the U.S., but was not applicable to the Indian conditions. Despite this, the anti-piracy organizations lobby for enforcement of the same IP rules and regulations in developing countries as are enforced in the developed parts of the world. Canada's relatively high software piracy rate as a developed country will provide a useful comparison with Pakistan to identify the differences and similarities (if any) between the two countries.

Finally, this study has the potential to extend the current understanding of software piracy determinants and factors that can lead to the creation of a piracy-favouring environment in a developing country. Based on the results of the research, there are possibilities that better policies could be adopted to address the problem of not only software piracy, but of piracy of all forms of IP. As has been done in most of the prior research, university students were chosen as the research participants. This work will therefore not only help in determining the factors that lead to a very high rate of software piracy in a developing country but will also explore the differences and similarities between piracy related factors for Pakistan and Canada, two countries that are economically and culturally very different. The main objective of this study is therefore to answer the following research question.

Can software piracy in university students of Pakistan be explained in terms of social norms rather than intentional behaviour?

3.3 Research Model

As explained in the above sections, software piracy has been viewed as an intentional behaviour, i.e. a behaviour which is a result of a thought out process or behaviour that is planned. This author contradicts the notion of intentional software piracy behaviour and suggests that software piracy can be represented as a consequential behaviour that results from social norms of a developing country's society. The model developed for this research has adopted some of the constructs (variables) from the existing research. Some studies have also used structural research models (e.g. Igbaria et al., 1995; Seale, 2002; Chiou, Huang & Lee, 2005; Seale et al., 1998). However most of the empirical studies predict software piracy behaviour based on the intentions of the respondents (e.g. Lin et al., 1999; Higgins & Makin, 2004; Kwong & Lee, 2002; Rahim et al., 2001; Wang et al., 2005; Peace et al., 2003; Chiou et al., 2005; Kwong, Yau, Lee, Sin & Tse, 2003; Rahim et al., 2000a). This study actually measures the piracy behaviour of the respondents by inquiring about their pirated software acquisition frequency and sources. Moreover, norms (social, cultural, organizational) have been found helpful in predicting software piracy, some of which, the model developed for this research takes into account.

Moores and Dhaliwal (2004) suggested that *"high-availability of pirated software", "high price of legal software"* and *"low censure (absence of legal punishments)"* are three important factors leading to high software piracy rates in Hong Kong. Other studies have also found that abundance of pirated software, high price of original software and lack of legal enforcement directly contribute to higher software

piracy rates. These factors have therefore been included in this research. Another study conducted in Thailand, with university students as the target population, concluded that demographic factors such as income level, age, gender, and computer proficiency have a direct impact on the morality of students regarding software piracy (Lin et al., 1999). Lending & Slaughter (2001) developed their own model based on the assumption that age, gender, and ethical climate are directly related to software piracy intention and behaviour. Al-Jabri & Abdul-Gader (1997) found that individual and peer ethical beliefs were positively associated with the intention to copy software, and Moores (2003) found that three of the four cultural dimensions[17] proposed by Hofstede (1983) have a direct impact on a country's software piracy rate. Most of these factors have been taken into account in this study.

3.4 Research Hypotheses

It was mentioned earlier that the lack of strong copyright and intellectual property protection agencies and the insignificant impact of lobbying groups such as the BSA could partly explain the high rate of software piracy in Pakistan. Canada, on the other hand, has a stronger legal enforcement system and anti-piracy organizations such as CAAST. However, Canada still has a higher piracy rate compared to other developed countries. The hypotheses in this research will therefore focus on the comparison of the respondents from both countries.

[17] Moores (2003) found that out of power distance (PDI), individualism (IDV), uncertainty avoidance (UAI) and masculinity (MAS), the first three were directly related to the software piracy of a country.

3.4.1 Economic Development in Pakistan and Canada

According to Marron and Steel (2000), intellectual property rights encourage novelty and economic growth. In a study on the relationship between national economy and piracy levels, they concluded that a strong inverse correlation existed between piracy rates and the income level of the country. Rapp and Richard (1990) also suggested that the issue of piracy and IP protection is strongly correlated with economic development. Ginarte and Park (1997) also found an inverse correlation between piracy and per capita income; economic freedom and the proportion of research and development; and national income and education. It has been noted in the studies mentioned above, that nations with higher income levels and sound economies have low piracy rates. Pakistan's Gross Domestic Product (GDP) per capita income is less than $684 as compared to Canada's $31,134. This is a very big difference and so is the difference between piracy rates of both countries. Very low purchasing power in Pakistan could explain the high piracy level in the country.

Moreover, Cheng et al. (1997) found that a "can't afford software" reason to make illegal copies of software was dominant among university students. The main reason behind this was low household income. Moores (2003) used a sample of 45 countries (including both developed and developing) to suggest that the economic wealth of a country plays a vital role in its piracy rate. Kini, Ramakrishna, and Vijayaraman (2003) also found that the income level of an individual is directly related to his or her moral intentions towards software piracy. Therefore, it is hypothesized that:

H1: Income will have a direct influence on piracy behaviour of subjects.

H2: High price of original software will have a direct influence on the piracy behaviour of subjects.

3.4.2 Canadian Culture vs. Pakistani Culture

Culture has been defined as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede, 1997, p.260). Yet culture is a very broad concept, and has little power if it is used as a residual category (Child, 1981). Many studies have used one or more of Hofstede's cultural dimensions. The following is a brief explanation of each of these dimensions taken directly from the Geert-Hofstede.com website (2006).

- **Power Distance Index (PDI)** focuses on the degree of equality, or inequality, between people in the country's society. A High Power Distance ranking indicates that inequalities of power and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of its citizens. A Low Power Distance ranking indicates the society de-emphasizes the differences between citizen's power and wealth. In these societies equality and opportunity for everyone is stressed.
- **Individualism (IDV)** focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A High Individualism ranking indicates that individuality and individual rights are paramount within the society. Individuals in these societies may tend to form a larger number of looser relationships. A Low Individualism ranking typifies societies of a more collectivist nature with close ties between individuals. These cultures reinforce extended families

and collectives where everyone takes responsibility for fellow members of their group.

- **Masculinity (MAS)** focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control and power. A High Masculinity ranking indicates the country experiences a high degree of gender differentiation. In these cultures, males dominate a significant portion of the society and power structure, with females being controlled by male domination. A Low Masculinity ranking indicates the country has a low level of differentiation and discrimination between genders. In these cultures, females are treated equally to males in all aspects of the society.

- **Uncertainty Avoidance Index (UAI)** focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations. A High Uncertainty Avoidance ranking indicates the country has a low tolerance for uncertainty and ambiguity. This creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. A Low Uncertainty Avoidance ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. This is reflected in a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.

- **Long-Term Orientation (LTO)** focuses on the degree the society embraces, or does not embrace, long-term devotion to traditional, forward thinking values. High Long-Term Orientation ranking indicates the country prescribes to the values of long-term commitments and respect for tradition. This is thought to support a strong work ethic

where long-term rewards are expected as a result of today's hard work. However, business may take longer to develop in this society, particularly for an "outsider". A Low Long-Term Orientation ranking indicates the country does not reinforce the concept of long-term, traditional orientation. In this culture, change can occur more rapidly as long-term traditions and commitments do not become impediments to change.

Moores and Dhillon (2004) conducted an analysis of 45 different countries (including Pakistan and Canada) with respect to the four cultural dimensions developed by Hofstede (1983). Moores and Dhillon concluded that Pakistan had high power distance and high uncertainty avoidance. According to this analysis, Pakistan also scored high on collectivism, indicating that Pakistani society is collective rather than individualistic. Canada, on the other hand, is very high on the IDV (80)[18] as compared to Pakistan which is only about 20.

Hofstede (1983, p.336) defines individualism as "a preference for a loosely knit social framework . . . in which individuals are supposed to take care of themselves and their immediate families only." Collectivism, in contrast, is "a preference for a tightly knit social framework in which individuals can expect their relatives, clan, or other in-group to look after them, in exchange for unquestioning loyalty." Gopal & Sanders (2000) have defined software piracy as a group activity. Many studies (Marron & Steel (2000); Shin et al. (2004); Husted (2000); and (Al-Jabri et al., 1997)) have concluded that the collectivistic culture or the collectivistic nature of the society is to blame for the high software piracy rates.

[18] All values for Hofstede's cultural dimensions are taken from Geert-Hofstede.com (), unless stated otherwise.

Pakistan's collectivistic culture could therefore be regarded as one of the main cultural attributes to be blamed for the country's 83 percent software piracy rate, which is one of the highest in the world. There could be other factors that contribute to the high piracy rate. The economy and legal infrastructure of a country and availability of pirated software are some of these factors and have been looked at in this research. However, Wagner and Sanders (2001) suggested that "there is a relationship between religion and the stages of an ethical decision making process regarding general ethical situations and software piracy" (p. 161). Islam and Christianity are the main religions of Pakistan and Canada, although the latter is more diverse in its religious distribution[19]. Both Islam and Christianity preach that stealing and robbing someone of their rights as highly unacceptable behaviour. Whether students consider their religious values before indulging in the piracy behaviour has yet to be determined. Only one article (see, Wagner & Sanders, 2001) was found, that considered religion as one of the variables in a software piracy study. Therefore the relationship between religion and software piracy needs to be examined further. However, as mentioned earlier, this relationship will not be tested in this research.

As far as collectivism is concerned, Pakistan shares its (collectivistic) culture with many other developing nations of the world such as Hong Kong, Indonesia, and its neighbouring countries, India and China. The cultural mores and norms that affect software piracy in these countries also prevail in Pakistan. For instance, The Bangkok Post (1995) quotes the head of the Indonesia Computer Software Association: "The problem of intellectual property rights is very individual. Ours is a collective culture

[19] 98 percent of Pakistani population is Muslim (Canada's Digital Collections. (2005).

where ideas belong to everyone. Unfortunately, some people here don't realize that when they copy something they deprive someone of their rightful earnings." This quote depicts the notion of cultural effects on software piracy. These statements also suggest that piracy of intellectual property and software in particular is encouraged not only by the economic factors but also by cultural norms. Shin et al. (2004) suggest that "piracy involves a group of individuals who purchase a copy of the software at the market price and make copies for all group members". They further discussed that "the unauthorized copying of personal computer software for use in the office or at home and sharing the software with friends and co-workers is the most pervasive form of piracy encountered, and is estimated to be responsible for more than half the total revenues lost by the software industry". (Shin et al., 2004).

"Among high IDV countries, success is measured by personal achievement. Canadians tend to be self-confident and open to discussions on general topics; however they hold their personal privacy off limits to all but the closest friends" (Geert-Hofstede.com, 2006, para. 3). This implies that Canada is based on an individualistic culture and therefore people would refrain from collectivistic activities and will hold personal goals more important than the society's or the group to which they belong. Swinyard et al. (1990) noted that Asians and Western people have a different moral decision-making perspective as well, the former being more circumstance-oriented as compared to the latter who are more rule-oriented. This is relevant to the context of this research because "the cultural history of Asia does not generally support the notion of protecting proprietary creative work" (Swinyard, et al., 1990, p. 657) or other forms of intellectual property. Steidlmeier (1993) explains that the notion of intellectual property

protection is associated with Western cultural values of liberalism and individual rights, which is in complete contrast to the Asian values of social harmony and cooperation (Swinyard et al., 1990; Donaldson, 1996). The difference in the social set up and the culture of Pakistan and Canada could explain the difference in the piracy rates.

Poor economy or low per capita income are therefore not the only factors responsible for the high rate of software piracy in Pakistan. As Husted (2000) noted, not only economic but cultural attributes are also relevant to piracy levels in a country. Marron et al. (2000) also found that culture and literacy levels are among the common issues that are part of the piracy problem. The study of software piracy in Pakistan should not be restricted to economic conditions. "To gain a holistic understanding of the underlying mechanics," (Shin et al., 2004) the investigation into software piracy must include cultural mores and attitudes. Therefore, social norms and culture will be taken into consideration as well and the following is hypothesized.

H3: Social/Cultural norms will have an influence on the piracy behaviour of subjects.

3.4.3 Other Piracy Facilitating Factors

Besides the effect of social and cultural norms and poor economy on software piracy, the availability of pirated products is a very important factor that could be significantly related to higher piracy rates. For instance, Rainbow Market in Karachi, and Hafeez Centre in Lahore are two of the biggest and best-known hardware and software malls (or plazas as called locally) in Pakistan. Each of these shopping malls comprises tens and hundreds of retailers selling illegal software. People from nearby smaller cities

come to these shopping centres to make their computer-related purchases. Hafeez Centre, for instance, is equivalent to a moderately-sized three-storey mall with a few hundred software and hardware retailers, most of whom are engaged in one kind of piracy or another. The Canadian software market's situation is totally different from the one described above. There are few, if any retailers openly selling pirated software. However, according to a recent CAAST news release (CAAST, 2005b), forty seven percent of the surveyed students admitted to pirating software. It will therefore be interesting to see through this study, the software acquisition resources of university students.

Two software piracy studies in Hong Kong (Moores & Dhillon, 2000) and Singapore (Moores & Dhaliwal, 2004) concluded that *high availability of illegal software, low censure (absence of legal punishments), high cost of legal software,* and *the reciprocals of these factors* dominantly reflected the high piracy rates of the regions being studied. Simpson et al. (1994) also included the element of legal factors in the piracy model that they proposed, and found that these factors have an effect on the ethical decision process, which leads to the actual piracy behaviour. Triandis (1980) suggested that the factors that facilitate a certain action (in a given environment) can actually make that act easy to do. Factors such as no fear of legal implications, and free access to pirated software, can actually encourage software piracy. Cheng et al. (1997) also found that the ease of piracy and minimal legal implications were the main factors that facilitate software piracy. The following is therefore hypothesized in regards to the availability factor.

H4: There will be a direct relationship between the availability of pirated software and the intent of subjects.

The legal infrastructure in terms of its severity is different in both Canada and Pakistan. There are many loopholes in the Pakistani legal system that exaggerate the piracy favouring environment. For example, the slow judicial system results in lengthy cases and delays of many years. The two raids conducted in October 2002 in Pakistan by BSA and local officials resulted in civil court cases but their results are still pending (IIPA, 2004). This situation is unlike Canada where courts have penalized copyright infringers on many occasions (see CAAST, 2005c; Microsoft Canada, 2006). A detailed discussion on the legal factors has been presented earlier and based on that discussion, the following hypotheses are made.

H5: Legal enforcement will have an influence on the intent of the subjects.

H6: Legal enforcement will have a direct influence on the social norms.

Previous studies have also suggested that gender is an important demographic factor that affects one's intention to pirate software. Simpson et al. (1994) found that gender plays a major role in the inclination to pirate software. In a survey of moral intentions towards software piracy, Kini et al. (2003) found that males were more inclined towards pirating software, and similar results were proposed by Higgins & Makin (2004). Similar results were also found by Sims, Cheng and Teegan (1996) Therefore, the following is considered as the null hypothesis for gender.

H7: There will be a difference between males and females regarding their software piracy behaviour.

"People's perceptions of a particular behaviour are shaped by the existing value system of the society" (Lau, 2003, p. 234). Several studies have determined that ethical beliefs of individuals are crucial in their decision-making process. The decision-making

model proposed by Jones (1991) suggested that an individual's attitude toward ethical issues will affect the individual's ethical judgement and then their ethical behaviour. Studies such as Whitman, Townsend, Hendrickson, & Fields (1998); Swaidan, Rawwas, & Al-Khatib, 2004; Siegfried, 2001; and Limayem et al. (1999) have also concluded that ethical beliefs have an impact on one's intentions. Ethical beliefs and attitudes have been used by many authors in software piracy studies (e.g. Wagner & Sanders, 2001; Seale et al., 1998; Chiou, Huang & Lee, 2005; Taylor & Shim, 1993; Higgins & Makin, 2004). It is therefore hypothesized that:

H8: There will be a direct relationship between attitudes towards piracy and the piracy behaviour of subjects.

The discussion that has been presented so far in this research extensively elaborates on the fact that current literature regards piracy behaviour is intentional. To conform to the current literature, the following final hypothesis is made.

H9: There will be a direct relationship between intent and actual piracy behaviour of subjects.

All of the above hypotheses will be tested for both Pakistani and Canadian data and results will then be compared to analyze similarities and differences between the two.

3.5 Chapter Review

In summary, the prior literature on software piracy conceptualizes software piracy as an intentional behaviour. This chapter presented hypotheses that could help understand the factors related to software piracy in developing parts of the world. The next chapter will present a description of the research methodology employed in this study.

4 RESEARCH METHODOLOGY

4.1 Site selection

Reasons for selecting Pakistan and Canada for the comparative analysis in this study have already been given. As is the case with many research projects, this study also had limited resources in terms of time and money. The sites for the study were therefore chosen with these factors taken into consideration. For the Canadian part of the study, the author's home university was chosen. For the Pakistani study, the city of Lahore was chosen since it has one of the biggest pirated software markets in Pakistan and also has several IT and computer science institutions.

4.2 Sampling Characteristics

The sample for this study is based on a student sample from one Canadian university and five Pakistani universities. Students were chosen as the target population in order to conform to the existing research, most of which is based on samples of college and university students (e.g. Eining & Christensen, 1991; Glass & Wood, 1996; Sims & Cheng, 1996; Solomon & O'Brien, 1990; Wagner & Sanders , 2001; Moores & Dhaliwal, 2000, 2004; Limayem et al., 1999, Chen et al., 1997; Simmons, 2004; Kini et al., 2003; Siegfried, 2005; Rahim et al., 2000; Whitman et al., 1990; Swaidan et al., 2004; Goal & Sanders, 1998). Students at both undergraduate and graduate levels were included in this study. Convenience sampling was employed in this research. As the name implies, this type of sampling is based on samples (subjects) conveniently available. Though almost impossible to treat rigorously, it is the method most commonly employed in many

practical situations such as in applied social science research (Statistics Canada, 2006; Wikipedia, 2006d). This method of sampling can introduce bias in the results. However past research has found convenience sampling appropriate for exploratory research (Tuncalp. 1988) and social science researchers therefore employ this methodology for various reasons (including lack or adequate resources). Moreover, most of the software piracy studies found in the current literature have employed convenience sampling.

4.3 Survey Instrument

As a measure of testing the models and the hypotheses in the study, a self-administered survey instrument was developed (see Appendices B and D). This survey instrument/questionnaire consisted of closed-ended questions[20] that were used to collect demographic details about the research participants. The questionnaire also consisted of, 31 items, each rated on a 7-point Likert scale to assess respondents' attitude towards ethical, economical and demographic implications of software piracy. Negatively worded items were included to detect response patterns. Various items in the questionnaire were adopted from existing studies. This was done in an effort to achieve authenticated results by using questions from previously published studies that have employed validated survey instruments to measure factors leading to software piracy. Questions were adopted from the work of various authors, including Moores & Dhaliwal (2004), Cheng et al. (1997), Siegfried (2005) and Al-Jabri et al. (1997).

Pilot testing (conducted in Canada) was accomplished in three phases: development and refinement of items using expert evaluators (phase 1); qualitative

[20] Only one open-ended question was used to get feedback about the questionnaire from the respondents. Since it was not critical towards the results of the study, this question was not taken into account while conducting statistical tests on the collected data.

discussion (phase 2) in small groups (two groups of n = 3 and n = 6) of undergraduate and graduate Information Technology (IT) students respectively; and finally, (phase 3) pre-validation of the instrument and research model with a small sample (n = 33) of IT and Interactive Arts (IA) graduate and undergraduate students at the author's home university. These two groups of students were chosen because they use a variety of software for their every day educational needs. Based on the feedback from the pilot study, minor changes were made to the format and content of the questionnaire, and it was also modified to make it adaptable in Pakistan. The two questionnaires that were used in the final studies are included as appendices.

In order to avoid any duplication of respondents, hard copies of the questionnaire were physically distributed at the same time in four classrooms and one computer laboratory at each of the five universities in Pakistan. At each university, two of the four classroom sessions were graduate, and two were undergraduate. Participation was voluntary and students were not under any obligation to complete the questionnaire once they had begun it. However, they were asked to return the complete or incomplete questionnaire before they left the classroom. All students were either in computer science or information technology programs in their respective universities.

The questionnaire at the university in Canada was administered through the Internet. A program was written in PHP/CGI to capture responses. Internal means (campus newsletters, inter-department memos) were utilized to advertise the study. The questionnaire was posted on the author's homepage under the university's domain. Students were able to access the online questionnaire by using their university computer IDs and passwords. Anonymity was assured as the system did not save any user specific

information. However in order to keep the results candid, all usernames entered were passed through an md5, a one way encryption algorithm, to ensure both privacy of the user and to ensure that respondents were unable to make multiple responses. As was done with the pilot study, IT and IA students were selected as the target population for the final study as well. However, the online survey was also made available to the computing science students.

4.4 Chapter Review

This chapter reflected on the sample characteristics, study citations and the survey instruments developed for this study. Next chapter will present a discussion on the collected data with an emphasis on the descriptive statistics and a description of methods employed for hypothesis testing, along with a brief discussion of the results.

5 DATA ANALYSIS

SPSS[21] and LISREL[22] were used to run different kinds of tests on the collected data. SPSS was used for factor analyses, creating composite scores, and running ANOVA. LISREL was used to test the research hypotheses by fitting data on structural models. Results obtained from the tests run on these applications will be discussed in this section.

5.1 Canadian Descriptive Statistics

The online survey conducted at the university in Canada returned 208 responses. In order to identify valid responses from invalid ones, *'Neutral'* option was set as the default selection for all Likert items. There were 12 such entries that had *'Neutral'* as the response for all Likert items and these responses were taken out from the data pool[23]. The final sample size was therefore 196 (n=196) for Canada. Figure 5-1 to figure 5-7 show the Canadian questionnaire with a frequency distribution for each of its question.

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[21] For a detailed overview of the SPSS application, see this webpage:
http://www.utexas.edu/its/rc/tutorials/stat/spss/spss1/index.html

[22] For a brief overview of the LISREL application, see this webpage:
http://www.ssicentral.com/lisrel/index.html

[23] Setting a default location to a particular response option may be disadvantageous in web surveys. A researcher has no means of identifying whether the default response was unchanged because the respondents did not read a statement, missed a statement or simply did not understand a statement. This factor of uncertainty could not have affected the statistical findings of this research because only 12 entries wee taken out of the collected data.

Figure 5-1 Canadian Descriptive Statistics

Canadian Descriptive Statistics

Question 1: Do you have access to a Computer

Response Categories	Responses	Frequency	Percentage
At Home	Yes	196	100.00
	No	0	0.00
At Work	Yes	127	64.80
	No	69	35.20

Question 2: You use a computer mostly at (Choose One)

Response Categories	Frequency	Percentage
At Home	1	89.80
At Work	20	10.20

Question 3: Your age in years is between

Response Categories	Frequency	Percentage
16-21	106	54.08
21-26	66	33.67
26-31	5	2.55
31-36	6	3.06
More than 36	13	6.63

Question 4: Your monthly household income in Canadian $ is

Response Categories	Frequency	Percentage
Under 1,000	86	43.88
1,000-2,000	49	25.00
2,000-3,000	30	15.31
3,000-4,000	4	2.04
More than 4,000	27	13.78

Question 5: You are

Response Categories	Frequency	Percentage
Under-Graduate Student	159	81.12
Graduate Student	37	18.88

Question 6: You are

Response Categories	Frequency	Percentage
Male	122	62.24
Female	74	37.76

Question 7: How often do you buy new software in a year

Response Categories	Frequency	Percentage
Never	82	41.84
A few times a year	113	57.65
A few times a month	0	0.00
A few times a week	1	0.51
Every day	0	0.00

Figure 5-2 Canadian Descriptive Statistics

Question 8: How often do you install software on the computer you most

Response Categories	Frequency	Percentage
Never	13	6.63
A few times a year	88	44.90
A few times a month	79	40.31
A few times a week	16	8.16
Every day	0	0.00

Question 9: Do you own a computer

Response Categories	Frequency	Percentage
Yes	189	96.43
No	7	3.57

Question 10: When you bought your computer, were there software installed on your computer that you didn't pay extra money for (e.g. Windows, Office, etc)?

Response Categories	Frequency	Percentage
Yes	124	63.26
No	72	36.73

Question 11: Please indicate where you usually get software from.

Response Categories	Responses	Frequency	Percentage
Purchase from online retailers.	Yes	39	19.90
	No	157	80.10
Purchase from local retailer stores.	Yes	96	48.98
	No	100	51.02
Download full versions of commercial software from Internet without paying for them.	Yes	149	76.02
	No	47	23.98
Copy software from friends.	Yes	151	77.04
	No	45	22.96
Copy software from family members.	Yes	115	58.67
		81	41.33
Purchase from your college/university bookstore/software shop.	Yes	41	20.92
	No	155	79.08

Figure 5-3 Canadian Descriptive Statistics

Question 12: Have you heard about a free operating system called Linux

Response Categories	Frequency	Percentage
Yes	179	91.33
No	17	8.67

Question 13: Do you use Linux

Response Categories	Frequency	Percentage
Yes	179	91.33
No	17	8.67

Question 14: Select the terms that you understand

Response Categories	Responses	Frequency	Percentage
Copyright	Yes	193	98.47
	No	3	1.53
Intellectual Property	Yes	136	69.36
	No	60	30.61
Software Piracy	Yes	181	92.35
	No	15	7.65

Question 15: Please indicate your response to each of the following statements by encircling one of the five numbers. The following table shows what each number implies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

15. a) Pirated software is easily available. *(Mean =4.69) (Skew = -2.58)*

Response Category	5	4	3	2	1
Frequency	154	28	10	3	1
Percentage	78.57	14.29	5.1	1.53	0.51

15. b) It is very easy to purchase pirated software in my city. *(Mean =3.58) (Skew = -0.30)*

Response Category	5	4	3	2	1
Frequency	77	12	69	24	14
Percentage	39.29	6.12	35.20	12.24	7.14

15. c) It is very easy to download pirated software. *(Mean =4.5) (Skew = -2.18)*

Response Category	5	4	3	2	1
Frequency	141	33	14	5	3
Percentage	71.94	16.84	7.14	2.55	1.53

Figure 5-4 Canadian Descriptive Statistics

15. d) I can easily copy software from my friends. *(Mean =4.35) (Skew = -1.69)*

Response Category	5	4	3	2	1
Frequency	127	34	18	10	7
Percentage	64.79	17.35	9.18	5.10	3.57

15. e) I have easy access to pirated software. *(Mean =4.32) (Skew = -1.54)*

Response Category	5	4	3	2	1
Frequency	125	32	21	12	6
Percentage	63.77	16.33	10.71	6.12	3.06

15. f) Legal software is very expensive. *(Mean =4.77) (Skew = -3.29)*

Response Category	5	4	3	2	1
Frequency	167	18	6	4	1
Percentage	85.20	9.18	3.06	2.04	0.51

15. g) I would buy pirated software if the price of legal software is too high. *(Mean =3.69) (Skew = -0.69)*

Response Category	5	4	3	2	1
Frequency	102	22	14	26	32
Percentage	52.04	11.22	7.14	13.26	16.33

15. h) I cannot afford legal software. *(Mean =4.01) (Skew = -1.01)*

Response Category	5	4	3	2	1
Frequency	103	30	37	14	12
Percentage	52.55	15.31	18.88	7.14	6.12

15. i) On average, a Canadian student's monthly salary is equal to the price of (legal) MS Windows XP. *(Mean =3.81) (Skew = -0.64)*

Response Category	5	4	3	2	1
Frequency	92	25	40	28	11
Percentage	46.94	12.75	20.41	14.28	5.61

15. j) There is no law against pirated software in Canada. *(Mean =2.02) (Skew = 1.00)*

Response Category	5	4	3	2	1
Frequency	15	7	46	27	101
Percentage	7.65	3.57	23.47	13.77	51.53

15. k) I would buy pirated software if there is no legal punishment for doing so. *(Mean =3.65) (Skew = -0.54)*

Response Category	5	4	3	2	1
Frequency	90	26	22	37	21
Percentage	45.92	13.26	11.22	18.88	10.71

Figure 5-5 Canadian Descriptive Statistics

15. l) I cannot be fined for buying pirated software. *(Mean =2.33) (Skew = 0.78)*

Response Category	5	4	3	2	1
Frequency	16	2	63	64	51
Percentage	8.16	1.02	32.14	32.65	26.02

15. m) Copying software is not legal. *(Mean =4.03) (Skew = -1.16)*

Response Category	5	4	3	2	1
Frequency	104	39	23	15	15
Percentage	53.06	19.9	11.73	7.65	765

15. n) I would buy pirated software even if it were not easily available. *(Mean = 2.53) (Skew = 0.49)*

Response Category	5	4	3	2	1
Frequency	34	13	47	30	72
Percentage	17.35	6.63	23.98	15.31	36.73

15. o) I would copy software from friends if pirated software were not easily available. *(Mean =3.99) (Skew = -1.07)*

Response Category	5	4	3	2	1
Frequency	104	33	28	15	16
Percentage	53.06	16.84	14.28	7.65	8.16

15. p) If legal software were available at much lower prices, I would buy it. *(Mean =4.49) (Skew = -2.21)*

Response Category	5	4	3	2	1
Frequency	140	31	14	4	7
Percentage	71.42	15.81	7.14	2.04	3.57

15. q) I would buy pirated software even if the cost of legal software is not too high. *(Mean =2.33) (Skew = 0.97)*

Response Category	5	4	3	2	1
Frequency	27	9	23	80	57
Percentage	13.77	4.59	11.73	40.82	29.08

15. r) I would buy legal software if I could afford it. *(Mean =4.39) (Skew = -1.76)*

Response Category	5	4	3	2	1
Frequency	131	31	34	38	47
Percentage	66.84	15.82	10.20	4.08	3.06

15. s) I would not copy software if there was a law against it. *(Mean =2.95) (Skew = 0.07)*

Response Category	5	4	3	2	1
Frequency	46	31	34	38	47
Percentage	23.47	15.82	17.35	19.39	23.98

Figure 5-6 Canadian Descriptive Statistics

15. t) I would not buy pirated software if there was a law against it. *(Mean =3.09) (Skew = 0.05)*

Response Category	5	4	3	2	1
Frequency	47	32	37	52	28
Percentage	23.98	16.33	18.88	26.53	14.28

15. u) I would not buy pirated software if I could be fined. *(Mean =3.21) (Skew = -0.07)*

Response Category	5	4	3	2	1
Frequency	61	25	35	45	30
Percentage	31.12	12.75	17.86	22.96	15.31

15. v) I would buy pirated software even if I feared being legally punished for doing so. *(Mean =2.64) (Skew = 0.25)*

Response Category	5	4	3	2	1
Frequency	16	33	55	48	44
Percentage	8.16	16.84	28.06	24.49	22.45

15. w) I would use pirated software even if I feared being legally punished for doing so. *(Mean =3.28) (Skew = -0.29)*

Response Category	5	4	3	2	1
Frequency	49	38	58	21	30
Percentage	25	19.39	29.59	10.71	15.31

15. x) I think that most students copy commercial software instead of buying it. *(Mean =4.29) (Skew = -1.24)*

Response Category	5	4	3	2	1
Frequency	113	42	28	11	2
Percentage	57.65	21.43	14.28	5.61	1.02

15. y) I think that most people buy pirated software. *(Mean =3.41) (Skew = -0.45)*

Response Category	5	4	3	2	1
Frequency	51	49	51	20	25
Percentage	26.02	25	26.02	10.20	12.75

15. z) I think that most people use pirated software. *(Mean =4.22) (Skew = -1.24)*

Response Category	5	4	3	2	1
Frequency	101	56	24	12	3
Percentage	51.53	28.57	12.24	6.12	1.53

15. aa) I see no harm being done to any one in buying pirated software. *(Mean =3.4) (Skew = -0.24)*

Response Category	5	4	3	2	1
Frequency	54	33	64	27	18
Percentage	27.55	16.84	32.65	13.77	9.18

Figure 5-7 Canadian Descriptive Statistics

15. bb) I think it is morally acceptable to buy pirated software. *(Mean =2.84) (Skew = 0.50)*

Response Category	5	4	3	2	1
Frequency	38	12	51	71	24
Percentage	19.39	6.12	26.02	36.22	12.24

15. cc) If I had a software package that costs $1,000 and my friend needs it but can't afford it; I would make a copy for him/her. *(Mean =4.26) (Skew = -1.45)*

Response Category	5	4	3	2	1
Frequency	117	38	22	12	7
Percentage	59.69	19.39	11.22	6.12	3.57

15. dd) I consider copying a software package as an acceptable behaviour. *(Mean =3.82) (Skew = -0.53)*

Response Category	5	4	3	2	1
Frequency	81	31	59	18	7
Percentage	41.32	15.81	30.10	9.18	3.57

As can be seen in figure 5-1, most of the Canadian respondents were under the age of 26 (n=172, 88%)[24]. There were 122 (62%) males and 74 (38%) female respondents. As expected, a very large number of students said that they knew the terms associated with the study. Ninety-eight percent (n=193), 69 percent (n = 136), and 92 percent (n=181) understood the terms copyright, intellectual property and software piracy respectively. This is very significant in terms of this study's hypothesis and the implications of this will be discussed in the next chapter. Ninety-six percent (n=189) of Canadian respondents owned a computer, and out of these, 124 (63%) indicated that their new computers had pre-installed software that they never paid for. The current literature doesn't indicate anything towards hard disk loading practice by computer retailers in Canada. One explanation for the 63% respondents indicating 'hard disk-loading' could therefore be that branded computers often come with bundled software that are marketed as 'free' for the customer and therefore respondents might have interpreted this question in this way. One hundred seventy-nine (91 %) students said that they have heard about Linux and use it as well. Although Linux can be obtained freely, it does not indicate that students who use Linux use this particular operating system (OS) only. Even if they did, it does not imply that they use other free software such as OpenOffice, etc.

5.2 Pakistani Descriptive Statistics

The survey in five Pakistani universities returned 365 responses. Out of these, any questionnaire that had a uniform response pattern (e.g. all *'Neutral'*, all *'Strongly Agree'* responses, etc.) in the Likert items was not included in the analysis. This kind of bias in

[24] The percentages in this chapter (except those that are shown in the figures/tables) are rounded off.

the responses is termed as an acquiescent response set[25] (Singleton and Straits, 1999). For more details on the acquiescent response bias, see (Ross et al., 1995; Ware, 1978). Twenty-six acquiescent responses were identified[26]. Therefore, the final sample size for the Pakistani part of the study was 339 (n=339). Figure 5-8 to figure 5-13 show the Pakistani questionnaire with a frequency distribution for each question. The Pakistani questionnaire was not translated into Urdu which is the national language of Pakistan and is widely spoken and understood in Lahore (city in which surveys were conducted). The curriculum being taught in all universities (that were included in the study) is in English and English is the main mode of academic communication. Therefore, students' understanding in terms of the questionnaire was not doubted.

[25] Generally, acquiescence response set is referred to the tendency for respondents to be very agreeable.
[26] Questionnaires that had one particular option (e.g. neutral, agree, disagree, etc.) selected for all of the Likert questions were taken out of the data set. The filtered responses could possibly still contain such questionnaires that did not have (only) a single option selected for all of the Likert items, but still fall under the acquiescence response set category. Such questionnaires were however not filtered out as the statistical effect they would have on the results would be minimal, if any.

Figure 5-8 Pakistani Descriptive Statistics

Pakistani Descriptive Statistics

Question 1: Do you have access to a Computer

Response Categories	Responses	Frequency	Percentage
At Home	Yes	327	96.46
	No	12	3.54
At Work	Yes	258	76.11
	No	81	23.89

Question 2: Your age in years is between

Response Categories	Frequency	Percentage
16-21	123	36.28
21-26	202	59.58
26-31	14	4.13
31-36	0	0.00
More than 36	0	0.00

Question 3: Your monthly household income in Rs. is

Response Categories	Frequency	Percentage
10,000-20,000	95	28.02
20,000-30,000	48	14.16
30,000-40,000	44	12.98
40,000-50,000	49	14.45
More than 50,000	56	16.52

Question 4: You are a

Response Categories	Frequency	Percentage
Under-Graduate Student	258	76.11
Graduate Student	80	23.59

Question 5: You are

Response Categories	Frequency	Percentage
Male	221	65.19
Female	118	34.81

Question 6: How often do you buy new software in a year

Response Categories	Frequency	Percentage
Never	32	9.44
A few times a year	172	50.73
A few times a month	118	34.81
A few times a week	12	3.54
Every day	5	1.47

Figure 5-9 Pakistani Descriptive Statistics

Question 7: How often do you install software on the computer you most

Response Categories	Frequency	Percentage
Never	[illegible]	[illegible]
A few times a year	119	35.1
A few times a month	144	42.48
A few times a week	[illegible]	[illegible]
Every day	11	3.24

Question 8: Do you own a computer

Response Categories	Frequency	Percentage
Yes	325	95.87
No	14	4.13

Question 9: When you bought your computer, were there software installed on your computer that you didn't pay extra money for (e.g. Windows, Office, etc)?

Response Categories	Frequency	Percentage
Yes	182	53.69
No	150	44.25

Question 10: Please indicate where you usually get software from.

Response Categories	Responses	Frequency	Percentage
Purchase from Hafeez Centre	Yes	201	59.29
	No	138	40.71
Purchase from other local CD shop.	Yes	257	75.81
	No	82	24.19
Download full versions of commercial software from Internet.	Yes	130	38.35
	No	209	61.65
Copy software from friends.	Yes	226	66.67
	No	113	33.33
Copy software from family members.	Yes	125	36.87
	No	214	63.13
Purchase from your college/university bookstore/software shop.	Yes	62	18.29
	No	277	81.71

Question 11: Have you heard about a free operating system called Linux

Response Categories	Frequency	Percentage
Yes	256	75.52
No	83	24.48

Figure 5-10 Pakistani Descriptive Statistics

Question 12: Do you use Linux

Response Categories	Frequency	Percentage
Yes	73	21.53
No	266	78.47

Question 13: Select the terms that you understand

Response Categories	Responses	Frequency	Percentage
Copyright	Yes	255	75.22
	No	84	24.77
Intellectual Property	Yes	78	23.01
	No	261	76.99
Software Piracy	Yes	163	48.08
	No	176	51.91

Question 14: Please indicate your response to each of the following statements by encircling one of the five numbers. The following table shows what each number implies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

14. a) Pirated software is easily available. *(Mean =61.36) (Skew = -1.69)*

Response Category	5	4	3	2	1
Frequency	208	82	34	9	6
Percentage	61.36	24.19	10.03	2.65	1.77

14. b) It is very easy to purchase pirated software in my city. *(Mean =55.16) (Skew = -1.62)*

Response Category	5	4	3	2	1
Frequency	187	101	28	14	9
Percentage	55.16	29.79	8.26	4.13	2.65

14. c) I can easily copy software from my friends. *(Mean =53.39) (Skew = -1.42)*

Response Category	5	4	3	2	1
Frequency	181	111	30	14	3
Percentage	53.39	32.74	8.84	4.13	.88

14. d) I have easy access to Hafeez Centre. *(Mean =47.79) (Skew = -1.04)*

Response Category	5	4	3	2	1
Frequency	162	97	49	26	5
Percentage	47.79	28.61	14.45	7.67	1.47

14. e) Legal software is very expensive. *(Mean =59.59) (Skew = -1.29)*

Response Category	5	4	3	2	1
Frequency	202	56	62	11	8
Percentage	59.59	16.52	18.29	3.24	2.36

Figure 5-11 Pakistani Descriptive Statistics

14. f) I would buy pirated software if the price of legal software is too high. *(Mean =47.2) (Skew = -1.18)*

Response Category	5	4	3	2	1
Frequency	160	98	59	11	11
Percentage	47.19	28.91	17.40	3.24	3.24

14. g) I cannot afford legal software. *(Mean =38.35) (Skew = -0.71)*

Response Category	5	4	3	2	1
Frequency	130	78	100	15	16
Percentage	38.35	23.01	29.49	4.42	4.72

14. h) An average Pakistani salary is less than the price of (legal) MS Windows XP. *(Mean =39.53) (Skew = -0.87)*

Response Category	5	4	3	2	1
Frequency	134	108	67	22	8
Percentage	39.53	31.86	19.76	6.49	2.36

14. i) There is no law against pirated software in Canada. *(Mean =29.79) (Skew = -0.62)*

Response Category	5	4	3	2	1
Frequency	101	93	95	25	25
Percentage	29.79	27.43	28.02	7.37	7.37

14. j) I would buy pirated software if there is no legal punishment for doing so. *(Mean =44.25) (Skew = -0.98)*

Response Category	5	4	3	2	1
Frequency	150	92	72	14	11
Percentage	44.25	27.14	21.24	4.13	3.24

14. k) I cannot be fined for buying pirated software. *(Mean =38.64) (Skew = -0.62)*

Response Category	5	4	3	2	1
Frequency	131	82	96	21	9
Percentage	38.64	24.19	28.32	6.19	2.65

14. l) Copying software is not legal. *(Mean =26.25) (Skew = -0.51)*

Response Category	5	4	3	2	1
Frequency	89	95	86	38	30
Percentage	26.25	28.02	25.37	11.21	8.85

14. m) I would buy pirated software even if it were not easily available. *(Mean =14.16) (Skew = -0.23)*

Response Category	5	4	3	2	1
Frequency	48	109	85	71	26
Percentage	14.16	32.15	25.07	20.94	7.67

Figure 5-12 Pakistani Descriptive Statistics

14. n) I would copy software from friends if pirated software were not easily available. *(Mean =27.14) (Skew = -0.81)*

Response Category	5	4	3	2	1
Frequency	92	146	72	20	9
Percentage	27.14	43.07	21.24	5.90	2.65

14. o) If legal software were available at much lower prices, I would buy it. *(Mean =52.21) (Skew = -1.40)*

Response Category	5	4	3	2	1
Frequency	177	105	39	12	6
Percentage	52.21	30.97	11.50	3.54	1.77

14. p) I would buy pirated software even if the cost of legal software is not too high. *(Mean =10.62) (Skew = 0.08)*

Response Category	5	4	3	2	1
Frequency	36	81	76	80	66
Percentage	10.62	23.89	22.41	23.60	19.47

14. q) I would buy legal software if I could afford it. *(Mean =32.74) (Skew = -1.14)*

Response Category	5	4	3	2	1
Frequency	111	155	35	26	12
Percentage	32.74	45.72	10.32	7.67	3.54

14. r) I would not copy software if there was a law against it. *(Mean =17.4) (Skew = -0.26)*

Response Category	5	4	3	2	1
Frequency	59	103	101	57	19
Percentage	17.40	30.83	29.79	16.81	5.60

14. s) I would not buy pirated software if there was a law against it. *(Mean =21.53) (Skew = -0.47)*

Response Category	5	4	3	2	1
Frequency	73	110	103	35	18
Percentage	21.53	32.45	30.38	10.32	5.31

14. t) I would not buy pirated software if I could be fined. *(Mean =18.58) (Skew = -0.52)*

Response Category	5	4	3	2	1
Frequency	63	120	111	27	18
Percentage	18.58	35.99	32.74	7.96	5.31

14. u) I would buy pirated software even if I feared being legally punished for doing so. *(Mean =13.86) (Skew = 0.01)*

Response Category	5	4	3	2	1
Frequency	47	72	100	74	46
Percentage	13.86	21.24	29.49	21.83	13.57

Figure 5-13 Pakistani Descriptive Statistics

14. v) I think that most students copy commercial software instead of buying it. *(Mean =34.81) (Skew = -0.90)*

Response Category	5	4	3	2	1
Frequency	118	130	62	21	8
Percentage	34.81	38.35	18.29	6.19	2.36

14. w) I think that most people buy pirated software. *(Mean =47.2) (Skew = -1.36)*

Response Category	5	4	3	2	1
Frequency	160	116	39	14	10
Percentage	47.19	34.22	11.50	4.13	2.95

14. x) I see no harm being done to any one in buying pirated software. *(Mean =31.56) (Skew = -0.65)*

Response Category	5	4	3	2	1
Frequency	107	107	76	35	14
Percentage	31.56	31.56	22.42	10.32	4.13

14. y) I think it is morally acceptable to buy pirated software. *(Mean =18) (Skew = -0.32)*

Response Category	5	4	3	2	1
Frequency	61	99	102	50	27
Percentage	17.99	29.20	30.09	14.75	7.96

14. z) If I had a software package that costs $1,000 and my friend needs it but can't afford it; I would make a copy for him/her. *(Mean =41.6) (Skew = -1.25)*

Response Category	5	4	3	2	1
Frequency	141	121	48	13	16
Percentage	41.59	35.69	14.16	3.83	4.72

14. aa) I consider copying a software package as an acceptable behaviour. *(Mean =23.3) (Skew = -0.57)*

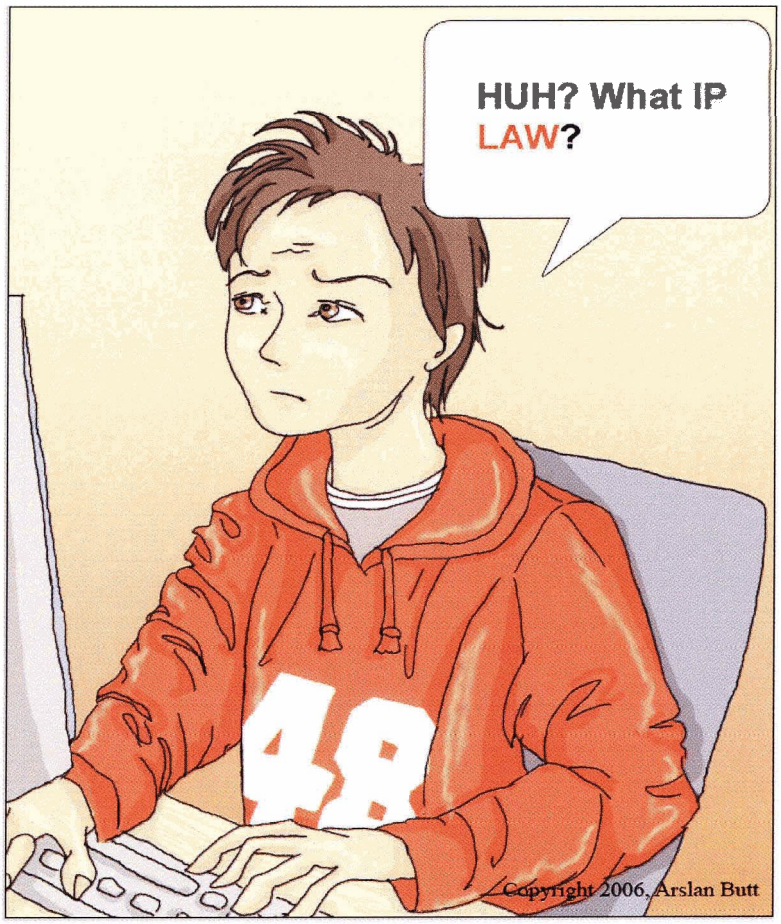
Response Category	5	4	3	2	1
Frequency	79	124	100	24	12
Percentage	23.30	36.58	29.50	7.08	3.54

This author believes that it is important to explain two particular questions from the Pakistani study. First, some questions asked the respondents about their computer usage at work. It is very common in a Pakistani society for people not to work while they are full time students in school. This custom or social norm is completely opposite to what prevails in Canada where students start working (even if they are doing volunteer work) during their high school years. Most of the graduate programs are not research based; therefore even graduate students don't hold any research assistant positions (or teaching assistant positions). This author was aware of these facts before this study was initialized. However, it was not anticipated at the time of questionnaire development that this question might create confusion for Pakistani students. Every group that the questionnaire was administered to asked for clarification on this question. They were then asked to answer the question with *'Yes'* if they used a school's computer in a lab or a classroom. They were also asked to indicate by writing a small note on the questionnaire if they did have a job. Only one student indicated that he was working full time. This implies that all those who responded *'Yes'* to this question used a school's computer in either a laboratory or a classroom. Second, there are 47 responses missing from the *'Income'* question. Most of these missing values were from female respondents. This factor could also be attributed to local customs. Younger people and even older females (living with parents) are not aware of their parents' income levels.

As was the case in Canadian data, most of the respondents were under the age of 26 (n = 325, 96%). There were 221 (65%) males and 118 (35%) female respondents. Gender distribution is very similar to that in the Canadian data. Ninety-six percent (n=325) (same percentage as Canada) owned a computer and out of these 182 (54%)

indicated that their new computers had pre-installed software that they never paid for. Two hundred fifty six (75 %) students said that they have heard about Linux. This figure is much lower as compared to the Canadian students. The number of Pakistani students actually using Linux is even lower (n=73, 21%). This indicates that students mostly use commercial proprietary software. In contrast to the Canadian situation, not many people were familiar with the three terms used in this study. Seventy-five percent (n=255), 23 percent (n = 78), and 48 percent (n=163) respondents said that they knew the terms copyright, intellectual property and software piracy respectively.

Figure 5-14 Fifty-two percent (52%) of Pakistani students did not understand the term software piracy

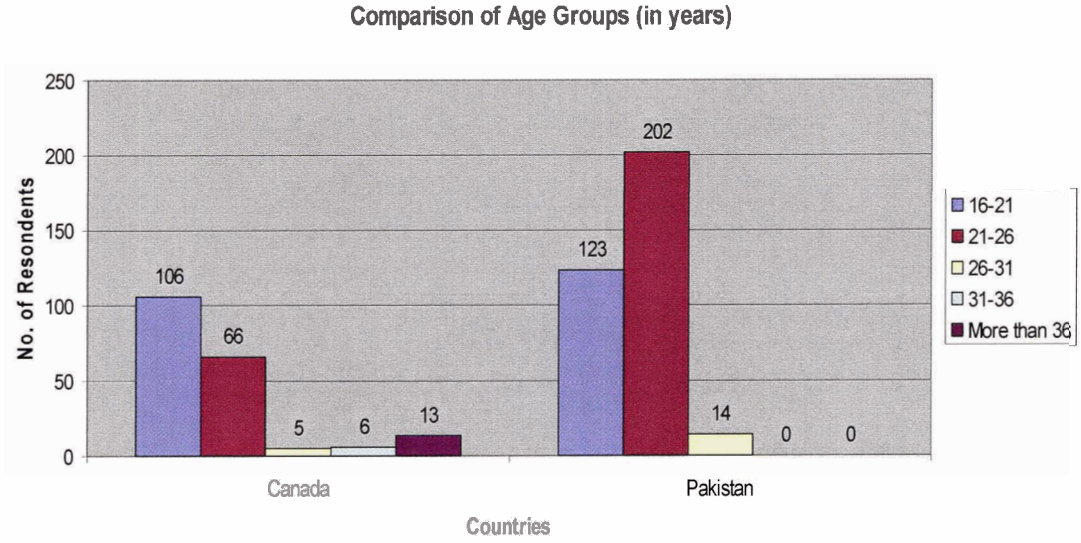


It is very important to emphasize here that this lack of knowledge was expected due to the lack of awareness related to IP issues in the Pakistani culture. The literature points out that lack of awareness in this regard is common across the developing parts of the world. This factor was considered during questionnaire development; therefore an example[27] of pirated software (that was thought would relate to Pakistani situation) was given after the *'terms'* question and before the Likert questions, as the latter assumed that students would understand by now what software piracy is, even if they didn't before starting the questionnaire.

5.3 Further Comparative Analyses of Demographics

The graphs in figures 5-15 to 5-17 represent a comparative depiction of Pakistani and Canadian respondents' demographics.

Figure 5-15 Comparison of Age Groups (in years) distribution of Pakistani and Canadian Students



[27] This can be seen in the questionnaire included in Appendix B.

Figure 5-16 Comparison of Gender distribution of Pakistani and Canadian Students

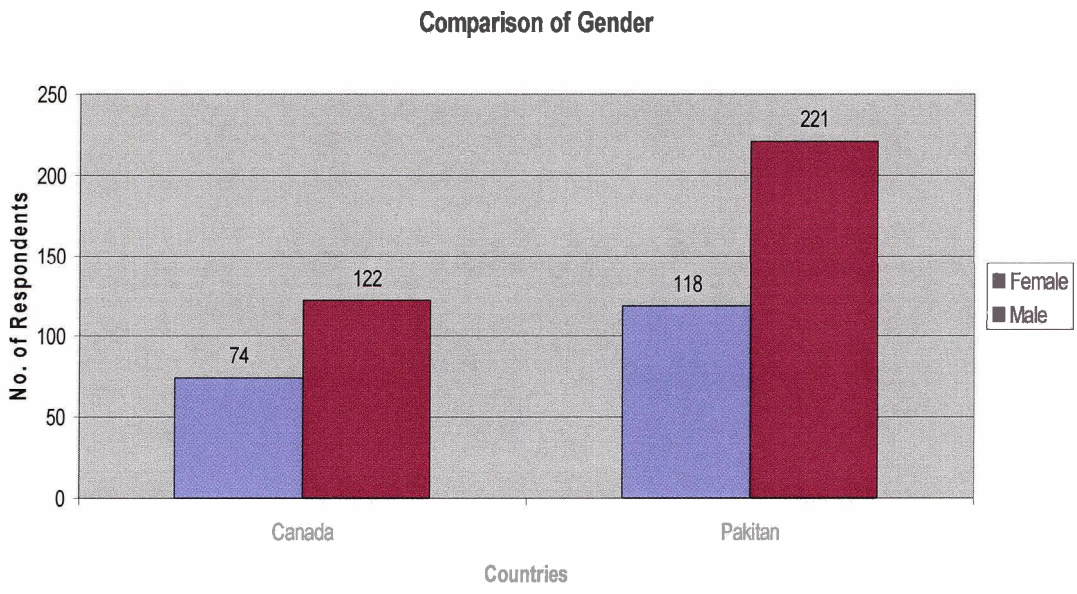
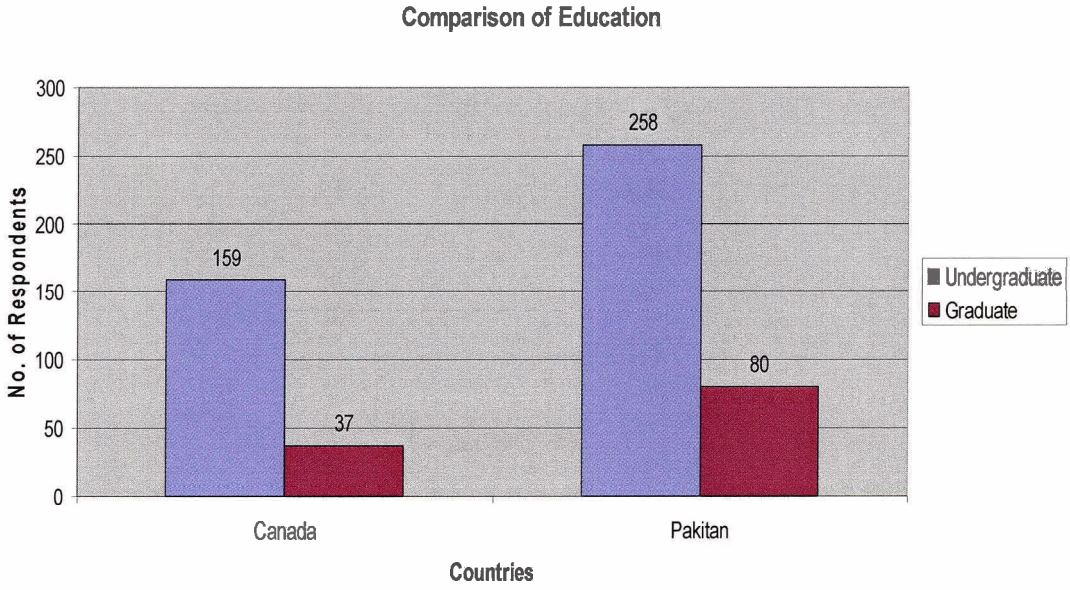


Figure 5-17 Comparison of Education distribution of Pakistani and Canadian Students



As can be seen in figure 5-15, most of the Canadian and Pakistani respondents were under the age of 26. The Canadian study had 13 respondents who were older than 36 and six respondents who were between 26 and 31 years. The Pakistani study did not have any respondent in these two age groups. The absence of Pakistani respondents in the two age groups could be attributed to two cultural factors: 1) it is very common in Pakistan for students to continue studies at the graduate level, as soon as they finish their bachelors; thus students are still 'young' even at the graduate level; 2) as is quite common in Canada, people begin their PhD (or even Masters) programs after being out of academia for several years and the people are therefore much 'older'. After leaving academia, the notion of continuing studies or upgrading one's academic qualifications is not very common in Pakistan. Moreover, there was no PhD student in the Pakistani study whereas the Canadian study may have included some PhD respondents as well (and therefore the presence of Canadian respondents in the last two age groups). The distribution of male vs. female respondents (figure 5-16) was relatively similar in Pakistan and Canada. The distribution of the respondents in terms of education level was different, however. As shown in figure 5-17, Pakistani study had 80 graduate students as compared to 37 in Canada. The following graphs (figures 5-18 and 5-19) show the frequency of buying and installing software by the Pakistani and Canadian respondents. Eighty-two (42%) of Canadian respondents said that they never buy software. There could be two reasons for this: 1) they might have recently bought a new computer that came with the required software; or 2) they always use pirated software.

Figure 5-18 Comparison of Software Buying frequency distribution of Pakistani and Canadian Students

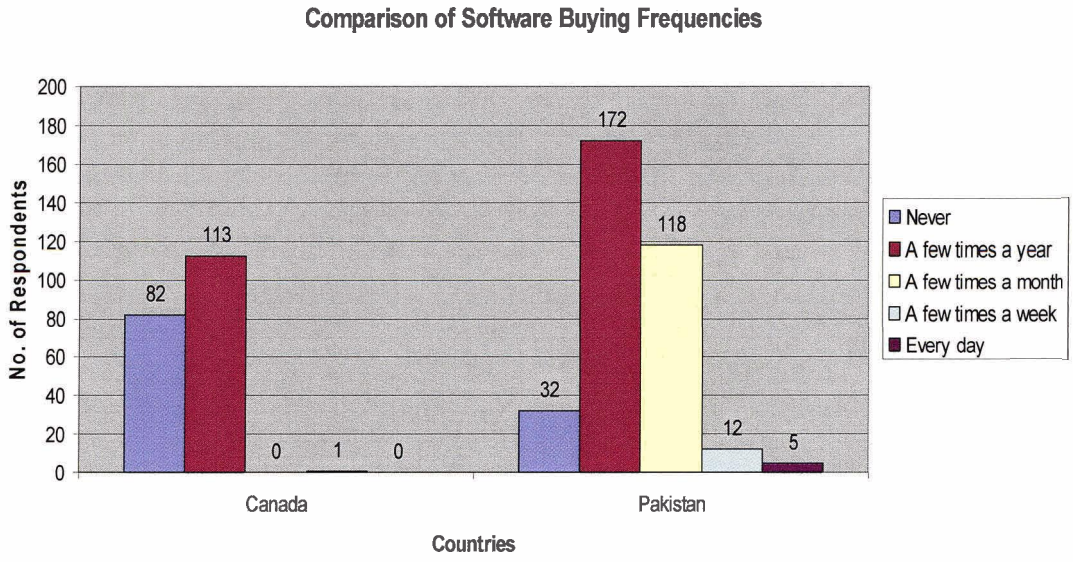
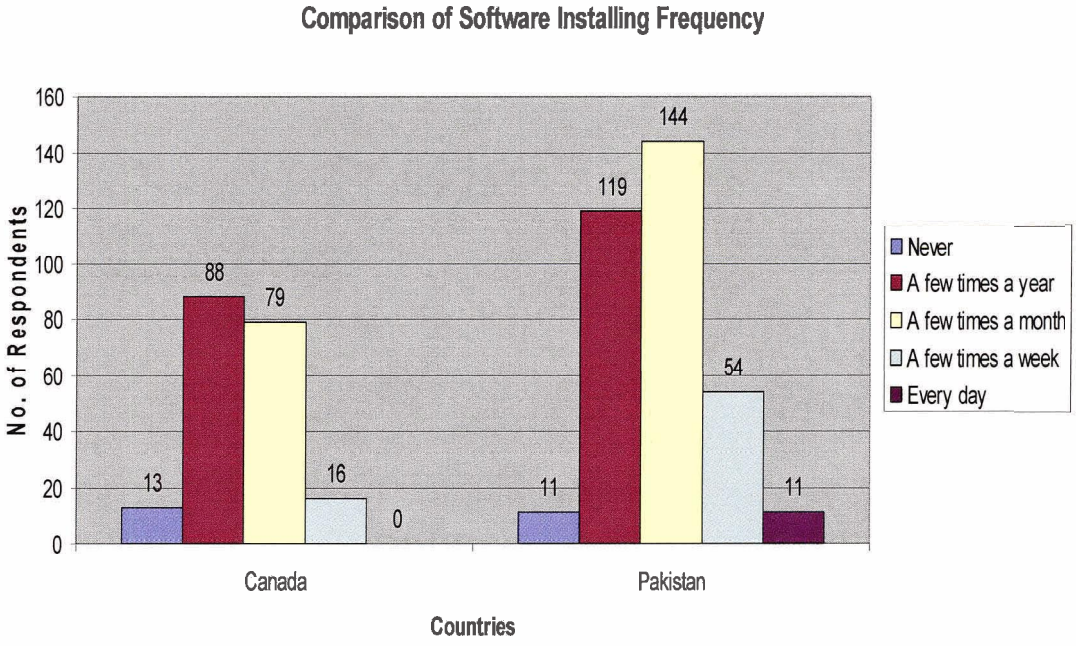


Figure 5-19 Comparison of Software Installing frequency distribution of Pakistani and Canadian Students



The above graphs (figures 5.18 and 5.19) show the frequency of buying and installing software by the Pakistani respondents. As compared to Canadian respondents, only a very small number of Pakistani students stated that they never buy software 32 (9%), which could be explained by the same reasons given earlier for Canadian students (for example, a recent purchase of a new computer bundled with software). The only possible difference could be that Canadian students might have received a legitimate bundled package of software with their new computers as compared to the Pakistani students who could have received pre-installed software on their new computers as a result of hard-disk loading by the retailers.

5.4 Hypotheses Testing

For testing hypothesis, the questionnaire items in both Pakistani and Canadian questionnaire were grouped together to make the statistical tests feasible. The groupings were made based on 1) the face validity, i.e. interpretability; 2) factor loadings (discussed below); and 3) reliability aka Cronbach's alpha, sometimes also referred to as 'internal consistency', of the Likert items. This grouping resulted in five major variables. Table 5.1 shows the five resulting variables along with the items from the *Pakistani questionnaire* associated with each of these groups. A similar distribution for the *Canadian questionnaire* is given in table 5.2.

Table 5-1 Composite Variables in the Pakistani Study[28]

	Pakistani Questionnaire Items
Variable (Group) Name	**Likert item #s from Question 14 in Figures 5-12 to 5-14**
Availability	a, b, c, d
Legal	i, j, k, l, r, s, t
Intent	m, p, u
Norm-attd (i.e. socially or culturally mediated attitudes)	n, v, w, x, y, z, aa,
Price	e, f, g, h, o, q

Table 5-2 Composite Variables in the Canadian Study

Variable (Group) Name	Items from Question 11 and Likert item #s from Question 14 in Figures 5-3 to 5-7
Availability	a, b, c, d
Price	f, h, i, p, r
Norms	x, y, z, cc
Ethical beliefs and Attitudes	aa, bb, dd,
Legal Knowledge	j, l, m
Legal Behaviour	s, t, u
Piracy Behaviour	(Question 11 items): Downloading from net, Copying from friends, copying from family members
Intent	n, q, v, w,

[28] The questions numbers for two variables may not be same in both questionnaires. For example, the questions for 'Intent' are numbered as m, p, u and n, q, v, w in the Pakistani and Canadian questionnaire respectively. The statements in both questionnaires are same. However there are some extra questions in the Canadian questionnaire, as a result of which the numbering of Likert items is different in both questionnaires.

5.5 Data Transformation

Structural Equation Modeling (SEM) with LISREL was used to test the relationships between the above groups/variables. Among many others, Seale (2002), Seale et al., (1998), Peace et al., (2003), Huang (2005), Lin et al., (1999) are some of the authors who have used SEM in their software piracy studies. Composite (total scores) were then obtained for each of the above variables. The *'Norm-attd'* group in the Pakistani data was further split. The first three items in this group (n, v, w) were called *'socnorm'* for *'social norms'* and the last 4 (x, y, z, aa) were called *'attit'* for *'attitude'*. In the SEM for the Pakistani group, a latent variable called ***'sociomor'*** was created which was composed of *'socnorm'* and *'attit'*. Multivariate procedures such as SEM and factor analysis require that the variables have interval properties. Because some of the variables used in this study were measured on a Likert scale and because some of the distributions of responses were skewed, the variables were transformed and made more normal using Categorical Principal Components Analysis (CatPCA). CatPCA can handle ordinal and nominal data, unlike classical PCA which can deal with numerical variables only (Gigi, 1985). CatPCA transforms the categories of the variables such that the latter can be considered as numerical values. The correlations between the original variables and the principal components are maximized to obtain the data transformations. Moreover, the missing values were imputed using the expectation-maximization (EM) procedure in LISREL.

While principal component analysis (PCA) is a tool that is often used to find the minimum set of orthogonal vectors that explain the most variance, the term factor analysis is usually reserved for confirmatory analyses of items based on theoretically

driven hypotheses concerning the latent structure underlying a set of observed variables. Latent variable modelling builds on factor analysis by specifying regression relationships among the latent constructs. Because some latent constructs serve as independent variables, it is important that they have adequate reliability and validity. Moreover, where compositing of questionnaire items is concerned, such compositing is only justified where high reliability as well as unidimensionality can be demonstrated. In this study, PCA was used to check on the unidimensionality of subsets of questionnaire items, chosen prior to represent a variable of interest (i.e., social norms). For the most part, dimensionality and reliability of subscales was as expected. Nevertheless, in relatively embryonic research areas (such as piracy research) it is to be expected that questionnaires and scale items undergo refinement as the knowledge base accumulates.

Since the purpose to which PCA was put in this study was to ensure unidimensionality of questionnaire subscales, rotation was not a concern. Generally, rotation is carried out in order to make the factors resulting from exploratory factor analysis more interpretable. For more details on PCA, see Kim and Mueller (1978a, 1978b), Rummel (1970, and Stevens (1986). In this study, interpretation of factors was not an issue. In any case, for those subsets of items that yielded more than one factor, both varimax, orthogonal, and principal axis factoring yielded identical solutions (but not, as is to be expected, identical loadings). Varimax rotation is commonly used in factor analysis (Kaiser, 1958). "A Varimax rotation is an orthogonal rotation, which means that the rotated components are uncorrelated. Compared to other types of rotations, a Varimax rotation tends to maximize the variance of a column of the factor pattern matrix (as opposed to a row of the matrix). This rotation is a commonly used orthogonal rotation in

the social sciences" (Lehman, O'Rourke, Hatcher & Stepanski, 2005, p. 443). For a more detailed treatment of varimax rotation in factor analysis, see Kaiser (1958).

5.6 The Analyses of Likert Questions

In the Pakistani data, four of the six *'price'* items loaded on one factor with internal validity of 0.719 (Cronbach's $\alpha = .719$). The remaining two price items contained components of price evaluation but also addressed purchasing intentions and decisions; because variability in these items could reflect variability in buying behaviour, only the first four price questions were used in making up a composite score. Similarly the reliability of the Canadian *'price'* factor was high ($\alpha = .69$). All four *'availability'* items in Pakistani data loaded on a single factor (Cronbach's $\alpha = .68$). The items were then optimally scaled using multiple correspondence analysis, and Cronbach's α for the four transformed *'availability'* items increased to .76. All five Canadian items in this category loaded up with even a higher reliability (Cronbach's $\alpha = .813$). PCA conducted on the Pakistani *'legal'* items resulted in a three factor solution that could be interpreted as being composed of the factors *'legal knowledge', 'legal actions',* and *'moral principles'*. However, this factor decomposition was not as clear cut as in the Canadian study, so for parsimony a one factor solution was retained. *'Legal'* items loaded up as a *'legal behaviour'* factor (Cronbach's $\alpha = .945$) and a *'legal knowledge'* factor (Cronbach's $\alpha = .482$). This implies that the awareness of legal implications of software piracy was more significant among the Canadian respondents. Questions 14(z) and 15(cc) in the Pakistani and Canadian questionnaire respectively, were designed to assess the collectivistic/individualistic nature of the respondents. Interestingly enough, in the Pakistani data this item loaded on both of the attitude/beliefs factor and on the social

norms factor. Separate factor analyses on these items were carried out both for the group that was familiar with the term 'software piracy' and for the group that was not. The result was almost identical in each case, further suggesting that there were no major differences in response patterns among those groups.

5.7 Pirated Software Acquisition as Piracy Behaviour

The two different behaviours (buying legitimate vs. buying pirated) is clearly identifiable in the Canadian case. The statements indicating acquisition of pirated software were therefore chosen as the criterion for piracy behaviour in Canadian SEM. However, in the Pakistani sample, the difference in the acquisition modes is not distinguishable at all. All forms of acquisition point towards piracy behaviour. Therefore, the items that, on the surface, appeared to be most directly suggestive of piracy behaviour were chosen to make up the dependent variable. Basically they were the best indicators of piracy and so they were chosen to represent the piracy behaviour construct. Subsequent tests confirmed that they were a good choice, but the primary reason for choosing them was theoretical, not statistical. The tables (showing components) resulting from the factor analysis of software acquisition modes are given in Appendix E. The following two tables present a descriptive frequency distribution of the software acquisition sources reported by the respondents in the Canadian and Pakistani study. The significance of some of these (software acquisition sources) has been discussed earlier and the remaining will be discussed later in this and next chapter. The correlations of these software acquisition sources are given in Appendix F.

Table 5-3 Frequency Distribution of Pakistani respondents' software acquisition sources

		Hard Disk Loading	Buy from Hafeez Centre	Buy from other local CD shops	Download from Net	Copy from Friends	Copy from Family members	Get from College/ University
N	Valid	332	339	339	339	339	338	
	Missing	7	0	0	0	0	0	
Mean	-	.55	.59	.76	.38	.67	.37	.18
Mode	-	1	1	1	0	1	0	0
Sum	-	182	201	257	130	226	125	62

Table 5-4 Frequency Distribution of Canadian respondents' software acquisition sources

		Hard Disk Loading	Buy Online	Buy Locally	Download from Net	Copy from Friends	Copy from Family members	Get from College/ University
N	Valid	196	196	196	196	196	196	196
	Missing	0	0	0	0	0	0	
Mean	-	.63	.20	.49	.76	.77	.59	.21
Mode	-	1	0	0	1	1	1	0
Sum	-	124	39	96	149	151	115	41

5.8 Fitting Data on Structural Models

"In addition to fit statistics, structural equation modelling produces estimates for partial regression coefficients (referred to as path coefficients), standardized regression coefficients and estimates of squared multiple correlations" (Wagner & Sanders, 2001, p. 165). LISREL was used to fit the Pakistani data on a structural equation model. The resulting path coefficients are shown in figure 5-18. The positive paths between two

variables indicate a positive relationship between them and vice versa. The closer the coefficient is to 1, the stronger the relationship. The Canadian data had a poor fit on this model. Therefore another model was made on which Canadian data had a good fit. The resulting model is shown in figure 5-19. This author feels the need to emphasize that the structural models were modified until an acceptable fit was achieved. The model was modified because (1) some of the independent variables had significantly non-normal distributions and (2) the relatively small sample size in the Canadian case made parameter estimation in more complex models more difficult. This is due to the under-identification problems that often arise when the number of degrees of freedom—a function of sample size and number of free parameters—is small. In SEM, structural coefficients between observed variables and latent variables and between latent variables and other variables are parameters to be estimated. For these reasons as well as for parsimony, a less complex SEM model was adopted. Robinson (n.d.) suggests that there are two main criticisms of SEM: 1) the assumption of data normality and requirement of a large sample size (>200); 2) misrepresentation of causal relationships. Unless the data is based on experiments, causality cannot (or should not) be claimed. In dealing with factors as diverse as ethics, censure, and attitudes in a new culture (with respect to a complicated phenomenon such as software piracy), a very great deal of exploratory work and theorizing must go on before any clear cut statements of cause-and-effect can be made. The structural models developed in this research therefore represent the influences of independent variables on dependent variables rather than showing causality between the two. Even if data analyzed with SEM is causal, SEM itself does not provide any such proof (Robinson, n.d.). As far as the sample size requirements are concerned, Robinson

(n.d.) discusses states that "statistical tests for model fit have the problem that their power varies with the sample size. If we have a very large sample, the statistical test will almost certainly be significant...this means that, if we have a large sample, we are very likely to reject the model even though it describes the data quite well. On the other hand with small samples the model is very likely to be accepted even if the fit is poor" (p. 5).

It has been mentioned earlier that CatPCA was used to address the issue of skewness in the collected data. Moreover, the LISREL manual recommends replacing the usual Pearson product moment correlation coefficient with an alternate measure of association in the case where the exogenous variables have few categories or are markedly skewed. However, as Hayduk (1987) points out, this procedure does not eliminate the normality assumption of the variables in the population; rather, it assumes that the variables are distributed as multivariate normal and that any deviations from normality in the data are due to the imposition of arbitrary categories and/or a poor choice of cutoff points. Hayduk (1987) further suggests that "if the underlying variables are non-normally distributed, it remains unknown whether more harm than good is done by living with the ordinary correlation coefficient and the skewed distribution or correcting the skew by emphasizing the untenable assumption of multivariate normality" (p. 331). By using CatPCA, which deals with normalizing the variables without assuming multivariate normality in the population, it was hoped that the above Scylla and Charybdis could be avoided. An alternative possibility would have been to use one of the methods for dealing with non-normal ordinal variables in PRELIS[29], such as censoring.

[29] For a list of PRELIS features, see this webpage: http://www.ssicentral.com/lisrel/index.html#prelis

Figure 5-20 Pakistani Structural Equation Model

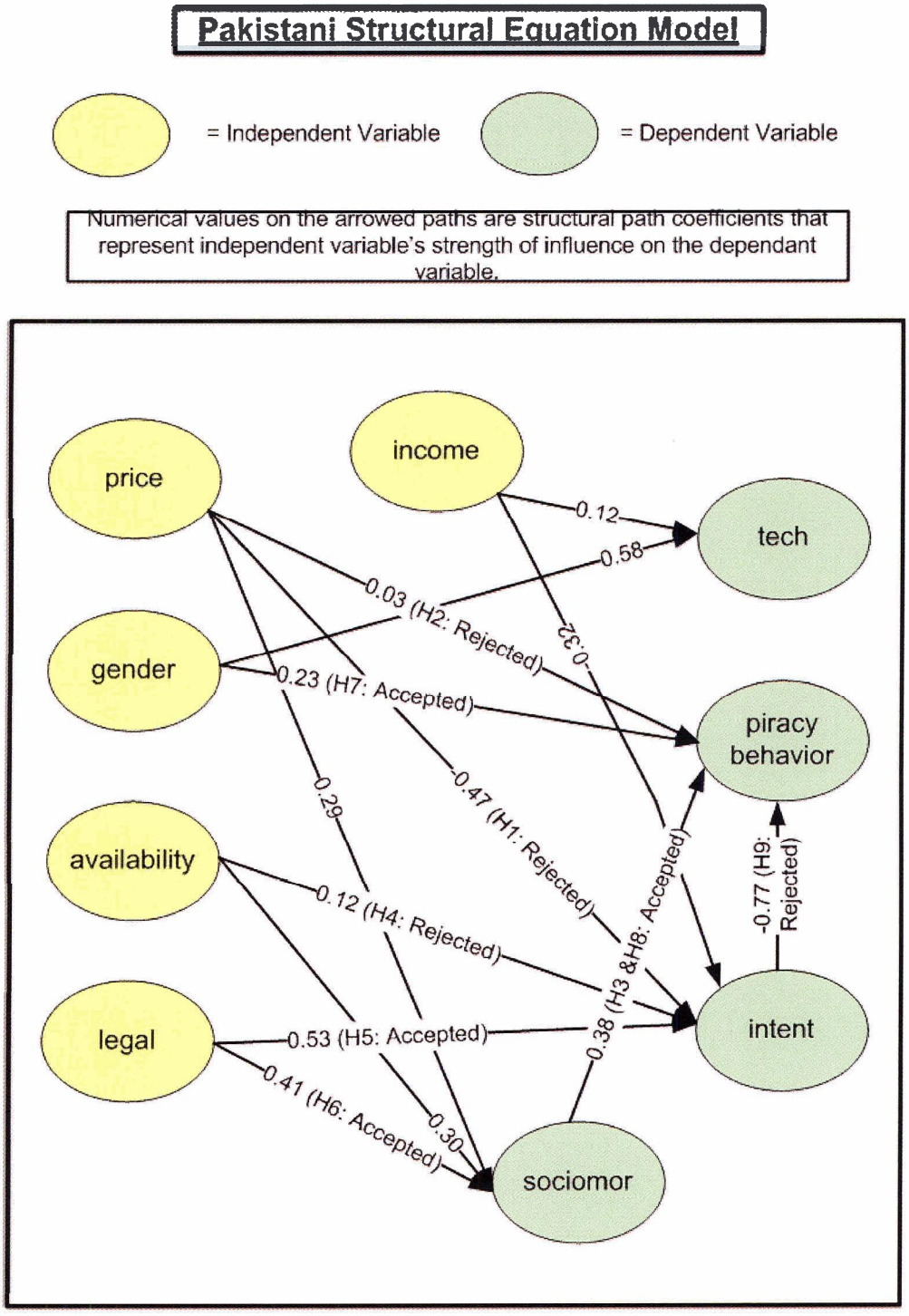
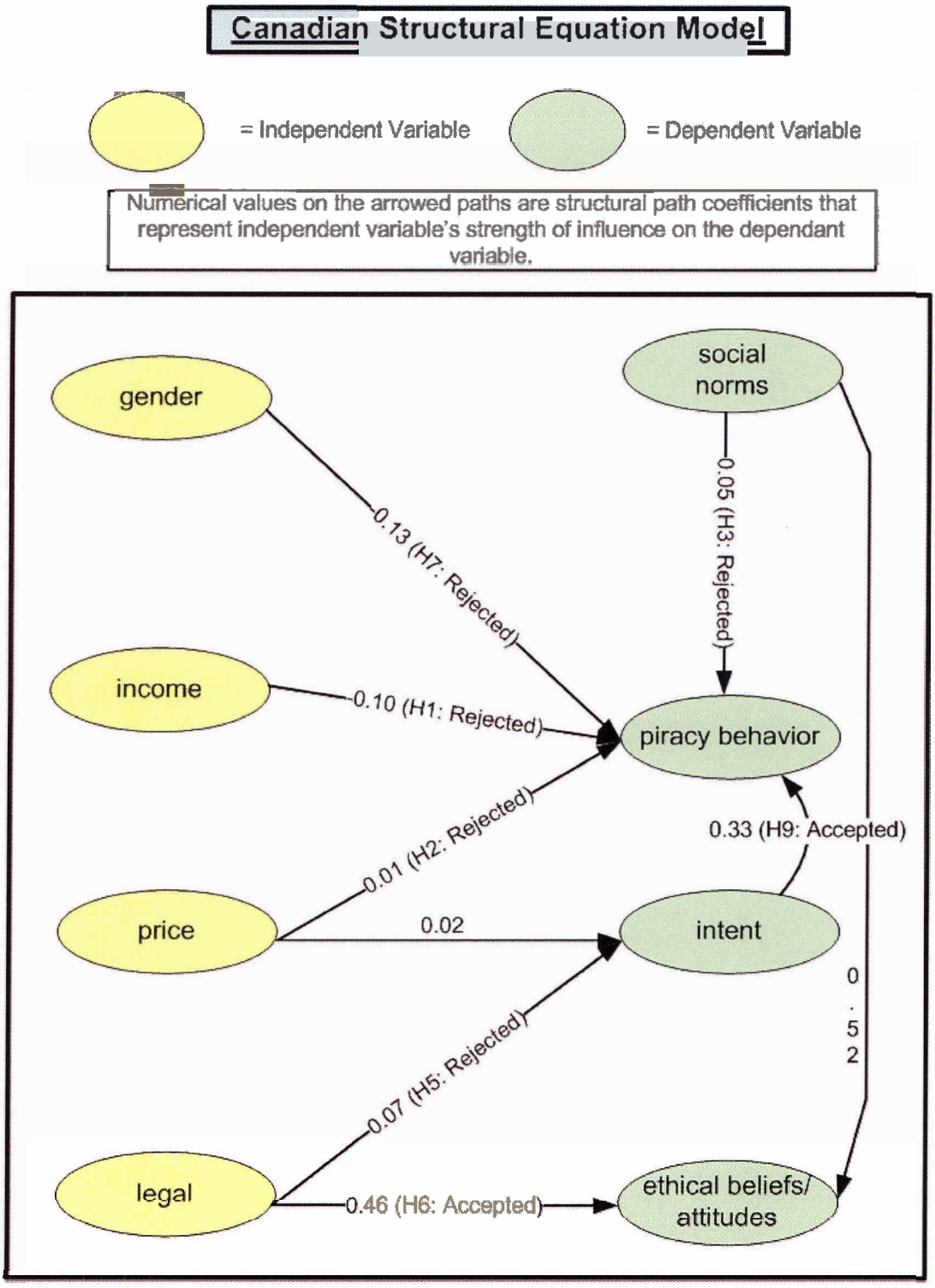


Figure 5-21 Canadian Structural Equation Model



The gender →piracy behaviour path in the Pakistani model has a coefficient of 0.23 which is a fairly strong indication of relationship between both variables. Hypothesis 7 is therefore accepted in Pakistan's case. The same path in the Canadian model has a coefficient -0.13 implying that Hypothesis 7 is rejected in this case. However one other relationship (that was not hypothesized) was seen in the Pakistani model. Males were found to be more involved in the activity of purchasing and installing pirated software. A higher level of technical sophistication in males could be attributed to this significant relationship with a fairly high path coefficient of 0.58. In the Pakistani model, the price factor (price → piracy behaviour, 0.03) does not seem to have any effect at all on the piracy behaviour, therefore rejecting Hypothesis 2. However, it has strong negative relationship (-.047) with the intent variable, thus rejecting Hypothesis 1. Possible causes and implications of this will be discussed in the next chapter. In the Canadian model, price has very weak relationships with both intent and piracy behaviour, having path coefficients of 0.01 and 0.02 respectively. Thus both Hypothesis 2 and Hypothesis 1 are rejected in this case. Legal issues have a strong influence on both intent (0.54) and the *sociomor* variable (0.40) in the Pakistani model. Therefore, Hypothesis 5 and Hypothesis 6 are accepted in this case. In the Canadian model, the legal construct has a weak relationship with intent (0.07) and a significant relationship with ethical beliefs and attitudes, thus rejecting Hypothesis 5 but accepting Hypothesis 6. The availability of pirated software has a very small effect on the intent of Pakistani students (0.13) but has a fairly strong relationship with the *sociomor (0.29).* Hypothesis 4 is rejected in this case. The correlation between the availability of pirated software and the intent of Canadian students is 0.23, which represents a significant relationship at α=0.05. Hypothesis 4 is

therefore accepted for the Canadian data. Intentions in the Pakistani model have a very high negative relationship (-0.76) with the piracy behaviour. Hypothesis 9 is therefore rejected. The *sociomor* construct, on the other hand, has a very significant relationship (0.39) with the piracy behaviour, thus accepting Hypothesis 3. Since ethical attitudes towards piracy were included in *sociomor* variable in the Pakistani model, Hypothesis 8 is also accepted. As far as the Canadian model is concerned, the *norms* variable has a strong influence (correlation coefficient = 05.2). The norms however do not have any effect on the piracy behaviour as is evident with a very small path coefficient of 0.05 between the two. Intent on the other hand has a significant relationship (0.34) with the piracy behaviour of the students. Hypothesis 9 and Hypothesis 3 are therefore accepted and rejected respectively. This suggests that intentions predict software piracy behaviour in the Canadian model, whereas norms are responsible for the piracy behaviour of Pakistani students.

Software piracy studies found in the literature review have adopted regression analysis, SEM or partial least squares as the method for hypothesis testing. Although this research relies heavily on its SEM results, regression analysis was also conducted on the composite variables of both Canadian and Pakistani data. Tables 5-5 and 5-6 represent the results of the conducted regression analysis.

Table 5-5 Regression Analysis of Pakistani Data

Measure	Unstandardized Coefficients		Standardized Coefficients	Correlations	
	B	SE	*β*	*r*	Semipartial *r*
Income	-.025	.051	-.020	.089	-.027
Price	.149	.035	.207	.510	.224
Availability	.181	.033	.231	.358	.289
Legal	.167	.029	.268	.484	.304
Attitudes/Ethical beliefs	.430	.054	.350	.562	.403
Gender	-.256	.161	-.067	.117	-.087

Dependent Variable: Social Norms:- R = .711 (R^2 = .505)

Table 5-6 Regression Analysis of Canadian Data

Measure	Unstandardized Coefficients		Standardized Coefficients	Correlations	
	B	SE	*B*	*r*	Semipartial *r*
Intent	.524	.051	.335	.529	.259
Attitude/Ethical Beliefs	.348	.061	.188	.453	.143
Price	.075	.043	.054	.365	.044
Legal	.258	.047	.152	.332	.137
Gender	-.283	.054	-.132	-.160	-.131
Availablity	.100	.033	.227	.397	.226

Dependent Variable: Piracy behaviour:- R = .595 (R^2 = .354)

As can be seen in table 5-8 above, the Canadian regression model explains 35% *(R^2 = .354)* of the variance in the Canadian respondents. Intent has the strongest correlation coefficient *(r=.529)* with the piracy behaviour. About 50% *(R^2 = .505)* of the variance in the social norms is explained by the Pakistani regression model presented in table 5-7. Attitudes and ethical beliefs have the strongest correlation *(r=.562)* after price *(r=.510)*. The following table summarizes the results of hypothesis testing based on the structural models and the regression analyses.

Table 5-7 Summary of Hypotheses Tests

Pakistani Study	Canadian Study
H1(Income →Piracy Behaviour): Rejected	H1 (Income →Piracy Behaviour): Rejected
H2 (Price →Piracy Behaviour): Rejected	H2 (Price →Piracy Behaviour): Rejected
H3 (Social Norms → Piracy Behaviour): Accepted	H3 (Social Norms → Piracy Behaviour): Rejected
H4 (Availability → Intent): Rejected	H4 (Availability → Intent): Accepted (using SPSS)
H5 (Legal→Intent): Accepted	H5 (Legal→Intent): Rejected
H6 (Legal→Social norms): Accepted	H6 (Legal→Social norms): Accepted
H7 (Gender→Piracy Behaviour): Accepted	H7 (Gender→Piracy Behaviour): Rejected
H8 (Attitudes → Piracy Behaviour): Accepted	H8 (Attitudes → Piracy Behaviour): Rejected (using SPSS)
H9 (Intent → Piracy Behaviour): Rejected	H9 (Intent → Piracy Behaviour): Accepted

5.9 Chapter Review

Descriptive statistics of the collected data were discussed. This chapter also presented the statistical results of structural equation modelling and regression analysis. Most of the results of this study have been obtained through SEM. The next chapter presents is a discussion of these results.

6 DISCUSSION

This research focused on the cultural dimension of software piracy and its effect on the behaviour of university students. Two structural models that incorporate social and cultural norms, economic conditions, ethical attitudes towards piracy and the availability of software piracy have been developed and tested. Since Canada and Pakistan are culturally and economically different countries, they were chosen to provide a contrasting view of the software piracy phenomenon.

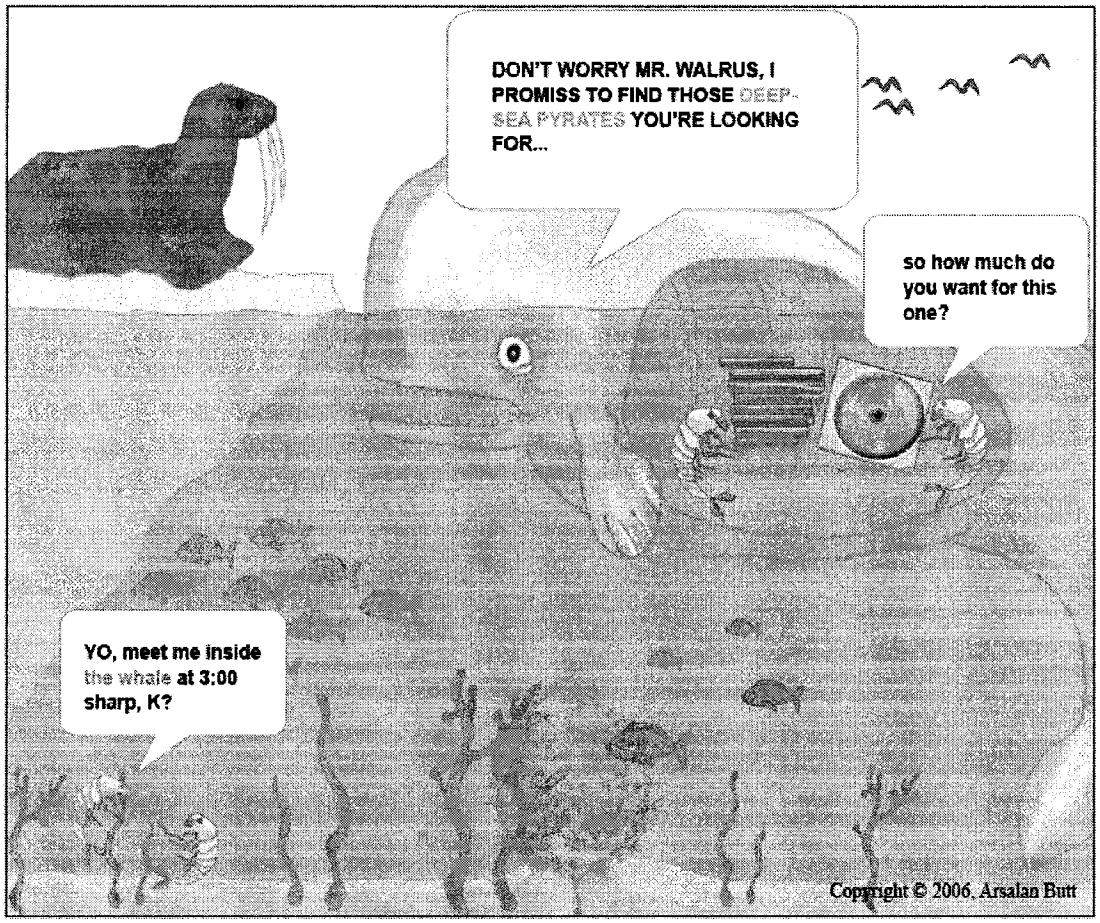
The analysis of the data provides several interesting insights. This study found that about 42 percent (n=82) of the Canadian respondents actually never buy any software, which is similar to the results found by a recent Canadian survey of university students conducted by CAAST. According to this survey 47 percent of students admitted that they pirate software (CAAST, 2005b). A smaller number of Pakistani students (n=32, 9%) stated that they never buy any software. This does not indicate that fewer people pirate software in Pakistan. It simply means that Pakistani students have other modes of pirated software acquisition such as copying from friends or family members and illegally downloading software from the Internet. Seventy-six percent of Canadian students downloaded pirated software from the Internet as compared to only 38 percent of Pakistani students. This is due to the unavailability of higher Internet speeds and higher bandwidth in Pakistan. Internet Service Providers (ISPs) in Pakistan generally provide hourly Internet connections; therefore, buying pirated software from a local retailer or copying it from a peer costs much less than downloading it from the Internet.

In Canada, the absence of retail outlets (selling pirated software) and the availability of higher bandwidths and faster Internet speeds make it more feasible to download the software illegally. About 18 percent of Pakistani respondents indicated that they buy software from their university software shop; however, on a personal visit[30] to the university's software shop it was found that legal software was not available at all. This indicates an absence of academic software licenses in Pakistani educational institutions as opposed to the Canadian university included in this research, where academic versions of commercial software are available at much lower prices than the commercial versions. Despite this availability, a large number of Canadian students (the number is comparatively very small to students who pirate in Pakistan) pirate software, which implies that they indulge in the piracy behaviour intentionally. Selling academic versions of commercial software at cheaper prices will therefore help reduce the extent of software piracy. Another method that can be adopted by software publishers to reduce piracy of their products is price discrimination, which has been suggested by many authors as well. Microsoft has taken this initiative by introducing a Pakistani version of the Windows XP program. This OS will be offered to students and home users at a 93 percent discounted price of the full version (Pakistan Link, 2005 a). The effect of this initiative will be seen in the next few years.

The analysis of economic factors (high price of legal software and low income) in this study provides a rationale for the reluctance of Pakistani government to aggressively enforce the intellectual property rights.

[30] This visit was made by the research assistant who handled the surveys in Pakistan.

Figure 6-1 Governments of Developing Countries are Reluctant in Enacting Stronger IP Laws.



Gopal and Sanders (1998) suggest that "governments of software publishers that maintain a significant international presence can employ trade sanctions in order to induce increased copyright enforcement" (p. 395). Although this may be the best solution (from a business/economical perspective) to curb high rates of copyright infringement, it would meet with a great deal of resistance from the governments of developing countries. Despite being aware of the rampant software piracy, governments of countries such as Pakistan are aware of the economic conditions of the mass population. Although the Pakistani government has recently taken some anti-piracy initiatives in response to the international pressure, piracy of all forms of IP still takes place on a very large scale.

People (students, in the context of this research) in the developing countries need to have cheap access to resources (software) in order to keep up with the rapid pace of technological advancement in the Western world. It can be assumed that governments of developing countries are aware of this and therefore are always reluctant to enact and enforce strict IP protection laws.

One item on the questionnaire assessed students on the individualistic/ collectivistic measure. Considering Likert scale values of 4 and 5 from this question as an indication of agreement, 77 percent (n = 262) of the Pakistani students presented collectivistic views. This result was expected. However, interestingly, a similar number of Canadian students showed collectivistic views (n = 115, 79%), which could very possibly be one of the major reasons for high software piracy rates among Canadian students. This also indicates the presence of a subculture within the culture of a society. Sub-culture is defined as "a culture-within-a-culture; the somewhat distinct norms, values and behaviour of particular groups located within society. The concept of subculture implies some degree of group self-sufficiency such that individuals may interact, find employment, recreation, friends and mates within the group" (Online Dictionary of the Social Sciences, 2006). This implies that even though Canadian society and culture is mainly individualistic, students can portray collectivistic attributes. The presence of students from various Asian ethnic groups in the Canadian sample could be an explanation for this. However, ethnicity was not considered in this research and will therefore require future exploration.

The empirical evaluation provides strong support that social norms and positive attitudes are correlated with the actual piracy behaviour of Pakistani students. This

finding is similar to those of Proserpio et al., (2004), Seale et al., (1998), Limayem et al. (1998) and Al-Jabri, I. & Abdul-Gader, A. (1997) who concluded that social norms have strong influence on piracy behaviour. On the other hand, intentions proved to be stronger predictors of piracy behaviour of Canadian students. The findings from the Canadian part of the study are similar to the existing literature which regards software piracy behaviour as intentional. Studies that have reached to similar conclusions are given in table 3-1 (Chapter 3). The achieved results answer the research question that this study was based upon; that is, it supports the hypothesis that software piracy behaviour in Pakistan cannot be regarded as purely intentional. It should rather be conceptualized as a consequential behaviour resulting from various elements, with customs or social norms being the strongest of them all.

This also indicates that in two culturally different countries, the conditions that are responsible for creating a piracy-favouring environment are essentially different. This finding is similar to that of Gopal and Sanders (1998) who found that their economical model of software piracy was applicable to the U.S. but not to India, and who concluded that there are cultural factors involved that need further consideration. However, there were two interesting odd relationships in the Pakistani data: 1) A high negative relationship between price and intentions (-0.47) implies that the higher the price of original software, the lower is the intent to pirate; and 2) intentions do not predict software piracy behaviour with a very strong negative relationship (path coefficient of -.076). Although this negative relationship suggests that intention is not a predictor of software piracy behaviour, the strength of the relation is rather odd. Both of the above relationships indicate that there is a variable (or more) that has not been considered in this

study and which need to be looked at in future research. Moreover, more than 50 percent of Pakistani students were not even aware of the term software piracy. Students who knew what software piracy meant and students who didn't mainly differed on the *intent* variable. This indicates a difference between an individual's intentional behaviour of an illegal activity as compared to one who performs the same behaviour without realizing the illegality of the act. This suggests that the concept of intentional software piracy behaviour in Pakistan should be used cautiously in future research. On the other hand, *intent* variable in the Canadian data clearly stood out as a predictor of piracy behaviour. Further to this, the difference between legitimate and illegal software acquisition modes of Pakistani students was very difficult to establish. All sources of software acquisition indicated piracy behaviour. Canadian data on the other hand clearly differentiated between the two acquisition modes. This problem therefore needs to be addressed in future research.

Swinyard et al. (1990) noted that "the cultural history of Asia does not generally support the notion of protecting proprietary creative work. In many Asian nations the highest compliment one can be paid is to be copied. Emulation is not only admired, it is encouraged" (p. 657). Due to a lack of IP related awareness (unlike the Western world), this culture of copyright infringement is deeply rooted in the Pakistani society in such a way that one buys and sells pirated software without even realizing that their action might be considered illegal and/or unethical. It is an established norm: a custom; the way an act is supposed to be normally carried by everyone. People do not indulge in the process of decision making about their software acquisition behaviour as they view it to be the only way. The abundance of pirated software markets and an almost absent legal enforcement

(in regards to IP rights) exaggerate an already piracy-favouring environment. Similar conditions are responsible for high piracy rates in other regions of the world as well. Moores et al. (2000) found the ready availability of pirated software to be one of the main reasons for high rates of software piracy in Hong Kong. One can argue that intellectual property protection policies may hinder economic development in developing nations, as these countries could employ the existing knowledge of the developed world for their own economic well being. Marron et al. (2000) also shared similar views. This again reflects on the reluctance of governments in employing strict anti-piracy regulations in order to allow their people to have easy access to required resources.

Gopal and Sanders (1998) correctly identified the need for a behavioural model for software piracy activity that would help software publishers gain insight into the behavioural dynamics of software pirates. However, as they also found that their economical model was appropriate for the U.S. and not for India, caution should be practiced in all future research that attempts to study piracy behaviour. This study was an exploratory, cross-cultural investigation of piracy in two very different cultures. The applicability of Western constructs such as *'attitudes'* and *'intentions'* to collectivist societies must always be critically examined. Based on previous research results and the results of this study, this author is confident that the structural models presented in figures 5-18 and 5-19 represent a reasonable explanation of software piracy activity in the student population of Canadian and Pakistani universities included in the study. However, due to limited resources, this research was restricted. Future research should look at the questions left unanswered by this study. Subjects from more countries should be included in future cross-country studies of software piracy behaviour so that the

results of this study could not only be generalized for the general student population but also to the population at large.

6.1 Conclusion

This study has found that there is no one way of understanding piracy behaviour across different countries. Although poor national economy plays a substantial role in software piracy rates, culture is also part of the equation. This study has also suggested that software piracy behaviour in a developing country such as Pakistan cannot be conceptualized as an intentional behaviour, but it can be in the case of a developed country such as Canada. Implications of the results for intellectual property rights protection policies have also been presented. Future studies on the subject should attempt to look at the questions left unanswered by this study so that the results obtained can be generalized at national levels. There is a lack of longitudinal research of software piracy behaviour and also of other forms of electronic piracy, such as the availability of pirated e-books on the Internet. Future research could therefore attempt to study both of these domains as well.

APPENDICES

Appendix A: Consent for Canadian Study

You are invited to participate in a research project conducted by Arsalan Butt. This research has been approved by the Simon Fraser University's (SFU) Research Ethics Board. The researcher is looking into social perceptions and attitudes of university students towards software piracy. Please be assured that this research is being conducted for the researcher's Master's project and is not being funded or sponsored by any commercial software manufacturer.

Your participation in this research is voluntary. You will be asked to fill out a questionnaire. You may refuse to participate, and may withdraw at any time. However, for a questionnaire to be considered complete, it is required that you do answer all questions. Your participation will take approximately five minutes. You are not required to provide your name or contact information. However, if you wish your name to be entered into a draw to win one of the three $50 Amazon.ca gift certificates, you can provide the required information at the end of this page.

Your confidentiality and anonymity is assured and there will be no way to link your name to your results. All data will be reported as group averages and individual names or identities will not be used and no individual information will be released.

If you have any concerns about this questionnaire or wish to complain about any of the procedures involved in the study, you can contact the Director, Office of Research Ethics by email at: hweinber@sfu.ca or phone at +1-604-268-6593.

If you have any comments, suggestions, questions or would like to know about the results of the study, please do not hesitate to contact me at +1-604-897-2372 or via e-mail at: ab@sfu.ca

If you would like your name included in the draw to win one of the three $50 Amazon.ca gift certificates, then please provide your name and email address below.

I have read and understand the above consent information, and am willing to participate in this survey.

Appendix B: Canadian Questionnaire

Please answer all questions and use a ✓ to select your answer(s) wherever applicable:

1. **Do you have access to a Computer:**

   At Home: ___ Yes ___ No

   At Work: ___ Yes ___ No

If you answered **NO** in **BOTH** of the options above, then please do not proceed with the questionnaire.

2. **You use a computer mostly at (Choose One):**

   At Home: ___

   At Work: ___

3. **Your age in years is between:**

   ___ 16 – 21

   ___ 21 – 26

   ___ 26 – 31

   ___ 31 – 36

   ___ More than 36

4. **Your monthly household income in Canadian $ is:**

   ___ Under 1,000

   ___ 1,000 – 2,000

   ___ 2,000- 3,000

   ___ 3,000 – 4,000

   ___ Over 4,000

5. **You are:**

___ Under-Graduate student

___ Graduate student

6. **You are:**

___ Male

___ Female

7. **How often do you buy new software in a year?**

___ Never

___ A few times a year

___ A few times a month

___ A few times a week

___ Every day

8. **How often do you install software on the computer you use most?**

___ Never

___ A few times a year

___ A few times a month

___ A few times a week

___ Every day

9. **Please select which of the following software is currently installed on the computer your use most or was installed in the past:**

MS Windows ___ Yes ___ No Version _____

MS Office ___ Yes ___ No Version _____

Adobe Photoshop ___ Yes ___ No Version _____

MS Visual Studio.Net ___ Yes ___ No Version _____

Oracle ___ Yes ___ No Version _____

Any others (please specify only 6):

_____

_____

10. **Do you own a Computer?**

___ Yes ___ No

If your Answer is ***NO*** in Question 9 above, then please skip to Question 13 below. Otherwise, continue with the questions.

11. **Please indicate what kind of computer you have (e.g.: Pentium IV, 2.0 GHz):**

Processor: _____

Speed: _____

12. **When you bought your computer, were there software installed on your computer that you didn't pay extra money for (e.g. Windows, Office, etc)?**

___ Yes ___ No

13. **Please indicate where you usually get software from. Use a ✓ under the specific column:**

	YES	NO
Purchase from Online retailers.		
Purchase from local retailer stores.		
Download full versions of commercial software from Internet without paying for them.		
Copy software from friends.		
Copy software from family members.		
Purchase from your college/university bookstore/software shop.		

14. **Have you heard about a free operating system called Linux?**

___ Yes ___ No

15. **Do you use Linux?**

___ Yes ___ No

16. **For the following, use a ✓ to select the terms that you understand:**

___ Copyright

___ Intellectual Property

___ Software Piracy

17. **Please indicate your response to each of the following statements by encircling one of the five numbers. The following table shows what each number implies.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

Pirated software is easily available.	5	4	3	2	1
It is very easy to purchase pirated software in my city.	5	4	3	2	1
It is very easy to download pirated software.	5	4	3	2	1
I can easily copy software from my friends.	5	4	3	2	1
I have easy access to pirated software.	5	4	3	2	1
Legal software is very expensive.	5	4	3	2	1
I would buy pirated software if the price of legal software is too high.	5	4	3	2	1
I cannot afford legal software.	5	4	3	2	1
On average, a Canadian student's monthly salary is equal to the price of (legal) MS Windows XP.	5	4	3	2	1
There is no law against pirated software in Canada.	5	4	3	2	1
I would buy pirated software if there is no legal punishment for doing so.	5	4	3	2	1
I cannot be fined for buying pirated software.	5	4	3	2	1
Copying software is not legal.	5	4	3	2	1
I would buy pirated software even if it were not easily available.	5	4	3	2	1
I would copy software from friends if pirated software were not easily available.	5	4	3	2	1
If legal software were available at much lower prices, I would buy it.	5	4	3	2	1
I would buy pirated software even if the cost of legal software is not too high.	5	4	3	2	1
I would buy legal software if I could afford it.	5	4	3	2	1
I would not copy software if there was a law against it.	5	4	3	2	1
I would not buy pirated software if there was a law against it.	5	4	3	2	1

I would not buy pirated software if I could be fined.	5	4	3	2	1
I would buy pirated software even if I feared being legally punished for doing so.	5	4	3	2	1
I would use pirated software even if I feared being legally punished for doing so.	5	4	3	2	1
I think that most students copy commercial software instead of buying it.	5	4	3	2	1
I think that most people buy pirated software.	5	4	3	2	1
I think that most people use pirated software.	5	4	3	2	1
I see no harm being done to any one in buying pirated software.	5	4	3	2	1
I think it is morally acceptable to buy pirated software.	5	4	3	2	1
If I had a software package that costs $1,000 and my friend needs it but can't afford it; I would make a copy for him/her.	5	4	3	2	1
I consider copying a software package as an acceptable behaviour.	5	4	3	2	1

18. **Was there anything in this questionnaire that you did not understand or something that you would like to comment on or give any suggestions? If, yes, please feel free to do so below. You can also send your complaints/comments/suggestions to Arsalan Butt on ab@sfu.ca.**

Appendix C: Consent for Pakistani Study

You are invited to participate in a research project conducted by Arsalan Butt. This research has been approved by the Simon Fraser University's (SFU) Research Ethics Board. Approvals for this survey have not been sought from Pakistani universities or agencies. The researcher is looking into social perceptions and attitudes of university students towards software piracy. Please be assured that this research is being conducted for the researcher's Master's project and is not being funded or sponsored by any commercial software manufacturer.

Your participation in this research is voluntary. You will be asked to fill out a questionnaire. You may refuse to participate, and may withdraw at any time. However, for a questionnaire to be considered complete, it is required that you do answer all questions. Your participation will take approximately five minutes. You are not required to provide your name or contact information. However, if you wish your name to be entered into a draw to win one of the three Rs. 1,000/- prizes, you can provide the required information at the end of this page.

Your questionnaire will be randomly placed in an unmarked envelope and will not be viewed until the study's completion. There will be no way to link your name to your results. All data will be reported as group averages and individual names or identities will not be used and no individual information will be released. If the collected data is communicated via internet between authorised individuals, it will be sent in coded form through a password protected website so in order to ensure your confidentiality and anonymity.

If you have any concerns about this questionnaire or wish to complain about any of the procedures involved in the study, you can contact the Director, Office of Research Ethics by email at: hweinber@sfu.ca or phone at +1-604-268-6593.

If you have any comments, suggestions, questions or would like to know about the results of the study, please do not hesitate to contact me at +1-604-897-2372 or via e-mail at: ab@sfu.ca

If you would like your name included in the prize draw for Rs. 1000, then please provide your name and email address below.

Full Name

Contact Information (e.g. email and/or phone number)

Date

Signature

Appendix D: Pakistani Questionnaire

Please use a ✓ to select your answer(s) wherever applicable:

19. **Do you have access to a Computer:**

At Home: ___ Yes ___ No

At Work: ___ Yes ___ No

If you answered ***NO*** in both of the options above, then please do not proceed with the questionnaire.

2. Your age in years is between:

___ 16 – 21

___ 21 – 26

___ 26- 31

___ 31 – 36

___ More than 36

3. Your monthly household income in Rs. (include all people earning in your house) is:

___ 10,000 – 20,000

___ 20,000 – 30,000

___30,000 – 40,000

___40,000 – 50,000

___ More than 50,000

4. You are a:

___ Bachelor's student

___ Master's student

Please specify if other _____

5. You are:

___ Male

___ Female

6. **How often do you buy new software in a year.**

___ Never

___ A few times a year

___ A few times a month

___ A few times a week

___ Every day

7. **How often do you install software on the computer you use most?**

___ Never

___ A few times a year

___ A few times a month

___ A few times a week

___ Every day

8. **Please select which of the following software is currently installed on your computer or was installed in the past:**

MS Windows ___ Yes ___ No Version _____

MS Office ___ Yes ___ No Version _____

Adobe Photoshop ___ Yes ___ No Version _____

MS Visual Studio.Net ___ Yes ___ No Version _____

Oracle ___ Yes ___ No Version _____

Any others (please specify only 5):

_____

_____

9. **Do you own a Computer?**

___ Yes ___ No

If your Answer is ***NO*** in Question 9 above, then please skip to Question 12 below. Otherwise, continue with the questions.

10. **Please indicate what kind of computer you have: (e.g. Pentium IV, 2.0 GHz)**

Processor: _____

Speed: _____

11. **When you bought your computer was there software installed on your computer that you didn't pay extra money for (e.g. Windows, Office)?**

____ Yes

____ No

12. **Please indicate where you usually get software from. Use a ✓ under the specific column:**

	YES	NO
Purchase from Hafeez Centre		
Purchase from other local CD shop		
Download full versions of commercial software from Internet		
Copy software from friends		
Copy software from family members		
Purchase from your college/university software shop		

13. Have you heard about a free operating system called Linux?

___ Yes

___ No

14. Do you use Linux?

___ Yes

___ No

15. For the following, use a ✓ to select the terms that you understand:

___ Copyright ___ Intellectual Property ___ Software Piracy

The use of the term *'pirated software'* in the following section will refer to the software that is generally available from Hafeez Centre or other CD shops for a very low price, e.g. Rs. 20 – Rs. 30 for the latest commercial software such Corel Draw Graphics Suite or Adobe Photoshop or MS Office.

16. Please indicate your response to each of the following statements by encircling one of the five numbers. The following table shows what each number implies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

Pirated software is easily available.	5	4	3	2	1
It is very easy to purchase pirated software in my city.	5	4	3	2	1
I can easily copy software from my friends.	5	4	3	2	1
I have easy access to Hafeez Centre.	5	4	3	2	1
Legal software is very expensive.	5	4	3	2	1
I would buy pirated software if the price of legal software is too high.	5	4	3	2	1
I cannot afford legal software.	5	4	3	2	1
An average Pakistani salary is less than the price of (legal) MS Windows XP.	5	4	3	2	1
There is no law against pirated software in Pakistan.	5	4	3	2	1
I would buy pirated software if there is no legal punishment for doing so.	5	4	3	2	1
I cannot be fined for buying pirated software.	5	4	3	2	1

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

Copying software is not legal.	5	4	3	2	1
I would buy pirated software even if it were not easily available.	5	4	3	2	1
I would copy software from friends if pirated software were not easily available.	5	4	3	2	1
If legal software were available at much lower prices, I would buy it.	5	4	3	2	1
I would buy pirated software even if the cost of legal software is not too high.	5	4	3	2	1
I would buy legal software if I could afford it.	5	4	3	2	1
I would not copy software if there was a law against it.	5	4	3	2	1
I would not buy pirated software if there was a law against it.	5	4	3	2	1
I would not buy pirated software if I could be fined.	5	4	3	2	1
I would buy pirated software even if I feared being legally punished for doing so.	5	4	3	2	1
I think that most students copy commercial software instead of buying it.	5	4	3	2	1
I think that most people buy pirated software.	5	4	3	2	1
I see no harm being done to any one in buying pirated software.	5	4	3	2	1
I think it is morally acceptable to buy pirated software.	5	4	3	2	1
If I had a software package that costs Rs. 5000 and my friend needs it but can't afford it; I would make a copy for him/her.	5	4	3	2	1
I consider copying a software package as an acceptable behaviour.	5	4	3	2	1

(Optional) Was there anything in this questionnaire that you did not understand or something that you would like to comment on or give any suggestions? If, yes, please feel free to do so in the white space below or please feel free to send them to Arsalan Butt at: ab@sfu.ca

Appendix E: Factor Analysis of Software Acquisition Sources

Factor Analysis from Pakistani Data

Communalities

	Initial	Extraction
Hard Disk Loading	1.000	.720
Buy from Hafeez Centre	1.000	.310
Buy locally	1.000	.504
Download from Internet	1.000	.587
Copy from friends	1.000	.575
Copy from family members	1.000	.552
Buy from college/university	1.000	.605

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1.660	23.717	23.717
2	1.149	6.421	40.138
3	1.044	14.908	55.045
4	.991	14.154	69.199
5	.867	12.383	81.582
6	.659	9.420	91.002
7	.630	8.998	100.00

Extraction Method: Principal Component Analysis

Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.660	23.717	23.717	1.540	21.994	21.994
2	1.149	6.421	40.138	1.247	17.808	39.802
3	1.044	14.908	55.045	1.057	15.243	55.045

Extraction Method: Principal Component Analysis

Rotated Component Matrix[a]

	Component		
	1	2	3
Hard Disk Loading	-.185	.181	.808
Buy from Hafeez Centre	.189	-.164	.497
Buy locally	.154	.608	.331
Download from Internet	.085	.739	-.183
Copy from friends	.689	.316	-.011
Copy from family members	.715	.200	-.029
Buy from college/university	.673	-.360	.150

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 5 iterations

Component Transformation Matrix

Component	1	2	3
1	.874	.487	.132
2	-.482	.804	.348
3	.056	-.367	.928

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Factor Analysis from Canadian Data

Communalities

	Initial	Extraction
Buy online	1.000	.715
Buy locally	1.000	.394
Download from Internet	1.000	.687
Copy from friends	1.000	.782
Copy from family members	1.000	.410
Buy from college/university	1.000	.703

Extraction Method: Principal Component Analysis

Total Variance Explained

component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.335	39.248	39.248
2	1.337	22.283	61.531
3	.947	15.780	77.311
4	.561	9.350	86.661
5	.490	8.168	94.829
6	.310	5.171	100.000

Extraction Method: Principal Component Analysis

Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.355	39.248	39.248	2.116	35.273	35.273
2	1.337	22.283	61.531	1.575	26.258	81.531

Extraction Method: Principal Component Analysis

Component Matrix[a]

	Component	
	1	2
Buy online	-.457	.712
Buy locally	-.597	-.194
Download from Internet	.802	.209
Copy from friends	.854	.231
Copy from family members	.358	.531
Buy from college/university	-.537	.664

Extraction Method: Principal Component Analysis

a. 2 components extracted

Rotated Component Matrix[a]

	Component	
	1	2
Buy online	-..056	.844
Buy locally	-.617	.119
Download from Internet	.803	-.205
Copy from friends	.859	-.212
Copy from family members	.570	.291
Buy from college/university	-.158	.823

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 3 iterations

Component Transformation Matrix

Component	1	2
1	.875	-.484
2	.484	.875

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Appendix F: Correlations of Pakistani and Canadian software acquisition sources

Correlations -- Pakistani Software Aquisition

Correlations

		Buy from Hafeez Centre	From other Local sofware shops	Download from Net	Copy from Friends	Copy from Family members	Buy from College/ University
Buy from Hafeez Centre	Pearson Correlation	1	-.047	.024	.025	.011	.112*
	Sig. (2-tailed)		.384	.664	.640	.840	.039
	N	339	339	339	339	339	339
Buy from other Local sofware shops	Pearson Correlation	-.047	1	.105	.229**	.146**	.071
	Sig. (2-tailed)	.384		.052	.000	.007	.191
	N	339	339	339	339	339	339
Download from Net	Pearson Correlation	.024	.105	1	.236**	.215**	.066
	Sig. (2-tailed)	.664	.052		.000	.000	.223
	N	339	339	339	339	339	339
Copy from Friends	Pearson Correlation	.025	.229**	.236**	1	.346**	.189**
	Sig. (2-tailed)	.640	.000	.000		.000	.000
	N	339	339	339	339	339	339
Copy from Family members	Pearson Correlation	.011	.146**	.215**	.346**	1	.208**
	Sig. (2-tailed)	.840	.007	.000	.000		.000
	N	339	339	339	339	339	339
Buy from Colege/ University	Pearson Correlation	.112*	.071	.066	.189**	.208**	1
	Sig. (2-tailed)	.039	.191	.223	.000	.000	
	N	339	339	339	339	339	339

*. Correlation is significant at the 0.05 level (2-tailed).

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

Correlations -- Canadian Software Aquisition

Correlations

		Buy Online	Buy from Local stores	Download from Net	Copy from Friends	Copy from Family members	Buy from College/ University
Buy Online	Pearson Correlation	1	.089	-.146*	-.236**	.048	.492**
	Sig. (2-tailed)		.234	.049	.001	.520	.000
	N	181	181	181	181	181	181
Buy from Local stores	Pearson Correlation	.089	1	-.409**	-.430**	-.033	.114
	Sig. (2-tailed)	.234		.000	.000	.660	.125
	N	181	181	181	181	181	181
Download from Net	Pearson Correlation	-.146*	-.409**	1	.647**	.222**	-.267**
	Sig. (2-tailed)	.049	.000		.000	.003	.000
	N	181	181	181	181	181	181
Copy from Friends	Pearson Correlation	-.236**	-.430**	.647**	1	.369**	-.262**
	Sig. (2-tailed)	.001	.000	.000		.000	.000
	N	181	181	181	181	181	181
Copy from Family members	Pearson Correlation	.048	-.033	.222**	.369**	1	.010
	Sig. (2-tailed)	.520	.660	.003	.000		.891
	N	181	181	181	181	181	181
Buy from College/ University	Pearson Correlation	.492**	.114	-.267**	-.262**	.010	1
	Sig. (2-tailed)	.000	.125	.000	.000	.891	
	N	181	181	181	181	181	181

*. Correlation is significant at the 0.05 level (2-tailed).

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

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