is.gov.ba

Information Society Development

e-Readiness assessment report for 2005

Analysis of BiH Society e-readiness. Report for 2005.

April 2006

Table of contents

Foreword

In November 2004, the Council of Ministers adopted the Policy, Strategy and the Action Plan for the Development of an Information Society in Bosnia and Herzegovina. The process has been led by the BiH Ministry of Communications and Transport, and the United Nations Development Programme (UNDP), and financed by government of Kingdom of Norway. These documents mark a milestone and represent the first joint effort to address this domain strategically. This is a vital activity since in spite of the remarkable accomplishments that BiH has achieved in past years, when it comes to information society development, we are still well behind others, on virtually all of the benchmarks.

The aim of this Report is to assess and present the current electronic readiness of BiH society. This has been done by analyzing the capacities of government organizations, educational institutions and businesses, alongside engaging with ordinary citizens as the ultimate beneficiaries of development in this field. The report has been prepared by UNDP BH thanks to financing and support from government of Kingdom of Norway.

This report finds that it is time for BiH governments to move forward - to put to use the existing remarkable infrastructure of computers, networks and Internet to enable better communication and service delivery. And crucially, both governments and telecom operators need to find ways to improve the current quantity of the fixed and mobile telephone lines, which remains below regional standards. Indeed, it is a matter of concern that 80% of citizens have access to fixed line phones, while only 40% have access to a mobile phone.

The outstanding results that we increasingly see in the education system need to be moved up to the next level and our schools and universities need to be connected with regional research centres. With all Universities, and close to 100% of the individual Faculties throughout BiH connected to Internet and equipped with student laboratories. We now need to boost the number of PCs per pupil. The target is to move from the current 27 students per PC to the European average of 15 per PC.

Interestingly, the business sector has shown the most significant improvement in readiness. The IT industry in BiH has the potential and capacity to accelerate progress towards an information society by offering the needed services and products. Over 2,500 people are employed in the sector and revenues have grown rapidly over recent years, making this a stronger industry than many of us believe. This report shows that some 35% of businesses are online, and some 14% of them have a web presence.

Interviews with citizens show that individual e-readiness is growing at a higher rate than other improvements. In 2005, we have seen an increase in individual readiness of over 4% and today, internet penetration stands at 13% of households.

Readers will be aware that various international reports record BiH's e-development indicators as being weak and recent progress as being insufficient. This Report makes clear that these depictions are not wholly accurate, and shows the true status of information society development in BIH, and our place in respect of other countries in the region.

Finally, this Report is fully in line with the Action Plan for the Development of an Information Society in BH, and we truly hope that it will be useful to government, as well as ordinary citizens.

Branko Dokić

Minister, Ministry of communications and transport BiH

Stefan Priesner

Resident Representative a.i., UNDP BiH

UNDP Bosnia and Herzegovina

Programme manager	Tarik ZAIMOVIĆ
Project manager	Fuad ĆURČIĆ, MBA
Reviewers	Stefan PRIESNER, Resident Representative UNDP in BiH
	H. E. Branko DOKIĆ, Ph.D. Minister, Ministry of communications and transport BiH
Editor	Fuad ĆURČIĆ, MBA
Authors	Fuad ĆURČIĆ, MBA
	Tarik ZAIMOVIĆ
	Zlatan ŠABIĆ, M.Sc.
	Brano VUJIČIĆ, M.Sc.
	Ismar DAUTOVIĆ
English translation	Alma MIRVIĆ
Cover page design	Almir KURT and Samir PLASTO
Technical design	Samira SALIHBEGOVIĆ
Project assistants	Nina MEHIĆ and Darijan BILIĆ
Government research expert	Timur GADŽO
Research team	Darijan BILIĆ and Anando HALILOVIĆ

Project partners

ŽUTE STRANE® YELLOW PAGES® GELBE SEITEN®

Bosna i Hercegovina
Ministrastvo komunikacija i prometa

Босна и Херцеговина
Министраство комуникација и промета

Bosnia and Herzegovina
Ministry of Communications and Transport

FBiH
SAVEZ OPĆINA I GRADOVA
FEDERACIJE BOSNE I HERCEGOVINE
ASSOCIATION OF MUNICIPALITIES
AND CITIES OF THE FEDERATION OF
BOSNIA AND HERCEGOVINA

САВЕЗ ОПШТИНА И ГРАДОВА РЕПУБЛИКА СРПСКА
SAVEZ OPŠTINA I GRADOVA
REPUBLIKE SRPSKE

Although publication of this Report is supported by
the United Nations Development Programme (UNDP)
the opinions stated herein
do not necessarily reflect the official position of
the United Nations Development Programme (UNDP)

is.gov.ba

e-Readiness

Assessment Report 2005

e-Readiness indicators and trends

1 E-READINESS INDICATORS AND TRENDS

1.1 Introduction

Global economy and our communication with the world around us drastically changes with the use of information and communication technologies (ICT). This change is quite obvious in both business environments and households and governmental institutions. All these changes result in a quicker and cheaper communication of the citizens, which indirectly results in a positive development of the society as whole.

Use of ICT in Bosnia and Herzegovina was interrupted by the horrible war that occurred in this country. This interruption occurred in the time when the development of ICT technologies was at its peak, and as a consequence of that, the BiH society missed the chance to join the world trends. Therefore, BIH society is an entire decade behind in terms of development.

With the adoption of Information Society Development Policy and Strategy by the Council of Ministers in November 2004, and identification of concrete projects through the Action Plan, Bosnia and Herzegovina has, over the past couple of years, created preconditions to approach a more serious development of the information society. One precondition for the successful implementation of the Strategy and Action Plan is to occasionally measure its success or failure. This is the primary goal of this publication, which talks about the overall development of information society and compares it with the standards and countries in the region and the world. This research was conducted through a combined methodology of several similar researches. This was done in this way simply because there is no uniform global standard. The results are presented, using the world leading methodologies: EU SIBIS methodology, UN methodology and the one of the World Economic Forum.

The first report for Bosnia and Herzegovina, which had a very similar content, appeared in the summer of 2003. E-Readiness Assessment Report is a publication prepared by UNDP as a result of the ICT Forum and conclusions of the Conference held on 26 May 2003. The World Economic Forum published a second report for 2004/2005, with similar contents, and with information about Bosnia and Herzegovina. According to this report, out of 104 ranked countries, Bosnia and Herzegovina is in 89th position. According to the same report for 2005/2006, Bosnia and Herzegovina dropped to 95th position.

This report aims to present the current situation in Bosnia and Herzegovina and point out, the specific directions that the society must take.

There are several methodologies in the world, suggested for measuring the information society development, such as: SIBIS methodology proposed by the European Union[1], UN methodology proposed through Partnership on Measuring ICT for Development[2], and the World Economic Forum one[3]. All methodologies proposed imply an extremely complicated manner of the research, which we, unfortunately, could not fully replicate in BiH.

This report is based on data collected, which will enable us to measure our position in relation to the region and the world. Information presented in this report is collected exclusively from the primary research.

This chapter provides more detailed information on various indicators of e-readiness assessment of the society and it provides an overview of the indicators used in this research.

1 http://www.sibis-eu.org/

2 Measuring ICT: The Global Status of ICT indicator. Partnership on Measuring ICT for Development, Partnership on measuring ICT for development, 2005, UN ICT Task Force.

3 World Economic Forum, ICT, March 2005

4 Measuring ICT: The Global Status of ICT Indicators, p. 13

1.2 United Nations indicators

In July 2005, United Nations (UN www.un.org), in collaboration with other partner institutions published a report, which suggests the methods and indicators for measuring information society development. *Measuring ICT: The Global Status of ICT Indicators* is the publication, which analyses availability and demand for ICT development indicators in the world.

In the group of Southeast European countries, Bosnia and Herzegovina received negative marks. Namely, according to research, there is no demand in Bosnia and Herzegovina to measure ICT development in the society[4]. Furthermore, according to research, Bosnia and Herzegovina does not provide any funds for financing such researches for either the state purpose or business purposes.

Indicators suggested by the UN are divided into ICT indicators for households (20 indicators) and ICT indicators for businesses (19 indicators)[5].

1.3 World Economic Forum indicators

In March 2005, the World Economic Forum (World Economic Forum www.weforum.org) published The Global Information Technology Report 2004-2005, in which Bosnia and Herzegovina appears for the first time.

Indicators suggested in this methodology are divided into three groups: environment index (market, political, legislative and infrastructural), readiness index (individual readiness, business and government readiness), and utilization index (individual use, business use and government use).

According to this report, Bosnia took 89th position of the total 104 countries involved in the research[6].

1.4 Additional indicators

According to SIBIS research, EU project for measuring e-readiness of EU member-countries, and EU strategy for information society development it is interesting to mention some additional indicators used in the process of measuring information society development.

According to eEurope 2002[7] indicators, there are four development phases of eGovernment:

- Phase 1 - information. Simple, direct (one-way) services provided to citizens in the form of on-line documents.
- Phase 2 - One-way (direct) interaction. Web portals offering the possibility of printing the forms and other applications from the website. They usually provide the option of so-called download forms.
- Phase 3 - two-way interaction. Publicly accessible web portal, which enables the citizens to file an electronic application to the government via web or e-mail.
- Phase 4 - complete electronic data processing. A complete communication with government public servants is conducted via ICT. Application tracking system in the government offices is completely electronic and there is no any exchange of hard copies in the entire process.

Apart from these phases, there is also Phase 0, which described the absence of any form of eGovernment. This phase also includes the form of eGovernment, which has a web portal the content of which provides no relevant information.

Pursuant to suggestions of eEurope and eEurope 2005 standards, development of eGovernment is monitored through development of 20 public services. These services are divided into two groups. First group includes the services for citizens, while the second group includes the business-oriented services[8].

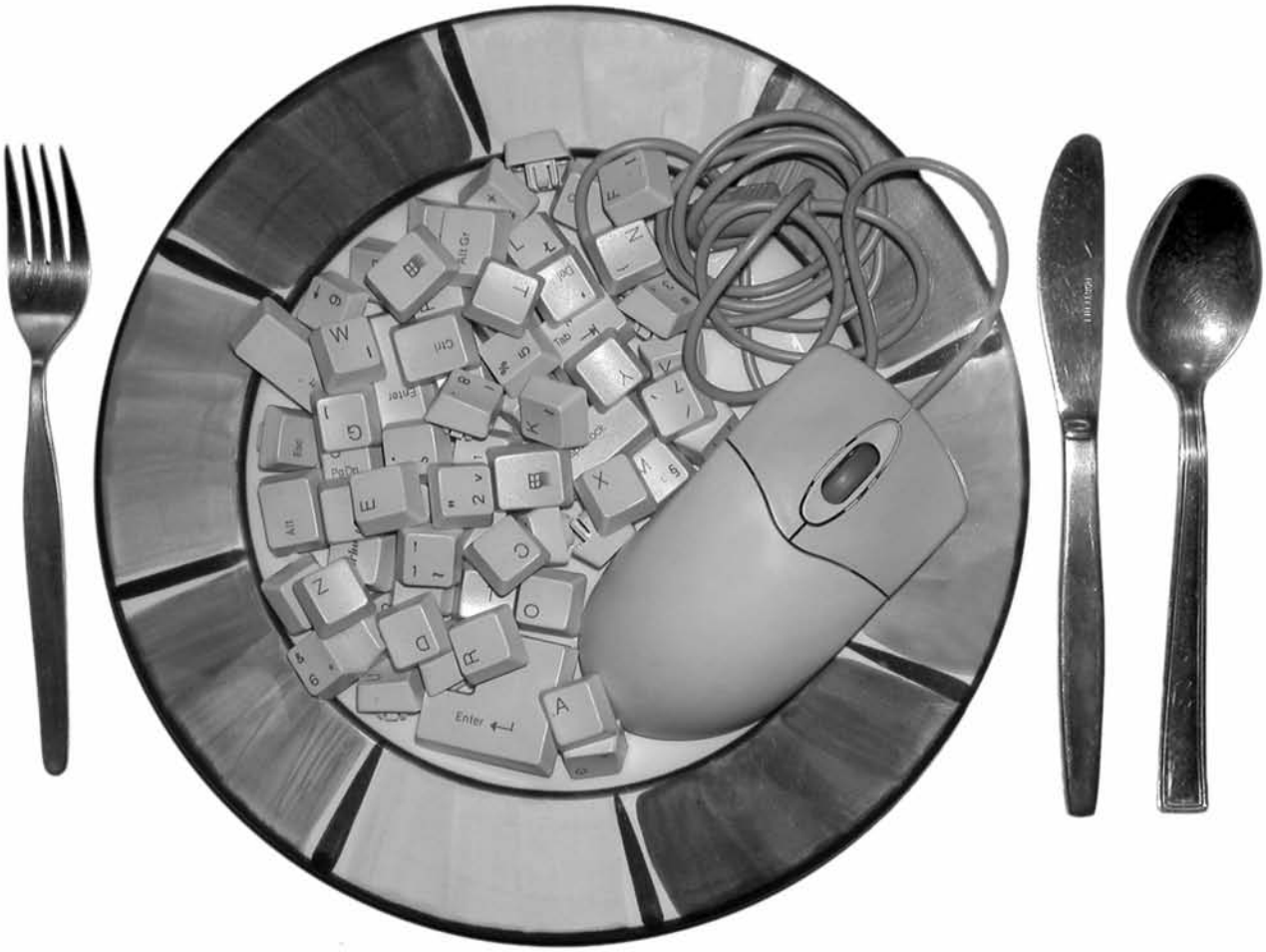
5 See Attachments
6 See Attachments
7 eEurope 2002 Final Report, Commission of the European Communities, February 2002.
8 See Attachments

1.5 Set of indicators used in this report

In this report we used the following indicators to establish e-readiness of BIH society.

Group of indicators	Name of the indicator
Indicators of development and infrastructure availability	Number of telephone subscribers/ 1000 inhabitants
	Number of mobile-phone subscribers/ 1000 inhabitants
	Number of telephone booths/ 1000 inhabitants
	Number of registered ISPs
	Number of Internet users/ 1000 inhabitants
	Number of broadband connection users/1000 inhabitants
	Total available capacity in Mb/s
	Price of landline phone calls for legal persons
	Price of landline phone calls for physical persons
	Price of monthly subscription for physical persons
	Price of monthly subscription for legal persons
	Price of a one-minute call (peak and off-peak)
	Number of hosts
	Number of registered Internet domains
Indicators of readiness of governmental institutions	Percentage of government public servants with access to computer
	Percentage of governmental institutions with LAN
	Percentage of governmental institutions with the Internet access
	Percentage of governmental institutions with web site
	Average degree of development of government web-sites
Indicators of readiness of educational institutions	Number of computers per pupil/student
	Number of educational institutions with computer labs
	Number of educational institutions with access to Internet
Indicators of individual readiness	Availability of landline telephones in house
	Availability of mobile telephones in house
	Availability of computers in house
	Internet access in house
	Method of internet access in house
	Number of legal persons with e-mail address
	Number of legal persons with web address
	Number of accredited ECDL and xPERT individuals
Indicators of business development and IT companies	Number of employees in IT companies
	Percentage of women in IT companies
	Client structure in IT companies
	Number of IT companies

is.gov.ba



e-Readiness

Assessment Report 2005

Research methodology

2 RESEARCH METHODOLOGY

2.1 Selection of target groups in the institutions and organizations included by the research

In order to evaluate e-readiness of the society as precisely as possible and collect the data for all indicators required in this study, the team selected the target groups for this research:

1. Telecom operators in Bosnia and Herzegovina: both landline telephony: BH Telecom, RS Telecom and HPT, and mobile telephony: BH Telecom, MOBIS, and HT-ERONET.
2. Council of Ministers as a state-level governmental institution.
3. Governmental institutions at entity and cantonal levels: ministries of RS, ministries of FBiH, cantonal ministries and government of Brčko District. Apart from that, the analysis included different governmental agencies at the entity and state level. Finally, this group includes the assemblies in the cantons and entities of Bosnia and Herzegovina.
4. Governmental institutions at the level of local self-government - municipalities in Bosnia and Herzegovina.
5. Educational institutions: universities, faculties, secondary school and primary schools from the entire Bosnia and Herzegovina.
6. Companies dealing with sale of hardware and software, and other ICT equipment in BiH.
7. Finally, data about the use of IT in households.
8. Number of persons who had training in the field of computer literacy.
9. And finally, the team, which worked on this report, used the relevant data collected from other sources and publications.

2.2 Selection of questions

During the questionnaire selection and design phase, the project team was guided by two principles. The questionnaire must be simple and it must contain key questions relevant for the general evaluation of the situation in Bosnia and Herzegovina - in principle, the number of computers and Internet connections.

We, certainly, considered the indicators for measuring information society development suggested by SIBIS, European Union and World Economic Forum. However, in Bosnia and Herzegovina, there are no reliable indicators and methods of collecting data that are suggested by renowned world institutions and projects. Therefore, the UNDP team consciously decided to make a simplified variant.

2.3 Collection of data

During data collection, the project team was governed by the two basic principles. Firstly, it started with a presumption that there were no data (in majority of cases) available within the governmental institutions or NGOs in BiH, and that accordingly, the research should be based on data collected in field - primary research). Second principle implied that we should include as many partner-institutions as possible. The second principle was particularly important to us because we wanted to build capacities in the partner-institutions for implementation of future projects, but also to accelerate the process of data collection.

2.4 Structure of institutions interviewed

2.4.1 General information on telecommunications

This information was collected from: (1) BH Telecom, (2) RS Telecom, (3) MOBIS, (4) HPT, (5) HT-ERONET, and six (6) private ISP companies. In direct contact with telecoms, we obtained the data in October 2005.

When it comes to secondary data, we used the information from previously mentioned UNDP publication "E-Readiness Assessment 2003".

2.4.2 Governmental institutions

Information about the governmental sector were collected from the total of: (1) 63 municipalities from FBiH, including 5658 public servants, Sarajevo City and employees of City Assembly; (2) 62 municipalities from RS, including East Sarajevo; (3) all cantonal governments in FBIH, including 7067 employees, Government of FBIH with 367 employees, and total of 16 ministries from RS and Secretariat of RS government with over 8400 employees; (4) 83 courts in Bosnia and Herzegovina, not including the Court of BiH and court of Brčko District with total of 3241 employees; (5) information from all employed at Council of Ministers, or State institutions, with 40 state institutions and over 7300 employees; (6) assemblies of all cantons in the Federation of BiH, where the research included 147 employees, and (7) information from 60 agencies, bureaus, secretariats and directorates at all levels of Bosnia and Herzegovina.

Association of municipalities and cities of FBIH (www.sogfbih.ba) helped us collect the data from the municipalities in the Federation of BiH. Union of municipalities and cities of RS (www.alvrs.com) collaborated with the team on the project and it helped us collect the data from municipalities in RS. With assistance of the Union in RS, we succeeded in obtaining relevant data concerning the governmental institutions and data from the primary and secondary school in RS. Collaborators from the **High Judicial and Prosecutorial Council** (www.hjpc.ba) shared with us the information from the courts in Bosnia and Herzegovina. We obtained the data from Council of Ministers with assistance of the colleagues from **Ministry of Communications and Transport of BiH** (www.mkt.gov.ba). Other information from the cantons, government of FBiH, agencies and other institutions were acquired through the direct contact with the mentioned institutions. With assistance of the company called **"Žute Strane" (Yellow Pages)**, we managed for the first time to collect reliable information about the number of companies in BiH that have its own web-address and e-mail address.

Secondary information included the information from UNDP research on e-Readiness Assessment from 2003, which analyzed 67 governmental institutions and 3865 employees. In the 2003 report, UNDP had analyzed the work of 20 municipalities in the entire Bosnia and Herzegovina. In these 20 municipalities, there were a total of 1897 employees.

2.4.3 Educational institutions

Information about the state of educational institutions were collected from the entire territory of Bosnia and Herzegovina, namely: (1) 596 primary and secondary schools from FBIH, (2) 195 primary and secondary schools from RS, (3) which provide education to nearly a half million of pupils, and (4) six universities in BiH.

Some data were collected through direct contact with cantonal ministries in FBiH. Data from RS were collected with assistance of Ministry of Education of RS and Union of municipalities and cities of RS. All aforementioned data were collected during November 2005.

2.4.4 IT companies in BiH

Finally, the degree of development of IT companies in BiH was analyzed on the sample of 40 companies from the entire BiH. The research was conducted with the assistance of **Association for information technologies in Bosnia and Herzegovina** (**BAIT** - www.bait.org.ba). The questionnaires were delivered in September 2005 and all data mentioned refer to that period.

When it comes to secondary data, within the scope of this research we used the data[1], which BAIT, in collaboration with SEED, collected in 2004. This research was conducted on the sample of 39 IT companies from the entire Bosnia and Herzegovina.

Apart from that, we used the official data of the Tax Administration Office of the Federation of BiH and Chamber of Commerce of Bosnia and Herzegovina.

2.4.5 Households

Data from the households were collected through professional assistance of Prism Research Agency (www.prismresearch.ba). The research was conducted in September 2005 on the sample of 1500 households.

When it comes to secondary information, we used the data from the report on Early Warning System for 2004 and 2005. This is a quarterly publication of the UNDP (United Nations Development Program) www.undp.ba. We obtained the information from the Agency for Public Opinion Research - Prism Research. Apart from that, we used the data from INFO Magazine (www.info.ba) and other researches cited in this text.

Besides, we also used information about the number of people who attended and mastered ECDL or xPERT courses. The data were collected from xPERT European Computer Passport and ECDL (European Computer Drivers License), the two associations which have their centers all around BiH and which conduct the training and accreditation of the individuals.

2.5 Indicators taken from local institutions

The team that worked on research on e-Readiness also contacted some key institutions in BiH, which have the data indicative to this report. Among others, those were Tax Administration Office of FBiH and Chamber of Commerce (www.komorabih.ba).

1 Market analysis of IC technologies in Bosnia and Herzegovina, May 2005

is.gov.ba

e-Readiness

Assessment Report 2005

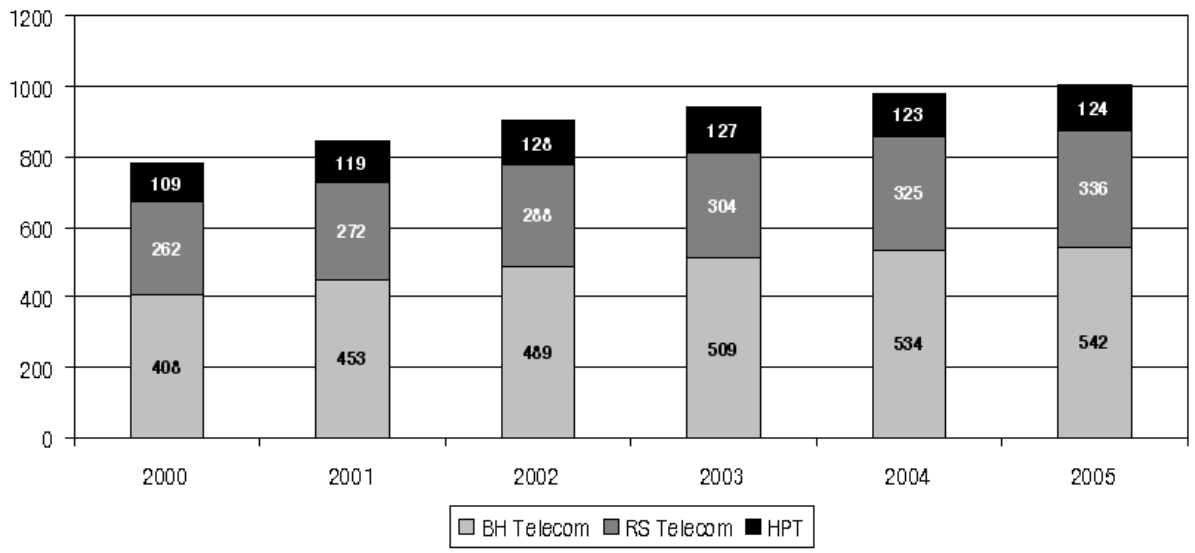
Research results

3 RESEARCH RESULTS

3.1 Network development and ICT penetration

According to results delivered by telecom operators in BiH, the number of landline telephones in 2005 was 1.002.000. Penetration results of the basic network infrastructure in Bosnia and Herzegovina are presented in the following tables.

Number of active landline telephones in operation (in thousands)



If we take that BiH has a population of nearly 3,85 million[1], and coefficient of household size of 3,2, we will get the number of 1.203.000 households, which is practically over 83% coverage. However, if we take into consideration that 10%[2] of landline telephone connections are business and public sector (average of all three telecom operators - somewhat more than 100.000 subscribers) we will get the coverage of 75% of households in BiH.

Knowing that EU average for households is 97%[3], this is certainly not satisfactory, not even for Bosnia and Herzegovina. Life Standard Measurement Study- LSMS[4], conducted in 2002, has shown that 85% of households in urban areas and 60% in semi-urban and rural areas have telephones (weighted average is somewhat higher than 70%), which, to great extent, confirms the previously given penetration percentage of landline telephones in BiH households.

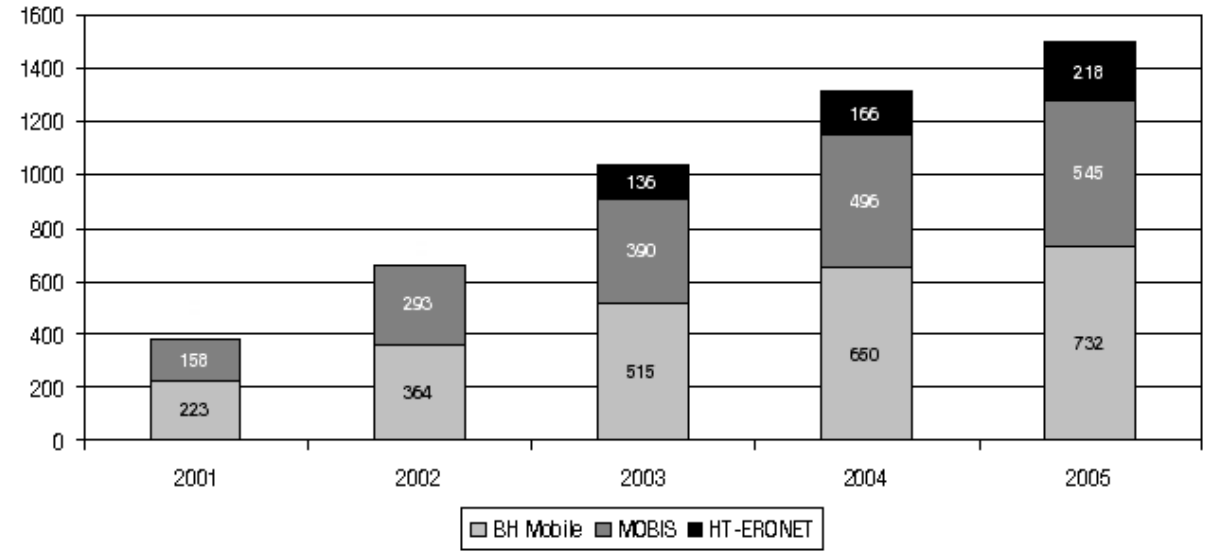
Finally, through primary research measuring[5], we learned that 80,1% of households have the landline telephone connection.

All this confirms the fact that realistic penetration of landlines telephones in BiH households varies between 75-80%.

Number of active mobile-phone subscribers in BiH in 2005, for all three BIH operators is somewhat less than 1.500.000. If we have in mind that this is the sum of pre-paid and post-paid users, and that BiH has population of nearly 3,85 million, the penetration rate of mobile connections is 39%[6]. Given the current economic situation in BiH, this percentage is certainly satisfactory.

1 Bureau for Statistics, as of October 2005 http://www.bhas.ba/
2 Appraisal of the author, based on similar indicators in other countries.
3 Europe's Information Socety Thematic Portal
4 "Life Standard Measurement Survey in BiH", DIFID, World Bank, UNDP and Statistics agencies in BiH, 2002., p.14
5 Prism Research, September 2005 - sample of 1500 households.
6 Population under 16 is not excluded from the research sample, thus the penetration level are probably higher.

Number of active mobile-phone users in operation (in thousands)

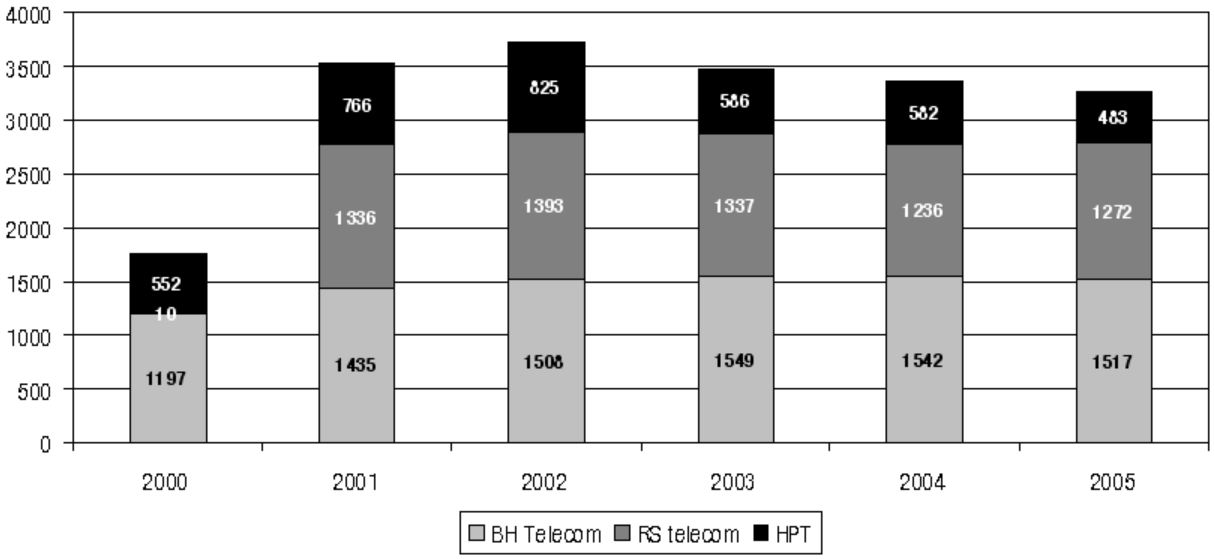


What is really important to mention here is a relative ratio between pre-paid[7] and post-paid users, which is an average of 6:1 in favor of the post-paid users[8]. This should certainly be understood as a serious signal to telecom operators - despite the great number, the users are not ready to attach themselves on long-term basis to certain operator.

It is important to highlight the fact that regardless of seemingly high level of use of mobile services, BiH is still significantly below the average of neighboring countries, in particular EU countries where the penetration of mobile phones is often over 100% (Scandinavian countries, Ireland, etc.). On the other hand, our closes neighbors on the West, Croatia and Slovenia have penetration significantly higher than 70%, which leaves enough development potential for BIH operators.

It is indicative that the number of public telephone booths in Bosnia and Herzegovina is in decline. Year after year, there are certain increases and drops with certain operators, but the general trend reports a decline of telephone booths in BiH. This is not surprising if we are aware of the trend in EU countries and an increasing number of mobile-phone users.

Number of telephone booths



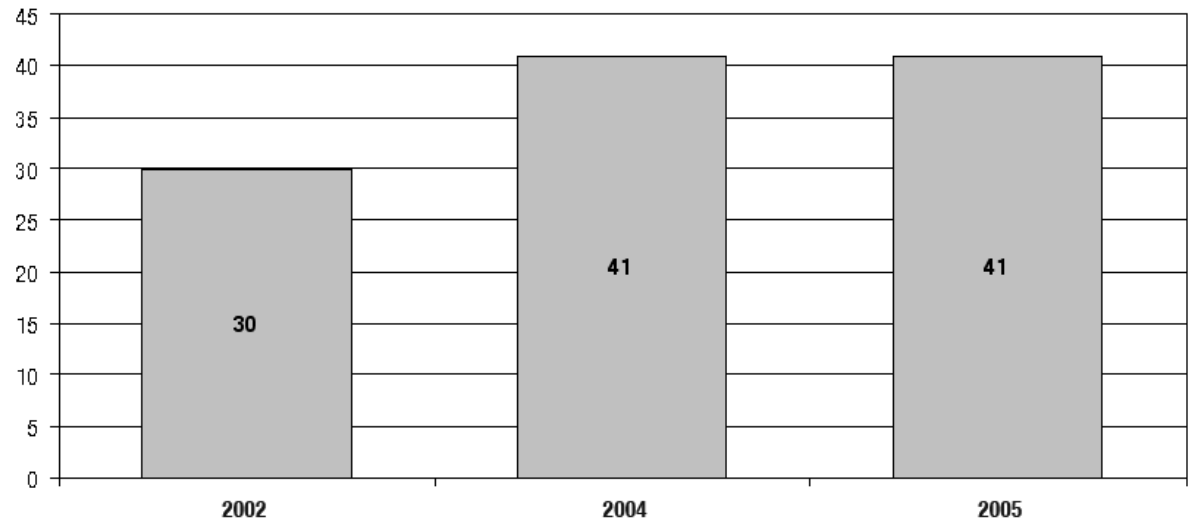
7 Post-paid users are the users subscribed to the services of mobile telecom operators, while the pre-paid users are the users who pay no subscription fee, but instead, they purchase the telephone credits.

8 Based on primary research of telecom operators.

According to information received from telecom operators, in 2005 there were 3272 telephone booths in BiH. The table below provides an overview of the number of telephone booths by years.

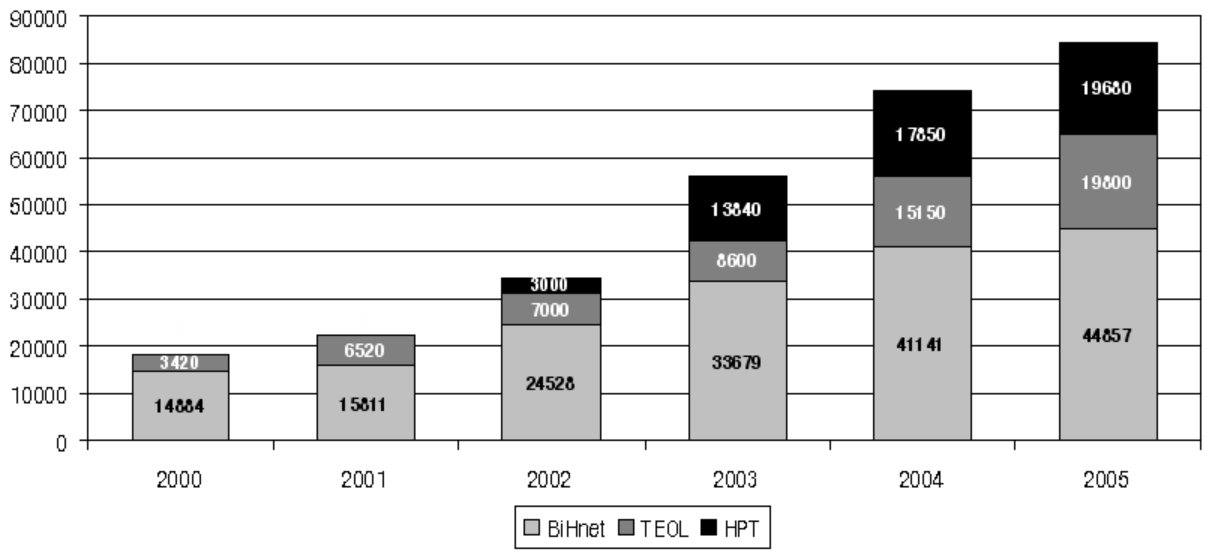
According to data received from Communications Regulatory Agency (CRA www.rak.ba), there are only 41 licensed Internet service providers. In Bosnia and Herzegovina, there are two more ISP who operate without the license, and five ISP that received the license, but they still did not activate this service. Apart from an interesting fact that the number of ISPs did not change significantly over the past few years, it is important to say that the spectrum of the services offered by ISPs also did not change, despite the introduction of a series of new services by the major telecom operators.

Number of registered ISPs



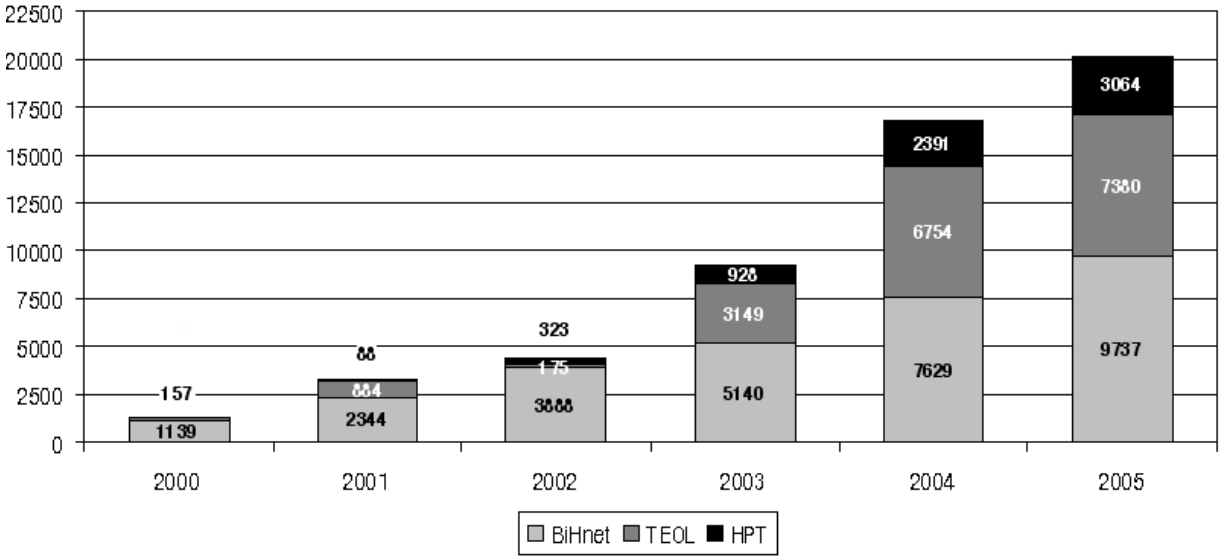
According to information received from telecom operators, the number of Internet users is increasing. Unfortunately, this rise is not as we would like it to be. According to research conducted in collaboration with major telecom operators, the number of users who subscribed via dial-up connection in 2005 was 84000.

Number of dial-up users registered with the major operators



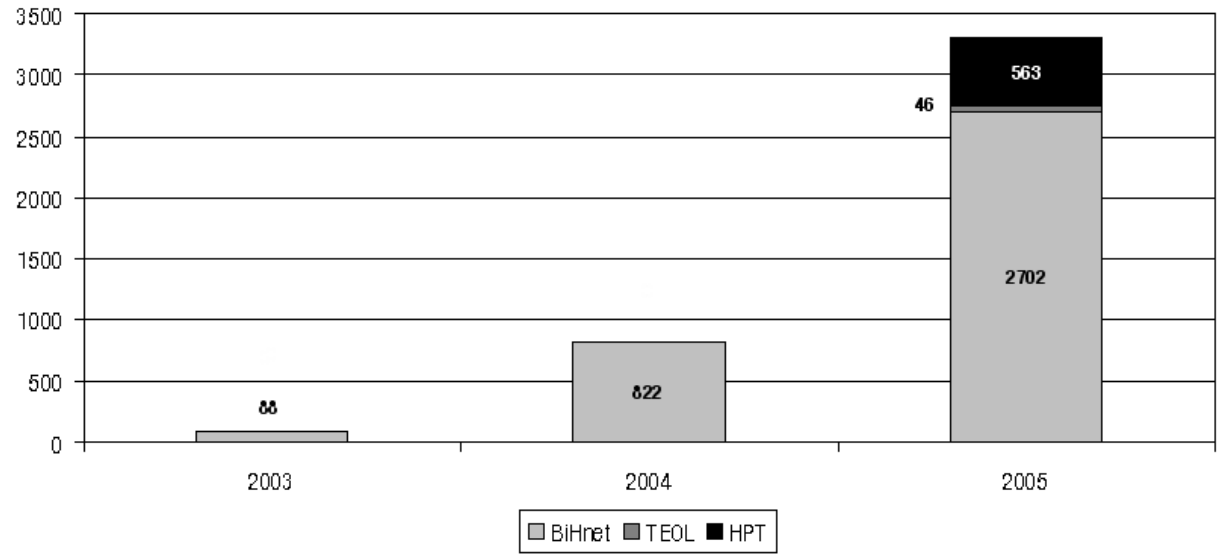
According to the same research, number of ISDN users in BiH in 2005 was 20081. The table below provides an overview of ISDN users by years.

Number of ISDN users registered with the major operators



Since the broadband technology, primarily ADSL service was offered to BIH users at the end of 2003, in this report we tried to measure the penetration of broadband technologies for the Internet access for the first time. Number of ADSL users in BiH in 2005 was 4845, and it is shown in the table above, per year. We only collected the information relative to the period of 2003 to 2005.

Number of ADSL users registered with major operators

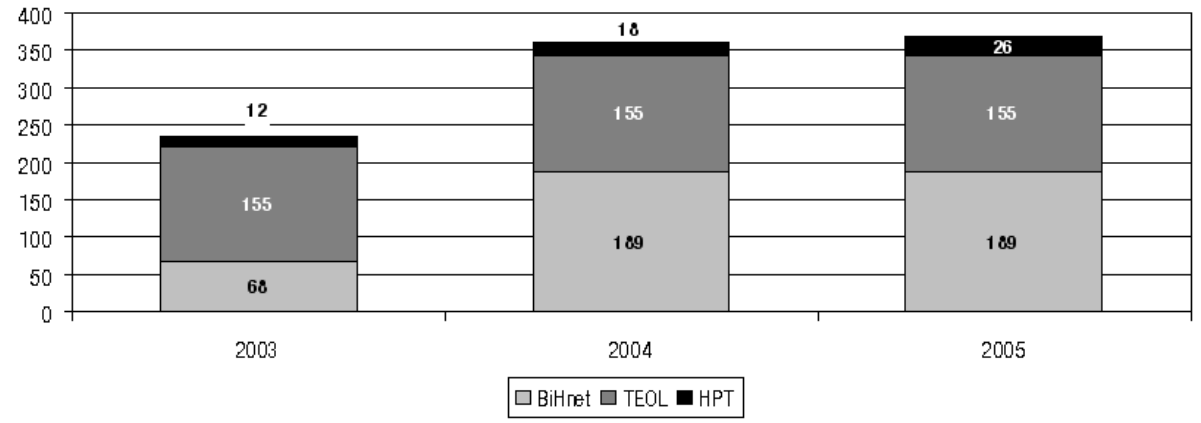


When it comes to penetration of cable internet, according to information received from CRA for 2005, in BiH there are 4751 registered users of the cable internet. Also, the number of users of wireless Internet in BiH in 2005 was 3046. There were 1054 users of the rented lines.

According to data collected from the three major operators, the total available capacity of international Internet connection in BiH in Mb/s is one of the smallest in region, and it amounts to 380 Mb/s. This information does not include other Internet connections that are used by private ISPs and certain individuals, such as satellite access. However, since the value of this capacity is relatively small, the number of such users was not included into this sum. Having all this in mind, the available capacity of the Internet connection used by BiH is very low. Just as an example, the Croatian Academic Network - CARNet - has 1 Gb Internet connection since 2002[9].

9 eSEEurope Regional Information and Communications Technologies Sector. Status and Usage Report. October 2004.

Total available capacity in Mb/s



The table below provides an overview of the prices of landline telephone connections for physical persons by years. Figures presented here refer to the standard tariffs for the connections, without any discounts and subsidies.

Price of telephone connection for physical persons (KM)

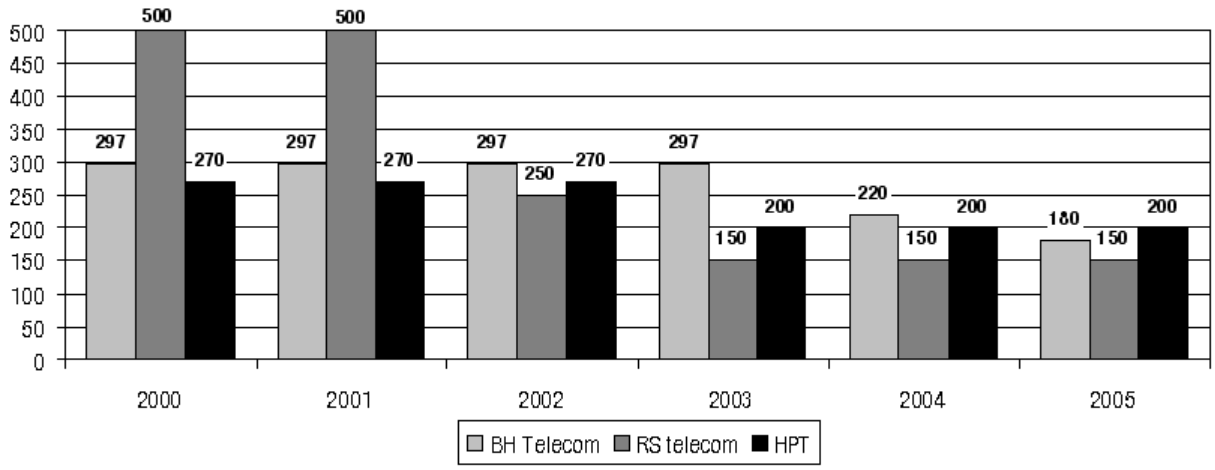
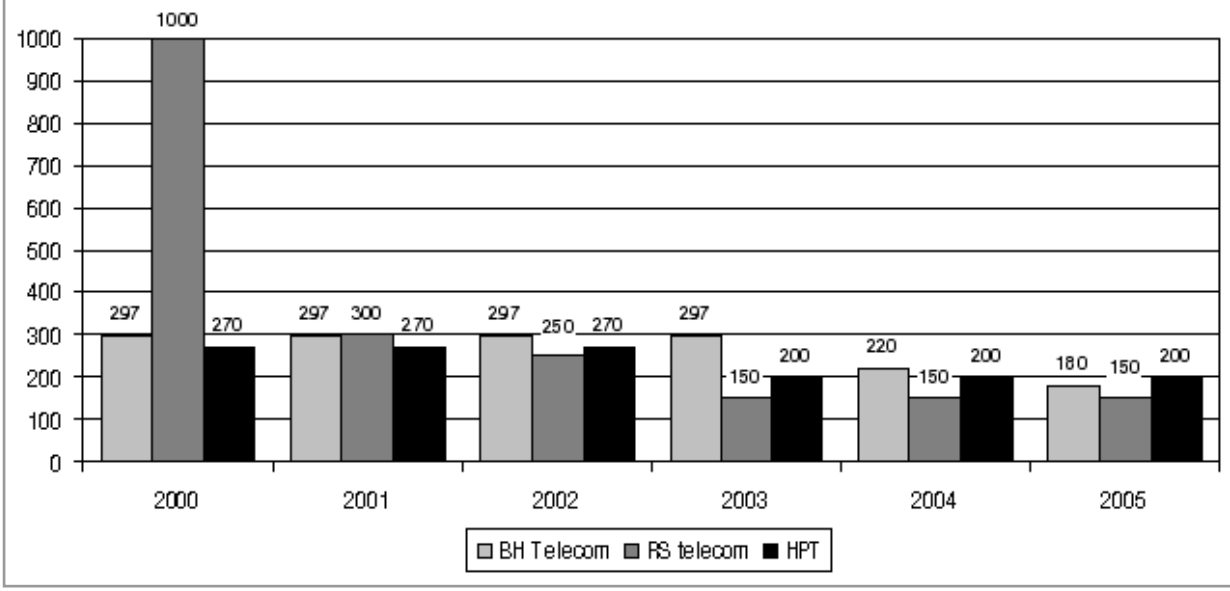


Table below provides an overview of the prices of telephone connections for legal persons by years.

Price of telephone connection for legal persons (KM)

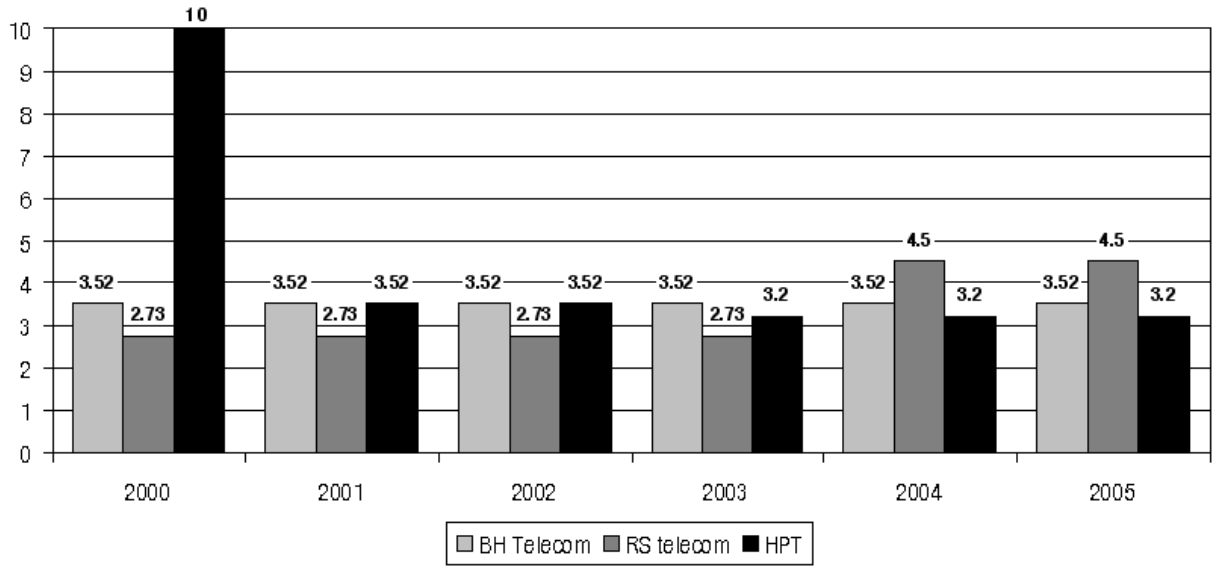


It is important to emphasize here that over the past four years, there was no significant drop of prices for telephone connection for either physical or legal persons. The situation is the same with all three operators. It is really important to put this information in the context of penetration rate of landline telephones in households, which is dissatisfactory anyway. Number of the users of landline telephone in the business and public sector is extremely small.

Subscription fee for the landline telephone for physical persons is certainly one of the lowest in the region and it includes a fair number of minutes of conversation (this varies among the operators), which certainly presents a significantly subsidized service in BiH. In the table below, it is clearly visible standardization of the subscription fee with all three operators, which varies to maximum 1 KM.

Table below provides an overview of monthly subscription to landline telephone for physical persons by years.

Price of monthly subscription fee for natural persons (KM)



As far as the price of landline telephone for legal persons is concerned, the subscription is not excessively high, and there is a clear consistency over the past six year. Table below provides an overview of subscription fee by years, for all three operators.

Price of monthly telephone subscription for legal entities (KM)

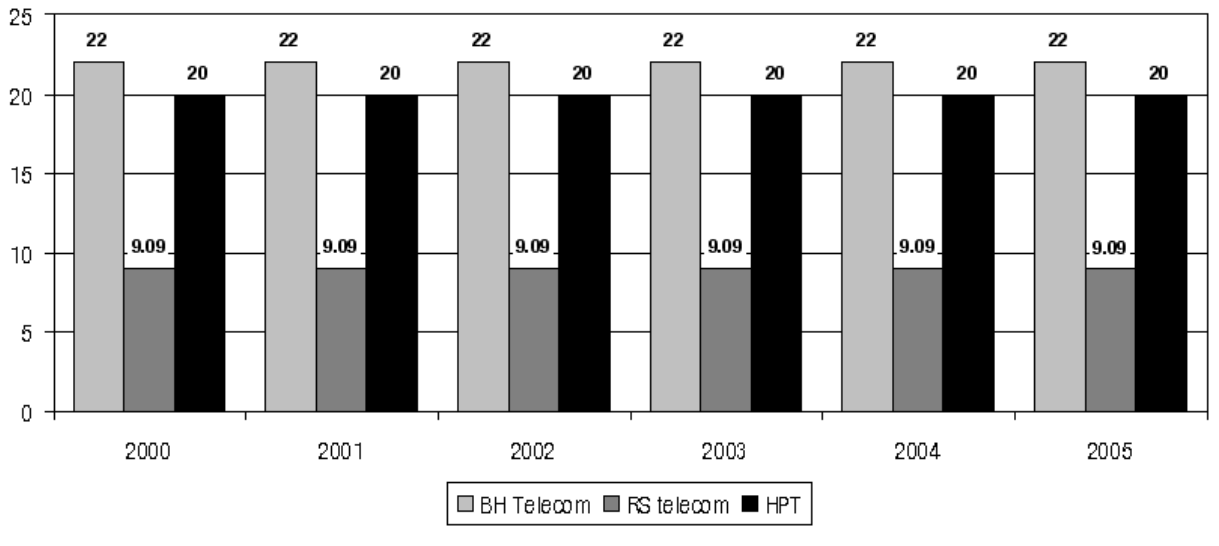


Table below shows the prices of call per minute in peak time, by years[10].

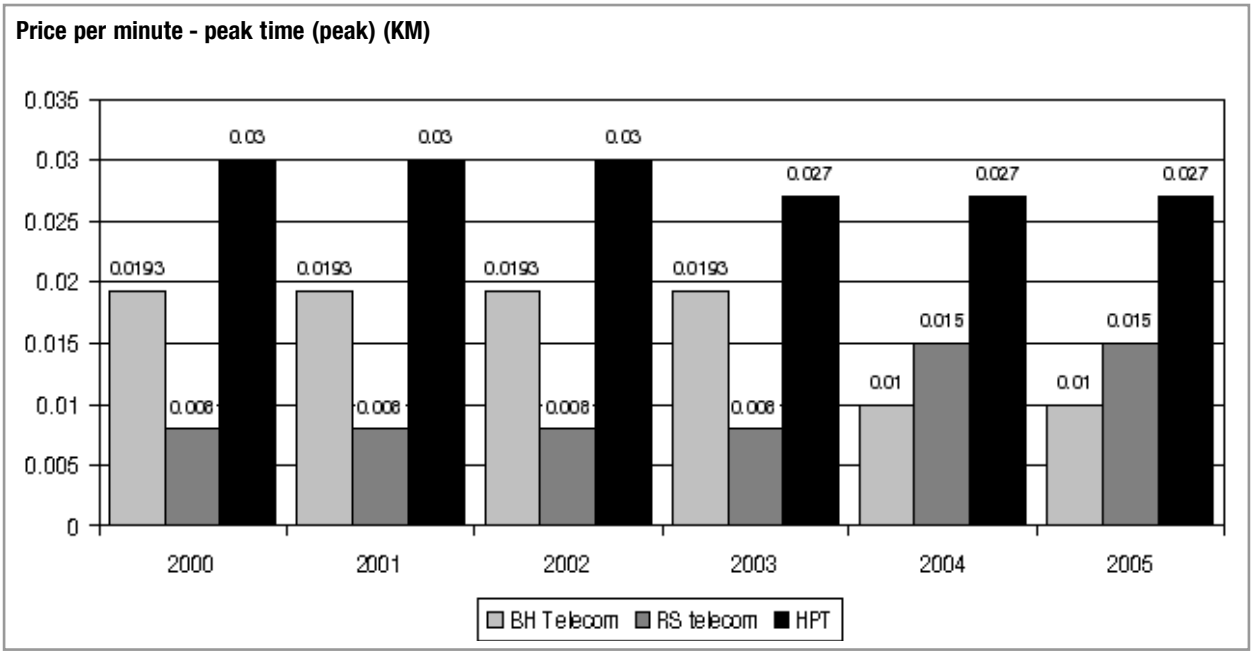
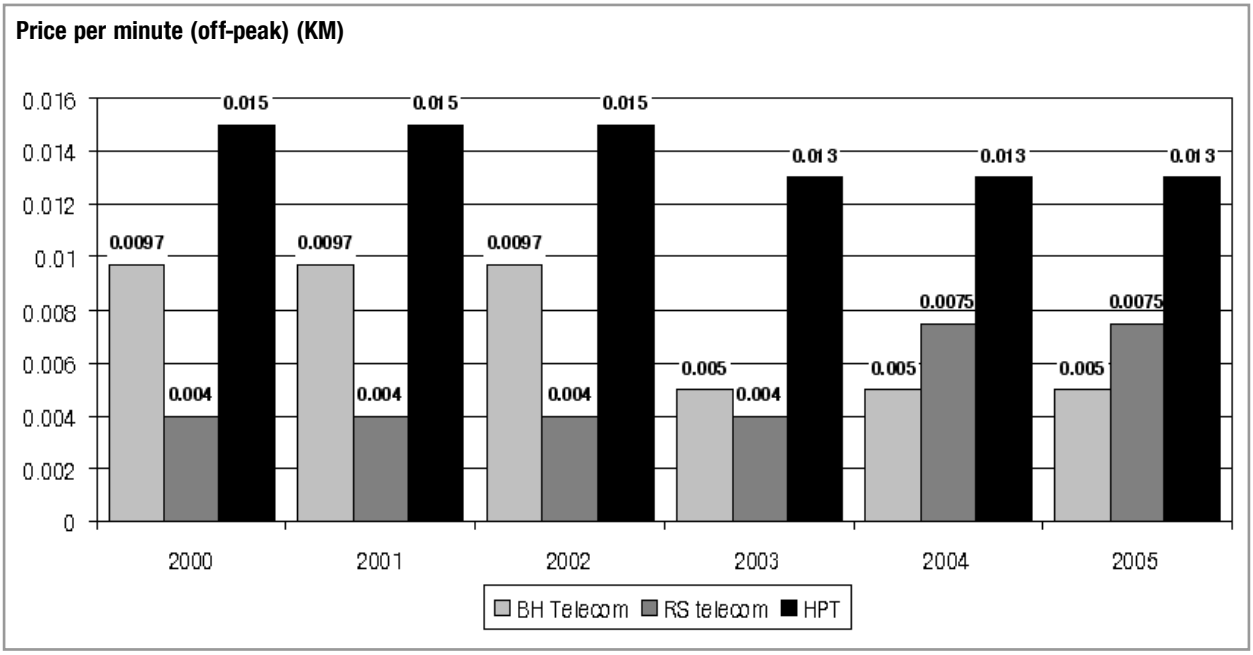


Table below provides an overview of off-peak calls by years[11].



When it comes to landline telephone calls in BiH, we can see that the prices are very favorable and in the average they do not exceed 0,017 KM/minute in peak time or 0.0085 KM/minute in off-peak time[12].

This practically means that the average user of landline telephone pays 22KM for 30 hours (50% peak and 50% off-peak), plus subscription fee.

On the other hand the situation with the mobile telephony is rather different.

10 Data as of December 2005.

11 Ibid.

12 "Peak" for majority operators means from 7:00 to 19:00 hours on working days.

The amount of subscription fee varies depending in the package, and this variety manifests the competition among these three mobile operators in BiH. It is impossible to objectively compare the realistic prices of the subscription fees. Also, because of variety of offers, we took the average price of call within all offered tariffs for post-paid services.

Table below provides an overview of the average price per minute peak time of all tariffs offered for the post-paid packages, by years[13].

Averge price per minute (peak) (KM)

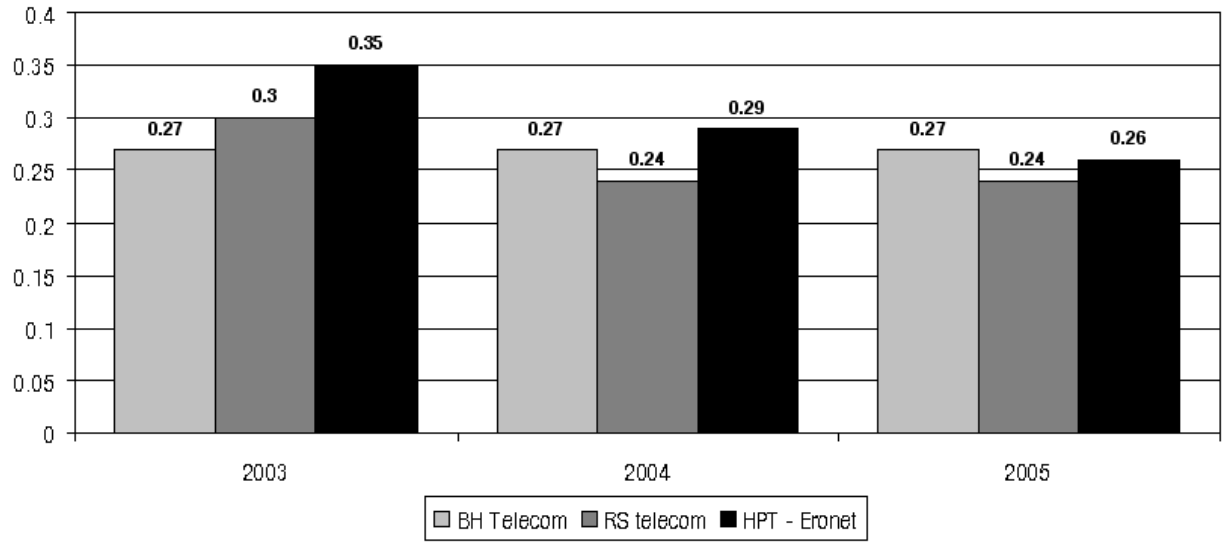
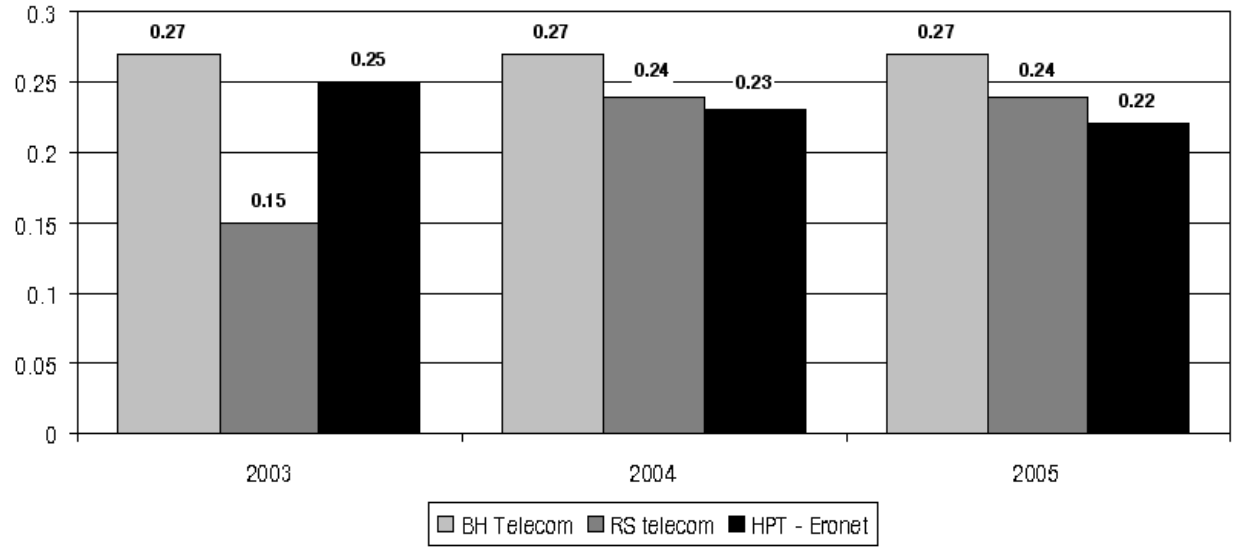


Table below provides an overview of the average price per minute off-peak of all the tariffs offered for post-paid services, by years[14].

Average price per minute (off-peak) (KM)



However, to get a clearer picture of the true ratio among the users, we must compare the prices of calls with the user consumption structure, and then compare it with the services offered by the operators.

13 Data as of December 2005

14 Data as of December 2005

The average user consumption structure of all three mobile operators, as well as the average time in minutes obtained from the mobile operators in Bosnia and Herzegovina is given in the table below:

	Share (%)	Duration in minutes	BH Telecom (KM)	RS Telecom (KM)	HT-Eronet (KM)
Within the same network[15]	67	43,55	11,8	10,2	10,6
Landline - peak	16	10,40	1,97	2	2
Landline - off peak	6	3,90	0,7	0,8	0,7
Other networks - peak	6	3,90	1,3	1,3	0,9
Other networks - off peak	5	3,25	0,9	0,9	0,7
Total		**65 minutes**	**16,67**	**15,2**	**14,9**
Average subscription fee			**21,5**	**15,3**	**26,7**
Total with the subscription included (KM)			**38,17**	**30,5**	**41,6**

Previous calculation shall be taken into consideration with certain reservations, and it can be used only as an orientation because it represents the average prices, based on prices from December 2005, offered to all its users in different types of communications and forms of users' relations.

Also, it is important to pay attention to the fact that some operators in BiH charge the calls per seconds, while the others charge per minutes, which is significantly less favorable for the user and it will significantly affect the total telephone bill.

3.2 Internet and society

One of the important indicators of development and use of Internet is the number of Internet domains being created. The University Tele-information Center (UTIC) is a scientific and organizational unit of the University of Sarajevo tasked with advancing the scientific and research work at the University of Sarajevo. UTIC is the institution which registers and issues licenses for the use of .ba domain[16]. Based on information this institution has on its web portal, over 3,000 .ba domains were registered in BiH by December 2005[17].

Number of registered .ba domains:

- 2915 BA domains (in general)
- 34 ORG.BA domains (organizations)
- 9 NET.BA domains (networks)
- 69 GOV.BA domains (government institutions)
- 86 EDU.BA domains (education institutions)
- 28 UNSA.BA domains (universities)

The next table provides a detailed overview of the number of registered domains per year and type of domain.

Unfortunately, as with many other issues, there is no uniformity in the BiH society in terms of use of registration of domains. For example, public servants in the Herzegovina-Neretva Canton use e-mail from the @net.hr domain. On the other hand, the Republika Srpska authorities usually register.com or .net domain. In some cases, .yu domain[18] is registered also. That is why the figures on the number of registered domains in BiH are not precise, because they do not include numerous institutions and users which are not using the .ba domain.

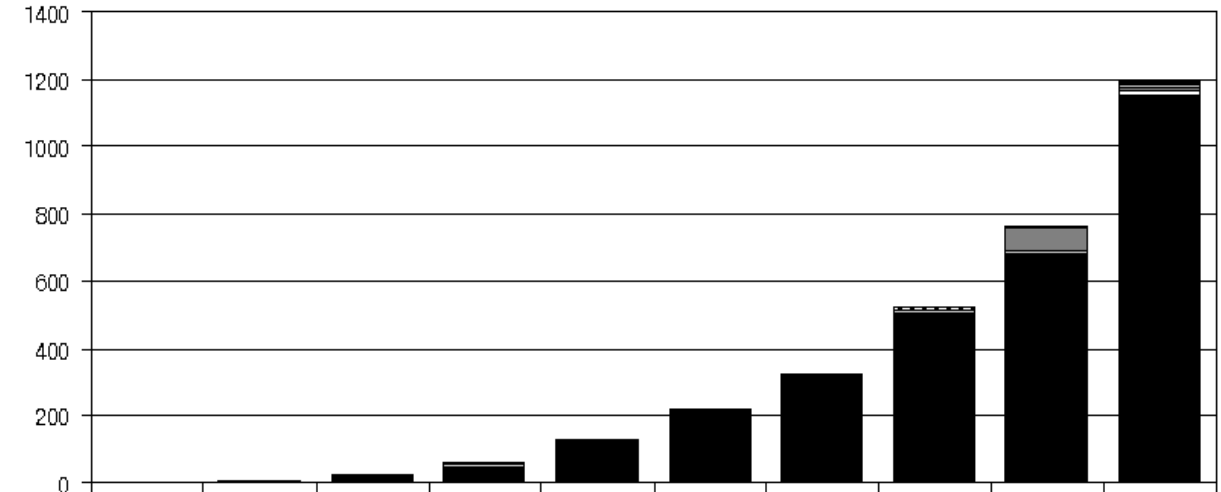
15 Calculations include 60% in and 40% in off-peak time.

16 http://www.utic.ba

17 http://www.nic.ba/stream/popis/ BiH Internet domain since 7.12.2005

18 http://www.urc.bl.ac.yu/ University Computer Center in Banja Luka.

Number of registered .ba domains and sub-domains



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
unsa.ba	0	1	0	4	2	4	3	5	5	4
edu.ba	0	0	0	0	2	2	2	1	60	8
gov.ba	0	0	3	3	5	4	3	7	10	9
net.ba	1	1	1	1	1	0	0	0	0	12
org.ba	0	1	2	1	1	1	2	2	7	9
.ba	1	0	21	49	118	208	314	506	678	1153

Certain municipalities in BiH are examples of well-conceptualized domain, such as the Neum municipality with the nacelnik@neum.ba e-mail address and the http://www.neum.ba we address. On the other hand, the Centar municipality in Sarajevo registered the http://www.sarajevo-centar.org address which is not using the .ba domain.

Based on the rough estimate of the number of .ba and other domains, gathered from government and educational institutions through primary research, we can conclude that around 40% institution have .ba domains registered, while 60% of them have registered some other. Unfortunately, only 69 institutions in BiH have registered the .gov.ba domain.

In the last few years, users were complaining about the expensive and complicated registration of domains. In addition, UTIC was fairly restrictive in terms of selection of domain name. Everything has changed for the better today. UTIC web portal www.nic.ba provides interactive registration with the option of online registration. The price of .ba domain registration is KM50 for one year[19]. Although this price represents a reduction in price when compared to previous years, it is still not competitive to the one of .com domains, which can be as little as $7.

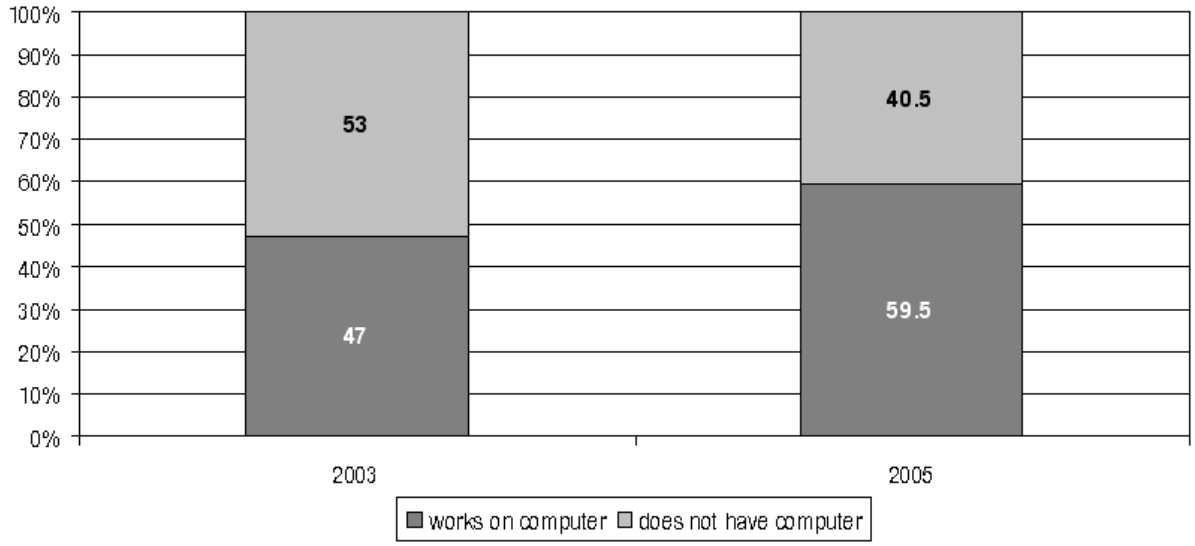
3.3 E-readiness in government institutions

3.3.1 State, entity and cantonal level institutions

As described already in the chapter on methodology research and the structure of interviewed institutions, this analysis encompassed a total of 38,638 employees. Out of the total number, 19,718 of them have a computer at work, which is 59,5%. Based on this analysis, we can conclude that e-readiness of government institutions in Bosnia and Herzegovina is at a satisfactory level. Naturally, it cannot be expected that all employees have and should have a computer for their work, however this information shows there exists a solid infrastructure to establish eGovernment. The table below provides a percentage overview of public servants using computers in their daily work.

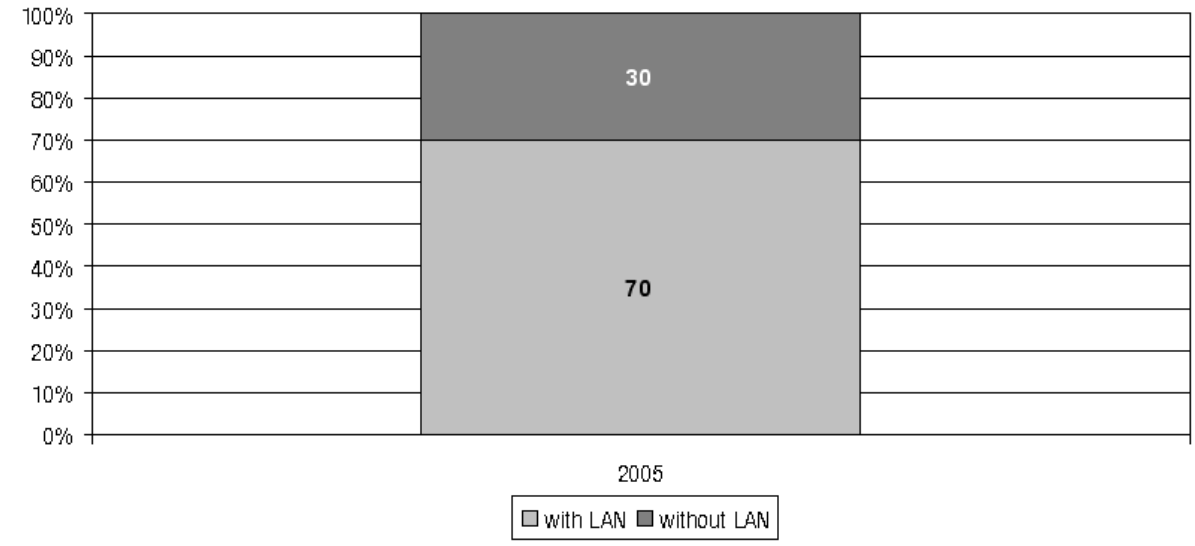
19 Basic UTIC offer, cheaper package-based options are also available.

Percentage of public servants using computers



Government employees must also have networks for speedy exchange of data and to successfully implement the eGovernment systems. In this regard, the situation is much better. The research shows that almost 70% of institutions confirm the availability of local computer network. Unfortunately, the research did not examine their quality or functionality, but this is a good signal showing there is a good basic infrastructure for the work. For the sake of comparison, in Rwanda, which experienced destruction and genocide like Bosnia and Herzegovina, there exists for a few years the Agency for Information Society with a coordinator in every ministry. Rwandan ministers use e-mail as the official means of communication. Similarly, in another African country, Tunisia, e-signatures were introduced in the government already in 2001 and their ministers have been using this technology for a number of years. The graph below provides a percentage overview of government institutions with local computer network.

Percentage of government institutions with LAN



The BiH Presidency has a web page (www.predsjednistvobih.ba), FBiH Government also has a web page (www.fbihvlada.gov.ba) and so does the RS Government (www.vladars.net). On the other hand, cantonal assemblies of the Sarajevo and Una-Sana canton reported that they both have web pages serving to report publicly and transparently about their work. All other cantonal assemblies did not report having a web page. Only half of cantonal governments have web pages, and the Canton Sarajevo one, www.ks.gov.ba, may be the best of them all. The percentage of agencies, directorates,

institutes and similar institutions having a web portal is 88%. One of exceptional examples of a good web page is the web portal of the **Judicial and Prosecutorial Training Centers in RS and FBiH** (www.cest.gov.ba) which provides **distance learning** services. Today, in addition to traditional seminar and course-based education, the centers in FBiH and RS provide distance learning to judges and prosecutors in BiH. According to Centers' reports, around 60 courses are already available online. Finally, it is important to mention the www.is.gov.ba portal, maintained by UNDP and providing an overview of relevant laws and projects in the field of information society development.

Unfortunately, government institutions still use their portals to present a fairly static material with some periodical changes in content. Public servants have not yet understood that Internet can be a cheap and quick way of transferring information to citizens. On the other hand, the web is probably the cheapest tool for government to be transparent and inform the citizens of its projects on time.

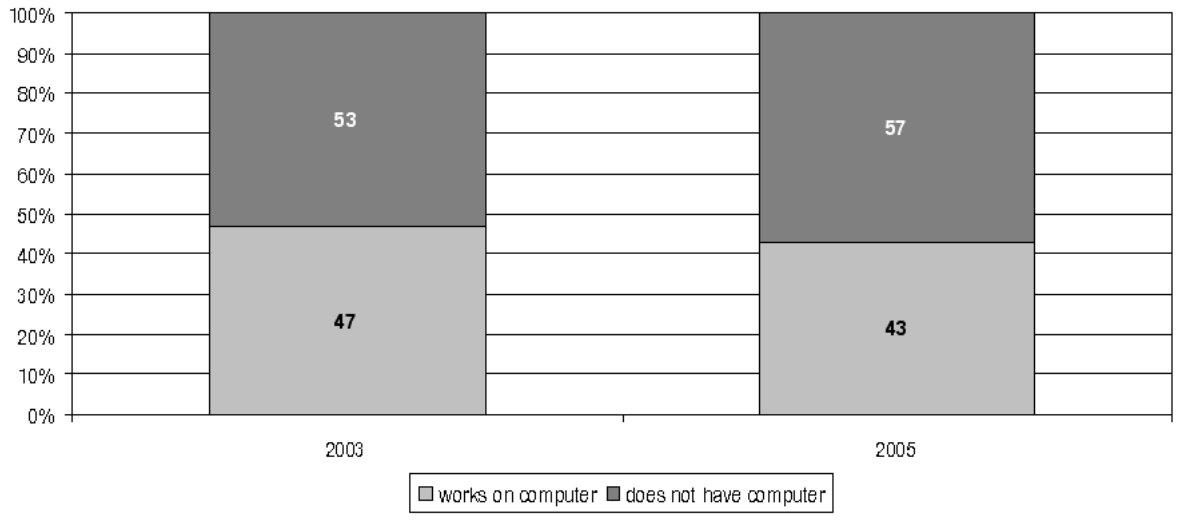
What governments need to do in the future is to use the web portals and the existing good infrastructure of networks in buildings to genuinely communicate with citizens and provide citizens with the opportunity to send letters to ministers and other public servants.

3.3.2 Municipalities

In this section of the report, results are presented individually for all municipalities in Bosnia and Herzegovina. We singled out the local government bodies from other government levels, because we think that special attention should be paid to them. The primary reason for this approach is that local government bodies have the closest communication with citizens. That is why eGovernment systems should be the most developed there where citizens request certificates, documents, etc.

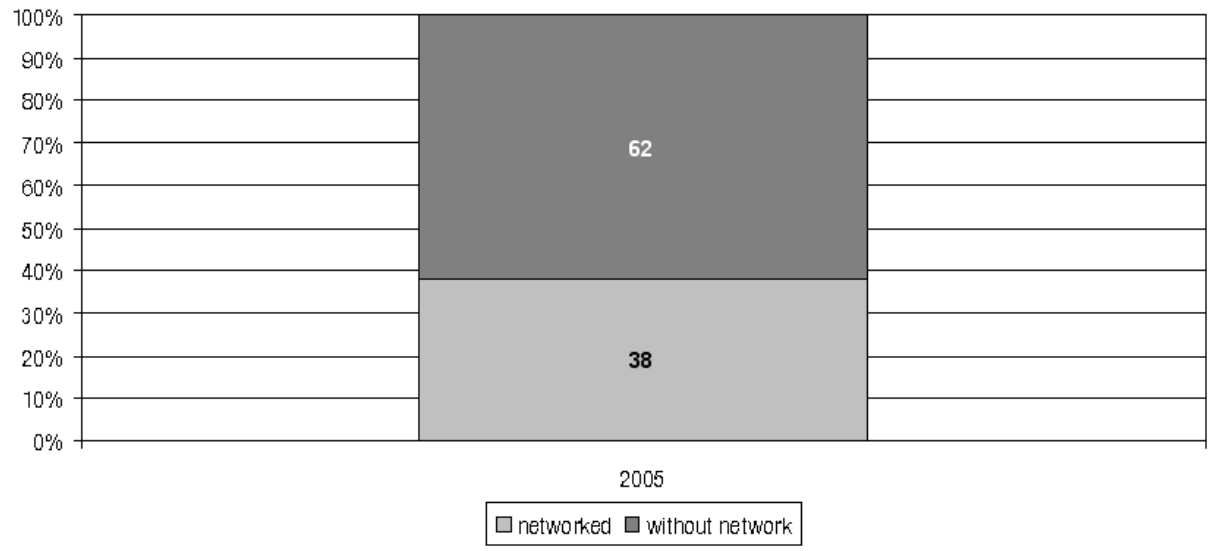
To that end, we analyzed how many public servants in municipalities have access to a computer. Out of nearly 10,000 employees analyzed in this survey, 4,000 of them had access to computer at work. The percentage of employees in local government bodies with access to computer in daily work is 42,2%. The table below compares this data with data from 2003. It is interesting to note that this percentage did not change significantly. There were no significant deviations with regards to penetration of computers in municipalities, either because of sample size or because of other reasons. However, a more serious question is placed here, which this research did not examine in detail. How much do employees really use technology in their work?

Percentage of employees using computers in municipalities



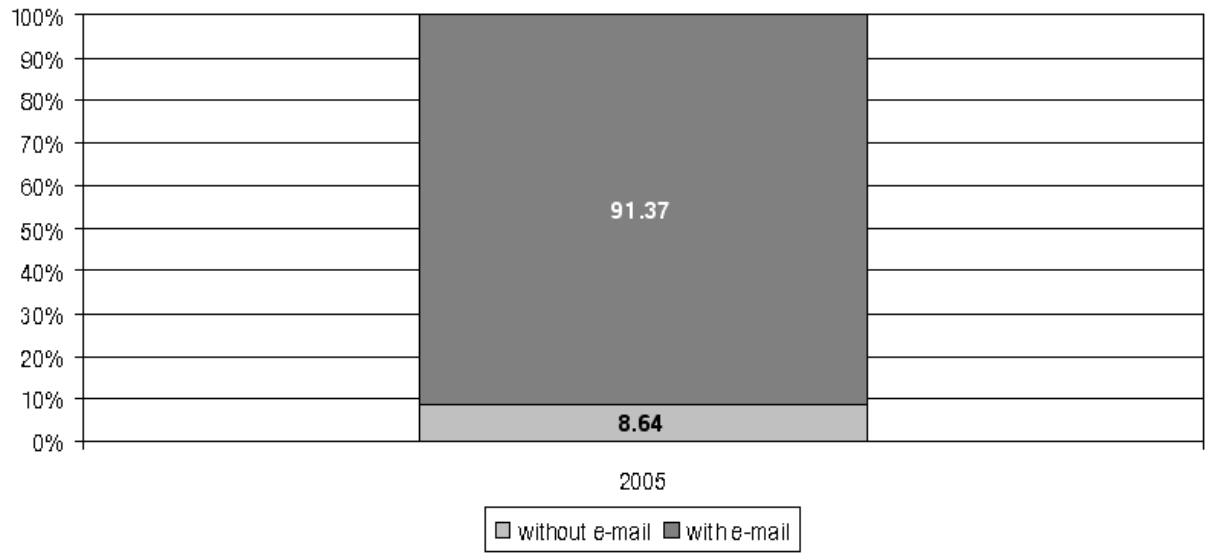
Employees must be connected into networks enabling them to exchange information and use the existing computers efficiently. According to research, 38,5% of municipalities have local computer networks. Computer networks for employees are one of the preconditions for employees to share information, and communicate efficiently so that citizens could get the needed answers promptly.

Percentage of networked computers in municipalities



One of the important steps in establishing a successful eGovernment is e-mail communication with citizens. It is interesting to note that a law was adopted in Denmark in 2004 by which citizens are entitled to refuse written mail from the municipality and request the same information to be sent to them by e-mail[20]. It is commendable that 91,3% municipalities in BiH have e-mail addresses.

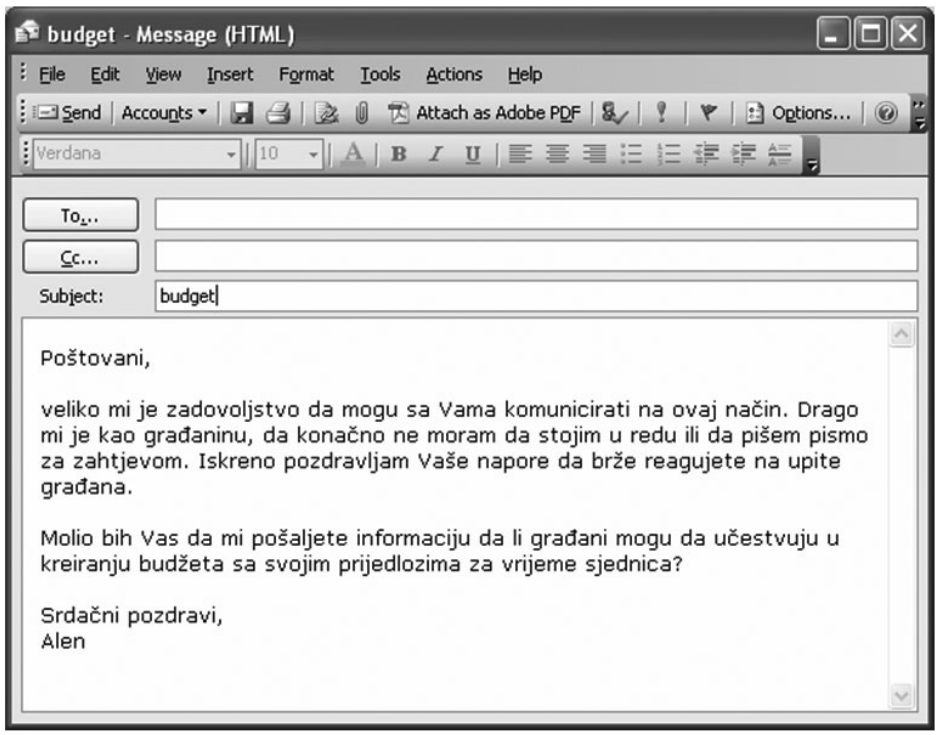
Percentage of municipalities with e-mail address



Unfortunately, as we have already mentioned, only a small number of municipalities have a properly registered e-mail address. It is often the case that private e-mail addresses are used through companies offering free sign-up (@hotmail.com or @yahoo.com).

In order to assess whether employees really use the e-mail addresses or they are registered only formally, a one-question e-mail was sent to all municipalities during research. The question was not aimed at obtaining concrete information, but test how often is the e-mail address checked and how much time is needed to get *any feedback*.

20 http://www.jm.dk/

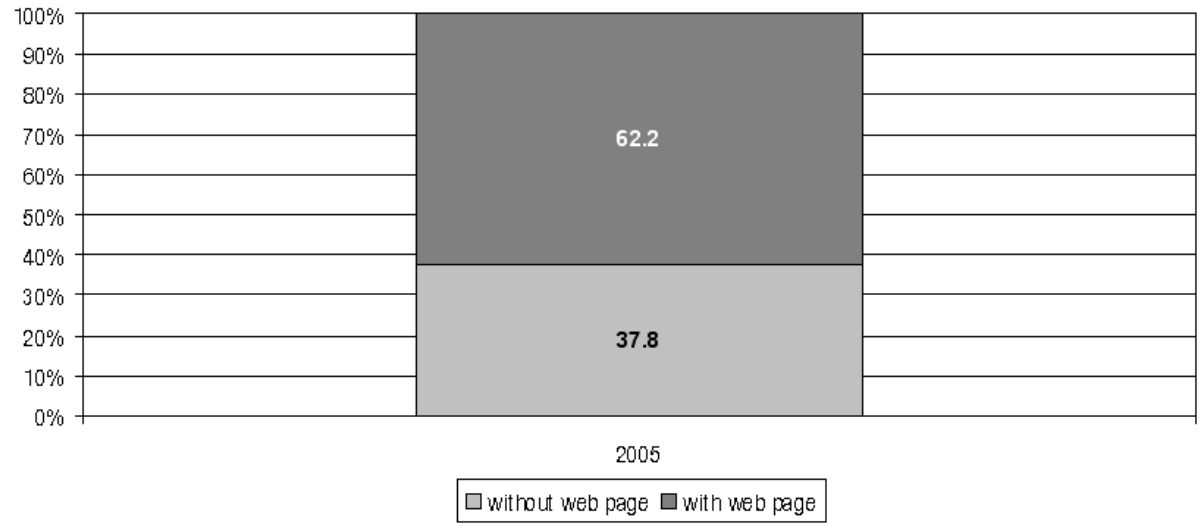


In this test, we measured the speed of answering. More specifically, we measured the time it took for a public servant to send us any reply. Naturally, the test included only those municipalities which officially published their e-mail addresses. The question was sent to a generic e-mail address.

Out of 127 municipalities, only 12 municipalities sent any kind of answer. Out of that number, seven municipalities responded the same day or one day late, while five others sent their responses in the next five to seven days. This test shows a worrying fact that only a small number of municipalities see electronic communication with citizens as relevant and official.

The research measured how many municipalities have their web page. Percentage-wise, 62,2% municipalities have a web page. The web page usually serves to publish information about the municipality, contact information, etc. A truly small number of municipalities use their web page to communicate with citizens. The table below provides percentage overview of web pages in the sample.

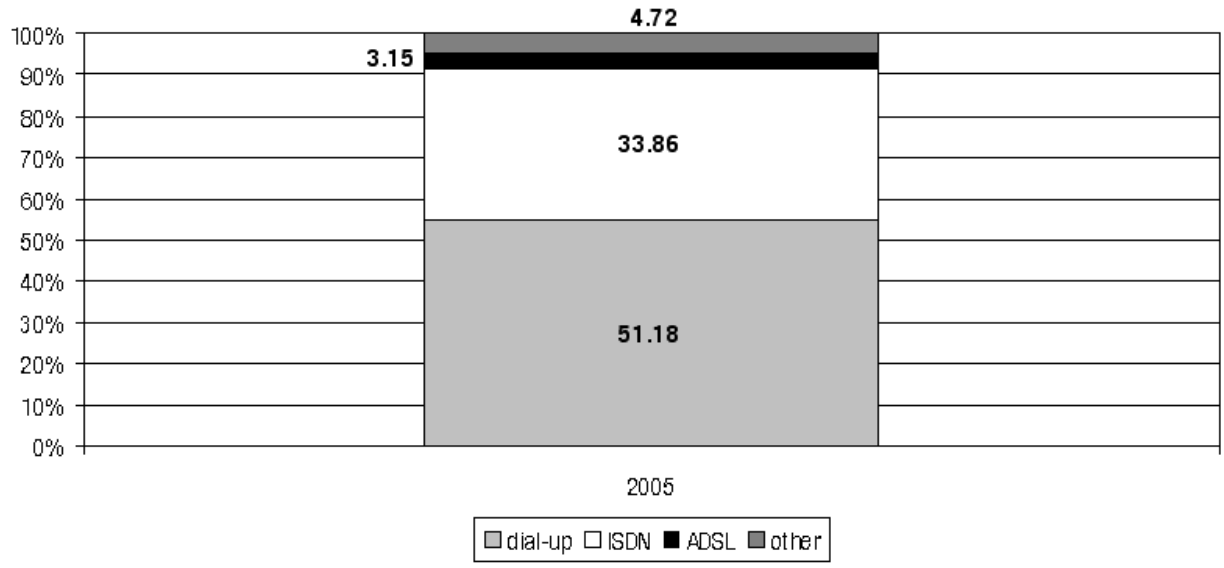
Percentage of municipalities with or without web page



Based on EU methodology[21], we analyzed the degree of web page development in municipalities, starting from phase 1 - information to phase 4 - complete electronic data processing. Simple one-way services to citizens, in the form of information, represent typical municipality web pages in almost all municipalities in BiH. We have observed rare cases when municipal web page moves to phase 2. Based on our research, we did not find any municipal or other government institution web page that is in phase 3 or 4.

In this report, we researched how municipalities access Internet. The research was done among municipalities having access to Internet. If municipalities have the objective to deliver their services partially via Internet, then it is to be expected that the employees have Internet access and that connection speed is high. Unfortunately, around 51,18% municipalities with Internet access obtain that access through dial-up connection, which is not enough to take full advantage of the eGovernment potential. The table below shows Internet access by type of connection.

Internet access in municipalities



As it can be seen from the table above, half of the municipalities use dial-up connection. It is commendable that the other half use one of the broadband technologies. However, dial-up technology is not the best one in terms of further development and efficient communication with users.

Finally, it is interesting to mention that 61 (almost 50%) out of the total number of municipalities stated that they have specialized software for: registry keeping, marriage records, citizenship records. Based on the questionnaire, 52 municipalities stated that have specialized software for cadastre records, while 28 municipalities possess the software to monitor social benefits of citizens in municipalities.

This data shows that municipalities possess the infrastructure to establish better communication with citizens. The data also shows that in most cases, municipalities possess software pertaining to eGovernment functionality. However, it is evident that this infrastructure and software are not completely functional for the citizens and business, because no one municipality provides online services (web-based services).

3.4 E-readiness in education institutions

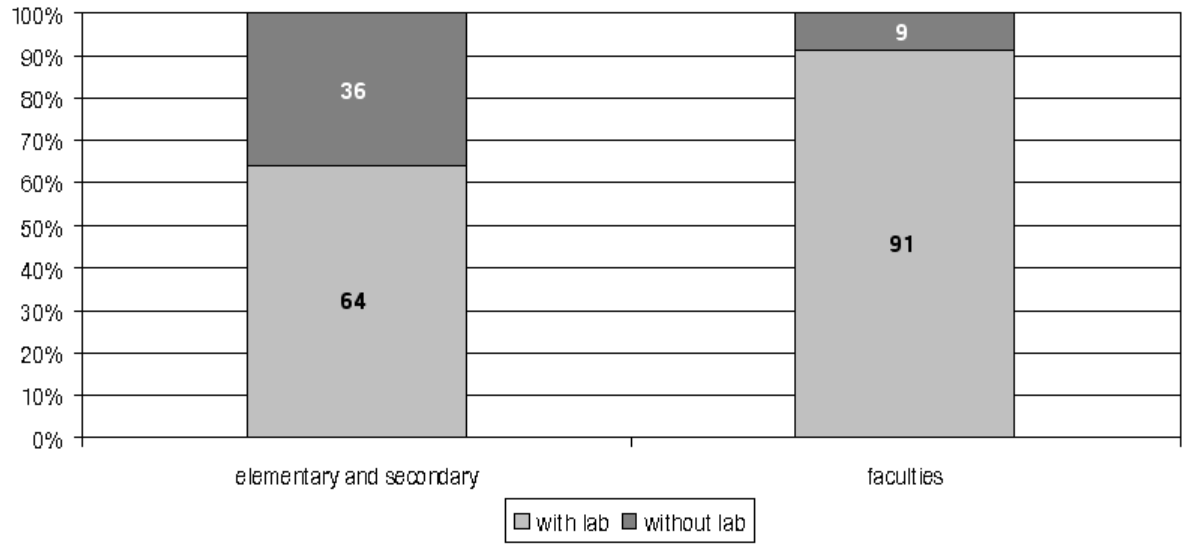
This report provides information related to education sector, in addition to analyzing the public administration. According to our research, we have around 57 students on one computer in our education institutions. With regards to

21 eEurope 2002 Final Report, Commission of the European Communities, February 2002

universities and faculties, the situation is somewhat better. Namely, there are 27 students per computer. According to Europe+ Strategy, the European standard is around 15 students per computer. Our research did not analyze the accessibility of these computers to students and pupils. The experience shows that in most cases, the computers are first allocated to professor, while computers available to students are the small number located in computer labs.

An important element of the educational system is computer skills education. The following indicator provides information about the number of schools with computer labs with ten or more computers. According to data in our research, almost 64% of primary and secondary schools have computer labs. The percentage of higher education institutions with computer labs is 91%. Presently, we cannot comment on the quality of those labs, or their availability to students. In the reports to come, we will try to analyze the availability of computer equipment to students during the entire day, without restrictions on time of use.

Percentage of schools with computer labs



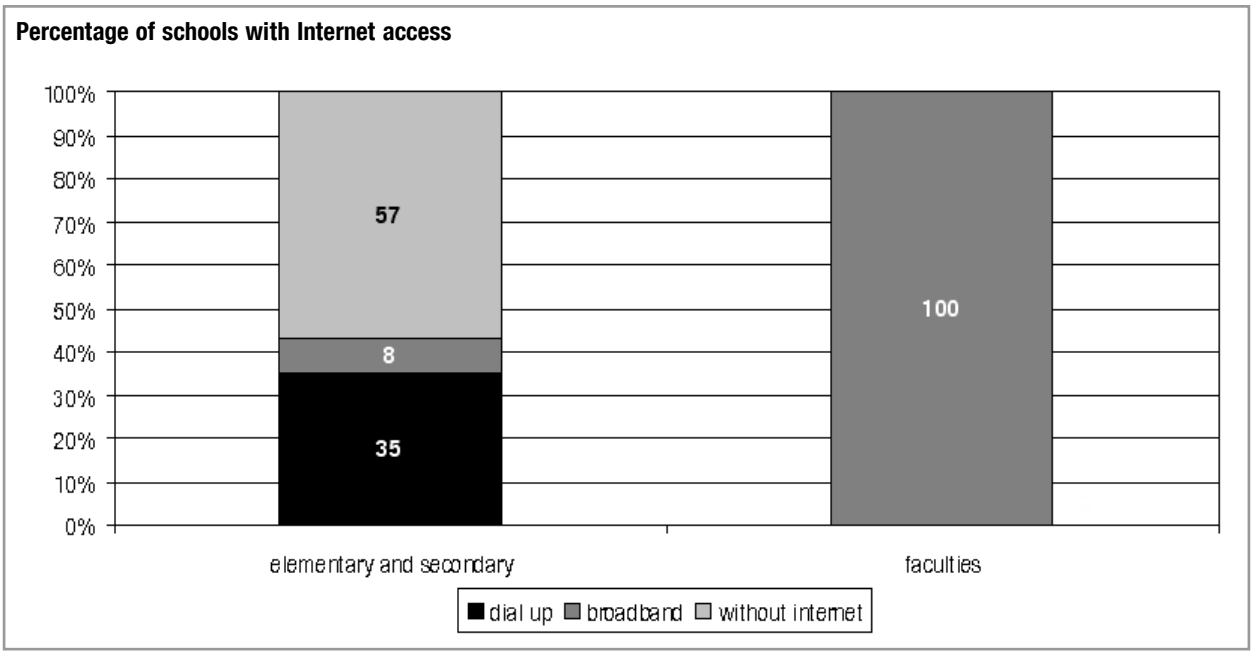
For the sake of comparison, "T-Croatia Telecom introduced ISDN connection in all Croatian schools, donated 1750 computers and provided to all schools 10 hours of free access to Internet per DAY, every day in the year. The T-Telecom also gives 100 million minutes of free Internet access out of school access to students during the entir4e school year. This is aimed at ensuring IT education of teachers and students and providing continuous and free access to information the Internet offers to all students and teachers in Croatia.[22]"

At this moment, it is questionable how much can a society do to increase penetration in households. However, availability of technologies can be indirectly increased through education institutions, reducing the digital gap[23]. In this regard, schools in BiH (especially the primary and secondary ones) must seriously and systematically access Internet and establish computer labs which will be available to students during the entire day. To date, the state-owned telecom operators and the government did not take similar measures. The next graph provides percentage overview of schools with Internet access and connection type. In primary and secondary schools, only 43% have Internet access. On the other hand, 100% of faculties have Internet access.

Based on the above graph, we can also conclude that broadband (quick Internet connection) exists in the small number of primary and secondary education institutions. It is commendable that all faculties have broadband Internet connection. It is also commendable that all universities have their web pages, as well as the fact that most professors have a personal e-mail address. It is significant to note that most universities reported that they have specialized distance learning software. It is important to note that the University of Sarajevo has the www.isss.ba the student information service which provides student registration and full Internet-based communication with Faculty.

22 http://public.mzos.hr/

23 Digital gap: term used to describe differenced in availability of technologies in a particular segment of society.



As we already mentioned, the research did not examine for what purpose and what is the quality of use of these technologies and whether they really influence the improvement of education in our schools.

It is significant to mention the funding of these projects and the development of information system in schools. Unfortunately funding data is incomplete, but based on some information, we can conclude that there are funds for these projects. Four universities in BiH, the University (Sveučiliste) in Mostar, University in Zenica, University in Tuzla and the University Džemal Bijedić - Mostar have all together allocated almost half a million KM for software in 2005. University of Sarajevo has managed to secure 350.000 KM from the World Bank for the development of parlier mentioned student information system/service. According to the report we received from the mentioned universities, altogether they allocated over KM 1,300,000 for hardware in 2005.

Progress in the education system is evident, at least according to these indicators. However, education institutions should further undertake all necessary steps to use the existing technology and systems to improve the already existing education system.

3.5 ICT companies and market in BiH

In November 2005, like in 2004, a research was conducted to obtain a clearer overview and profile of ICT companies in BiH. The Association for Information Technologies in BiH - BAIT, together with UNDP, initiated this research and analysis.

The analysis was done based on secondary and primary research where secondary research encompassed data from: INSEAD and WEF: "The Global Information Technology Report 04/05", CRA - Communication Regulatory Agency, BiH Foreign Trade Chamber, FBiH Ministry of Finance, Tax Administration, BiH Statistics Agency and the BiH Central Bank, while information about BiH ICT were collected and analyzed during primary research.

3.5.1 Secondary research

The war in BiH started while ICT expansion in the world was at its peak. The war has led to a complete halt in information society development in BiH as well as destruction of ICT infrastructure and industry.

3.5.1.1. General industry data

Consequence of this state and slow recovery is the fact that:

- The BiH society is presently at the bottom of ICT development and use,

- Out of 51 ICT indicators about society development conducted by the World Economic Forum[24] Bosnia and Herzegovina ranks above position 70 in only 14 of them.
- With regard to all other indicators, we are at the very bottom of the scale.

WEF[25] indicators cause the most concern as they show that BiH, per technological indices, takes the following positions among 104 countries:

- 104 position - index of company level technological absorption,
- 103 position - buyers' dynamism index,
- 102 position - technological sophistication index,
- 97 position - quality of scientific and research institutions index,
- 97 position - investment in research and development index,
- 95 position - investment in training index.

And in terms of value of other indices:

- 101 position - intellectual rights protection index,
- 101 position - administrative restrictions index,
- 99 position per cluster development index.

This highlights an extremely poor situation of the overall environment for industry development in BiH. Judging by the above information, we can conclude that BiH does not provide favorable grounds for the development of ICT industry. However, the following research shows quite the opposite.

This secondary research showed that there are around 2.600 companies in BiH which registered business in this industry (Table: Number of registered ICT companies in BiH for 2003 and 2005). Compared with data published in the UNDP's study "E-readiness Report for 2003", the number of registered ICT companies grew ten times. We should note that:

No.	Line of business	No. of companies	
		2002	2005
1	Production of computers and other data processing equip.- DL/30.02.00	50+	90
2	Production of wire and isolation cables- DL/31.30.00	4	8
3	Production of el. pipes and other electronic components- DL/32.10.00	6	6
4	Production of RTV emitters and devices for teleph. and telegr. - DL/32.20.00	14	18
5	Production of TV and radios and the like, and supporting equipment- DL/32.30.00	4	4
6	Production of instruments and devices for measuring and control- DL/33.20.00	-	25
7	Production of equipment for industrial process control- DL/33.30.00	5	6
8	Wholesale trade in household electronic appliances- DL/51.43.00	-	191
9	Wholesale trade in office machines and equipment- DL/51.64.00	-	161
10	Retail trade in household electronic appliances- DL/52.45.00	-	425
11	Retail trade in office machines and equipment- DL/52.48.10	-	237
12	Repair of household electronic appliances	-	484
13	Telecommunications I/64.20.00	25+	149
14	Renting office machines, equipment and computers- K/71.33.00	4	143
15	Advising on computer equipmentK/72.10.00	25+	36
16	Advising and program equipment supply- K/72.20.00	-	233
17	Data processing- K/72.30.00	20+	51
18	Designing databases- K/72.40.00	20+	52
19	Maintenance and repair of office machines and computers- K/72.50.00	-	149
20	Other related computer activities- K/72.60.00	20+	119
	TOTAL	200+	2.587

Table: Number of registered ICT companies in BiH in 2003 and 2005

24 The Global Information Technology Report, World Economic Forum, 04/05

25 The Global Information Technology Report, World Economic Forum, 04/05

- Previous analysis did not encompass some line of business codes (51.64.00 - Wholesale trade in office equipment and computers, 52.48.10 - Retail sale of office machines and computers, 72.20.00 - Consulting and program equipment supply and 72.50.00 - Maintenance and repair of office machines and computers).
- And without lines of business coded 33.20.00 (Production of instruments and devices for measuring and control), 51.43.00 (Wholesale trade in electric household appliances), 52.45.00 (Retail trade in electric household appliances) and 52.72.00 (Repair of electric household appliances) the number of registered ICT companies is 1.462.

It is important to note that unwritten practice of BiH entrepreneurs is to register business even for those fields in which they never do any business. That is why the court registry data of registered companies can only provide us with a partial image of the real situation.

Regardless, based on the aforementioned, we can conclude that BiH experienced a kind of expansion with regard to increase in the number of ICT companies.

3.5.1.2. Number of employees in the industry

The information in table below (and sources of information) show that we still do not have complete and consistent data in all state-level government institutions. This is particularly the case about the number of employees. Out of the reported 2.399 companies, 579 did not include information about the number of employees. This questions the accuracy

No.	Line of business	1	2	3	4	5	6
1	Production of computers and other data processing equip.- DL/30.02.00	50+	90	89	12	432	5.61
2	Production of wire and isolation cables- DL/31.30.00	4	8	9	3	161	26.83
3	Production of el. pipes and other electronis components- DL/32.10.00	6	6	6	6	-	-
4	Production of RTV emmitters and devices for teleph. and telegr.. - DL/32.20.00	14	18	18	5	134	10.31
5	Production of TV and radios and the like and supporting equipment- DL/32.30.00	4	4	4	0	12	3.00
6	Production of instruments and devices for measuring and control- DL/33.20.00	-	25	26	3	103	4.48
7	Production of equipment for industrial process control- DL/33.30.00	5	6	6	0	29	4.83
8	Wholesale trade in household electronic appliances- DL/51.43.00	-	191	189	37	537	3.53
9	Wholesale trade in office machines and equipment- DL/51.64.00	-	161	156	24	394	2.96
10	Retail trade in household electronic appliances- DL/52.45.00	-	425	415	44	1,094	2.95
11	Retail trade in office machines and equipment- DL/52.48.10	-	237	224	55	330	1.95
12	Repair of household electronic appliances	-	484	483	130	558	1.58
13	Telecommunications I/64.20.00	25+	149	-	-	-	-
14	Renting office machines, equipment and computers- K/71.33.00	4	143	143	64	106	1.34
15	Advising on computer equipmentK/72.10.00	25+	36	36	13	69	3.06
16	Advising and program equipment supply- K/72.20.00	-	233	229	65	502	3.06
17	Data processing- K/72.30.00	20+	51	50	17	155	4.70
18	Designing databases- K/72.40.00	20+	52	51	16	158	4.51
19	Maintenance and repair of office machines and computers- K/72.50.00	-	149	146	40	253	2.39
20	Other related computer activities- K/72.60.00	20+	119	119	45	128	1.73
	TOTAL	200+	2,587	2,399	579	5,155	2.15

Legend: (1) Number of companies[26], (2) Number of companies[27], (3) Number of companies[28], (4) Number of companies without data on the number of employees, (5) Number of employees, (6) Average number of employees.

26 BiH Information Society Business Strategy, Section: ICT Industry, from 4.3.2004.

27 FBiH Ministry of Finances - Tax Administration, from 21.10.2005

28 BiH Statistics Agency, from October 2005

of the reported data on the number of employees in this industry. However, what is certain is that the number of employees in this industry is higher than 5.000. If we add the number of employees in the telecommunications industry, then this number is significantly higher.

All of this supports the notion that this industry is experiencing undoubted growth in BiH and that it deserves much more attention than it was provided in the past, both by the government and non-governmental sector.

3.5.2 Primary research

Primary research was conducted on the basis of questionnaires sent to addresses of 300 ICT companies in BiH. In the first two weeks, 40 companies responded to questionnaires. The questionnaire was sent by e-mail to all respondents. We note that this questionnaire was not sent to all great telecom operators, which were not covered by this research.

Previously, the estimate was that there were over 300 IT companies on the BiH market, out of which 85% are local companies and 15% are mostly foreign dealerships. Similarly, the estimate was that a large number of them were small companies, out of which 36% hire five employees, while only 3% hire from 50 to 100 employees.

In comparison to the previous year, the questionnaire was simplified while the aim of the research was to obtain information about:

- Total turnover in KM in 2004,
- Basic company business,
- Client structure,
- Employee structure,
- Number of computers sold in 2004,
- Number of software products available,
- ISP - number of users,
- Satisfaction with super-provider services (ISP).

The data shows that the market is stabilizing and that big companies are taking larger piece of the cake year after year, while smaller ones are experiencing difficulties. The main reason for this is that founders and directors of these companies do not have any managerial knowledge or are not skilled enough in management. Instead of improving their managerial knowledge and skills, they continue to work relying primarily on their intuition and reflexes, blaming the environment (competition, government, etc) for their failure.

Most companies do business on the BiH market. Almost 95% of them place their services exclusively in BiH. There is even a small number of those companies which have been able to impose themselves on the entire territory of BiH. Most of them are focused on urban areas and immediate surroundings, related to the main offices of these companies. The reasons for this attitude and "isolation" of ICT companies are:

- Relying on personal connection when closing business deals,
- Inability to organize business outside the company seat,
- Incompletion of one's own products which can be quickly implemented.

Both this survey and the aforementioned survey conducted by SEED, showed a great degree of unpreparedness of ICT top managers in responding to this project. BiH business people unwillingly report in the public how their company is doing (transactions and profit) and the number of employees. Most ICT top managers are thinking in the same way and not respond to similar questions, which greatly hinders the development of a more complete and clearer picture of the ICT industry in BiH.

Regardless of this research conducted among private companies doing business in Bosnia and Herzegovina, we can conclude that there are companies in BiH which can offer almost all services needed for the development of BiH information

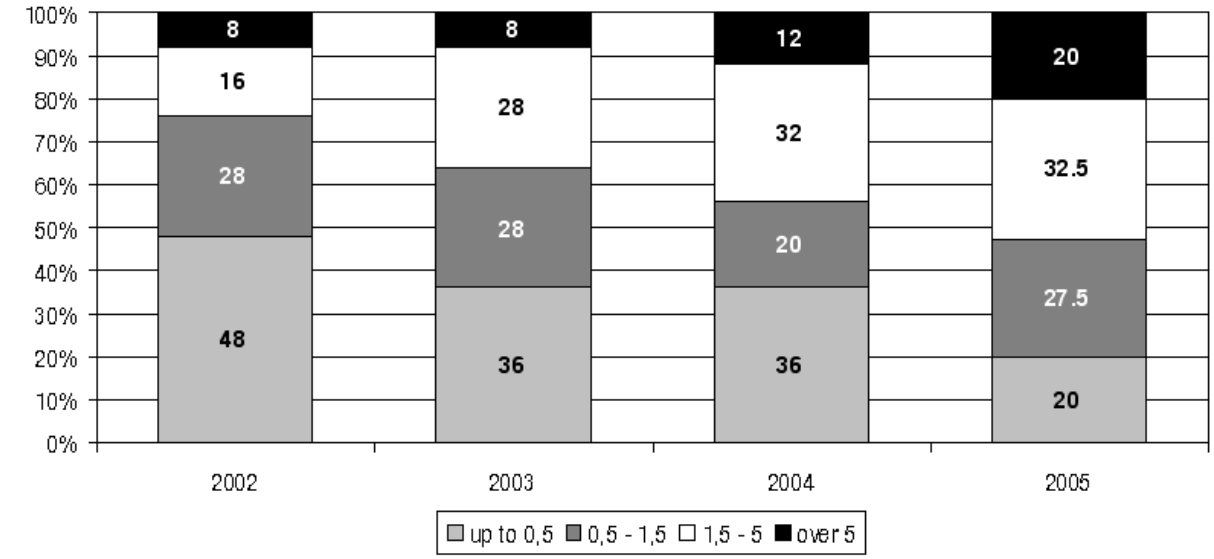
society. What is particularly encouraging is that the analysis unequivocally showed that software sale and ICT services delivery has been increasing year after year in researched companies.

Somewhat discouraging are the data about the number of imported products, showing a great imbalance between imports and exports. This is likely to continue in the time to come.

3.5.2.1 Turnover and profit of ict companies

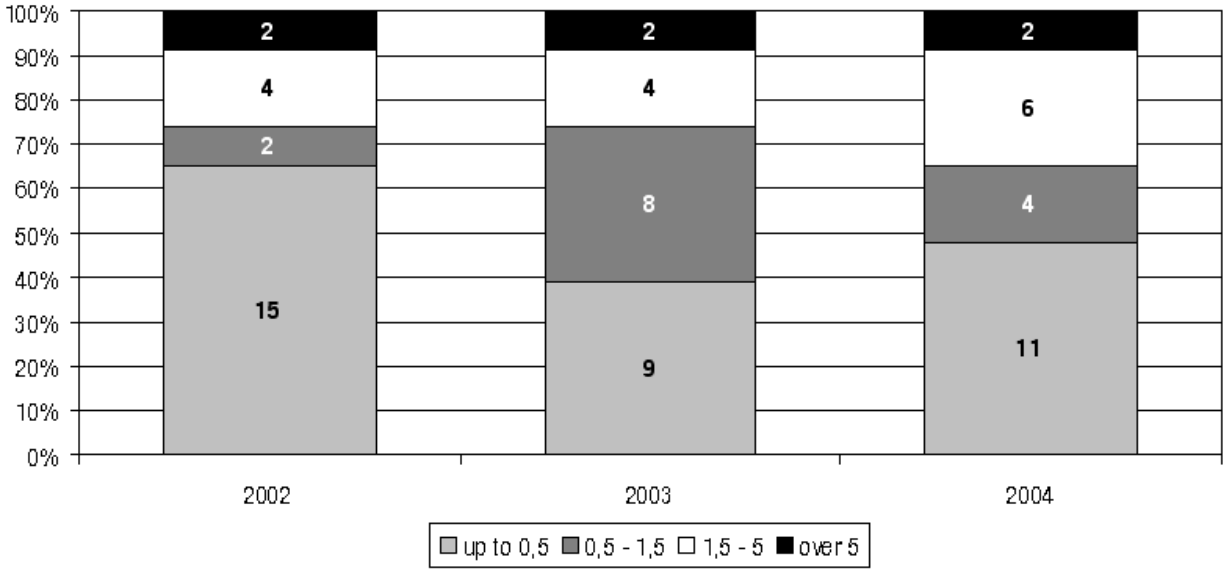
Turnover and profit gained by ICT companies are growing in BiH. The table below shows the percentage of ICT companies which participated in the research from 2002 to 2005 and their total turnover grouped into four groups. It is evident that 20% of researched ICT companies in BiH achieved more than five million KM in turnover.

Turnover of ICT companies in millions of KM



Similarly to this indicator, there has been an increase in profit gain by ICT companies in BiH. The graph below shows trends in profit gained by ICT companied. This is almost proportional to the transactions made. Given that some top managers believe that the question about the profit touches upon the business secret subject, this year's survey did not include this question, and that reduces somewhat the ability to monitor the growth in profitability trend of this industry.

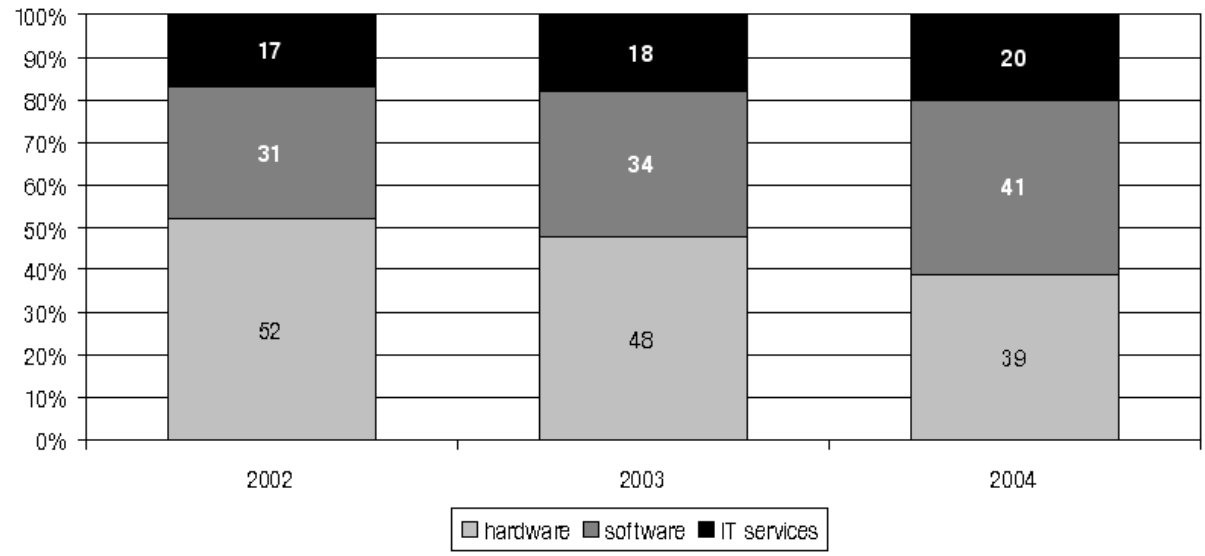
Profit of IT companies



If we consider the practice of business adjustment to reduce profit tax, then the image of realistic profitability becomes even more unclear.

The following graph provides a percentage overview in terms of hardware, software and the share of IT services between 2002 and 2004. The analysis undoubtedly gives information that there has been a slight increase, year after year, in the sale of software and IT services.

Share in profit of IT companies

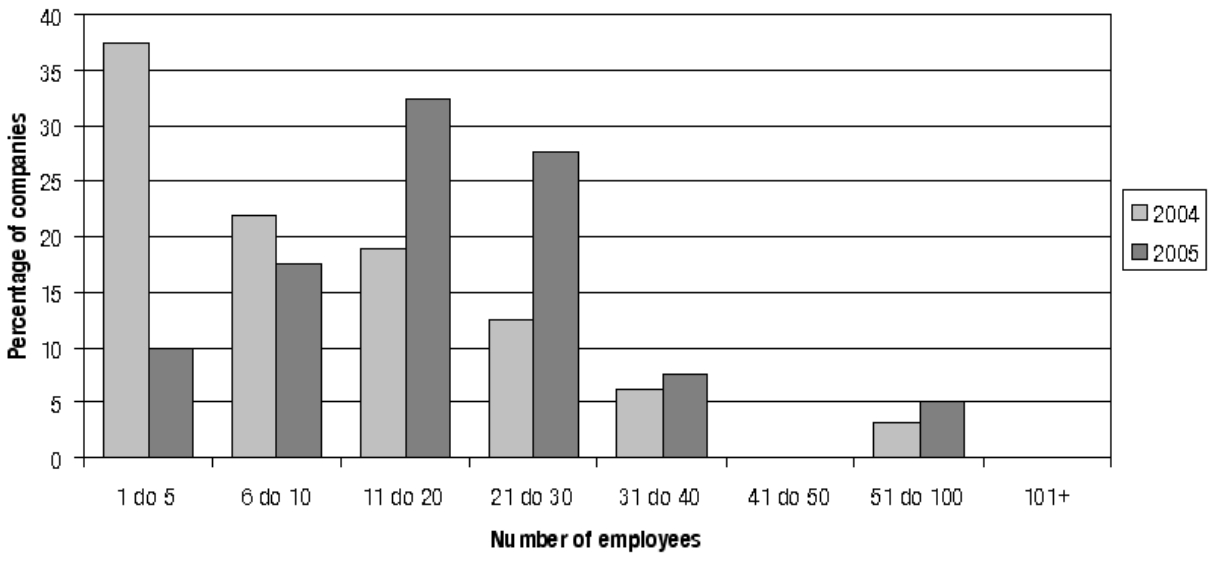


3.5.2.2 Primary line of business

When asked about the basic line of business of the ICT company, 55,00% responded they sell hardware, 67,50% produce and distribute software. Only 10% provide ISP services.

This information confirms the stated conclusion that production and distribution of software is on the increase with ICT companies in BiH. Increased awareness about the fact that ICT solutions do not consist of hardware, operational system and word processing program only, shows that buyers have begun recognizing the true values of ICT. This fact contains reasons why the already established but also the other ICT companies have started to focus on their own development of software solutions.

Percentage of IT companies per groups of employees



3.5.2.3 Employee structure

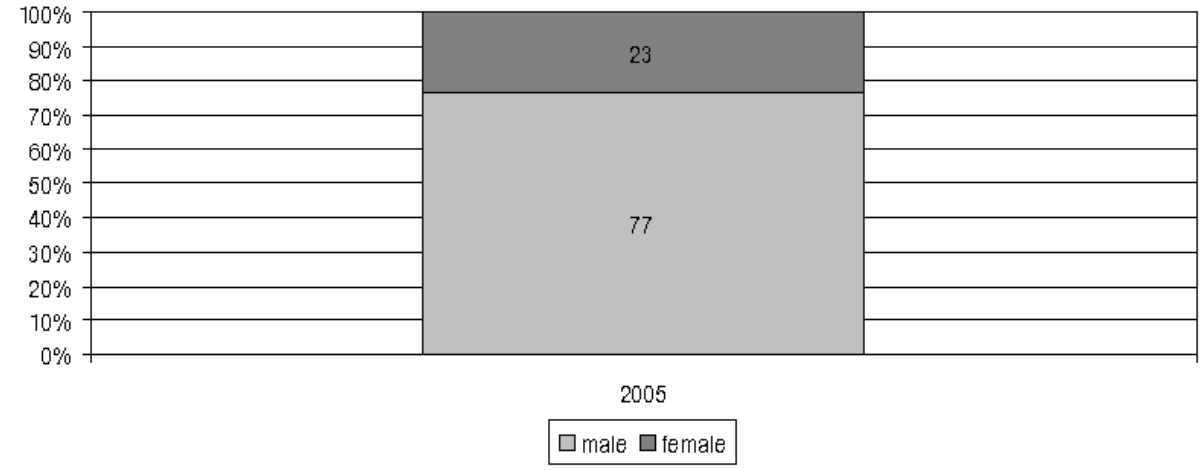
This research showed that the number of employees in ICT industry has grown. More importantly, the size of ICT companies per number of employees has increased as well. The table above shows that the number of companies with 10-30 employees has increased dramatically. On the other hand, the number of companies with 1-10 employees has reduced significantly.

On average, an ICT company in BiH has 19 employees, which is 50% more than last year's average of 12 employees. Out of all ICT companies which participated in the research, the company with the largest number had 82 permanently employed staff.

Out of the total number of employees, 28% of them work on software development, while 33% work on hardware maintenance. This indicator shows that the focus of ICT companies in BiH has changed to software development. The remaining 40% of staff work on other tasks in the company.

Gender structure of employees in BiH ICT companies probably shows a trend similar to most other industries. According to the research conducted in 2005, only 23% of employees are women.

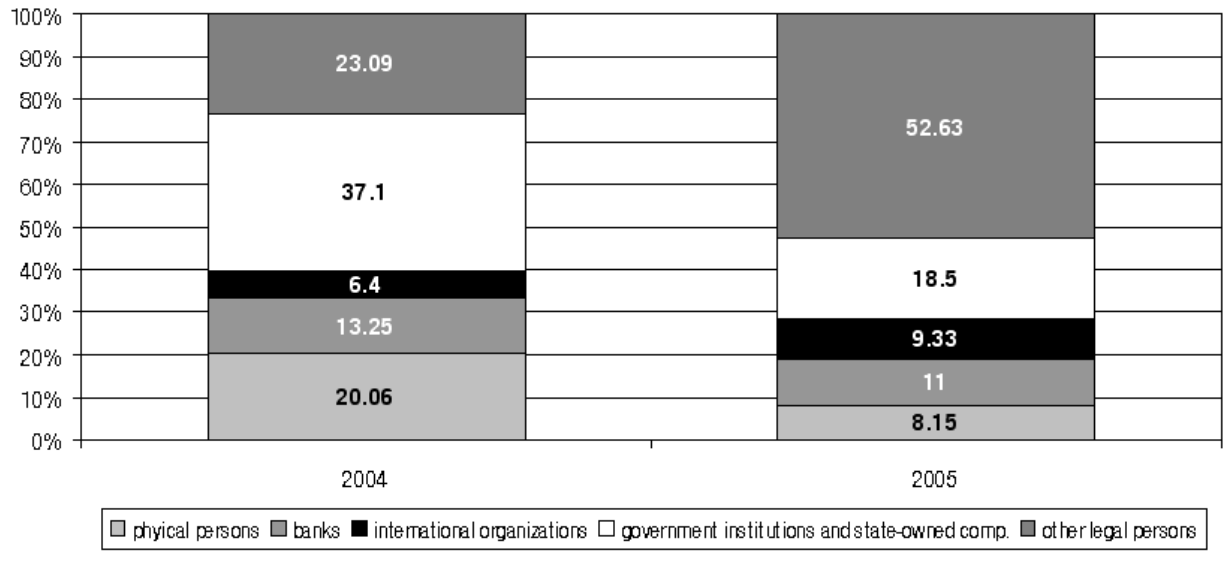
Gender structure of employees in IT companies



3.5.2.4 Client structure

Structure of clients of ICT companies wishes to analyze and clarify who are the buyers of ICT services in BiH. The table below shows the client structure in comparison to overall company profit.

IT company client structure



As we can see from the table above, the legal persons and the international organizations increased the share in client structure of ICT services and products. On the other hand, it is clear that the state, through different government bodies and public enterprises is not the main user of ICT services and products, as was the case in the previous few years.

We can see from this analysis that there is a banking sector's saturation. This sector is particularly interesting and indicative because good longstanding relations with local ICT companies ended with the change in ownership of banks. Focus shifted on ICT companies in those countries from where the owners' capital originates.

3.5.2.5 ICT company offer

The offer provided by local IT companies can be assessed as satisfactory. Namely, out of all the researched companies, 62% of them have domestically produced software in their offer. According to the research, companies which provide their own applicative solutions have approximately 5 different software products. Depending on the software type, ICT companies reported that they have from 5 to over 300 clients of applicative software in BiH.

The conference organized by UNDP from 21-22 February 2005 in Sarajevo, titled Conference on Information Society Development, gathered 400 participants which showed that there exists local company knowledge for the implementation for the Information Society Development Strategy[29]. Similarly to this conference, a conference organized by the Civil Service Agency (www.ads.gov.ba) in cooperation with UNDP, showed the readiness of private sector to support the information society development[30]. Namely, the conference gathered around 520 participants, and about 30 local companies presented software solutions already implemented in government institutions.

Another present trend is adding a local mark to globally known software brands (Microsoft, Oracle, SAP etc.). In partnership, local ICT companies recognized an opportunity here and started working on implementation and adaptation of these products to the needs of local buyers.

3.5.2.6 Import and export ratio

The analysis shows that the difference in import vs. export coverage is significant. Even next to the success achieved by some BiH companies in placing their primarily software solutions abroad, this significant difference will remain for many years to come.

Information on import and export in the last three years[31] shows large deficit of export with regard to import. Most imported products bear the tariff mark 8471 (Machines and units for automatic data processing; magnetic or optical readers, machines for coded registration of data on - data carriers and information for processing of such data not mentioned or included in another place), 8544 (isolated wire (including lacquered wire and anodized wire), cables (including coaxial cables) and other isolated conductors, with connecting devices or without them; optical or individually plasticized fiber cables (light conductors), even when they contain electrical conductors or are equipped with connecting devices) and with the tariff mark 8473 (Parts and tools (apart from covers, machine cases and the like) appropriate for use exclusively or mostly with machines bearing tariff numbers from 8469 to 8472). It is evident that most imports are of computer equipment, computers more precisely and that other supporting equipments is imported in almost the same numbers.

Export does not come close to covering imports. Only with some products, like the ones with tariff marks 8544, 7326900000 and 3926900090, recorded is export worth mentioning.

All of this points at the low level of technological development and the absence of appropriate production capacities in the ICT industry.

29 http://is.gov.ba/2IS

30 http://egov.ads.gov.ba

31 Data covers the first nine months of 2005.

Tariff number	Description	Export			Import		
SECTION VII - CHAPTER 39		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
3,921,900,000	... Mouse pads delivered separately...	78,455.66	1,274,869.90	741,790.97	7,832,520.58	9,183,096.17	6,825,386.63
3,926,900,090	... Plastic covers for computer equipment...	3,223,853.82	3,107,368.91	2,472,295.27	15,525,904.36	20,215,504.32	15,392,797.66
SECTION VIII - CHAPTER 42		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
4,202,210,000	... Laptop and notebook bags...	277,942.80	215,838.15	142,365.80	1,328,287.50	1,250,691.23	1,020,065.76
4202.22	... with external surface made of plastic or textile.	13,154.68	25,610.01	55,180.09	1,152,511.06	1,638,224.12	2,086,854.46
4202.221000	... made of plastic...	483.59	18,480.47	40,779.02	505,430.56	686,626.81	603,145.95
4202.229000	...made of textile...	12,671.09	10,169.02	14,401.07	647,080.50	948,557.83	1,483,708.51
SECTION XIV - CHAPTER 70		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
7020.000000	Glass protective filters are optically processed glass filters used to reduce reflection and other problems related to the use of computer terminal, monitors and others.	12,875.38	4,309.01	7,415.62	553,148.60	334,769.15	318,195.82
SECTION XV - CHAPTER 73		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
7326.900000	RACK cases and supporting elements	4,729,195.01	14,020,198.31	14,660,192.03	11,145,809.37	13,541,521.51	13,346,387.91
SECTION XVI - CHAPTER 84		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
8414 59 90	- - - - others	70,576.57	64,016.76	26,788.62	2,081,925.83	1,738,154.72	1,012,033.50
8443 51 00	- - Ink-jet printers	21,734.98	108,548.56	39,390.40	966,566.56	985,973.34	1,230,942.45
8443 59 40	- - - - for use in production of semiconductors	141,797.67			2,763.37		
8443 90 05	- - for use in production of semiconductors						
8469	Automatic writing and word processing machines	6,617.72	42,882.67	3,911.66	89,473.04	94,214.36	43,061.83
8469 11			4,889.57		738.73	4,080.05	163.67
8470	Computing machines and pocket machines with recording, computing, reproduction and display functions; book-keeping devices, postal stamps machines, ticket issuing devices and similar devices with in-built apparatus...	22,484.44	202,362.13	67,835.94	3,862,673.10	1,645,629.69	971,783.48
8471	Machines and units for automatic data processing; magnetic or optical readers, machines for coded registration of data on - data carriers and information for processing of such data not mentioned or included in another place	1,346,557.44	1,542,471.87	1,100,863.09	90,330,728.90	95,580,663.03	96,015,085.65
8473	Parts and tools (apart from covers, machine cases and the like) appropriate for use exclusively or mostly with machines bearing tariff numbers from 8469 to 8472	881,131.41	1,333,368.34	1,089,088.85	32,448,832.05	34,116,885.68	25,116,090.14
SECTION XVI - CHAPTER 85		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
8542	Electronic integrated circuits and microsets:	182,869.59	213,681.12	274,717.16	19,263,668.18	21,673,572.50	14,328,433.15
8544	Isolated wire (including lacquered wire and anodized wire), cables (including coaxial cables) and other isolated conductors, with connecting devices or without them; optical or individually plasticized fiber cables (light conductors)...	14,997,644.34	15,865,849.43	20,699,500.01	47,272,200.57	58,750,961.97	46,604,214.87
SECTION XX - CHAPTER 96		**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
9612.102000	From artificial fibers, not more than 30mm in width, permanently built in plastic or metal cartridges, the kind used in automatic type writers, machines for automatic data processing and other machines...	1,876.65	58.67	479.51	407,947.28	395,540.87	222,447.77

Tariff number	Export			Import		
SECTION VII - CHAPTER 39	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
3,921,900,000	78,455.66	1,274,869.90	741,790.97	7,832,520.58	9,183,096.17	6,825,386.63
3,926,900,090	3,223,853.82	3,107,368.91	2,472,295.27	15,525,904.36	20,215,504.32	15,392,797.66
SECTION VIII - CHAPTER 42	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
4,202,210,000	277,942.80	215,838.15	142,365.80	1,328,287.50	1,250,691.23	1,020,065.76
4202.22	13,154.68	25,610.01	55,180.09	1,152,511.06	1,638,224.12	2,086,854.46
4202.221000	483.59	18,480.47	40,779.02	505,430.56	686,626.81	603,145.95
4202.229000	12,671.09	10,169.02	14,401.07	647,080.50	948,557.83	1,483,708.51
SECTION XIV - CHAPTER 70	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
7020.000000	12,875.38	4,309.01	7,415.62	553,148.60	334,769.15	318,195.82
SECTION XV - CHAPTER 73	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
7326.900000	4,729,195.01	14,020,198.31	14,660,192.03	11,145,809.37	13,541,521.51	13,346,387.91
SECTION XVI - CHAPTER 84	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
8414 59 90	70,576.57	64,016.76	26,788.62	2,081,925.83	1,738,154.72	1,012,033.50
8443 51 00	21,734.98	108,548.56	39,390.40	966,566.56	985,973.34	1,230,942.45
8443 59 40	141,797.67			2,763.37		
8443 90 05						
8469	6,617.72	42,882.67	3,911.66	89,473.04	94,214.36	43,061.83
8469 11		4,889.57		738.73	4,080.05	163.67
8470	22,484.44	202,362.13	67,835.94	3,862,673.10	1,645,629.69	971,783.48
8471	1,346,557.44	1,542,471.87	1,100,863.09	90,330,728.90	95,580,663.03	96,015,085.65
8473	881,131.41	1,333,368.34	1,089,088.85	32,448,832.05	34,116,885.68	25,116,090.14
SECTION XVI - CHAPTER 85	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
8542	182,869.59	213,681.12	274,717.16	19,263,668.18	21,673,572.50	14,328,433.15
8544	14,997,644.34	15,865,849.43	20,699,500.01	47,272,200.57	58,750,961.97	46,604,214.87
SECTION XX - CHAPTER 96	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
9612.102000	1,876.65	58.67	479.51	407,947.28	395,540.87	222,447.77

3.6 Examining household e-readiness in BiH

In cooperation with PRISM Research, the UNDP conducted a survey on the sample of 1500 households for the purpose of E-readiness report for 2005. The survey should have provided answers about the degree of usage of phones, mobile phones, computers and Internet. In addition, the research provided an answer about the Internet connection type, in case the household had Internet access.

Although proposed methodologies envisage testing of availability of electrical power, radio and TV in a household, we removed those questions because we believe that the penetration rate of these technologies in BiH is fairly high and should not be part of this research.

In addition, with the help of Yellow Pages, we obtained, for the first time, an indicative analysis of Internet penetration in businesses.

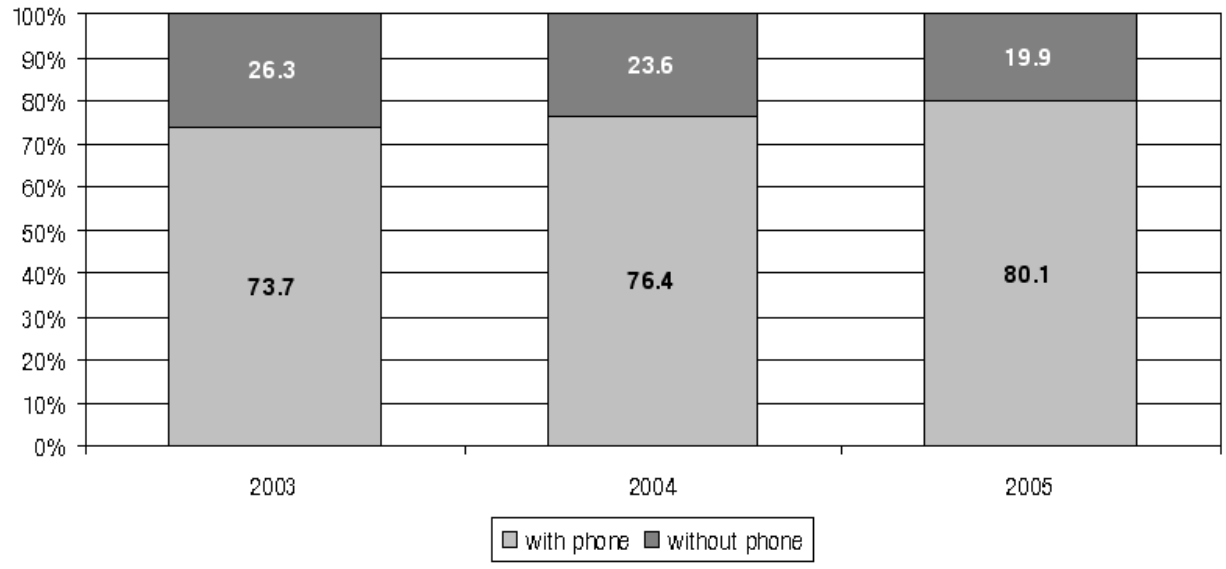
According to the indicators recommending the previously mentioned methodologies, the penetration is measured per 1000 inhabitants and not per households. However, as the BiH statistics are not reliable, we cannot obtain a precise information on the number of inhabitants and hence, about the penetration itself.

3.6.1 Availability of landline telephones

According to research, 80,1% of households in BiH have landline telephone connection. The research does not show great deviation of certain regions with regard to landline telephony. On the other hand, the research clearly highlight that telephone availability is higher in urban than in rural areas. This is confirmed by the research of the living standard of the BiH citizens, conducted in 2002 and showing that 85% of BiH households in urban areas and 60% in semi-urban and rural areas have a phone.

Data for previous years are obtained from UNDP Early Warning System publication for first quarter of 2004 and first quarter of 2005.

Penetration of landline telephone connection in BiH

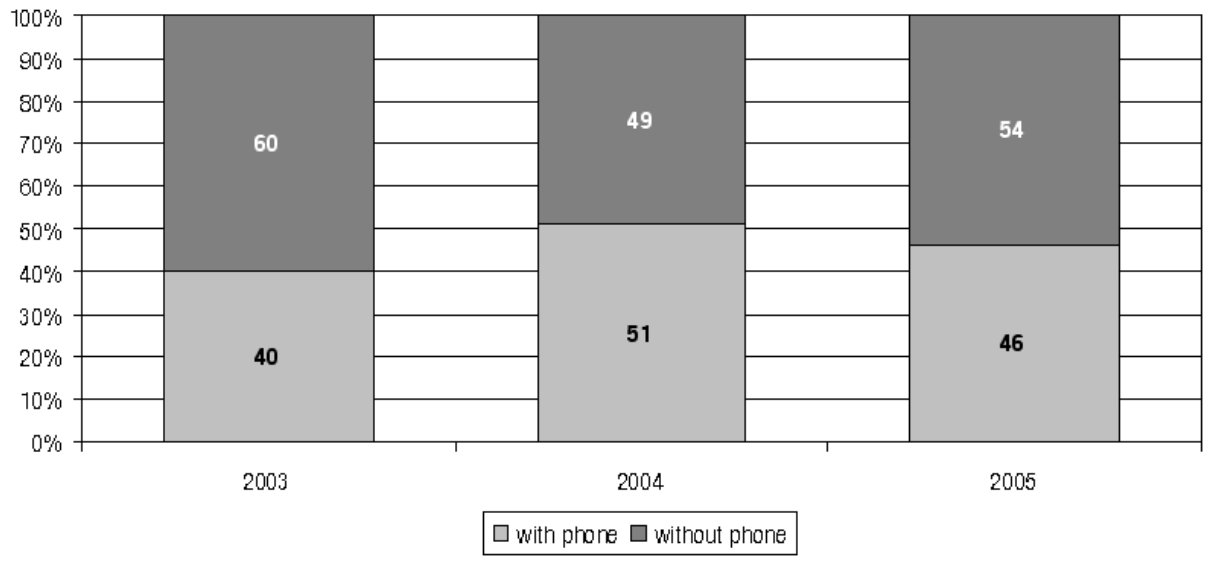


This greatly coincides with primary research shown earlier in the text. Based on information received from dominant telecom operators, the research shows landline telephone lines penetration of 75% for BiH households.

3.6.2 Availability of mobile telephones

UNDP organized primary research in this segment. According to research, only 46,2% of households have a mobile phone. Other research shows the following results. According to other UNDP research (Early Warning System for 2004 and 2005), the mobile phone penetration in households was 39,2% in January 2004 while it was 51,4% in January 2005. The table below provides percentage overview of mobile phone penetration in the households, according to primary research.

Mobile phone penetration in BiH



Depending on the sample size probably, the results have certain deviations. We can obtain a slightly better picture when we compare this data with the ones from previous chapter (telecom operators), showing that mobile phone penetration at individual level amounts to 39%.

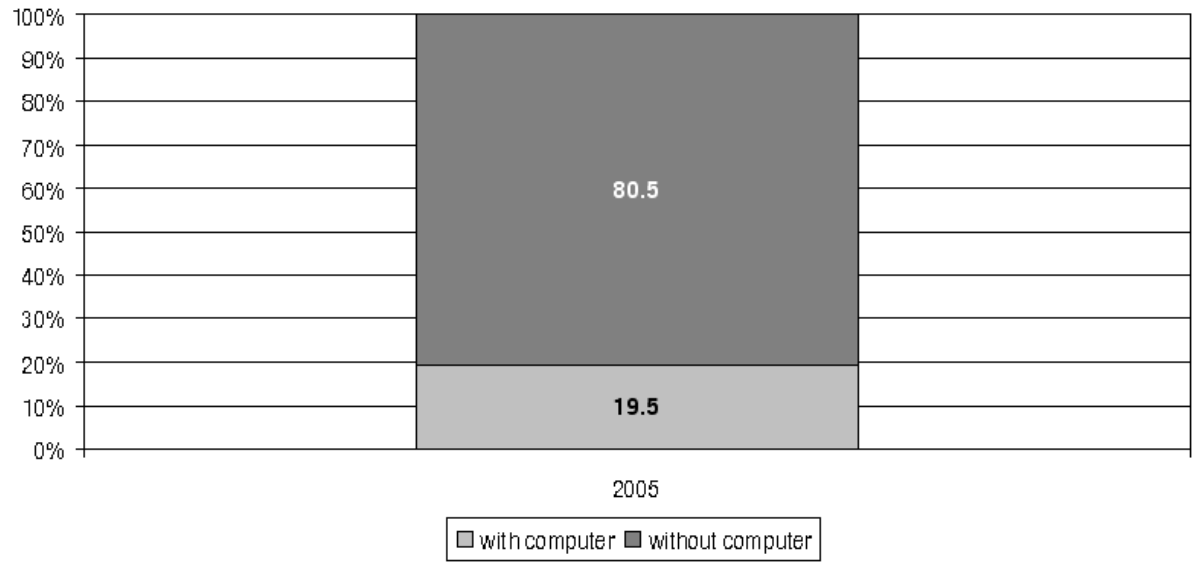
In this segment, it is important to distinguish primary from secondary research in order to obtain a clearer picture. Primary research shows that around 45% of households have a mobile phone. On the basis of secondary research, that is

based on the number of mobile phone users and the estimate of the number of inhabitants in BiH, we can conclude that individual mobile phone penetration is 40% in BiH. Certain deviations probably appear with the number of mobile phone users registered as legal persons and the fact that citizents under 16 are not eliminated from the research sample.

3.6.3 Availability of computers

The availability of personal computer in households is an important indicator of one's society development. According to research, only 19,5% of household possess a computer.

Percentage of households in BiH with computer



To date, no research was conducted on this subject. Therefore, we do not have relevant data with which we can compare this indicator.

3.6.4 Internet access

In addition to primary research conducted for the purpose of this report, it is important to mention here the other research conducted on the topic of individual e-readiness.

With the assistance of *PULS*[32] agency, Httpool conducted an independent research on a sample of 1000 respondents. In response to the question about availability of an Internet connection in the household, the penetration in FBiH is 16% while it is 9% in the RS. According to research published on the Httpool[33] portal on 13 October 2005, Internet penetration in households is 14% in the entire BiH.

Data available in the Early Warning System for 2004 and 2005 show results at household level. According to data from first quarter in 2004, only 9,1% of households had Internet access while 4,7% had access via dial-up connection. Furthermore, according to the report of first quarter of 2005, 14,8% of households have Internet out of which 8,9% have Internet access via dial-up connection.

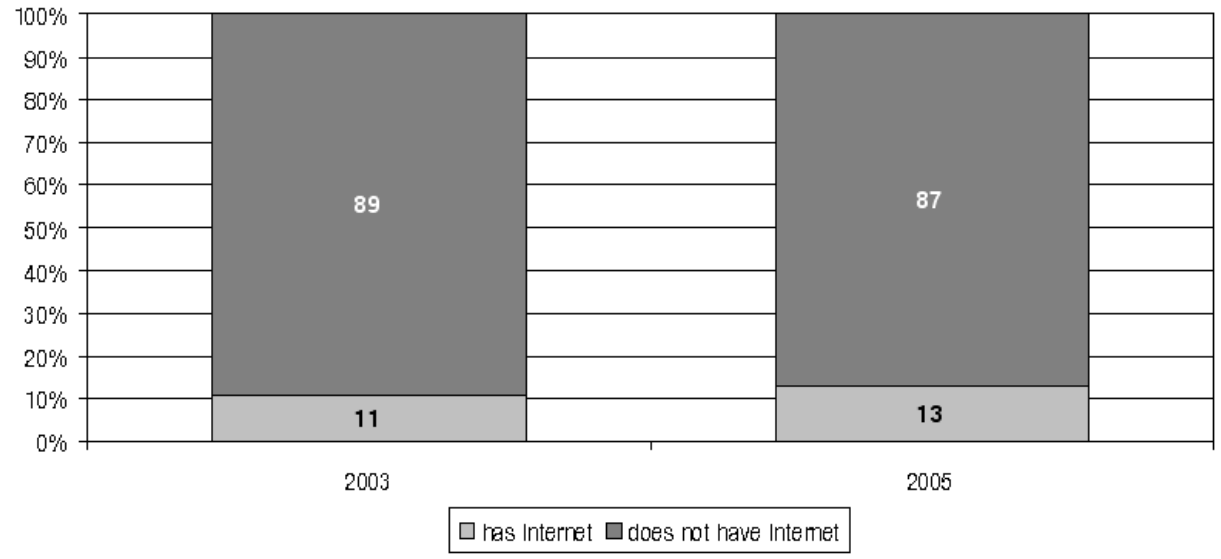
The research we conducted in September 2005 for the purpose of this report on the sample of 1500 households in the entire BiH, showed that 12,7% of households have Internet access.

According to primary research data, from all households who have an Internet connection, 48,7% of respondents access Internet via dial-up connection. That means that dial-up continues to be the most popular methods of access to Internet. However, an extremely high rate of cable penetration (26%) shows that broadband technologies are becoming

32 INFO magazine no. 94, p. 22, Httpool: Independent research of BiH internet market.

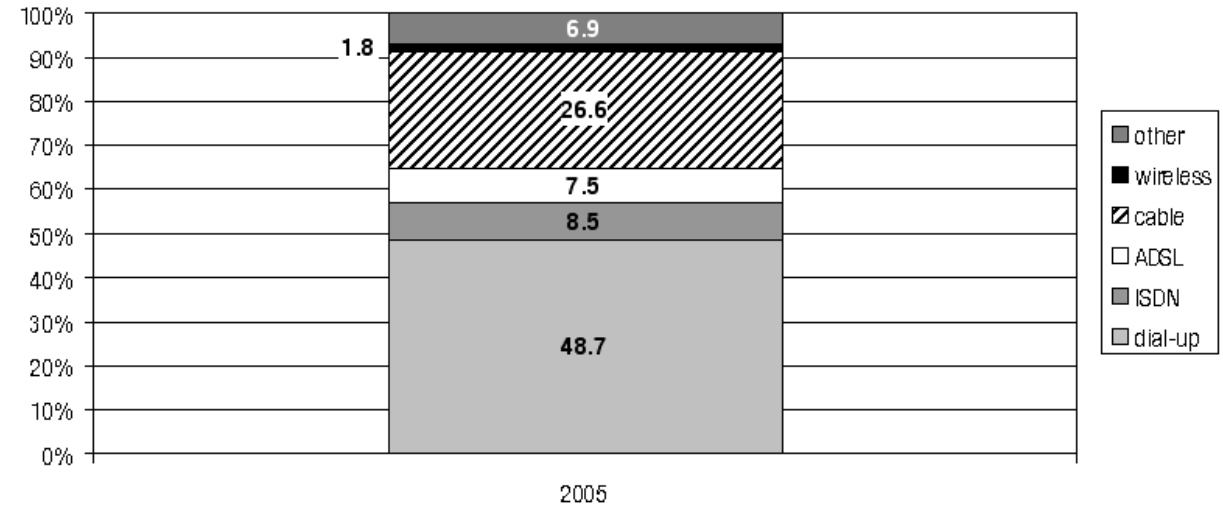
33 http://www.httpool.ba/index.asp?novica=219

Internet penetration in households



more present, thanks to the private sector primarily. On the other hand, other broadband technologies, such as ADSL and DSL are still underdeveloped. The table below provides an overview of the type of connection to Internet.

Connection to Internet



According to research conducted by Prism Research, especially for this report, only 12% of households have a personal e-mail address.

It is interesting to mention the research conducted by CRA[34]. According to their analysis from December 2005, individual Internet penetration in BiH is 20,8%. According to this research, total number of subscribers with Internet access was 176491 in December 2005. Out of that number, 151959 were physical persons and 24532 were legal persons.

In this segment, it is important to emphasize that some Internet users, such as large service companies with thousands of employees, were considered as one connection in the sense of the figures, although in reality they can have hundreds of Internet users. A good example of this is the Faculty of Economics of the University of Sarajevo, which is

34 Communication Regulatory Agency in its report: Annual survey of users with CRA license for ISP service delivery in BiH in 2005.

registered as one of the UTIC users while, essentially, all 200 employees of the Faculty use Internet daily in their work. In addition, hundreds of students of this faculty have unlimited Internet access in four separate computer labs.

3.6.5 Assessment of Internet penetration in BiH

Exactly because of the dilemmas presented in the previous section, we need to differentiate two terms:

- Internet penetration in households and
- Access to technology.

Internet penetration in households understands having at least one computer with Internet access in a household. Access to technology understands that a person has access to technology in the household, at work place, in an education institution or by means of another alternative.

According to CRA data, there are 151959 Internet users in BiH, registered as physical persons. If we take into account that an average BiH family counts 3,2 members, then we obtain the result that household penetration is around 12,63%[35]. That means that 12,63% of households or almost half a million citizens have access to Internet technology in their households. This indicator coincides with most primary research and as such, can be considered reliable.

On the other hand, the calculation of total availability of technology (popularly called individual Internet penetration) is much more complex. The problem is that certain citizens have access to this technology at work, but not from home. Furthermore, certain business people use Internet account registered on a physical person at work as well. As mentioned above, there are often hundreds of employees with indirect access to Internet technology[36]. In addition, not all employees use Internet in a company with Internet access.

All of this makes the calculation significantly more complex, which would show the realistic individual Internet penetration in BiH. In absence of specific indicators on Internet availability at the work place, it is only possible to use estimates.

If we consider CRA data that there are 24532 Internet connections in BiH, registered on physical persons, and that an average BiH company counts 13 employees[37], the individual Internet penetration is 24532 x 13 = 318916 citizens with access to technology at their work place, which is around 8,3% of citizens.

When this number is added to 12,63% of household penetration, we obtain the indicator of 21% of total individual Internet penetration in the BiH society. In this segment, it is important to note that there is certainly some overlap, citizens who have Internet at home and at work but it is impossible to establish the percentage of overlap with reliability.

Finally, it is interesting to note that the Internet penetration was around 86% in December 2003 in EU15, while the average for Central and Eastern Europe (CEE10) was 74%. For example, neighboring Bulgaria has the rate of 47%, Romania 41% and Slovenia incredible 94%[38]. This alone says that the BiH society is far behind the neighboring countries.

3.7 Business e-readiness

According to information received from Yellow Pages, in December 2005 there were around 40000 registered users in the group of private companies. Out of that number, 14175 have a registered e-mail address, 5798 have a registered web address in the Yellow Pages address book.

According to these indicators, the Internet penetration in BiH business sector is 35%. Web page penetration in the business sector is 14,5%.

35 151959 x 3,2 = 486269 citizens have access to Internet technology in their households. (486269 ÷ 3850000) * 100% = 12,63%.

36 We should not mention big BiH companies like telecom operators, posts, power supply companies, banking sector, then universities and faculties, as well as some bodies of the administration where most employees have access and use Internet daily in their work.

37 BiH Statistics Agency

38 eEurope+ benchmarking report: Objective 3, Stimulate Use of Internet, September 2004.

When we talk of Internet penetration in the business field, it is commendable that some local businesses offer on-line services as well. This link was not proven, but it is quite certain that there is a connection between the number of services provided on the Internet and the degree of penetration.

VF Komerc (www.vfkomerc.ba) provides online services for ordering food items, delivered to home address 60 minutes after the order. Furthermore, Interliber (www.interliber.ba) is probably the first online bookstore in BiH, providing you with selection and purchase of titles published in the world. It is interesting to note that www.cvjecara.com.ba from Bijeljina provides you with the opportunity of ordering and sending flowers anywhere in BiH. Similarly, www.posao.ba has been available for a few years now, a web portal worth mentioning and it is the very destination of all persons seeking employment in BiH. This is almost a philanthropic gesture by the Development Studio company, offering all services for free. Finally, we should mention online newspapers, reading service provided by Internet and offered by Avaz, Nezavisne Novine and Oslobođenje, as well as some weeklies.

According to unofficial information of the Bankers' Association, e-banking is presently possible in all banks in BiH. According to unofficial estimates of the bank clerks, around 2% of clients of BiH banks use e-banking services. The aforementioned report eEurope+, published in December 2003, states that around 65% of business in EU15 use e-banking services. Concerning Central and Eastern Europe, the average is 38%. In that regard, we should mention Estonia where 95% of banking transactions were done electronically in 2005[39].

All of these indicators show that the private sector is ready for the use of Internet technologies. Furthermore, it is noticeable that the private sector is starting to provide different services via Internet, primarily for physical persons. However, government bodies should also take advantage of the existing infrastructure and readiness to communicate more efficiently with companies.

3.8 Number of hosts and secure servers on Internet

The DNS (Domain Name System) tree is made up of several generic TLDs like .com or .net and lots of so-called country code Top Level Domains (ccTLD) like .ba or .hr, which in general correspond to existing states or geographic areas in the real world. ccTLDs are all designated by two letters and correspond, with a very few exceptions, to the two-letter country codes of the ISO 3166 standard.

Counting a number of hosts (DNS in particular) in the region will not give a measure of number of Internet hosts let alone the number of internet users. Some machines are hidden behind devices so they do not appear in the host count however it can be useful for recording growth of an individual region or a country.

Number of real hosts represents the number of non-duplicate hosts. This is always obtained by subtracting the duplicate hosts from the hosts that were counted. The following graph gives overview for BiH, Croatia and SCG.

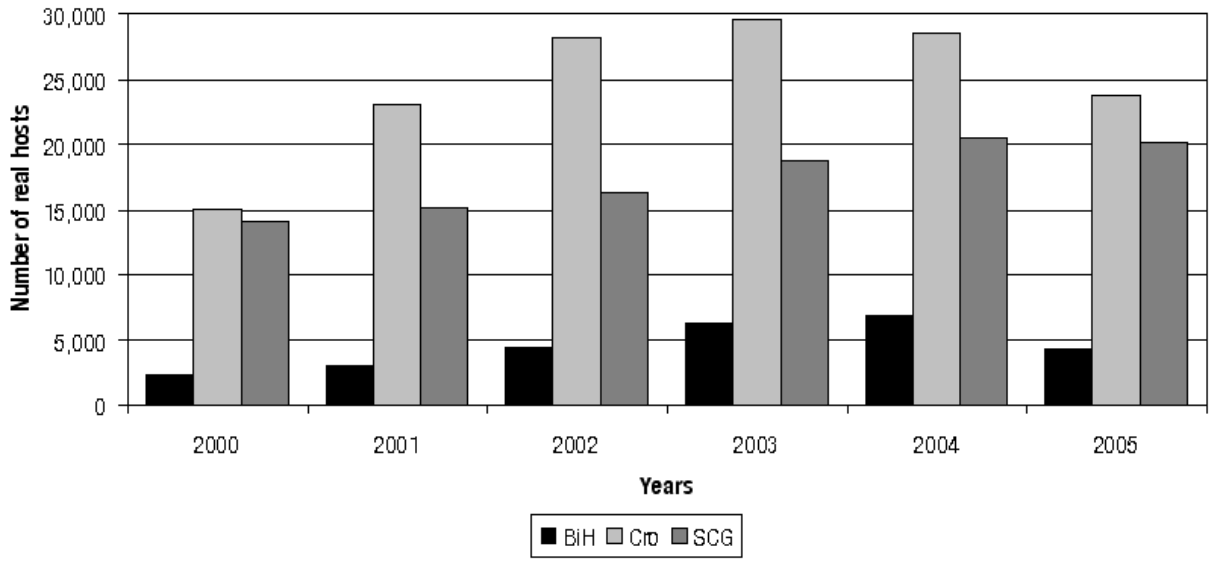
Since in the previous chapter we have explained that some institutions in BiH register domain names in the neighboring countries, such a huge difference can be contributed partially to that fact.

Croatia leads the way in number of real hosts and in 2002, they had almost doubled their closest counterpart Serbia and Montenegro in comparison. However all regions have experienced decline in numbers of real hosts, especially Croatia, in a past year in particular. This could be a result of upgrading and implementing more secured networks throughout the region.

BiH significantly falls behind in a number of real hosts when compared to its neighbors; however this difference can be accredited to a difference in population and their needs as well as the fact that our country was the last to finalize its official political status. Good news is that an entire region is steadily increasing which indicates further growth in internet use by the general population. The following graph shows percentage of change in number of real host in BiH, Croatia and SCG for the past five years.

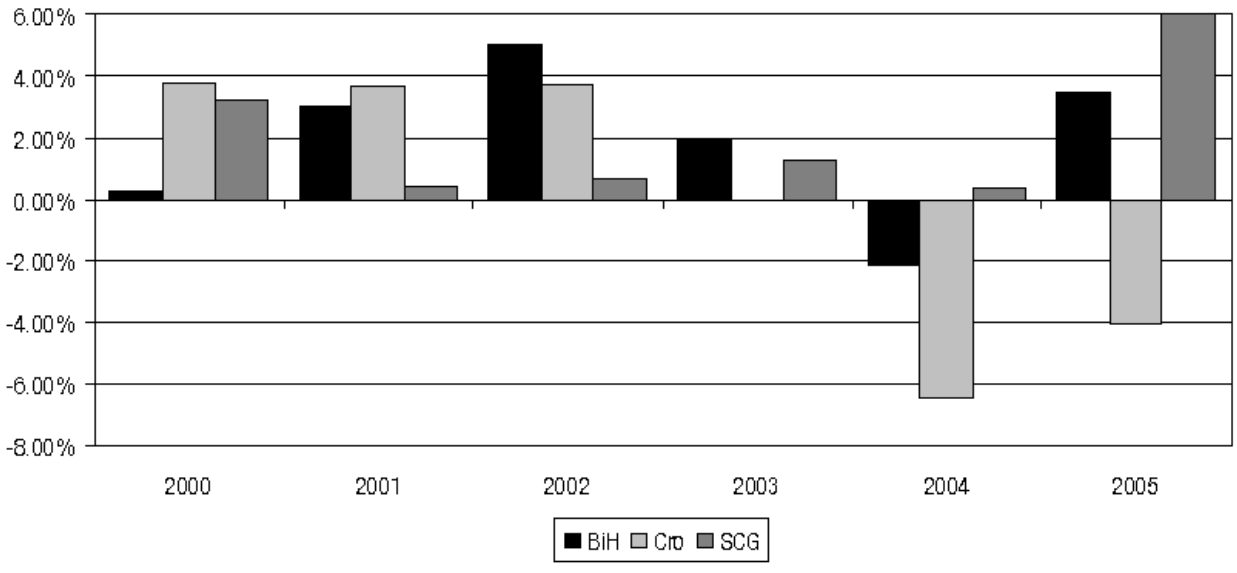
39 INSEAD eEurope 2005. Study of the degree of alignment of the new member states and the candidate countries.

Number of real hosts in the region



All data was obtained from RIPE NCC[40] which is one of five Regional Internet Registries (RIRs) providing Internet resource allocations, registration services and co-ordination activities that support the operation of the Internet globally. The information used was published in November 2005.

Percentage of change in number of hosts



3.9 Computer skills

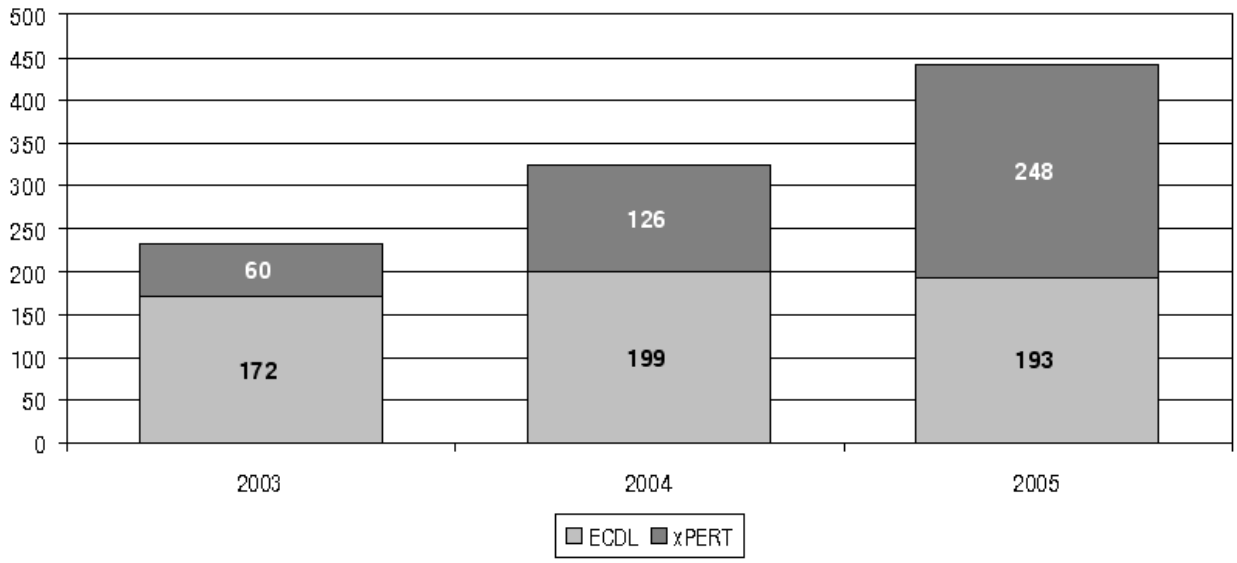
Having computer skills, that is being familiar with basic functions in text editor, Internet, e-mail and other operation are very hard to assess. Classes providing students with basic functions of computer work have been introduced with the reform of primary and secondary education. Unfortunately, a large part of the population, which completed schooling before the reform, did not have an opportunity to acquire these skills.

40 http://www.ripe.net/ RIPE NCC is independent, not-for-profit membership organization that supports the infrastructure of the Internet through technical co-ordination in its service region.

That is what we analyzed the issued ECDL and xPERT certificates on tests passed; ECDL (European Computer Drivers License) that is xPERT (European Computer Passport) which are presently the only ones to provide as with an overview of the situation. According to the report of the ECDL association and the xPERT association in Bosnia and Herzegovina, the number of accredited persons which passed one or the other exam in 2005 is 441. The total with this year is 998.

The table below provides an overview of the number of accredited individuals who passed these courses.

Number of persons accredited in ECDL and xPERT per year



is.gov.ba

e-Readiness

Assessment Report 2005

Annexes

4 ANNEXES

4.1 UN indicator

ICT indicators for households:

1. Availability of electricity in the house
2. Availability of radio in the house
3. Availability of landline telephones in the house
4. Availability of mobile telephones in the house
5. Availability of TV in the house
6. Availability of computers in the house
7. Availability of Internet access in the house
8. Methods of Internet access in the house
9. Location where Internet is most frequently used
10. Frequency of Internet usage
11. Reasons for computer usage
12. Reasons for Internet usage
13. Concrete services/activities Internet is used for
14. Language of Internet locations visited
15. Types of products/services bought over Internet
16. Value of products/services bought over Internet
17. Barriers to computer usage
18. Barriers to Internet usage
19. Barriers to purchase over Internet
20. Geographic locations where products were bought over Internet

ICT indicators for businesses:

1. Availability of electricity in business
2. Availability of mobile device
3. Availability of computers in business
4. Number of computers
5. Availability of Internet
6. Methods of Internet access
7. Presence of local computer network
8. Presence of web portal
9. Recent ICT investment
10. Percentage of total number of employees using computer in the usual work

11. Percentage of total number of employees with Internet access in the usual work
12. Concrete services/activities Internet is used for
13. Value of Internet shopping
14. Value of Internet sale
15. Client groups or location of Internet sale
16. Training in ICT use
17. Barriers to computer usage
18. Barriers to e-trade
19. Geographic location where Internet goods were sold or bought (locally or abroad)

4.2 World Economic Forum indicators

The table below provides an overview of indicators and results for Bosnia and Herzegovina.

Number of inhabitants (in millions, 2003)	4,2			
Number of Internet users per 100 inhabitants	2,6			
RANK / out of 104 countries				
Environment index	**92**	**Readiness index (continuation)**		
Market environment	97	4.05	Buyers' sophistication	93
Political and legislative environment	93	4.06	Buyers' dynamics	103
Infrastructural environment	53	4.07	Price of land line	87
1.01 Availability of scientists and engineers	86	4.08	Availability of Internet access	49
1.02 Availability of private capital	87	5.01	Investments in training	95
1.03 Sophistication of financial market	98	5.02	Availability of training services	80
1.04 Degree of technology	102	5.03	Quality of business schools	88
1.05 Cluster development situation	99	5.04	Business development investment	97
1.06 Collaboration in cluster	85	5.05	Business telephone monthly subscription	48
1.07 Collaboration of university-industry	73	5.06	Price of telephone subscription for businesses	77
1.08 Quality of scientific and res. Institutions	97	6.01	Government priorities for ICT	80
1.09 Research contributions in companies	88	6.02	Government procurement of ICT	95
1.10 Brain drain	95			
1.11 Availability of loans	62	**Usage index**		**92**
1.12 Administrative costs	101	Individual usage		60
1.13 Simplicity of business start-up	89	Business usage		97
2.01 Efficiency of law drafting	92	Use by the government		91
2.02 Laws related to ICT	91	7.01	Number of mobile phone subscribers	54
2.03 Efficiency of judiciary	78	7.02	Number of telephone subscribers	52
1.04 Protection of intellectual property	101	7.03	Public phone booths	55
3.01 Main telephone lines	50	7.04	Telephone lines	48
3.02 Secure Internet servers	76	7.05	TVs	63
3.03 Internet page	62	7.06	Broadband DSL	65
		7.07	Broadband cable	60
Readiness index	**86**	7.08	Internet users	77
Individual readiness	77	8.01	Use of foreign licenses	90
Business readiness	83	8.02	Level of technology absorption	104
Government readiness	87	8.03	Innovation capacity	79
4.01 Quality of math. and scien. education	47	8.04	Availability of telephone lines	73
4.02 Quality of education system	59	8.05	Availability of mobile phones	96
4.03 Quality of schools	65	9.01	Government success in promoting ICT	89
4.04 Internet access in schools	76	9.02	Government online services	71

4.3 Additional indicators

For citizens:

1. Tax payment: registration, payment and analysis
2. Job search
3. Social benefits: unemployment, child supplement, health care payments, students supplement
4. Personal documents: passport or driving permit
5. Car registration: new, second hand or imported
6. Construction permits
7. Police report (in case of theft)
8. Public libraries: review of catalogue and ordering
9. Certificates: birth and marriage records
10. Admission to higher education institutions
11. Residence registration: in case of change of address
12. Healthcare services: consulting

Company-related services:

1. Healthcare and pension: payments and examinations
2. Company income registration
3. VAT
4. Enterprise registration
5. Passing statistical data
6. Customs declarations
7. Environment licenses: obtaining a license
8. Public procurement