

# **IMPACT OF WTO- COMPLIANT ANTI-PIRACY INITIATIVE ON THE PAKISTANI SOFTWARE VENDORS**

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## **INTRODUCTION**

The Pakistan government has been under severe pressure from the World Intellectual Property Organization (WIPO) and International Intellectual Property Alliance to tighten its anti-piracy regime. In 2000, IIPA recommended Pakistan to be placed on the watch list of major violators of international intellectual property legislation. According to IIPA, Pakistani copyright law is TRIPS-incompatible. The Alliance called for a TRIPS-compatible draft that should take into account new technologies including implementation of provisions of WIPO treaties like WCT and WPPT.

The current estimated value of the worth of Pakistani piracy is over US\$ 100 million. The Pakistani piracy operation is said to include motion pictures, sound recording, computer programs, computer entertainment and books.

Subsequent reports from IIPA in 2002 and in 2005 have placed additional emphasis on computer software piracy that includes operating systems; computer applications; games; and computer compatible motion pictures and music. It called for the closure of six optical media copying plants out of which four were said to be in Karachi.

The Musharraf government has accepted these demands and various crackdowns have been conducted on Rainbow Center Karachi which is said to produce the bulk of pirated optical media like CDs and DVDs. On a visit to the United States, Musharraf met with the Chairman of Microsofts and reaffirmed Pakistan's commitment to anti-piracy crusade.

In early 2006, all optical media copying facilities were sealed by the law enforcement agencies but the authorities gave in later to pressure from various quarters.

Pakistani Copyright Law has been criticized and the following amendments are proposed by the international agencies:

There shall be an express rental right for computer programs and sound recording. The reproduction and translation compulsory license, though amended in 1992, shall be made compatible with the 1971 Berne Appendix.

Foreign sound recording shall be provided a clear point of attachment.

Civil ex-parte search orders, essential to enforce against end-user piracy shall be provided. They are compatible with Article 50 to TRIPS.

WTO has asked Pakistan to conform to the international concerns regarding this issue of piracy.

An unexplored aspect is the economic impact of these strict measures, proposed by IIPA and WIPO, on the average computer software vendor in Pakistan. This sector provides employment to a large number of people all over the country. A large number of small to medium sized businesses rely on pirated software because of the costs and obligations attached with legal software.

This study seeks to answer the question: will implementing WTO-compliant anti-piracy measures result in lower sales for the average computer vendor in Karachi.

### **The Rationale for IPR**

Earlier studies have highlighted the inherent tensions that exist between the Intellectual Property Regime<sup>1</sup> and competition. In a capitalist economy, competition is seen by most as generally important and indeed essential to curb market distortions, induce efficiency in use of resources, prevent monopoly or oligopoly, maintain prices at fair levels, as low as possible, prevent excessive or monopoly profits and promote consumer interests and welfare (Khor, 2005).

An IPR is seen by many as a privilege granted in recognition of the need of the holder to recoup costs incurred in the research and innovation process, so as to maintain incentives for further innovation. Thus an IP<sup>2</sup> entails an exclusive right for a limited time, enabling the holder to charge a higher price than the cost of production. That higher price reduces access of consumers to the product, and access of other producers to production inputs and methods. The monopoly granted prevents or deters competition from rivals that can sell at lower prices. These are costs that are seen to be short-term (since the exclusive right is of limited duration), but which are supposed to be outweighed by the long-term benefits brought about by the innovation which IPRs encourage (Watal, 2001).

The optimal degree of protection (where social benefits are judged to exceed social costs) is said to vary widely by product and sector and is supposed to be linked to variations in demand, market structures, R&D costs and the nature of the innovative process (CIPR, 2002). In reality, the IPR regime cannot be tailored so precisely and therefore the level of protection afforded in practice is necessarily a compromise. Striking the wrong compromise – whether too much or too little – may be costly to society, especially in the longer term.

There is thus a balancing required between the monopoly privilege granted to the IP holders and the public interest (including consumer welfare, the competition from other producers, and national development prospects). The appropriate balance requires the right policies that enable IP to be appropriately given for correct reasons and to the correct parties, and that they be of an appropriate period, and that flexibilities and exemptions and exclusions are provided to safeguard vital public interests. If the balance is tilted excessively to the IP holder, then one consequence is that the IP facilitates a stream of monopoly profits beyond what is justified for recovering the costs of innovation, and society bears the costs unreasonably. These may include prevention of access to goods and services (including essentials such as medicines, food and information, and important inputs for production), curbing of economic development, an overall reduction in competition and its benefits for resource allocation, and a monopolization in products, sectors or the economy as a whole (Jaffe & Lerner, 2004). Recent trends in major developed countries have shifted the balance further in favor of IP rights holders.

WIPO has been an active forum for IP harmonization, for example through its 1996 Copyright Treaty. The present negotiations for possible new treaties relating to patents and to broadcasting are other examples. In fact, WIPO has become a more active forum for negotiations new treaties aimed at harmonization of IP systems and rules than the WTO. If current patent harmonization negotiations proceed along the lines advocated by the developed countries in the substantive patent law treaty process, there is a strong possibility that the results of recent developments in the major countries (such as the relaxing of criteria of patentability and the much easier granting of patents) will be disseminated to the rest of the world. There is thus a danger of what many analysts consider a dysfunctional system being disseminated to developing countries (Khor, 2005)

Recent studies show the high extent of costs incurred by developing countries. The former chief of trade policy research in the World Bank, Michael Finger (2002), estimates that the obligations on developing countries to implement TRIPS will result in increased payments by them of US\$60 billion a year. A report by the World Bank (2002) estimates that the net annual increase in patent rents resulting from TRIPS for the top six developed countries in this field will be US\$41 billion (with the top beneficiaries being America with \$19 billion, Germany \$6.8 billion, Japan \$5.7 billion, France \$3.3 billion, Britain \$3 billion and Switzerland \$2 billion). Developing countries that will incur major annual net losses include South Korea (\$15.3 billion), China (\$5.1 billion), Mexico (\$2.6 billion), India (\$903 million), and Brazil (\$530 million).

Well-known trade economists who advocate free trade have also criticized the imbalances of TRIPS and the adverse effects on competition caused by the upward harmonization of IP standards induced by TRIPS. Jagdish Bhagwati, an economics professor at Columbia University, in a letter to Financial Times (2001), argued that the WTO must be about mutual gains in trade whereas IP protection is a tax on the poor countries' use of knowledge, constituting a wealth transfer to the rich countries. He advocated that the TRIPS agreement be removed from the WTO.

Analysts have asked governments in the Third World to do a cost-benefit analysis before implementing the demands of IIPA. They have suggested that abrupt implementation of such demands would damage the economy especially small business and employment. They have also stressed the need to find out the reasons for the limited appeal of genuine copyrighted products in the Third World (Khor, 2005).

It is interesting to note that Noam Chomsky has rejected the rationale for IPR by stating that most "intellectual property" treasures were nursed with public subsidy in their teething days. He has cited the example of the Internet as a case in point.

### Methodology

A questionnaire was developed addressed to computer software vendors. The study has focused on computer software vendors because they are expected to know the business of selling software. They were chosen because of their unique position in the software supply chain. Their daily interaction with individual, corporate and government clients should mean that they understand the mindset of these customers and would know their buying decision variables.

Most questions use a nominal scale with one using ordinal scale.

The questionnaire contained seventeen (17) questions in all and focuses on the following areas:

Questions 1 to 6 are concerned with the general buying and selling environment that exists in the sampled area. They probe issues that provide information regarding the general status of things in the current software market.

Question 7 probes the rationale for the lack of appeal of genuine software.

Questions 8 to 11 probe the product-support-service aspect of software sales. These questions analyze the augmentation impact of product-support-services that come with genuine software.

Questions 12 to 14 probe the impact of anti-piracy measures on hardware prices.

Questions 15 & 16 are concerned with the profitability of software vendors.

Question 17 probes the prospects of Pakistani software in a strict anti-piracy regime.

Karachi is a very large software market, so selecting a representative sample from the whole city was difficult. The hub of Karachi's software is the area of I I Chundrigar Road and Rainbow Centre. According to the Yellow pages, there are a total of about six hundred (600) computer software and hardware vendors in this area. They were considered to be a representative population. A simple random sample was taken to select fifteen percent (15%) of these vendors who were to be questioned for this survey.

Ninety (90) questionnaires were distributed among various vendors in the I I Chundrigar Road and Rainbow Centre areas.

The answers were fed into a Microsoft Excel Worksheet. A question-by-question approach<sup>1</sup> was used in combination with a question-versus-question approach<sup>2</sup>. Chi-square test, Binomial Distribution and Percentage Distribution are used as analysis techniques. Graphs and Pivot table are used for on-screen analysis.

The hypothesis developed was:

$H_0$ : a WTO-compliant anti-piracy regime would decrease business opportunities of a mid-sized Pakistani software vendor

$H_1$ : a WTO-compliant anti-piracy regime would not decrease business opportunities of a mid-sized Pakistani software vendor

### Questionnaire

**Question 1:** Are you aware of the difference between pirated and genuinely licensed computer software?

The question was almost tautological as there is already a substantial level of awareness regarding this issue. As the sample selected was primarily of the more sophisticated sales area in Karachi, the tautological nature of this question might get further strengthened. The question, however, was deemed necessary because pockets of vendors may exist that are ignorant of this issue.

Ignorance of the issue of anti-piracy would have made all subsequent questions redundant. However, the negative answer bearing questionnaires had been included in the subsequent analysis to give a more comprehensive picture of the anti-piracy issue.

The number of ignorant vendors is most likely to increase when sample is taken from the lesser-privileged areas of Karachi.

Response	Frequency
Yes	86
No	4

$H_{A_0}$ : At least ninety percent of all software vendors are aware of the issue of software piracy

$H_{A_1}$ : At least Ninety Percent of all software vendors are not aware of the issue of software piracy

$H_{A_0}$ :  $\Pi \geq 90$

$H_{A_1}$ :  $\Pi < 90$

$\alpha = 0.05$

$np > 500$  ( $90 \cdot 90 = 8100$ , satisfied)

using

$z_{cal} = 1.7552$

$z_{tab} = 1.6449$

As  $z_{cal} > z_{tab}$ , the hypothesis is accepted.

Hence at least 90% of software vendors are aware of the issue of computer piracy.

Question 2: Of overall software sales in the previous year, what percentage was of genuinely licensed software?

Any anti-piracy move would disrupt sales of pirated software. It was assumed that most vendors would be losing a substantial part of their sales due to anti-piracy measures.

$H_{B_0}$ : The proportion of genuine software sales in overall sales is evenly distributed

$H_{B_1}$ : The proportion of genuine software sales in overall sales is not evenly distributed

Response	Frequency	N	Percentage
I don't know	17	90	18.88
Less than 10%	35	90	38.88
Between 11 & 24%	16	90	17.77
Between 25 & 49%	13	90	14.44
More than 50%	9	90	10.0

Degree of Freedom = 4

Significance = 0.05

Chi-Square Tabulated Value = 9.4877

Chi-Square Calculated Value = 22.22

As  $Chi_{tab} < Chi_{cal}$ , it falls in the rejection region.

So, the proportion of genuine software sales in overall is not evenly distributed.

**Question 3: What segment is your biggest buyer?**

The underlying assumption behind this question was that multinational companies would be more receptive of any push in the direction of genuine software sales. So I assumed that vendors with multinational clients, forming the majority of the client base, would be more receptive anti-piracy measures.

HC<sub>0</sub>: The sector-wise distribution of buyers is evenly distributed

HC<sub>1</sub>: The sector-wise distribution of buyers is not evenly distributed

<b>Response</b>	<b>Frequency</b>	<b>N</b>	<b>Percentage</b>
Govt. Organizations	8	90	8.08
Individuals	31	90	34.44
Local Firms	31	90	34.44
Multinationals	20	90	22.22

Degree of Freedom = 3

Significance = 0.05

Chi-Square Tabulated Value = 7.8147

Chi-Square Calculated Value = 16.044

As  $Chi_{tab} < Chi_{cal}$ , it falls in the rejection region.

So, The sector-wise distribution of buyers is not evenly distributed.

**Question 4: Do you think that most of your corporate clients are aware of computer software piracy?**

Large corporate clients were expected to be more aware of the issue of software piracy. Being businesses, they were expected to understand the impact of piracy on software manufacturers. Though, in a capitalist regime, they were expected to benefit from piracy whenever and wherever possible, at least the cost of awareness campaign was expected to be low for most large corporate clients. I assumed that on the other side, there might exist a large number of small businesses using pirated software that might not even be aware of the issue at all. Employees working in IT departments might know but strategic level management might not know. In such a case, the cost of awareness campaign would increase substantially.

Response

Frequency

$HD_0$ : At least 70% of all corporate clients are aware of computer software piracy

$HD_1$ : At least 70% of all corporate clients are not aware of computer software piracy

$HD_0: \Pi \geq 70$

$HD_1: \Pi < 70$

$\alpha = 0.05$

$np > 500$  ( $90 \cdot 70 = 6300$ , satisfied)

using

$z_{cal} = 3.680$

$z_{tab} = 1.6449$

As  $z_{cal} > z_{tab}$ , the hypothesis is accepted.

So, at least 70% of all corporate clients are aware of computer software piracy

**Question 5: Do corporate clients insist on buying genuinely licensed software?**

Most multinationals were instructed by their principals overseas to buy a particular brand of software under international level corporate deals. They were expected to be more proactive in the acceptance of incurring expense of buying genuine software.

<b>Response</b>	<b>Frequency</b>
Yes	40
No	50

$HE_0$ : At least 70% of all corporate clients insist on buying genuine software

$HE_1$ : At least 70% of all corporate clients do not insist on buying genuine software

$HE_0: \Pi \geq 70$

$HE_1: \Pi < 70$

$\alpha = 0.05$

$np > 500$  ( $90 \cdot 70 = 6300$ , satisfied)

using

$z_{cal} = -6.62$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.



So, at least 70% of all corporate clients do not insist on buying genuine software

Question 6: Have you ever tried to persuade your corporate client to buy genuine software?

Due to anti-piracy crackdowns, some vendors were expected to be keen on avoiding any inconvenience regarding the issue of computer piracy. Some might believe that benefits of selling pirated software may be less than the cost incurred if in future a software manufacturer brings legal action against them. With this mindset, they might be educating their corporate clients to buy genuine software which would not only increase their sales but would have also protected them against future inconvenience.

Response	Frequency
Yes	38
No	52

$H_{F_0}$ : At least 50% of all vendors have persuaded their corporate clients to buy genuine software

$H_{F_1}$ : At least 50% of all vendors have not persuaded their corporate clients to buy genuine software

$H_{F_0}$ :  $\Pi \geq 50$

$H_{F_1}$ :  $\Pi < 50$

$\alpha = 0.05$

$np > 500$  ( $90 * 50 = 4500$ , satisfied)

using

$z_{cal} = -0.75$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 50% of all vendors have not persuaded their corporate clients to buy genuine software.

Question 7: What is the main reason (in your opinion) for the limited appeal of genuine software?

In this question I wanted to analyze the reasons because of which even corporate clients do not buy genuine software. Most anti-piracy debates focus on the cost factor alone while ignoring other aspects of software sales like compulsory re-buy situations.

$H_{G_0}$ : The main reasons for limited appeal of genuine software are evenly distributed

$H_{G_1}$ : The main reasons for limited appeal of genuine software are not evenly distributed

<b>Response</b>	<b>Frequency</b>	<b>N</b>	<b>Percentage</b>
Cost of buying	24	90	26.66
Compulsory re-buy situation	17	90	18.88
Ignorance	8	90	8.88
Cost may be manageable but it is seen as an unwanted expense	10	90	11.11
I don't know	12	90	13.33
Clients think that it is an unimportant matter despite knowing the issue	3	90	3.33
Cost of Maintenance	16	90	17.77

Degree of Freedom = 6

Significance = 0.05

Chi-Square Tabulated Value = 12.59

Chi-Square Calculated Value = 21.844

As  $\chi_{tab} < \chi_{cal}$ , it falls in the rejection region.

So, the main reasons for limited appeal of genuine software are not evenly distributed.

**Question 8: Do you provide after-sales service for pirated computer software?**

Some vendors derive their business by providing after-sales-services like software installation and troubleshooting. They may oppose any anti-piracy measure that robs them of this source of income.

$H_0$ : Percentage of vendors providing after-sales service for pirated software is evenly distributed

$H_1$ : Percentage of vendors providing after-sales service for pirated software is not evenly distributed

<b>Response</b>	<b>Frequency</b>	<b>N</b>	<b>Percentage</b>
Yes	60	90	66.66
No	26	90	28.88
I don't know	4	90	6.66

Degree of Freedom = 2

Significance = 0.05

Chi-Square Tabulated Value = 5.9915

Chi-Square Calculated Value = 53.0667

As  $\chi_{tab} < \chi_{cal}$ , it falls in the rejection region.

So, percentage of vendors providing after-sales service for pirated software is not evenly distributed.

**Question 9: Do you provide after-sales service for licensed computer software?**

Some clients who use genuine software like those buying branded computers (genuine operating system is bundled with branded computer sales) don't go to the software manufacturers' outlets due to the fact that not many outlets exist. Others avoid for other reasons. This has resulted in business for street vendors who charge for the provision of "after-sales-services". These vendors might resist strict anti-piracy measures.

$H_{0}$ : Percentage of vendors providing after-sales service for licensed software is evenly distributed

$H_{1}$ : Percentage of vendors providing after-sales service for licensed software is not evenly distributed

<b>Response</b>	<b>Frequency</b>	<b>N</b>	<b>Percentage</b>
Yes	82	90	91.11
No	1	90	1.11
I don't know	7	90	7.77

Degree of Freedom = 2

Significance = 0.05

Chi-Square Tabulated Value = 5.9915

Chi-Square Calculated Value = 135.8

As  $\chi_{tab} < \chi_{cal}$ , it falls in the rejection region.

So, percentage of vendors providing after-sales service for licensed software is not evenly distributed.

**Question 10: Are your corporate clients aware that most genuine computer software comes with top of the line after-sales service?**

Most genuine software comes with top of the line after-sales-service support. The manufacturers provide free upgrades, bug-fixes and other facilities. This surely makes the whole experience of using genuine software more worthwhile. For corporate clients, manufacturers also offer customization options that are not available on pirated software. This meant that vendors would be against anti-piracy measures because these measures robbed them of this source of revenue.

$H_{0}$ : Corporate Clients' awareness about after-sales service attached to genuine software is evenly distributed

HJ<sub>1</sub>: Corporate Clients' awareness about after-sales service attached to genuine software is not evenly distributed

Response	Frequency	N	Percentage
Yes	31	90	34.44
No	28	90	31.11
I don't know	31	90	34.44

Degree of Freedom = 2

Significance = 0.05

Chi-Square Tabulated Value = 5.9915

Chi-Square Calculated Value = 0.2

As  $\chi_{tab} > \chi_{cal}$ , it falls in the acceptance region.

So, corporate Clients' awareness about after-sales service attached to genuine software is evenly distributed.

**Question 11: Have you ever tried to educate your clients on this matter?**

In a strict anti-piracy regime, there would be a substantial need for after-sales-support. Most of this business would have to be outsourced to existing vendors. Some vendors are expected to see this coming and might, hence, persuade their clients on shifting to genuine software. Any association formed with a global software manufacturer would surely enhance the image of the software vendor which might be an added advantage.

HK<sub>0</sub>: At least 50% vendors have tried to persuade their clients to buy genuine software

HK<sub>1</sub>: At least 50% vendors have not tried to persuade their clients to buy genuine software

Response	Frequency	N	Percentage
Yes	56	90	62.22
No	34	90	37.77

HK<sub>0</sub>:  $\Pi \geq 50$

HK<sub>1</sub>:  $\Pi < 50$

$\alpha = 0.05$

$np > 500$  (90\*50 = 4500, satisfied)

using

$z_{cal} = 2.319$

$$z_{\text{tab}} = 1.6449$$

As  $z_{\text{cal}} > z_{\text{tab}}$ , the hypothesis is accepted.

So, at least 50% of all vendors have persuaded their corporate clients to buy genuine software.

**Question 12: Will Hardware sales decrease due to strict anti-piracy measures?**

A substantial part of computer sales is on hardware upgrades. Many domestic users of computers use them for entertainment like computer games. The incremental requirement of hardware for each new title is a big demand creator. A lot of vendors sell computer memory and graphic cards for this segment of computer game players. With no pirated games available, the sales of these upgrades would have deteriorated substantially as the genuine games are very expensive. Most popular titles start from US\$ 100 (Rs. 6000 approximately). Every new operating system merits some addition to the hardware like memory upgrade. Small firms using graphics software will be most badly hit as an average computer costs them about Rs. 1 hundred thousand. With genuine software, the cost would double. This was expected to curb the overall demand of computer hardware.

$HL_0$ : At least 90% people think that hardware sales will decrease due to strict anti-piracy measures

$HL_1$ : At least 90% people think that hardware sales will not decrease due to strict anti-piracy measures

Response	Frequency	N	Percentage
Yes	83	90	92.22
No	7	90	7.77

$$HL_0: \Pi \geq 90$$

$$HL_1: \Pi < 90$$

$$\alpha = 0.05$$

$$np > 500 \quad (90 \times 90 = 8100, \text{ satisfied})$$

using

$$z_{\text{cal}} = 70.27$$

$$z_{\text{tab}} = 1.6449$$

As  $z_{\text{cal}} > z_{\text{tab}}$ , the hypothesis is accepted.

So, at least 90% of all vendors think that hardware sales will decrease if strict anti-piracy measures are enacted.

**Question 13: Will anti-piracy measures drive the hardware prices down?**

Many computer hardware components are expensive because of overwhelming demand. Prices of high-end memory and graphic cards are often inflated due to high demand. If this demand decreases due to more expensive software, the price of these hardware components may come down.

HM<sub>0</sub>: At least 90% people think that hardware prices will decrease due to strict anti-piracy measures

HM<sub>1</sub>: At least 90% people think that hardware prices will not decrease due to strict anti-piracy measures

Response	Frequency	N	Percentage
Yes	72	90	80
No	18	90	20

HM<sub>0</sub>:  $\Pi \geq 90$

HM<sub>1</sub>:  $\Pi < 90$

$\alpha = 0.05$

$np > 500$  ( $90 \times 90 = 8100$ , satisfied)

using

$z_{cal} = -3.16$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 90% vendors think that the price of hardware will not decrease if strict anti-piracy measures are enacted.

**Question 14:** Will anti-piracy measures increase the overall cost of computer system purchase?

Some computer journalists in the West are talking about software-hardware bundling. In this situation hardware sales would be subsidized by software companies. A similar situation may arise globally and to a lesser extent locally. Hardware capacity is already more than required.

HN<sub>0</sub>: At least 90% people think that overall cost of computer purchase will increase

HN<sub>1</sub>: At least 90% people think that overall cost of computer purchase will not increase

Response	Frequency	N	Percentage
Yes	66	90	73.33
No	24	90	26.66

$H_{N_0}: \Pi \geq 90$

$H_{N_1}: \Pi < 90$

$\alpha = 0.05$

$np > 500$  ( $90 \cdot 90 = 8100$ , satisfied)

using

$z_{cal} = -5.2715$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 90% vendors think that the cost of purchase of computer will not increase if strict anti-piracy measures are enacted.

**Question 15:** What will be the long-run impact of strict anti-piracy measures on your business?

The assumption was that, in the long run, software vendors would be fully compensated by the market forces which will adjust demand and supply such that the overall profitability would not be markedly different from profitability today.

$H_{O_0}$ : At least 90% vendors think that strict anti-piracy measures will increase sales in the long run

$H_{O_1}$ : At least 90% vendors think that strict anti-piracy measures will not increase sales in the long run

<b>Response</b>	<b>Frequency</b>	<b>N</b>	<b>Percentage</b>
Yes	67	90	74.44
No	23	90	25.55

$H_{O_0}: \Pi \geq 90$

$H_{O_1}: \Pi < 90$

$\alpha = 0.05$

$np > 500$  ( $90 \cdot 90 = 8100$ , satisfied)

using

$z_{cal} = -28.225$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 90% vendors think that strict anti-piracy measures will not increase sales in the long run.

**Question 16:** What will be the short-run impact of strict anti-piracy measures on your business?

In the short-run, a catastrophe was expected for many vendors as they would lose revenues from hardware sales, software sales and an overall lowering of consumers' mood.

$HP_0$ : At least 50% vendors think that strict anti-piracy measures will increase sales in the long run

$HP_1$ : At least 50% vendors think that strict anti-piracy measures will not increase sales in the long run

Response	Frequency	N	Percentage
Yes	36	90	40%
No	54	90	60%

$HP_0: \Pi \geq 50$

$HP_1: \Pi < 50$

$\alpha = 0.05$

$np > 500$  ( $90 * 50 = 4500$ , satisfied)

using

$z_{cal} = -1.89$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 50% vendors think that strict anti-piracy measures will not increase sales in the short run.

**Question 17:** Do you think that Pakistani Software would sell (keeping in mind the current quality) if there is a strict anti-piracy regime in Pakistan?

This question probed the chances of Pakistani software in a strict anti-piracy regime. The question was whether Pakistani software manufacturers would gain anything substantial under stricter laws.

$HQ_0$ : At least 60% vendors think that the sales of Pakistani software will increase if strict anti-piracy measures are enacted

$HQ_1$ : At least 60% vendors think that the sales of Pakistani software will not increase if strict anti-piracy measures are enacted



Response	Frequency	N	Percentage
Yes	28	90	31.11%
No	62	90	68.88%

$HP_0: \Pi \geq 60$

$HP_1: \Pi < 60$

$\alpha = 0.05$

$np > 500$  ( $90 * 60 = 5400$ , satisfied)

using

$z_{cal} = -11.55$

$z_{tab} = 1.6449$

As  $z_{cal} < z_{tab}$ , the hypothesis is rejected.

So, at least 60% vendors think that strict anti-piracy measures will not increase sales of Pakistani software

### **Conclusion**

A wide range study which samples from the whole city would be very beneficial in calculating the complete impact of anti-piracy measures on the Pakistani Computer Software & Hardware Vendor Industry.

The issue of piracy in its full context may also be explored. The study could focus on specific factors concerning piracy and may probe the length and breadth of awareness level regarding computer piracy.

Intellectual Property is an international concern but the government shall seriously consider its full impact before taking any serious measures. The hypothesis was proven.

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