STIKK

INTERNET PENETRATION AND USAGE IN KOSOVO

Prishtina, January 2012

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ABBREVIATIONS

ICT – Information and communications technology

ISP – Internet Service Provider

IWF – Internet Watch Foundation

LAN – Local Area Network

RIPE NCC - The Réseaux IP Européens Network Coordination Centre

STIKK - The Kosovo Association of Information and Communication Technology

KEYWORDS

Internet penetration, Kosova, Kosovo, Internet service provider, parental control, Internet usage, households, rural population, proportional stratified random sampling, facebook usage, email usage, Albanian, survey, wardriving, contention ratio.

ABSTRACT

Using desk research, quantitative approaches and other methods, this study aims at understanding and developing baseline data related to Internet penetration and usage in Kosovo. In the course of this study, Internet usage and habits, and demographic Internet penetration based on households and users were studied. In addition, data on geographical Internet penetration in urban and rural areas was gathered and analysed. The findings show that both rural and urban areas utilise wireless Internet access. Further, this study reveals that Internet penetration in Kosovo is high and can be compared to other regional countries such as Greece and Bulgaria. Internet penetration based on households is 72.1 %, whereas Internet penetration based on users is 46.3%.

Further, the study outlines some shortcomings in the ICT management, coordination and cooperation among relevant stakeholders. Internet usage varies across age, gender and residential status among the respondents. This study provides baseline data and policy recommendation that can support the authorities and the private sector to make policies based on evidence. The findings can be further utilised to improve customer service.

1. INTRODUCTION

The Kosovo Association of Information and Communication Technology (STIKK), a local ICT association based in Prishtina, is proactively engaged to enhance the ICT sector in Kosovo. This study was made possible with their kind support.

Currently, in Kosovo, there are only top-down data collection and analyses on the subject matter. The information and data sources that are publicly available have been created using feeds mainly from Internet service providers or other secondary sources. This approach did not prove to be the most accurate because of quick market changes, information provision errors, and lack of information exchange between actors, as well as difficulties in data aggregation in order to bring the analysis at the national context.

Considering the latest developments of the Internet bandwidth increases that local Internet Service Providers have just implemented, it is more than obvious that potential foreign investors and local businesses will want to make use of Kosovo´s Internet infrastructure and work force potential to further develop their businesses.

In all these recent developments and obvious potential of the ICT sector, it has been deemed necessary that a detailed research in regards to Internet usage, habits and geographical and demographic penetration is more than needed in order to further support and strengthen this prospective sector in Kosovo.

Therefore, Phogen LLC was contracted to complete a study on this subject with the aim of providing not only baseline information and analysis but also suggestions in regards to possible improvements in the ICT sector approaches, regulations and initiatives.

2. RELATED STUDIES

The subject of Internet penetration in Kosovo has been researched by various companies and organisations, however most of the data available is either outdated or based on secondary sources, i.e. data has been collected from Internet Service Providers[1] or it was obtained through other secondary sources such as Internet World Stats[2] who have published data regarding Internet penetration in Kosovo. The data was collected by a research company based in Macedonia called GfK Macedonia[3]. Therefore, based on the current resources available, there is a lack of publicly available primary research in the subject matter. In order to describe more the amount of related studies, the table below gives more details in regards to the published reports:

1 http://www.art-ks.org/?cid=1,162/
2 http://www.Internetworldstats.com/europa2.htm#kv
3 http://www.gfk.com.mk/

Nr	Title/link	Internet Penetration	Ref. Page	Month/Year
1	**EU Kosovo Progress Report 2009** http://ec.europa.eu/enlargement/pdf/key_documents/2009/ks_rapport_2009_en.pdf	5.40%	41	2008
2	**eSEE ICT Status Report - Stability Pact** www.stabilitypact.org/e-see/040906-ict-status.pdf	6%	95	April, 2004
3	**Cullen Report IV (Enlargement countries telecommunications monitoring)** http://www.cullen-international.com/ressource/224/0/final-study-report-31-march-2011.pdf	6.24%	136	Jan, 2010
4	**EU Kosovo Progress Report 2010** http://ec.europa.eu/enlargement/pdf/key_documents/2010/package/ks_rapport_2010_en.pdf	6.40%	28	2009
5	**Pasyre e tregut te Telekomunikacionit: TM1-2011** http://www.art-ks.org/repository/docs/Pasqyre%20e%20tregut%20te%20Telekomunikacionit%20TM1-2011.pdf	7.69%	12	2011
6	**Investing in Kosovo 2009** www.eciks.org/english/publications/investing_in_kosovo/content/media/investors-guide_web.pdf	12%	16	2005
7	**National Background Report on ICT Research for Kosovo (2009)** www.wbc-inco.net/attach/KosovoICTReportFINAL_01_12_2009.pdf	20%	24	Nov, 2009
8	**Investing in Kosovo 2010** www.developingmarkets.com/dma/wp-content/uploads/2010/11/investing-in-kosovo-2010.pdf	20.90%	19	Sept, 2009
9	**Households* with Internet Connection** http://www.indexkosova.com	53%*	homepage	2009

Table 1: Related Studies   *) households.

The Telecommunication Regulatory Authority of Kosovo regularly gathers information on Internet penetration from Internet Service Providers via a questionnaire[4] that is filled out on quarterly basis. Although, the questionnaire has questions that aim at getting data at the municipal level, the data is not published in the quarterly reporting[5].

At the onset of the research, during the desk research phase, it was immediately obvious that there is a significant data gap regarding the Internet usage and user habits in Kosovo. For example, one of the existing studies covers mainly basic email communication, online search and online business promotion. To quote, "Internet is basically used (41.8%) to communicate via e-mail, for market search (36.0%) and to promote their businesses on the Web (10.1%)"[6]. Subsequently, thorough research and analysis of Internet user behaviour in Kosovo is not available and remains subject to further research.

Finally, the Kosovo authorities completed the national census in 2011 and have included questions in regards to Internet household penetration and computer ownership[7]. However, the findings of the census will not be available for public before December 2013[8].

4 http://www.art-ks.org/repository/docs/Pyetesori%20per%20Sherbimet%20e%20Internetit_(ISP).xls
5 http://www.art-ks.org/repository/docs/Pasqyre%20e%20tregut%20te%20Telekomunikacionit%20TM1-2011.pdf
6 http://lexetscientia.univnt.ro/download/216_lesij_css_XV_2_2008_art_17.pdf/
7 http://esk.rks-gov.net/rekos2011/repository/docs/R2ENG.pdf
8 http://esk.rks-gov.net/rekos2011/?cid=2,61,169

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3. NEED OF THE STUDY

This purpose of this study is to cover various needs and data gaps pertaining to business support, Internet infrastructure and services, and customer support. Based on available data, it is obvious that there is a strong need for up-to-date and thorough studies that would address relevant issues, support businesses and potential foreign investing companies who want to make informed business choices. Also, the Ministry of Trade and Industry of Kosovo has published its program on consumer protection[9] and this study aims at supporting this endeavour. Additionally, in order to further expand the Internet usage and penetration, it is a prerogative to create a competitive market through offering more transparent services, better value for money, and better monitoring of the sector which can be achieved through introducing efficient government regulations, performing research on specific subjects of interest, analysing existing available resources, and implementing good practices.

Further, and highly relevant, this study aims at gaining better understanding of Internet attitudes and behaviours. Understanding how users, especially youth, utilise the Internet is of major importance to further empower the younger generations in Kosovo using ICT as a tool[10]. This study aims at developing baselines that can be monitored and analysed in the future on how ICT skills of Kosovar youth can be further improved and developed through a myriad of activities and projects such as innovation centres, vocational trainings, internships, certifications, etc.

Currently, Kosovo does not have an Internet shopping infrastructure and Kosovars do not have online purchasing habits. Companies and customers alike have yet to grasp this concept. One of the research reports in this subject completed by the Central Bank of Kosovo concludes that "47.6% don't use EB [e-banking] since they don't trust the security systems"[11]. Having said this, it is imperative to further analyse the distrust of general population on anything related to online financial transactions. Proactively, strategies on raising general awareness of the population in regards to e-banking services and also online payments should be developed on a timely manner.

The desk research phase also revealed that currently in Kosovo the Internet infrastructure is not properly mapped out. Companies operating in Kosovo are limited in information exchange and coordination among relevant actors. This in turn does not provide an accurate aggregated map of Internet infrastructure and, as a result, cross-sectorial cooperation is hampered. To illustrate, construction companies, in lack of information and strict control by the local authorities, can destroy the Internet infrastructure in the course of their work.

Internet infrastructure is vital to the development and business processes of a given country. One example worth looking into is that of New Zealand, who were successful in creating the National Broadband Map, which essentially serves "to comprehensively map New Zealand's Broadband landscape and provide information and tools to aid in demand aggregation and infrastructure planning." A good practice was highlighted in this process, the network suppliers around New Zealand voluntarily provide to the State Services Commission with their network coverage map[12].

Moving on, the survey addressed topics related to the Internet subscribers (users) and the customer support that they receive by their respective Internet Service Providers. The findings will serve to fill in the data gap in these areas. To strengthen the study to gain data that have practical usage, the questionnaire included a question related to the e-government project that is being currently implemented in Kosovo. Finally, and related to above, there is a strong need to initiate discussions and to create baselines that can support further research, monitoring and evaluation.

9   www.mti-ks.org/repository/docs/ProgramiMbrojtjaKonsumator_231209.pdf

10   http://www.stikk-ks.org/sq/component/dms/doc_download/9-skills-gap-analysis-for-information-and-communication-technology+skillsgap+analysis+STIKK

11   www.bqk-kos.org/repository/docs/SistemiIPagesave/Eng_Presentation_15062011.pdf

12   http://www.broadbandmap.govt.nz/

4. METHODOLOGY AND SCOPE

The data collection for this study began by desk research. In this phase, the study considered secondary sources by going through the existing literature and body of knowledge which in turn helped the design of the questionnaire. Basic statistical data was collected through different sources. The data in relation to age groups and location were taken from the Statistical Office of Kosovo[13], whereas the information in regards to the total population in regions and municipalities was sourced from the preliminary results of the Census in Kosovo[14] organized by the Office of Population Census.

Using the questionnaire, the data collection of the study was completed using a quantitative approach. The sample population was developed using the Proportional Stratified Random Sampling methodology. The scope of this study includes the demographic Internet penetration (households and users), geographic Internet penetration and Internet usage (user behaviour).

4.1. POPULATION SAMPLING

The sampling of population was based on Proportional Stratified Random Sampling methodology. Initially, total population grouped by gender and divided based on location (municipalities) was analyzed. This data was crossed with stratified information based on age groups. Finally, the number of questionnaires for each municipality, age group and gender was defined. Note, gender ratio is almost equal and it was considered as such throughout the sampling process. Pre-calculated table for Determining Sample Size from a Given Population[15] was also used. Based on this document, the following mathematical calculations were performed:

$$s = \frac{X^2 * N * P * (1 - P)}{d^2 * (N - 1)} + (X^2 * P * (1 - P))$$

s = required sample size.
X^2 = the table value of chi-square for 1 degree of freedom at the confidence level of 0.05 which is (3.841).
N = the population size.
P = the population proportion (assumed to be .50 since this would provide the maximum sample size).
d = the degree of accuracy expressed as a proportion (.05).

Population under age of 10 and above age of 59 were excluded due to low Internet activity. Consequently, the total population for research purposes was around 1.22 million (71.2%). These values are substituted in the above mention formulae, and the result is:

$$s = \frac{3.841 * 1219733 * 0.5 * (1 - 0.5)}{(0.05 * 0.05) * (1219733 - 1)} + (3.841 * 0.5 * (1 - 0.5)); \quad s = \frac{1171248.6}{30.49.3} + 0.96; \quad s = 385$$

Therefore, based on this sample population, the total number of required questionnaires for the population between ages 10 to 59 (71.2 % of total Kosovo population) is 385. The final step was incorporation of the proportional aspects of the methodology. The total number of questionnaires was divided in age group and location strata. The final results are:

13 http://esk.rks-gov.net/ENG/publikimet/doc_download/967-demographic-social-and-reproductive-health-survey-in-kosovo
14 http://esk.rks-gov.net/rekos2011/?cid=2,40,265
15 http://opa.uprrp.edu/InvInsDocs/KrejcieandMorgan.pdf

Nr.	Location	10 – 19	Quest.	20 – 29	Quest.	30 – 39	Quest.	40 – 49	Quest.	50 – 59	Quest.	Total	Total Quest.
1	Deçan	7991	3	6706	2	5380	2	4366	2	3547	1	27990	10
2	Dragash	6885	2	5776	2	4635	2	3762	1	3056	1	24114	8
3	Ferizaj	22282	6	18695	5	14999	4	12173	4	9890	3	78039	22
4	Fushë Kosovë	7118	2	5972	2	4791	2	3889	1	3160	1	24930	8
5	Gjakovë	19302	5	16195	5	12994	4	10546	3	8568	3	67605	20
6	Gjilan	18454	5	15482	4	12422	4	10082	3	8192	3	64632	19
7	Gllogoc	12008	4	10076	3	8084	3	6561	2	5330	2	42059	14
8	Hani i Elezit	1924	1	1615	1	1295	1	1052	1	854	1	6740	5
9	Istog	8056	3	6758	2	5422	2	4401	2	3576	1	28213	10
10	Kaçanik	6858	2	5754	2	4617	2	3747	1	3044	1	24020	8
11	Kamenicë	7298	2	6123	2	4913	2	3987	2	3239	1	25560	9
12	Klinë	7705	2	6464	2	5187	2	4210	2	3420	1	26986	9
13	Kllokot	523	1	439	1	352	1	286	1	232	1	1832	5
14	Lipjan	11782	3	9885	3	7932	3	6437	2	5230	2	41266	13
15	Malishevë	11206	3	9402	3	7543	2	6123	2	4974	2	39248	12
16	Mitrovicë*	14679	4	12315	4	9881	3	8019	3	6515	2	51409	16
17	Novobërdë	1378	1	1156	1	928	1	753	1	612	1	4827	5
18	Obiliq	4417	2	3706	1	2974	1	2414	1	1961	1	15472	6
19	Pejë	19623	5	16464	5	13210	4	10721	3	8711	3	68729	20
20	Podujevë	18026	5	15125	4	12135	4	9848	3	8002	3	63136	19
21	Prishtinë	40634	11	34093	9	27354	7	22200	6	18037	5	142318	38
22	Prizren	36513	10	30635	8	24579	7	19948	6	16208	5	127883	36
23	Rahovec	11286	3	9469	3	7597	2	6166	2	5009	2	39527	12
24	Shtime	5594	2	4694	2	3766	1	3057	1	2484	1	19595	7
25	Skenderaj	10520	3	8826	3	7082	2	5747	2	4670	2	36845	12
26	Suharekë	12239	4	10268	3	8239	3	6687	2	5433	2	42866	14
27	Viti	9627	3	8077	3	6480	2	5260	2	4273	2	33717	12
28	Vushtrri	14326	4	12020	4	9643	3	7827	2	6359	2	50175	15
	Total:	**348254**	**101**	**292190**	**89**	**234434**	**76**	**190269**	**63**	**154586**	**55**	**1219733**	**384**

Table 2: Questionnaire distribution

4.2. QUESTIONNAIRE

The questionnaire was designed using available questionnaire design guidelines[16]. The number of questions was a total of 33. The questionnaire included few multiple answer questions and no open questions. Furthermore, the questionnaire was divided in 7 sections covering personal information, Internet habits, and Internet service provider related questions. The questionnaire was completed in 7 regions (28 municipalities) and 49 villages during the period of 7 – 18th of November 2011. The interviews were performed face-to-face randomly selected within the target groups. Additionally, extra notes were taken in case interviewees were not from the targeted municipality but from surrounding villages. Through this approach, it was possible to gather more information in relation to Internet usage and connectivity in rural areas. However, in order to fully research Internet connectivity in rural areas of Kosovo based on Cadastral Zones[17], a more thorough research is needed.

5. INTERNET PENETRATION

There are two types of Internet penetration, geographic Internet penetration and demographic Internet penetration (households and users). Data collection in regards to penetration can be completed using many methods and approaches. Geographic Internet penetration is, in a nutshell, a detailed geographical map with mapping mediums that carry Internet traffic to households. The demographic Internet penetration is based on households and users. The former is defined as the percentage of total households that have Internet connectivity, whereas the latter defines the number of Internet users out of total population.

The data has shown that 84.5% of interviewees from 28 municipalities and 81.6% (40 out of 49) villages have Internet connectivity. Note that due to the low number of sample size of rural areas, the following details have been considered:

 a) *The total number of villages was based on 28 cadastral zones that were part of the total population (see previous footnote on Cadastral Zones for details). Therefore, the total number of villages is 1128.*
 b) *Assumption: Each village/city must have at least one household, with or without Internet connectivity.*
 c) *Assumption: Each interviewee represents one household.*
    The following results were obtained using online statistical calculators[18]
 d) *The Confidence Level is 95%*
 e) *The Confidence Interval for rural areas is 13.7%*
 f) *The Confidence Interval for urban areas is 5%*

Considering the fact that 63.2% of population lives in rural areas[19], the following has been calculated:

$$ph = (a * b) (c * d)$$

ph = Demographic Internet Penetration based on households
a = urban Internet penetration (lowest point of confidence interval, 5%)
a = 84.5% - 5% = 79.5%

16 http://www.mrs.org.uk/standards/downloads/2011-07-27_questionnaire_design_guidelines.pdf
17 www.kgjk-ks.org/repository/docs/gazeta/26.english.pdf
18 http://www.macorr.com/sample-size-calculator.htm
19 http://esk.rks-gov.net/ENG/publikimet/doc_download/967-demographic-social-and-reproductive-health-survey-in-kosovo-, p.28

b = urban population

c = rural Internet penetration (lowest point of confidence interval, 13.7%)
a = 81.6% - 13.7% = 67.9%

d = rural population

ph = (79.5% * 36.8%)   (67.9% * 63.2%)

ph = 72.1 %

Therefore, using the lowest point of confidence intervals of 5% and 13.7% it is shown that demographic Internet penetration based on households in Kosovo is **72.1 %**, as shown in the graph below:
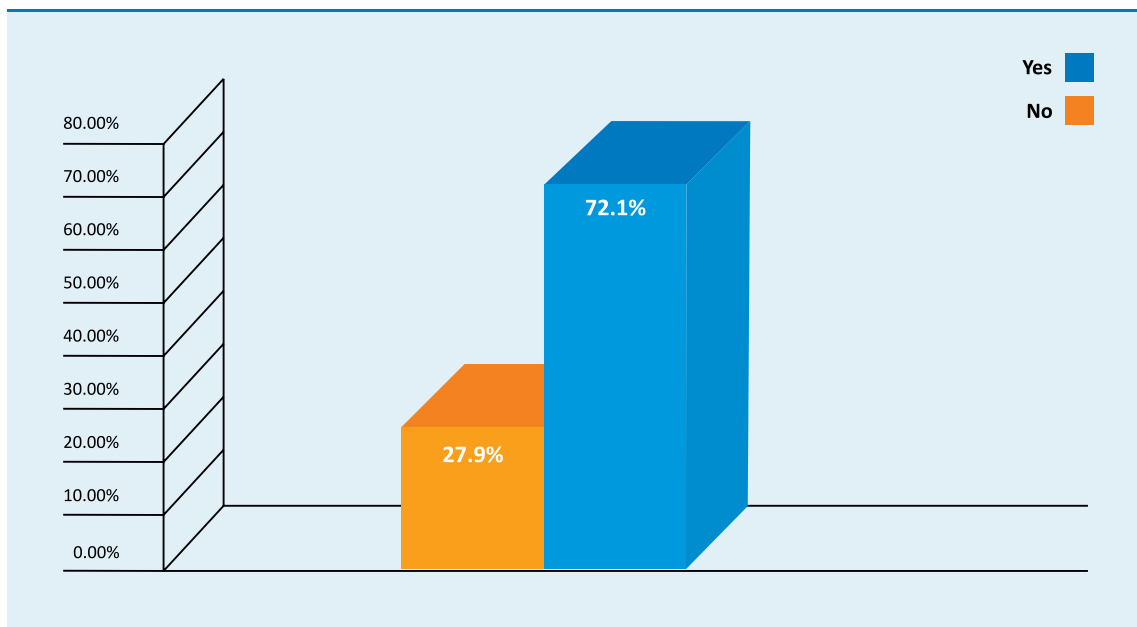
Population with Internet connectivity at home

Figure 1: Population with Internet connectivity at home

The confidence interval decreases with the increase of the sample population, therefore a bigger sample population is needed in order to provide a better approximation of the Internet penetration in households. According to the findings of this study, in Kosovo the Internet penetration is estimated at 72.1%, this is indeed a significant penetration level considering that in European Union countries, the Internet penetration in 2011 is estimated at 73%, as per EuroStat published report[20] about the Internet usage in households and by individuals. In this report, the author states that "The proportion of households in the EU with access to the Internet reached 73% in 2011, representing an increase of 24 percentage points compared with 2006". Another factor that further explains the rate of Internet penetration in Kosovo is the unregulated market of Internet service providing. Namely, there is a typical situation of service provision where one person in the village (as mentioned above the majority of population lives in rural areas) buys

20 http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-11-066/EN/KS-SF-11-066-EN.PDF

wireless Internet connectivity from one of the bigger service providers and resells it to as many members of the village community as possible. This model is unregulated and out of the reach of authorities, however it is an effective way of ensuring wider access to Internet by the local population.

In addition to Internet usage at home, 23% of interviewees said that also they use the Internet in other places such as work (17.36%), at friends (1.39%), or Internet cafes (4.17%).
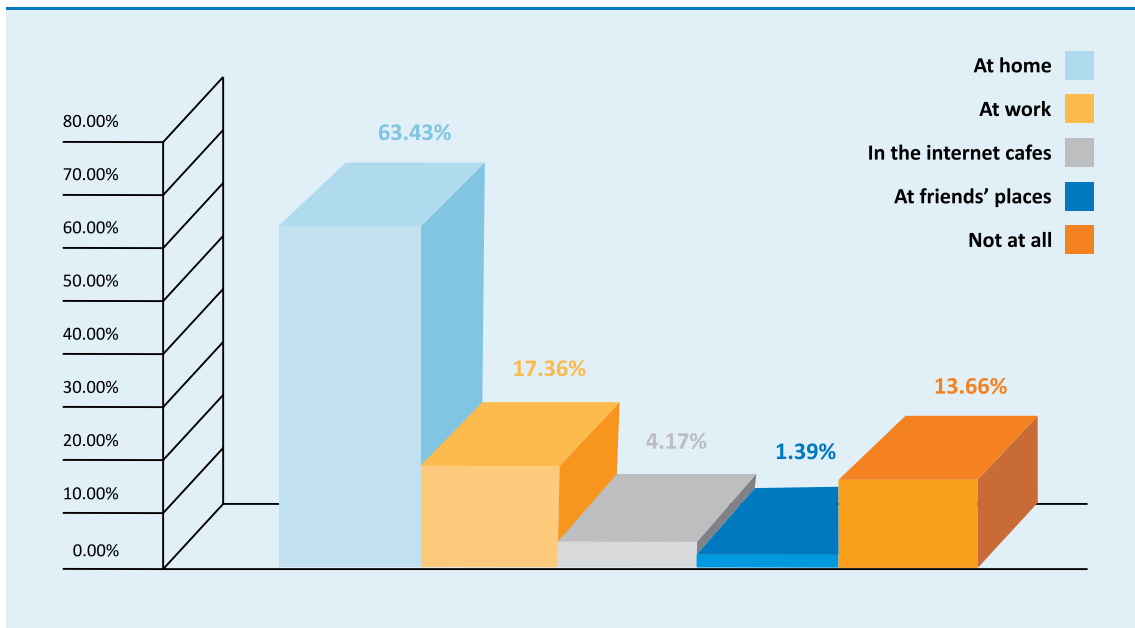
Where do we use Internet?

At home	
At work	
In the internet cafes	
At friends' places	
Not at all	

- 80.00%
- 70.00%
- 60.00%
- 50.00%
- 40.00%
- 30.00%
- 20.00%
- 10.00%
- 0.00%

63.43%   17.36%   4.17%   1.39%   13.66%

Figure 2: Internet usage location

There is a small difference between villages and cities in regards to Internet connectivity; however there is a variation in regards to cost per bandwidth unit that subscribers pay, the cost being higher in villages. Also, there is a different approach in regards to the technologies that are being used, as explained further below.

Based on the Census 2011[21], Kosovo has around 295070 households. As a result of calculations above it is concluded that at least 72.1% of Kosovars in urban and rural areas have Internet at their homes (each interviewee representing one household). This data reveals the following:

295070 (*households*) ∗ 72.1 % (*Internet connectivity*) = 212745 (*households with Internet*)

Therefore, 212745 households in Kosovo have Internet connectivity. On the other hand, the data that has been gathered in regards to the monthly cost of Internet connection that subscribers pay can be seen in the diagram below.
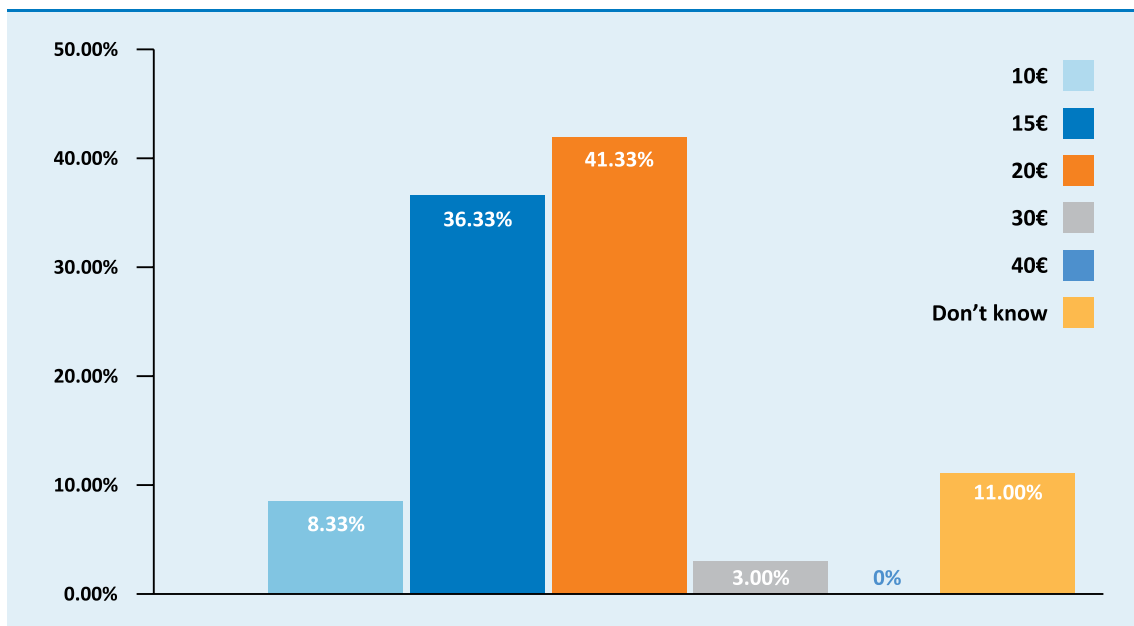
Price of Internet connection per month

Figure 3: Price of Internet connection

Therefore, the annual estimated Internet connectivity cost for households (average 6 family members[22]) in Kosovo is approximately 3.5 million euro.

The reason for not having Internet connectivity due to lack of infrastructure is not the most common one. Usually, as interviewees stated, non-connectivity reasons include cultural values and it has to do with the decision of the head of family not to have an Internet connection at home. More frequently, the explanation is that children/teenagers use the Internet extensively (during the night), consequently performing badly at school. It is interesting to note the fact that a very low number of the interviewees said that there is no Internet connectivity in their community even if they do not have connectivity at their homes; this includes as remote villages as Shajne in Dragash region. However, the technology that is being used for connectivity is different. While in villages wireless technology is heavily utilized, on the other side in larger cities the cable broadband or xDSL are the main methods of Internet service provision[23]. Additionally, in villages the service is being provided by small Internet providers (as well as big providers in some cases) while in bigger towns/cities the service is being offered exclusively by biggest Internet Service Providers.

The following calculation, using the details above and data from the graph below, gives the average number of Internet users:

Expect you. how many other family members also use the Internet?
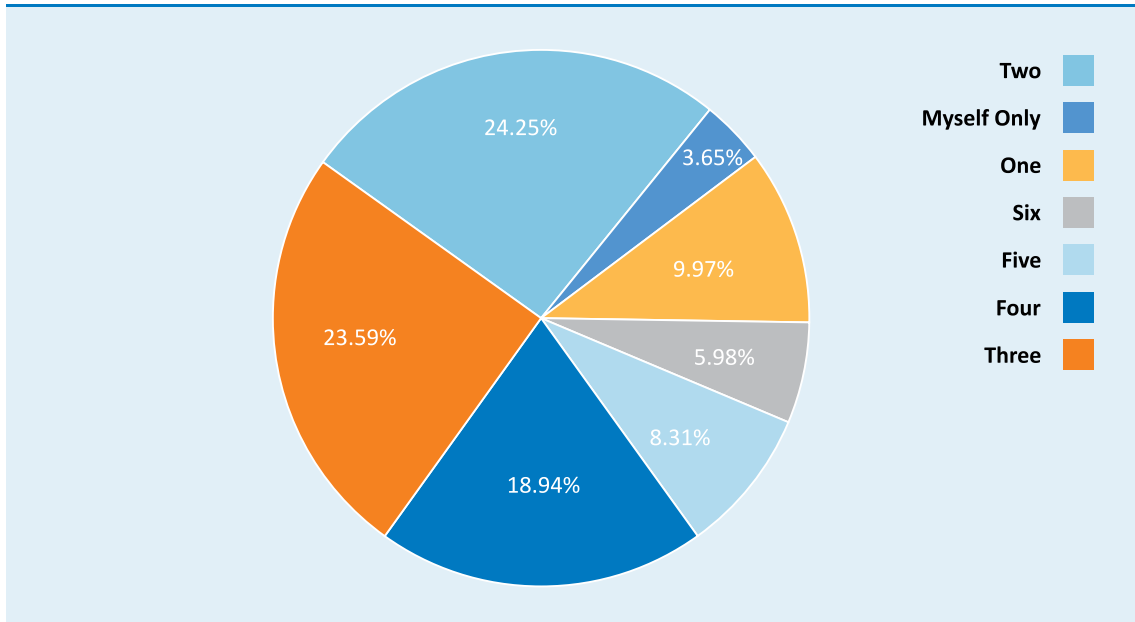(Survey question)

Figure 4: Internet users in family

$$pu = P * \sum_{0}^{m} (m + 1) * r_m$$

pu=Demographic Internet Penetration based on users

P=The number of households with Internet connectivity

m=The number of members of family within the household that use the Internet (Excluding the interviewee)

r_m=The proporation of interviewees that fit within different groups of m value

Therefore, the total number of users within households that have Internet connectivity is:

pu= 212745 * (1 * 3.65% + 2 * 9.97% + 3 * 24.25% + 4 * 23.59% + 5 * 18.94% + 6 * 8.31% + 7 * 5.98%)

pu = 802304

If the result above is expressed as a percentage of the total population[24]:

$$pu = \frac{802304}{1733872} * 100 \; ; \quad pu = 46.3\%$$

Therefore, Kosovo's demographic Internet penetration based on users is **46.3 %.**

Internet Penetration based on users
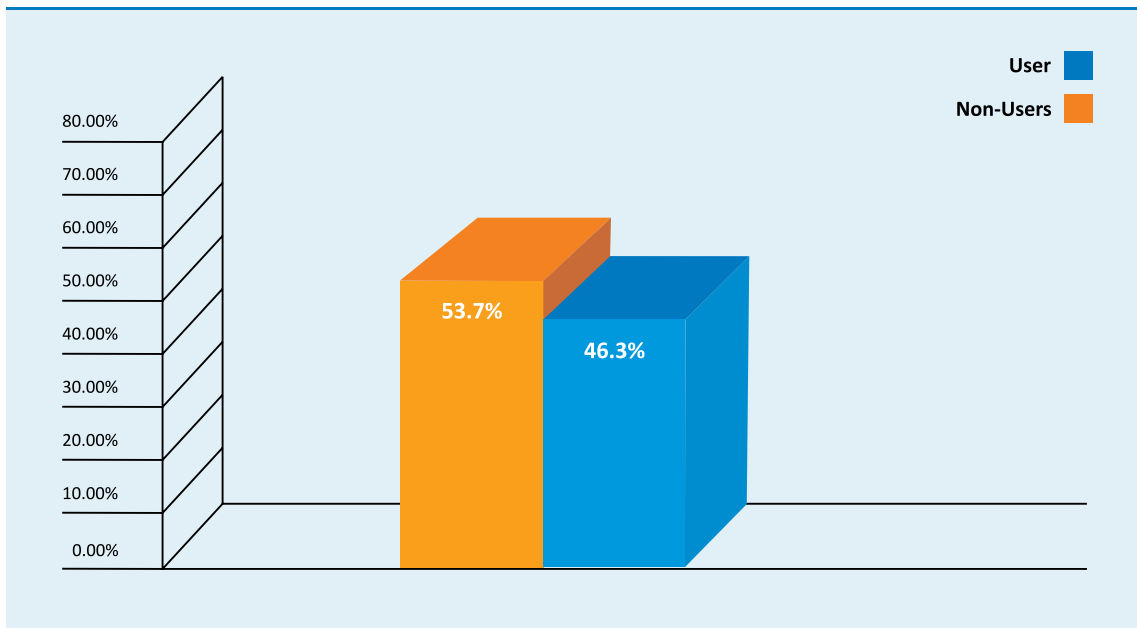
Figure 5: Internet Penetration based on users

If the data above is compared to other countries from the region, Kosovo's Internet penetration (46.3%) based on users is similar to Bulgaria (47.85%,) and Greece (46.2%.)[25].

In order to further analyse the level of Internet penetration from geographical point of view, a variation of wardriving[26] and GPS-based locating action was performed in the following regional roads:

a) Prishtina to Gjilan, 42 km – November 2011 (See kml[27] file)

During this process, 405 wireless Access Points were discovered on route, of which 195 had open access and were not password protected (note that MAC filtering could have been implemented by the Access Point Administrator, but this requires further analysis). Additionally, as can be seen on the map below, the density of networks increases close to the bigger cities while there is also a constant presence of access points in-between cities, confirming the high Internet penetration rate in rural areas.

25 https://www.cia.gov/library/publications/the-world-factbook/rankorder/2153rank.html

26 http://dspace.cusat.ac.in/jspui/handle/123456789/2362

27 http://www.phogen.com/gps/prgl.kml

Figure 6: Wardriving from Prishtina to Gjilan

b) Prishtina to Hani Elezit, 58 km – November 2011 (See kml[28] file)

The total number of discovered access points was 374, out of which 238 were without any password protection (MAC filtering also possible). The naming conventions of recorded wireless access points give hints in regards to its usage. Most of major Internet service providers have their equipment pre-configured, hence the same name appears in many access points. Moreover, a portion of access points were obviously a property of local Internet Service Providers. This fact was very often visible on the wireless access point name which included ISPs name and even the telephone number, presumably for customer support. For illustrative depiction, please see the figure below:

Figure 7: Wardriving from Prishtina to Hani i Elezit

c) Prishtina to Podujeva, 26 km – January 2012 (See kml[29] file)

The total number of discovered access points was 220, out of which 140 were without any password protection (MAC filtering possible). The situation in regards to naming conventions is the same with other recorded data.

29 http://www.phogen.com/gps/prpd.kml

Figure 8: (Prishtina to Podujeva)

Based on gathered information from these regional roads, it is evident that for 126 km driving there are around 1020 wireless access points in the surrounding areas. Therefore, in Kosovo's regional roads connecting Prishtina, in average, we can expect 8 wireless access points per 1 km. Note that there other factors that will affect this approximation, such as population density factor, hills, lakes (see lake of Badovc towards Gjilan, there are no access points), etc. This further proves the high rates of Internet penetration in Kosovo. However the security aspects of Internet access through many free access points will become a bigger concern in the future, as discussed further below.

5.1. INTERNET SERVICE PROVIDERS (ISPs)

Based on the quarterly report[30] published by the Telecommunications Regulatory Authority, there are 31 companies that provide Internet services in Kosovo, out of which 5 have International traffic exchange capabilities. The other remaining 26 Internet Service Providers have access to the Internet through the main five ISPs. However, it is a good practice to include more details in regards to listed and not listed ISPs. These details can be easily found in the RIPE NCC Database[31] using search keywords such as Kosovo, Kosova, Mitrovica, Prishtina, etc.

Based on the gathered data and as seen on the graph below, 40% of rural areas are covered by local ISPs (without direct access to the Internet but through one of the major ISPs). The other 60% is covered by major ISPs.

National vs. Local ISPs - Market Share in Rural Areas
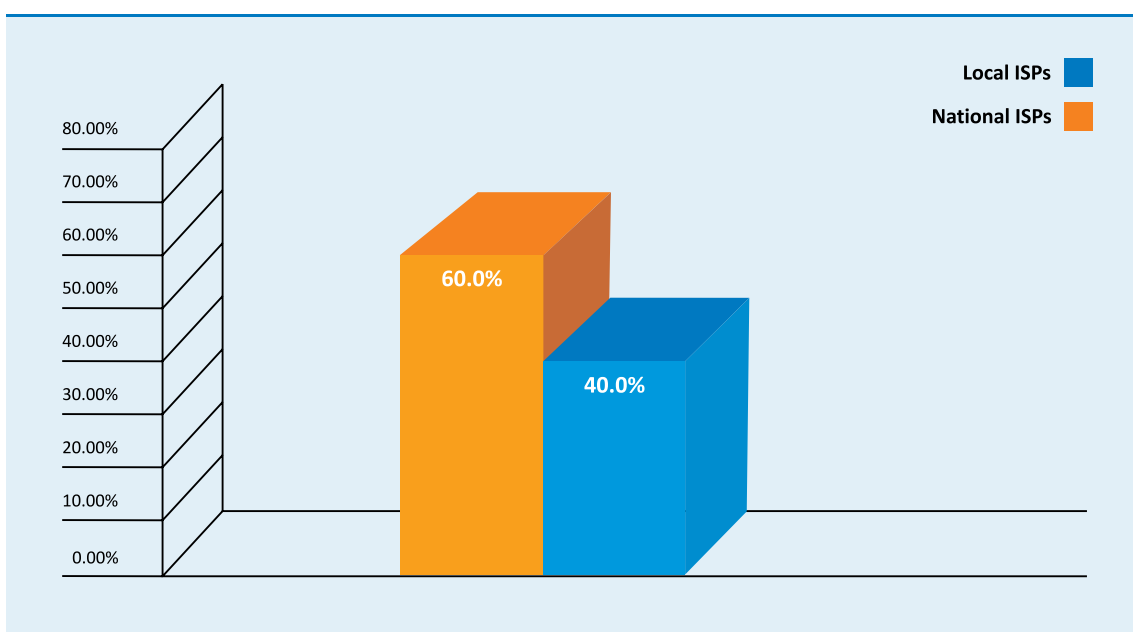
Figure 9: ISP market share in rural areas

In regards to the ISP market shares (urban and rural), see the graph below. Note that the group "others" consists of all other ISPs, which might be supplied with Internet connectivity through the major three ISPs. In addition, other smaller ISPs with international connectivity were also included in this group.

30   http://www.art-ks.org/repository/docs/Pasqyre%20e%20tregut%20te%20Telekomunikacionit%20TM1-2011.pdf

31   https://apps.db.ripe.net/search/full-text.html
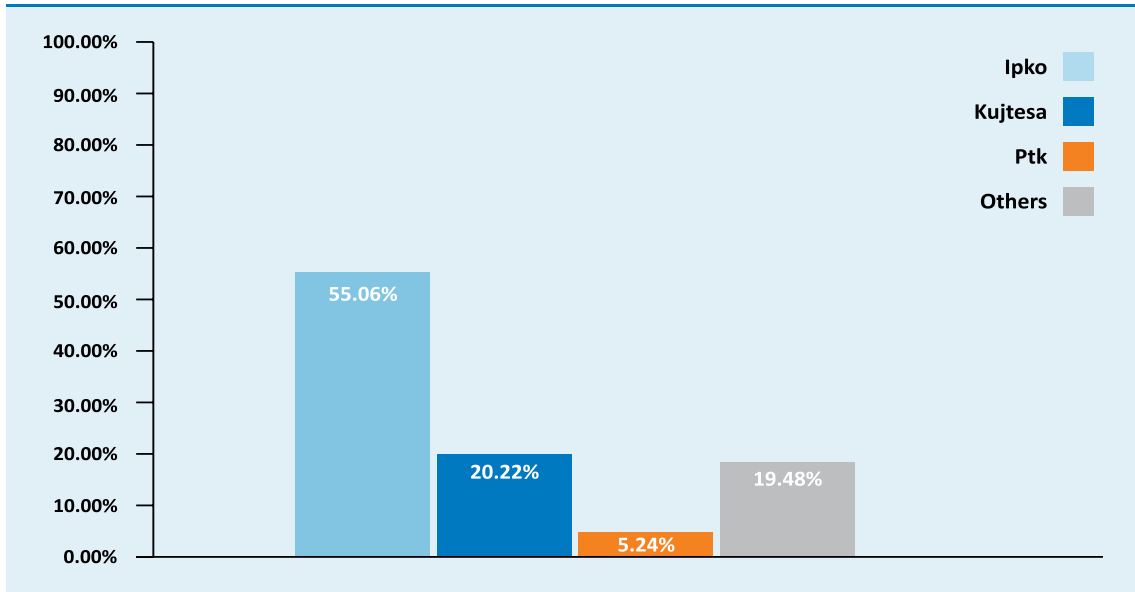
ISP Market shares

Figure 10: Kosovo ISP market shares

5.2. QUALITY OF INTERNET PROVIDING SERVICES

The graph below shows the satisfaction of subscribers with the provided Internet bandwidth. It is important to consider the proportion of users who are satisfied with Internet speeds only in the early morning and late in the evening. This issue is related to Contention Ratio[32] and the number of users that are connected to the same exchange point.

Are you satisfied with the speed of Internet connection at home?
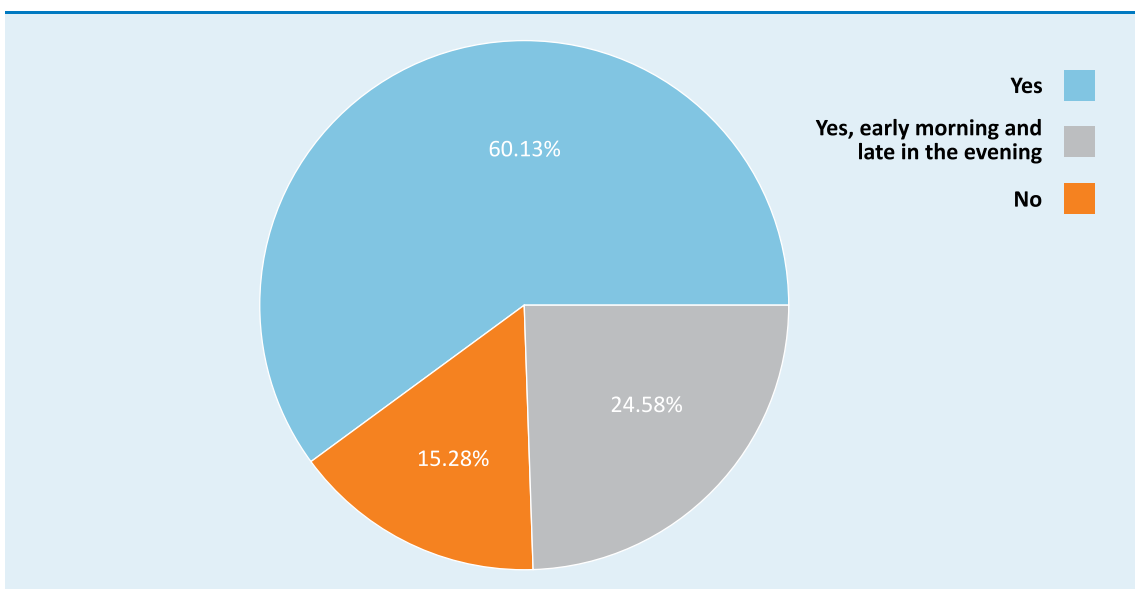
Figure 11: Internet connectivity satisfaction

Considering the fact that the Telecommunications Regulatory Authority of Kosovo is collecting information from Internet Service Providers every three months, adding contention ratio data would be beneficial[33], although the majority of users are happy with their Internet speeds, as the graph below shows. In order to illustrate the issue of content ratio, the following paragraph is cited from the Telecom Regulatory Authority of India:

"All the service providers shall provide information regarding contention ratios adopted by them to provide *Internet/broadband service in their tariff plans submitted to TRAI, manual of practice, call centers and on their websites.*

All the service providers (ISPs, UASLs, CMSPs, BSOs) shall quarterly publish contention ratio for different Internet/broadband services on their website to facilitate subscribers to take informed decision."[34]

How often do you have Internet connectivity problem ?
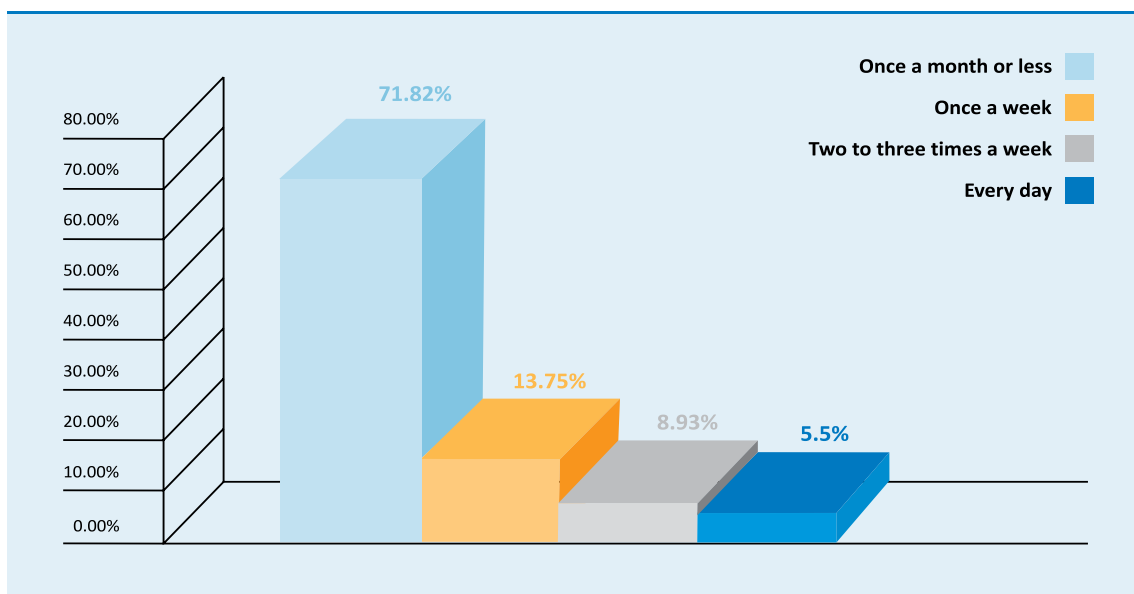
Figure 12: Internet connectivity problems

In regards to the Internet bandwidth provided to subscribers, it is important to note that the majority of respondents do not know what bandwidth services they are receiving (see graph below), although they have more information in regards to the cost of the service that they pay as discussed earlier.

What is the bandwidth of your Internet connection?
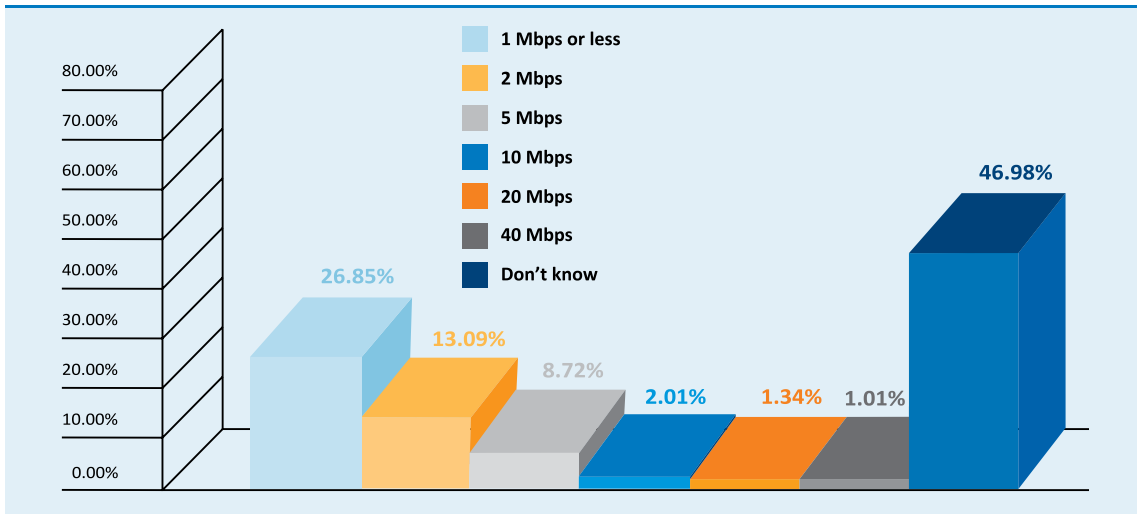
Figure 13: Internet bandwidth provision

6. INTERNET USAGE

6.1. USERS

The report published by the Statistical Office of Kosovo states that in 2003 the ownership of a computer was only 9%, whereas in 2009 this figure increased to 55%[35]. Although the graph below shows similar results as in 2009, it is important to note the fact that 26.18% of households own the second computer and 5.57% own the third computer. Note that the computer ownership is comparable to European countries[36]. If this information is compared to the next graph further, it becomes apparent that the highest proportion of families is in a situation where 3 users use the same computer. Hence, it is evident that more computers per household are needed in order to accommodate the standard of one computer per user at home.

How many computers / laptops do you have at home?
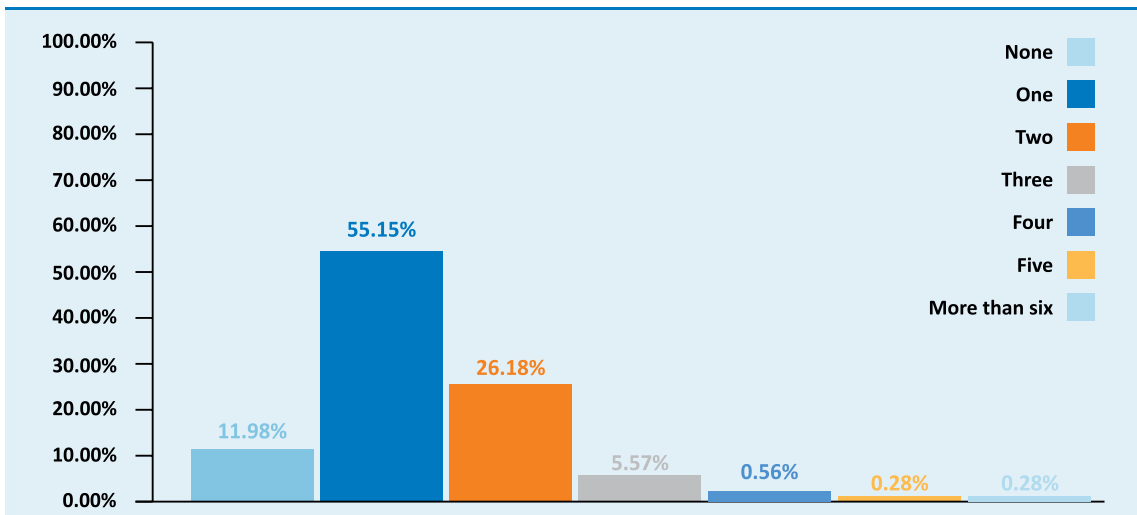
Figure 14: Computer ownership - per household

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35 http://esk.rks-gov.net/ENG/publikimet/doc_download/967-demographic-social-and-reproductive-health-survey-in-kosovo-, p.13

36 http://www.economist.com/node/12758865?story_id=12758865&subjectID=348909&fsrc=nwl

How many family members use the same computer?
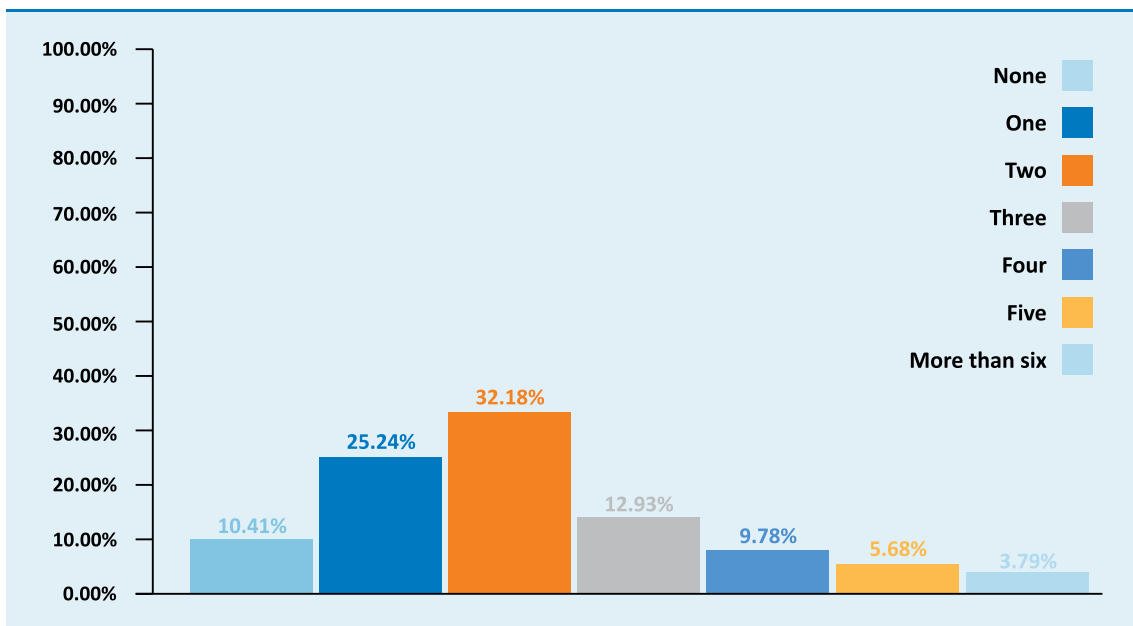
Figure 15: Computer users per computer

The graph below shows statistics on population that do not use the Internet. It is important to note the following observations. The proportion of users who do not speak English and consequently do not use the Internet is low (4.48%). Similarly, the number of users who stated that they do not know how to use the Internet is also low (1.49%) but in addition to this proportion, one must also consider the proportion of users who do not know how to use computers at all (10.45%). In addition, there is a significant percentage of users who do not have a computer at home (20.9%). Note that this is different from the graph further above which depicts the population that do not have computer at home but use the Internet somewhere else.

The result mentioned above, that in average 3 users use the same computer at home and the result that a significant proportion of population (20.9%) do not have a computer at home (hence do not use the Internet), provides more justification for the proposal of removing customs for the ICT equipment in Kosovo[37], which was initiated by the ICT sector various actors in Kosovo.

Why don't you use the Internet?
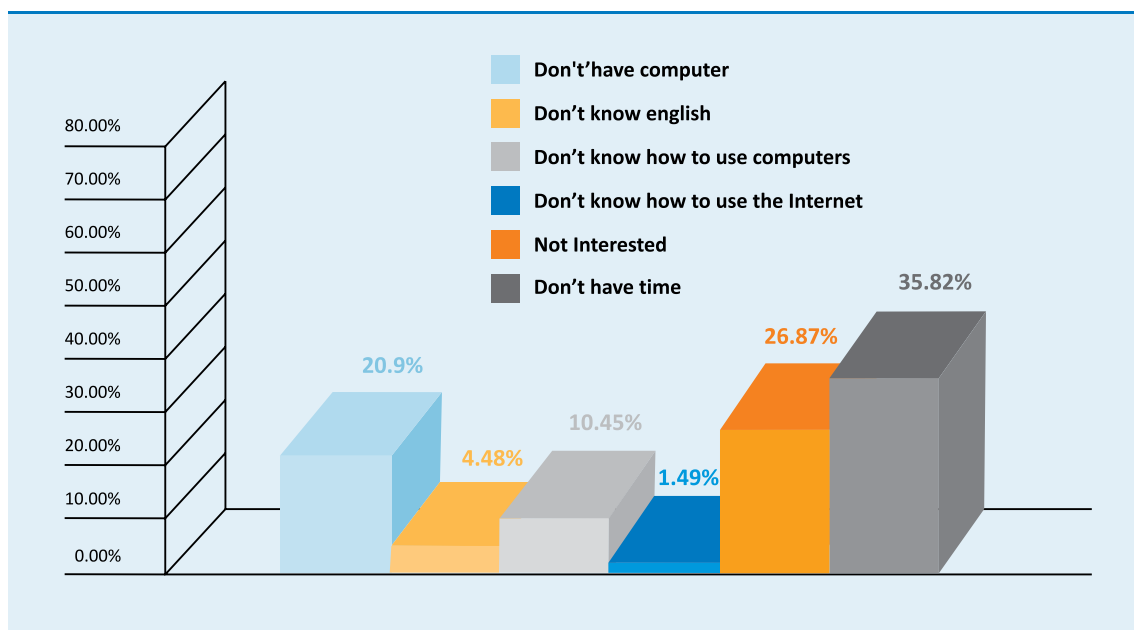
Figure 16: Internet non-users

The graph below gives more insight into the placement of computers at home. Note that the group "laptop in few rooms" includes users who use a laptop (other mobile equipments were not considered) and move it from one room to the other. The group of users who have computers in personal rooms needs more attention. The graph below provides information in regards to time of day Internet usage. The age group of 10-19 that use the Internet late at night and after midnight is low but in the future with the increase of computer ownership, Internet penetration, and lower age of Internet literacy, the information society in Kosovo needs to proactively consider the issue of parental control. The society needs to be fully aware of the fact that children are vulnerable and very easily can become victims of the Internet. In this context, the issue of child pornography needs to be addressed proactively. The international community is working on preventive measures and this issue will become a matter of discussion and risk in every community, including Kosovo.

The global community recognizes that children are put at risk by those who engage in the production, distribution, and consumption of child pornography, and the children involved can suffer serious negative effects throughout their lifetime as a result of this exploitation[38].

The European Commission is also working on amending existing legislation, following the example of United Kingdom where all major ISPs block access to child abuse websites named on a list maintained by the Internet Watch Foundation (IWF)[39]. Similarly, in Canada Internet Service Providers must report child pornography offences under federal law[40].

38 http://www.ualberta.ca/~hsmun/2011%20Background%20Papers/UNICEF%20Child%20Pornography%20-%20Final.pdf
39 http://www.itu.int/osg/blog/2011/01/12/ISPsBattleEUChildPornographyFilterLaws.aspx
40 http://www.justice.gc.ca/eng/news-nouv/nr-cp/2010/doc_32510.html
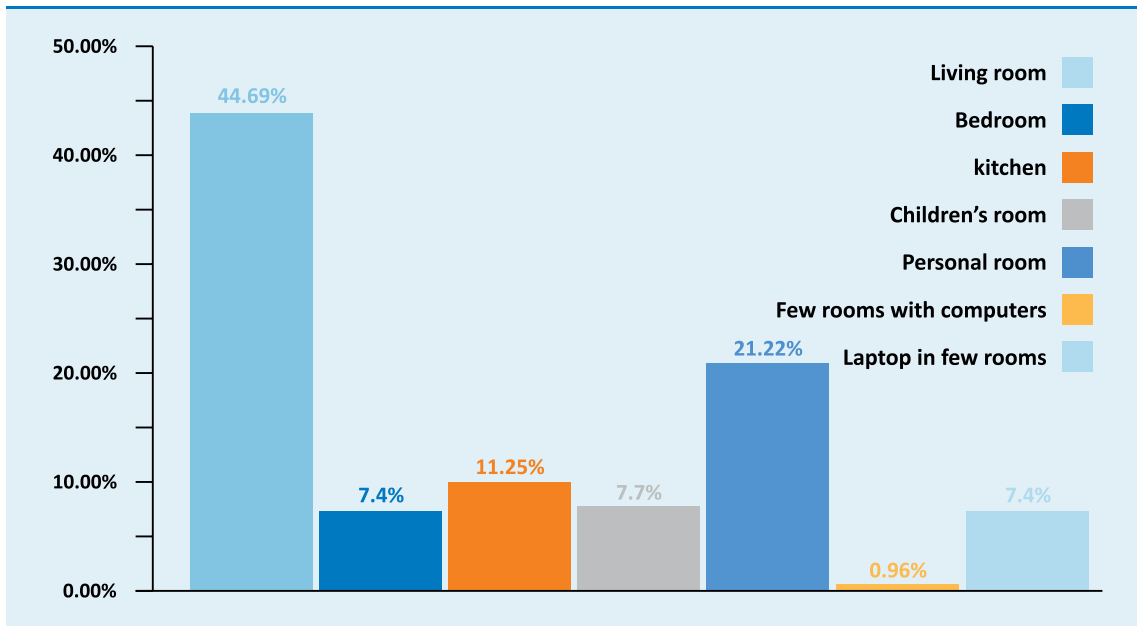
Where did you place the computer?

Figure 17: Computer location at home

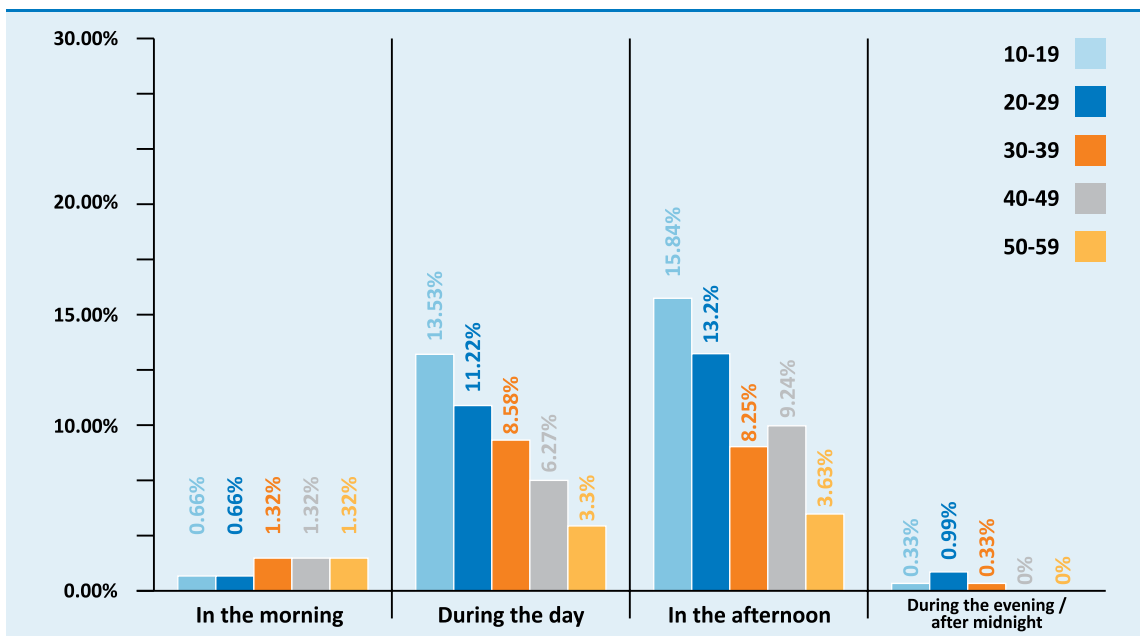## Daytime Internet usage (by age)

Figure 18: Daytime Internet usage

6.2. EDUCATION

The graphs below show data on education levels of interviewees and the level of Internet penetration in all levels of schools which is not satisfactory. With the national Internet penetration levels comparable to Bulgaria and Greece (as described above), Kosovo has the infrastructure to increase the level of Internet penetration in schools and this has been a subject of discussions for a long period of time.
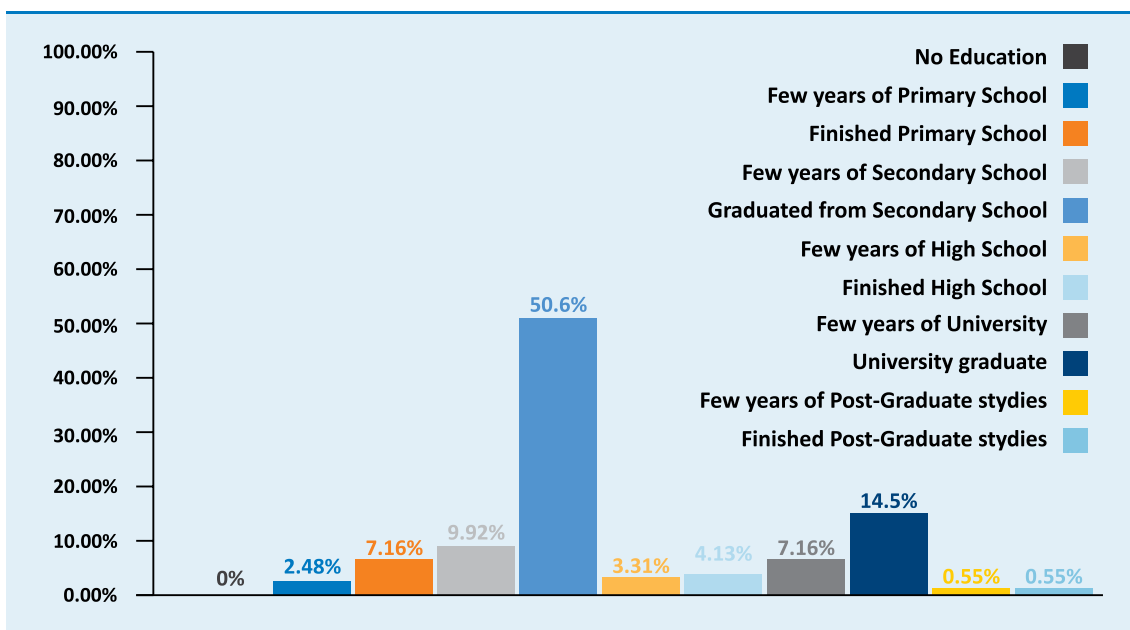
Figure 19: Education levels of interviewees

Do you have Internet at school / university?
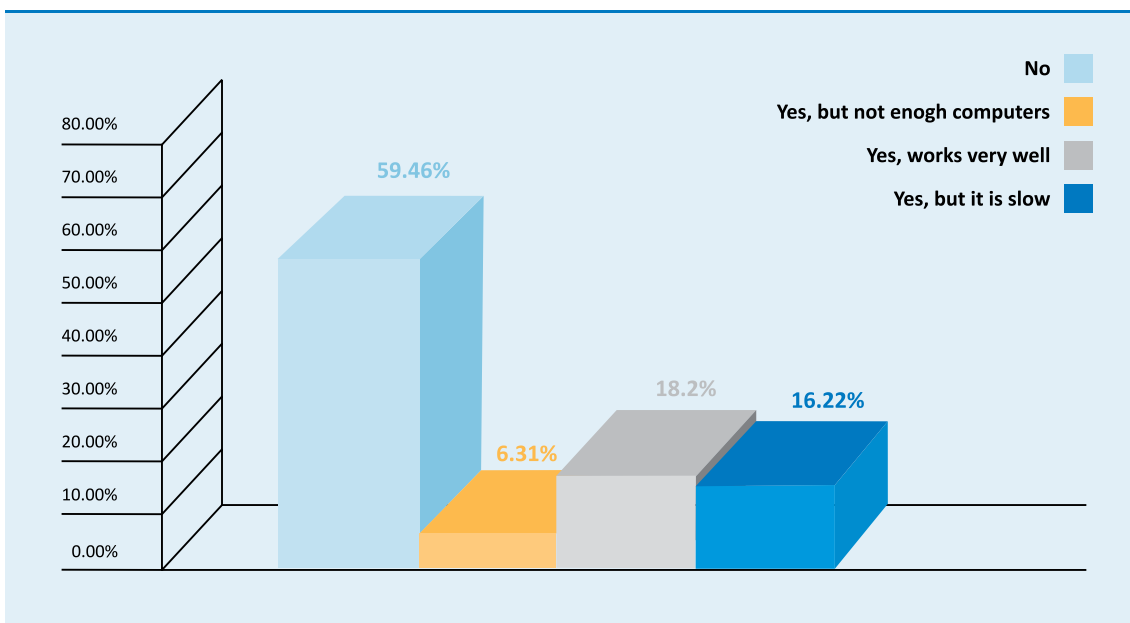
Figure 20: Internet at schools

6.3. LANGUAGE

The graph below gives information in regards to languages that users use while browsing the Internet. Note that most of young Internet users use the English language as primary language, while Albanian language is used more by age groups from 40 – 59.

Languages that are Used for Internet browsing (Based on Age groups)
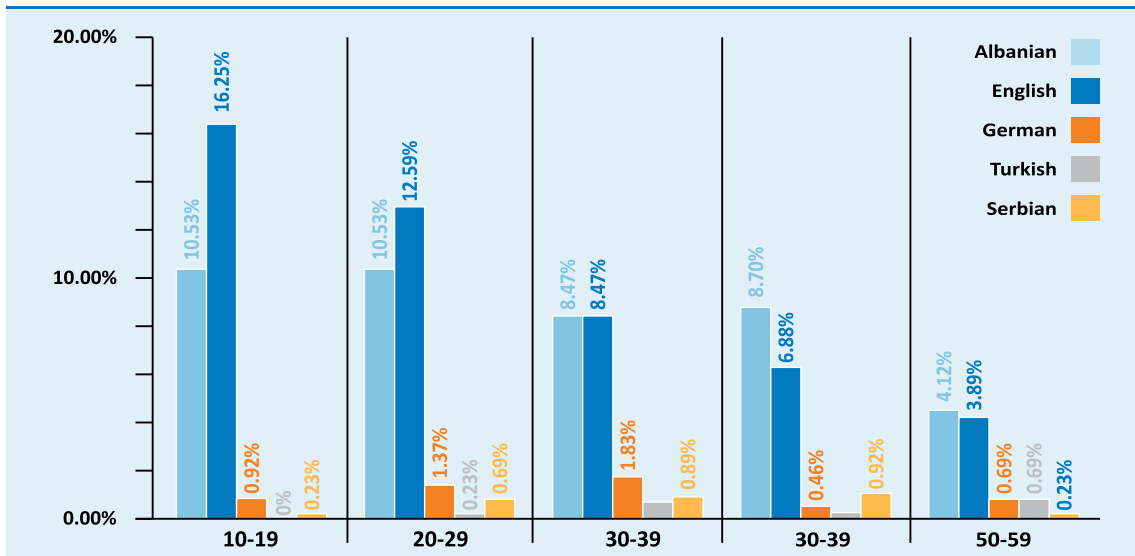
Figure 21: Languages used for Internet browsing

6.4. DAILY INTERNET USAGE

The graph below shows the frequency of Internet usage of respondents. As shown, the majority of users (80.86%) use the Internet on daily basis.

How oftes do you use the Internet
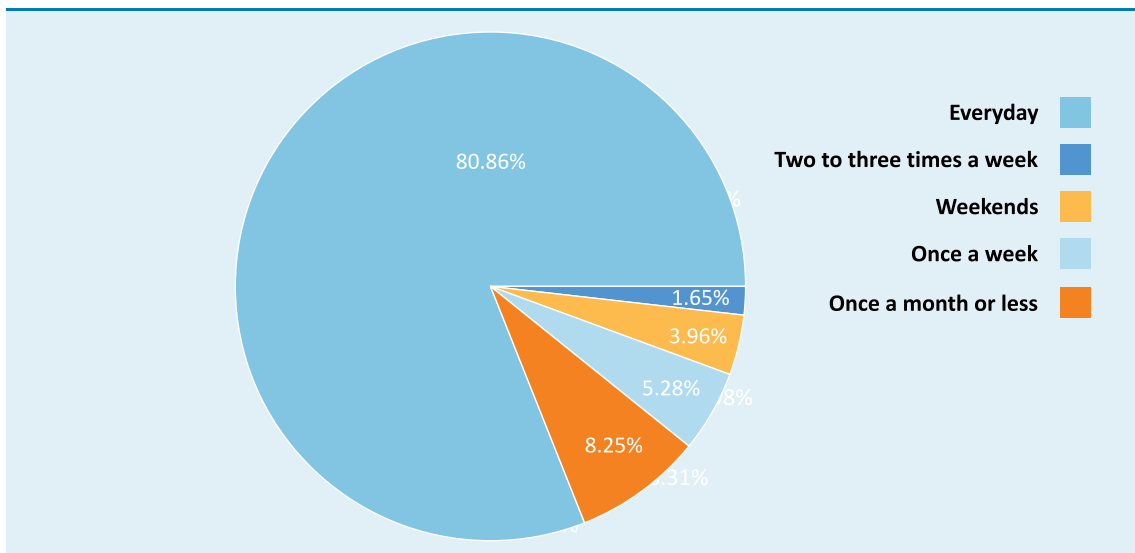
Figure 22: Frequency of Internet usage

6.5. PURPOSE OF INTERNET USAGE

6.5.1. ENTERTAINMENT

The Internet has been traditionally used also for entertainment. The situation in Kosovo is similar because users use the Internet also for playing games and lately for socialising. There are many other forms of entertainment that Internet provides but only the following were considered.

6.5.1.1. VIDEO GAMES

Although the questionnaire did not contain information on activities and professions of facebook gamers, through face-to-face interviews, it has become obvious that the main groups of players are teenagers, housewives, and employees while at work. The graph below shows this information based on gender and age groups.

Internet usage for Facebook games
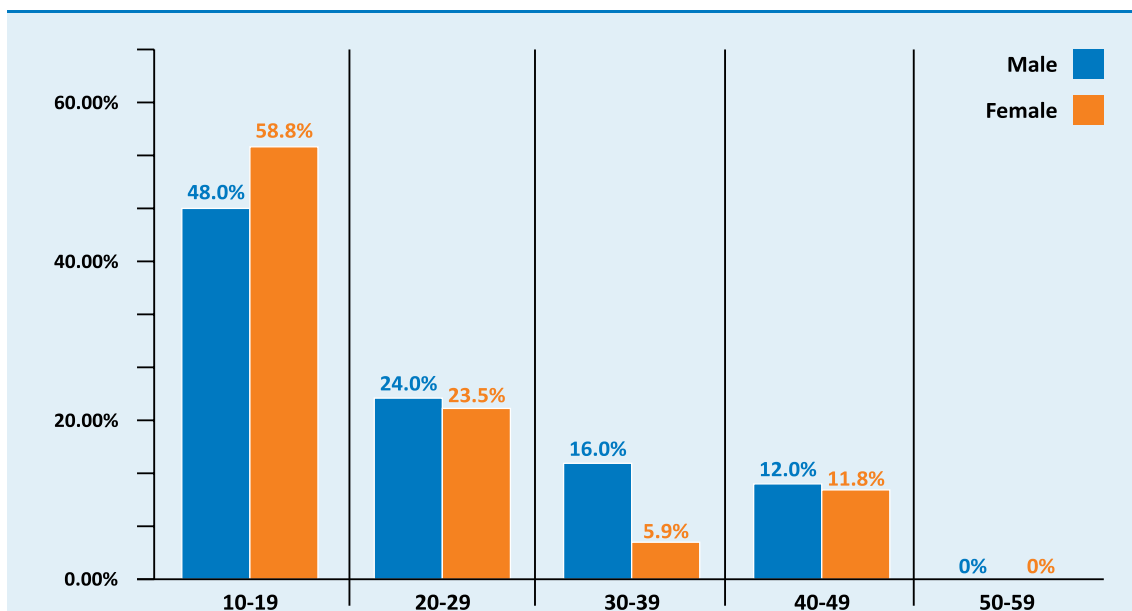
Figure 23: Internet usage for facebook games

The graph below shows the Internet usage for games. If this data is compared with the location of Internet usage for games, it is evident that there is a shift from game playing in Internet cafes (within LAN), which has been the favourite place for youngsters in the past, to playing games from home by connecting to game servers available online. The reason for this change is mainly the provision of higher bandwidth connections for households, more comfort for a cheaper price.
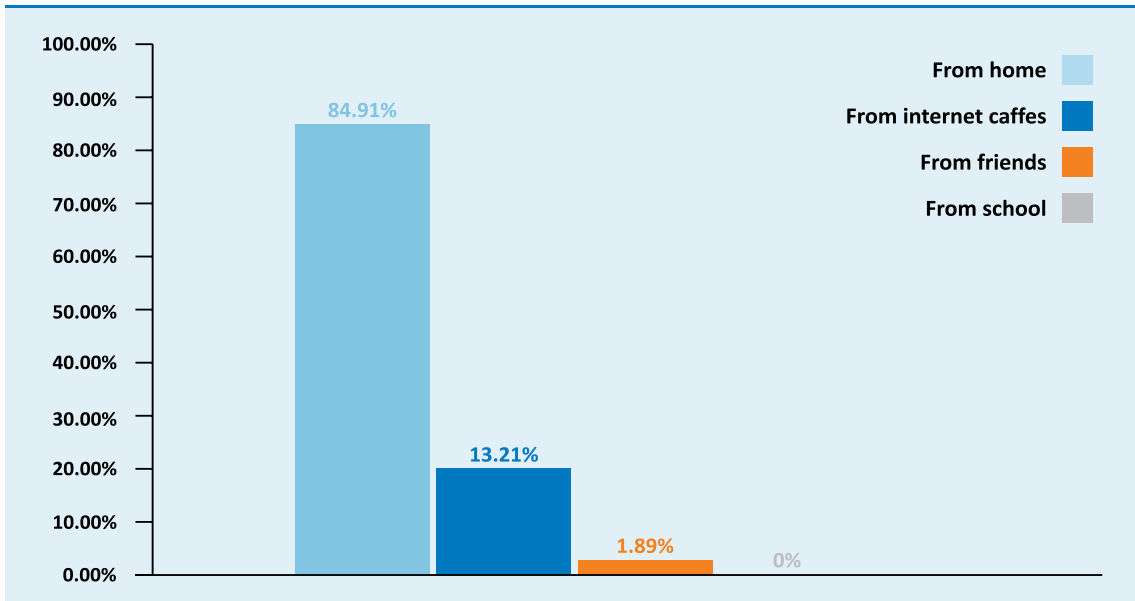
From where do you play the games?

100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%

From home
From internet caffes
From friends
From school

84.91%
13.21%
1.89%
0%

Figure 24: Game playing location

How often do you play games?

60.00%
40.00%
20.00%
0.00%

Not every day
Every day up to 1 hour
Every day up to 3 hours
Every day up to 5 hours
Every day more than 5 hours

50.94%
28.3%
16.98%
1.89%
1.89%
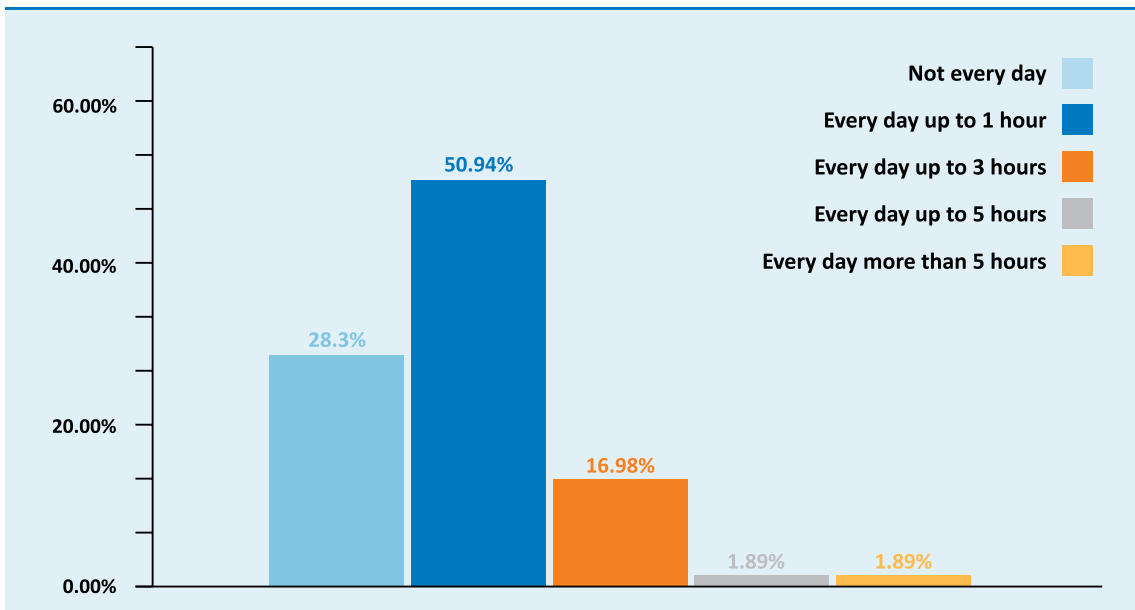
Figure 25: Frequency of playing games

The graph below shows the Internet usage for games. This does not include facebook gamers where female participants are very active, rather, in this group there were no female respondents who play games such as Counter Strike, etc.

Internet usage for games
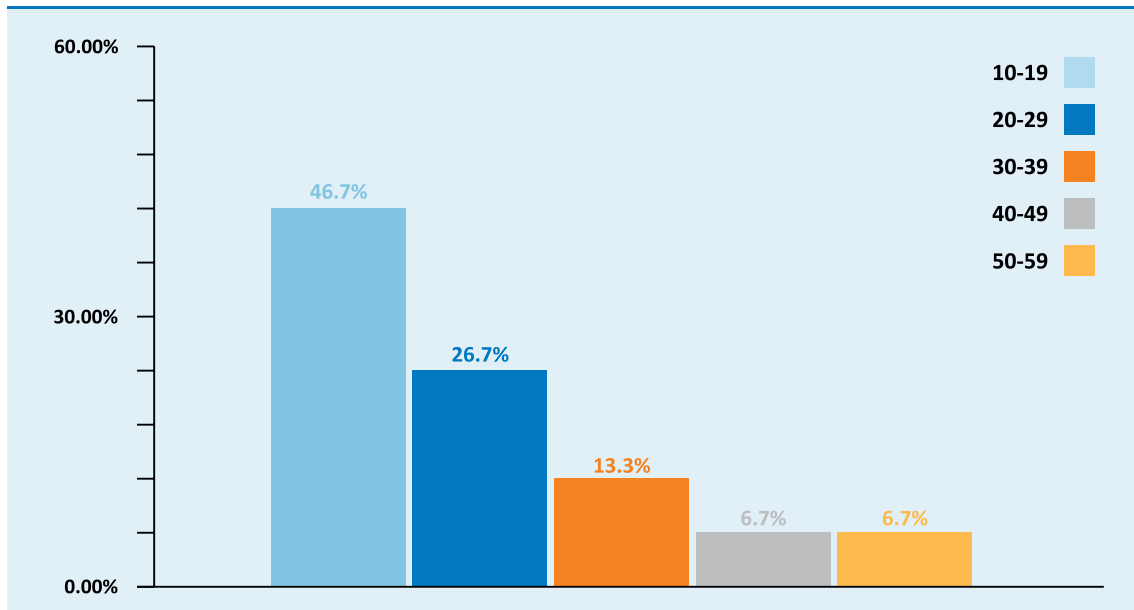
Figure 26: Internet usage for games

6.5.1.2. SPORTS

As seen in the graph below, when there is the question of Sports information, the age difference does not matter and it is not significant. Respondents of age groups from 10 – 49 are all almost equally interested in Sports related news. However, there is a considerable difference when it comes to gender, as shown in the graph further down.
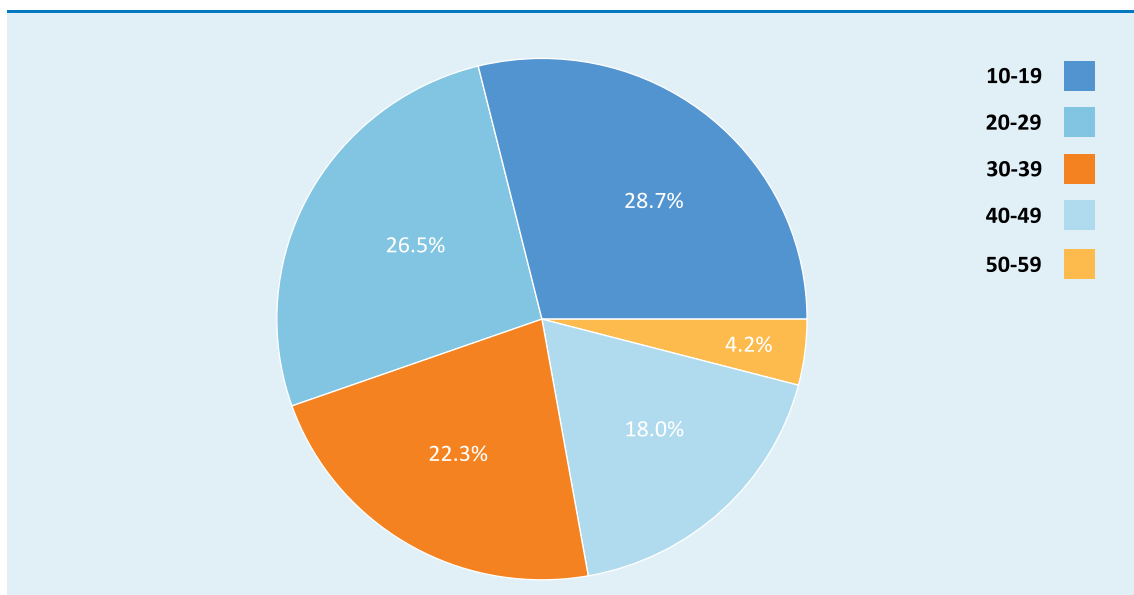
Do you use Internet for information related to Sports?

Figure 27: Internet usage for sports by age

Do you use Internet for information related to Sports?
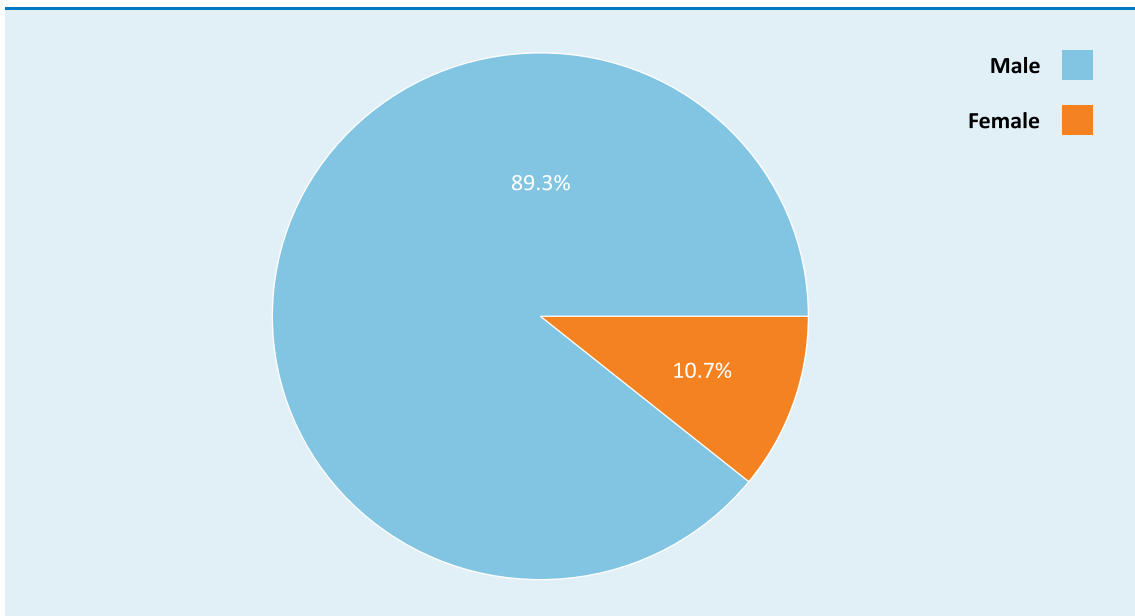
Figure 28: Internet usage for sports by gender

6.5.1.3. NEWS

The most interested age group in regards to the news (national news too) is the youth of age from 20 – 29, as shown in the graph below.
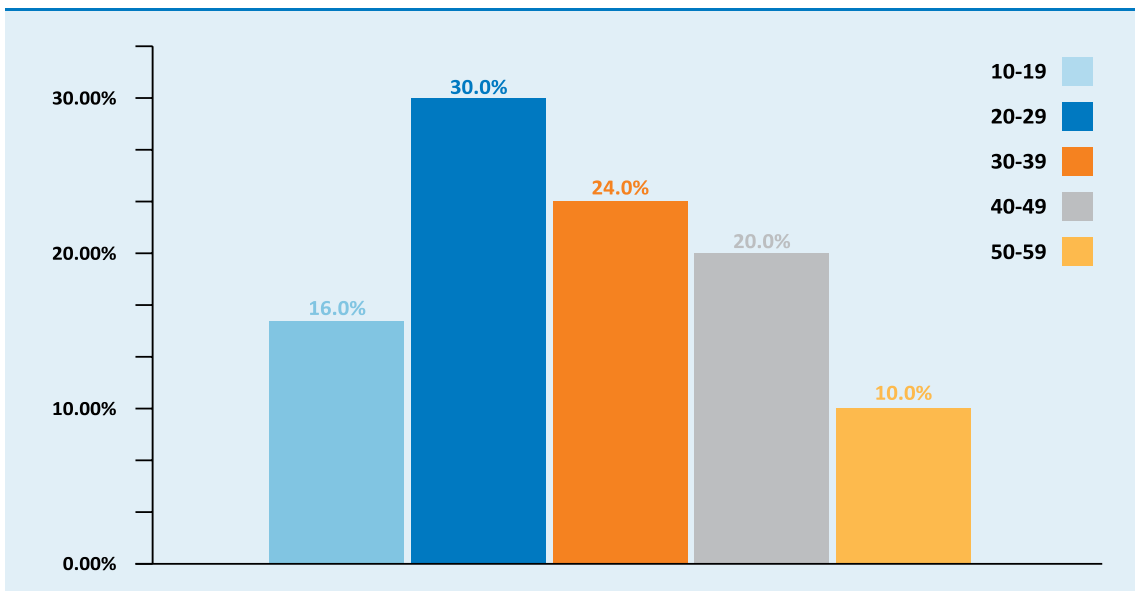
Do you use Internet for information related to News?

Figure 29: Internet usage for news by age

6.5.1.4. MUSIC

Although data has been gathered in regards to the usage of Youtube, this graph shows the use of Internet for music without considering specific content providers.
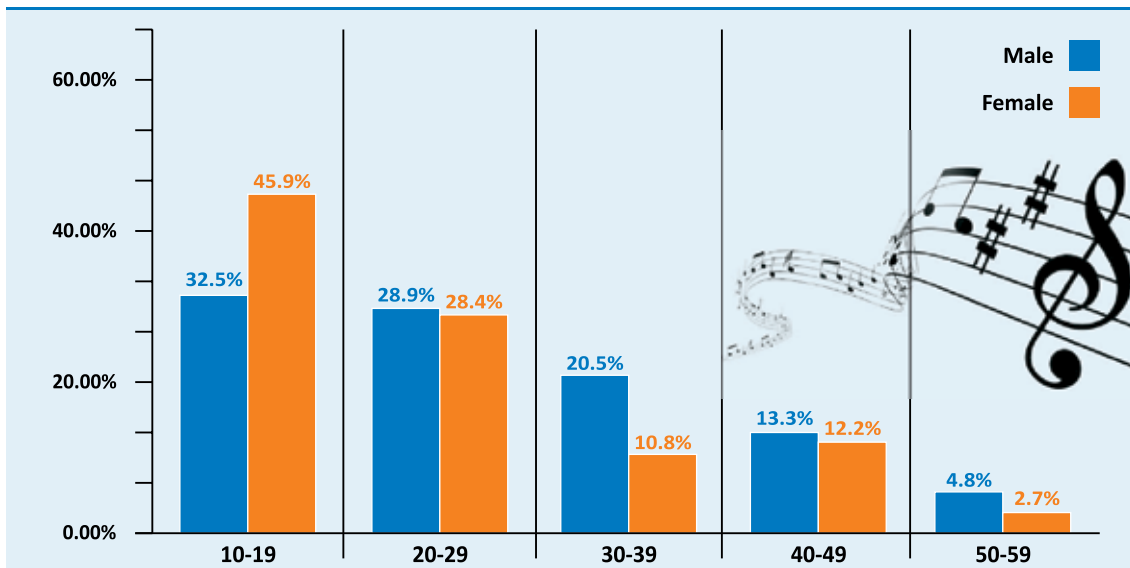
Internet usage for music

Figure 30: Internet usage for music

6.5.1.5. MOVIES

In this graph, the usage of the Internet for downloading movies (torrent files[41]) and watching movies online has been included. It is interesting to further analyze this type of information, once the law on copyrights[42] starts to be implemented in Kosovo. For the breakdown, see figure below.
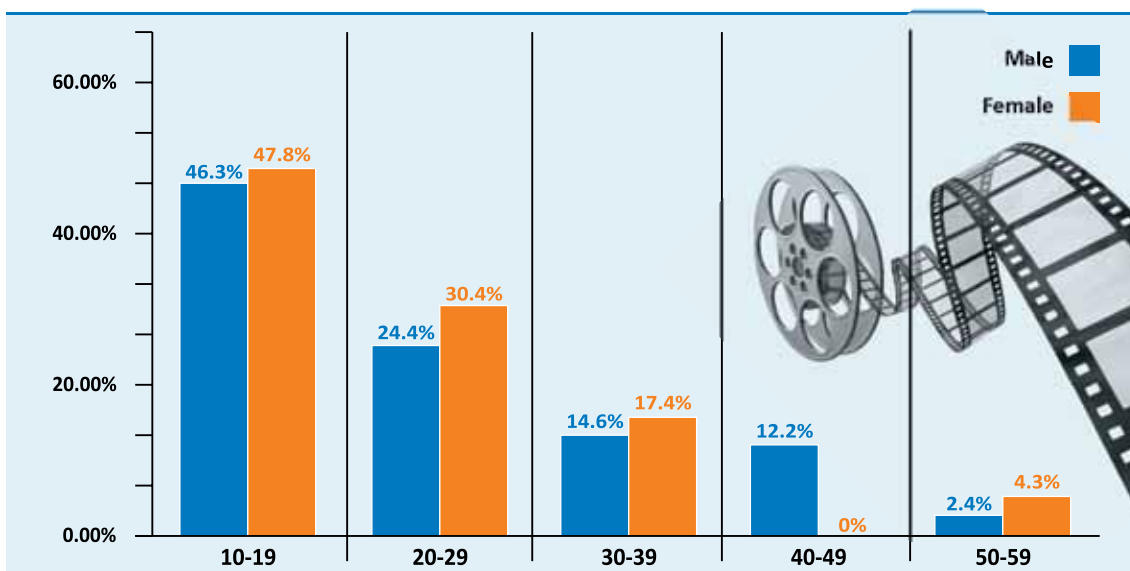
Internet usage for movies online

Figure 31: Internet usage for movies

41 http://paths.sheffield.ac.uk/wikiana/wiki/Torrent_file
42 http://www.kuvendikosoves.org/common/docs/ligjet/2004_45_en.pdf

6.5.1.6. GENERAL BROWSING

The graph below shows that female young users are ahead of male population in regards to Internet browsing and reading. This also holds true when it comes to using the Internet for research and studying, as it is shown further down.
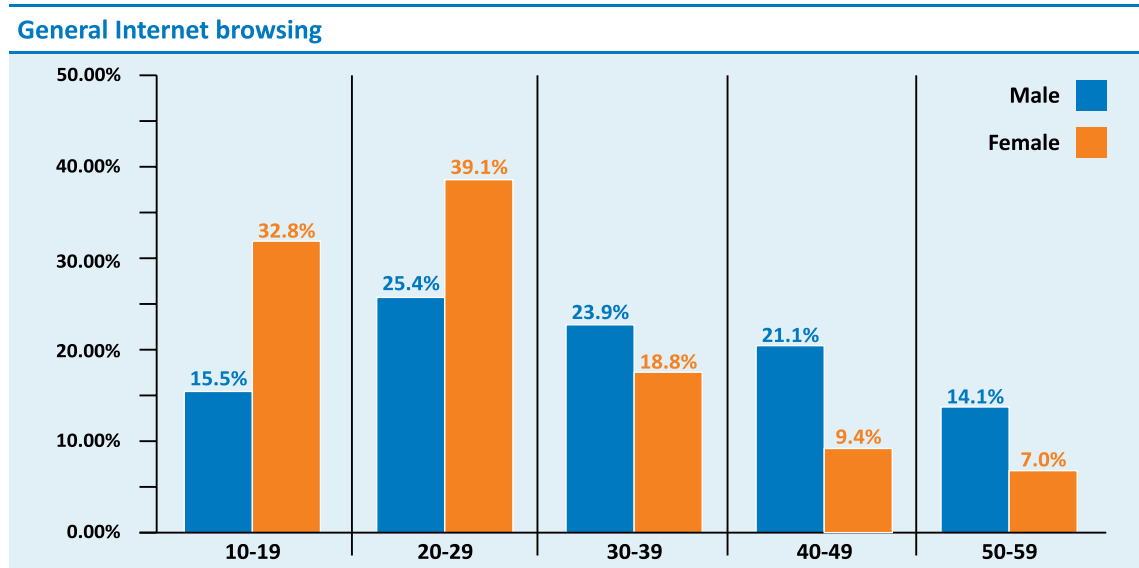
General Internet browsing

Figure 32: General Internet browsing

6.5.1.7. INTERNET, E-BANKING AND ONLINE SHOPPING

The section Related Studies above refers to a source where 47.6% of bank clients do not trust the Internet for e-banking services. Even though this research was done only through interviewing bank clients, the overall situation is similar, as it is shown below. The important point to note in this graph is the low percentage (2.99%) of users that are not aware of online payments as a possibility, hinting on satisfactory Internet literacy rates.
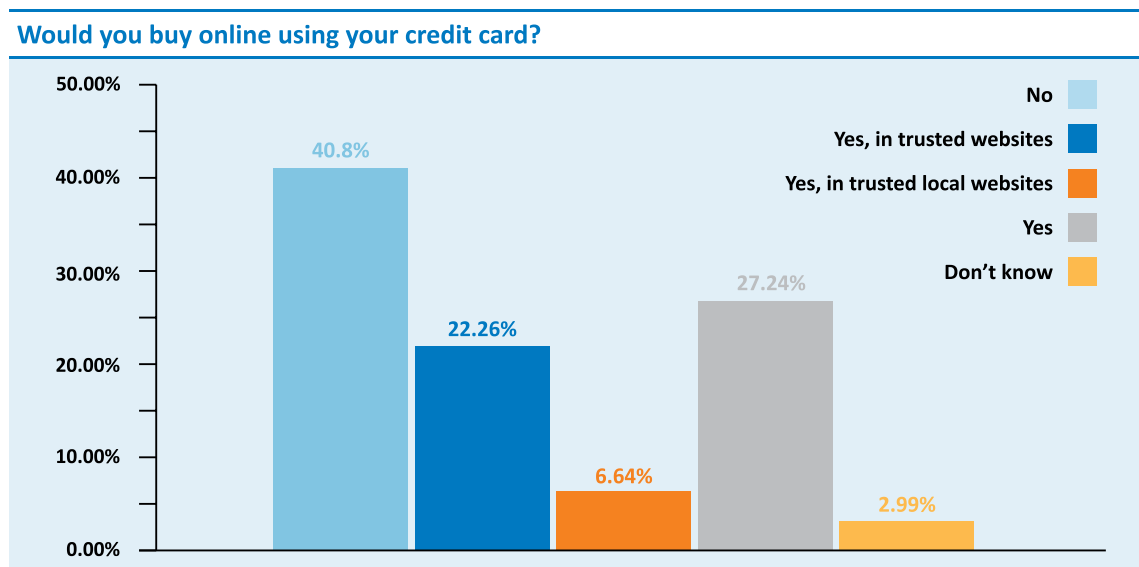
Would you buy online using your credit card?

Figure 33: Online shopping confidence

The issue of Internet and Security needs further in-depth analysis and implementation with special emphasis on web security, security auditing for public and private sector (i.e. ISO 27001), and raising awareness for end-users.

6.5.2. COMMUNICATION

One of the main drivers on the increase of Internet demand is the convenient means of communication that Internet offers. Considering the fact that nearly every third Kosovar today lives abroad and that every third household in Kosovo has at least one family member living abroad[43], low cost communication is of vital importance and the Internet offers exactly this.

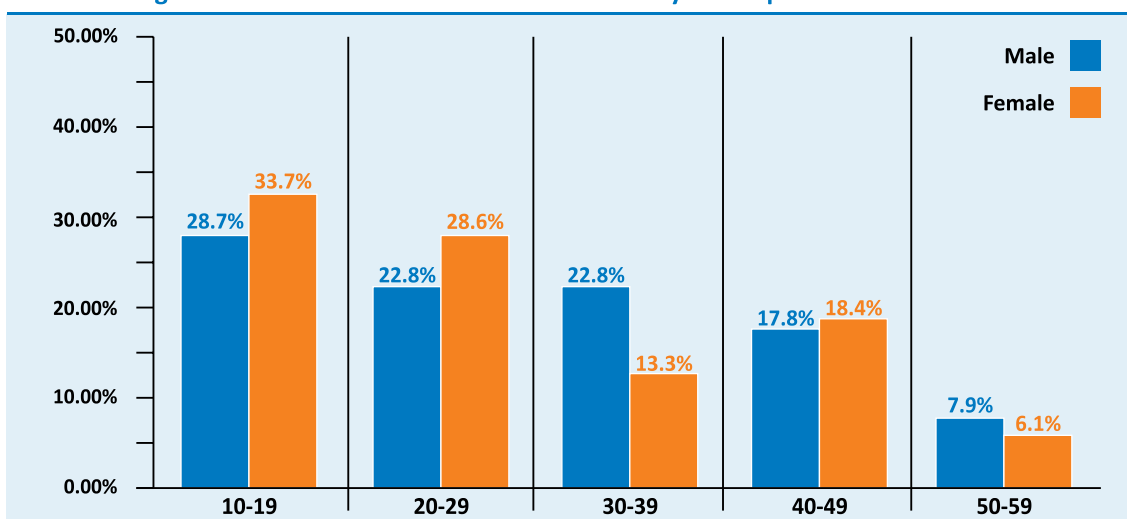**Internet usage for communication with friends and family in Diaspora**

Figure 34: Internet usage for communication

6.5.2.1. AUDIO & VIDEO COMMUNICATION – SKYPE

Skype service is an addition to the communication means with the family abroad. However, this service is very popular due to its optimized audio and video communication capabilities. Additionally, this service is very popular with rural areas considering the fact that higher numbers of migrants come from rural areas[44].

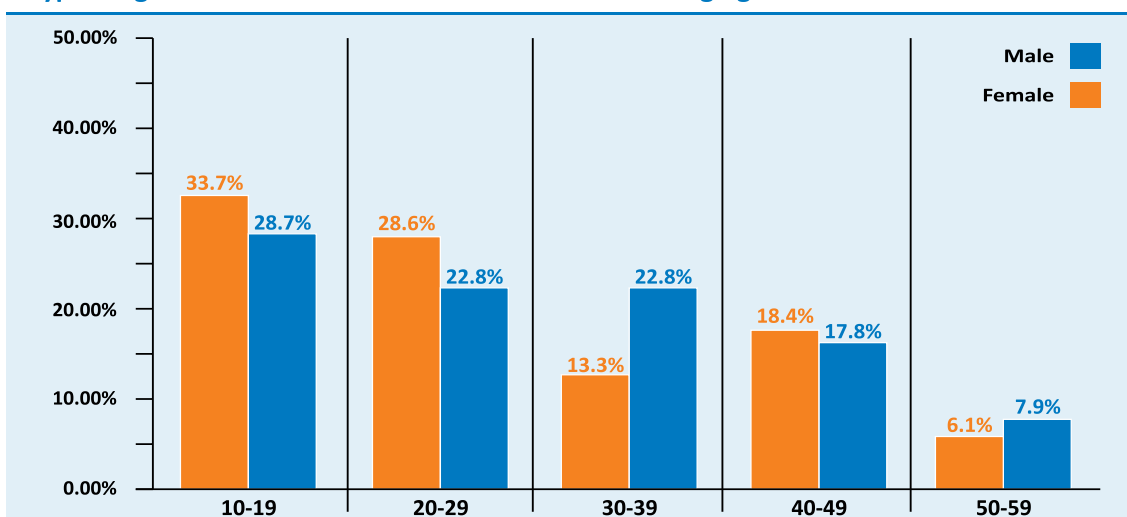**Skype usage for video communication and instant messaging**

Figure 35: Internet usage for Skype services

6.5.2.2. INSTANT MESSAGING – MSN MESSENGER

Although other instant messaging, audio and video services have entered the market, MSN Messenger is still being used by a significant proportion of population.
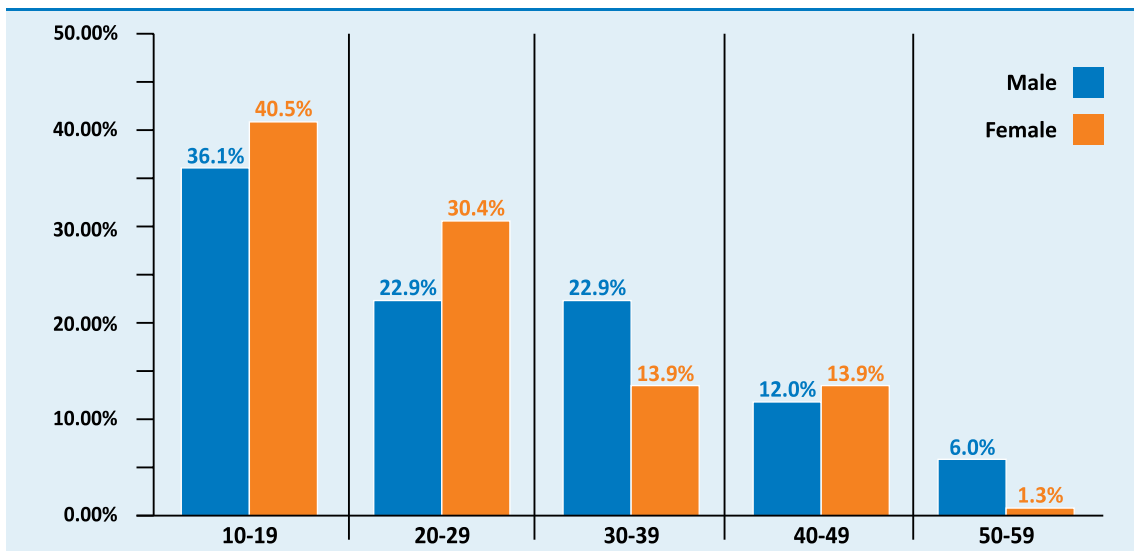
Internet usage for MSN messenger

Figure 36: Internet usage for MSN Messenger services

6.5.2.3. SOCIAL NETWORKS

For the purposes of this study only *facebook* was considered – considering that other social media network services such as Twitter are not very popular in Kosovo. The results are shown in the graph below. It is evident that both male and female users are very active in using this service.
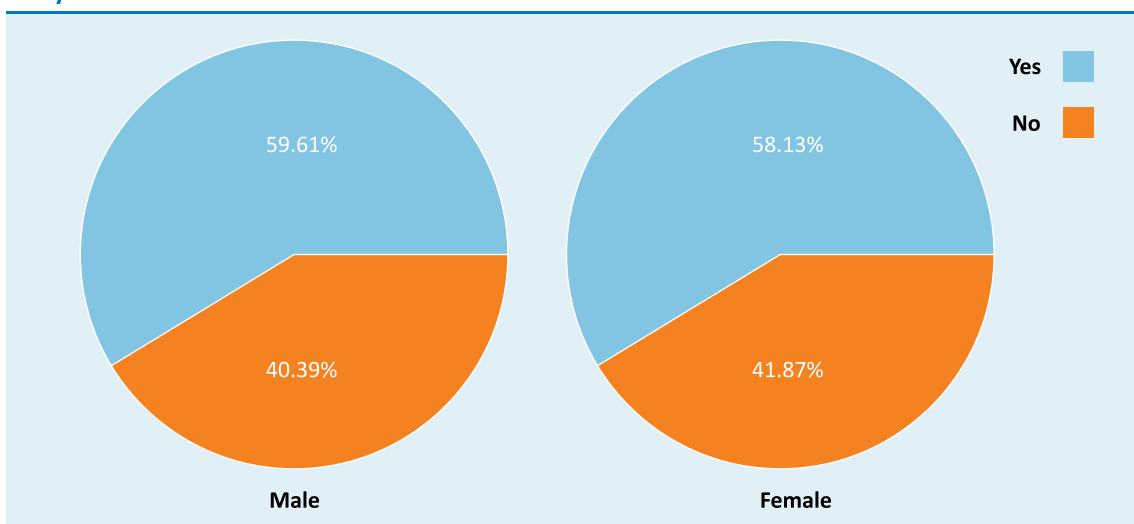
Do you use Facebook?

Figure 37: Internet usage for Facebook services

6.5.2.4. EMAIL COMMUNICATION

Email communication for personal reasons is being used mostly by younger generations, and almost equally among male and female. However, the graph further below shows that email communication for work and business is being used by a much higher proportion of male users, leaving female users at just 19%. This might give a hint on career differences that are present based on gender and requires further research by field experts. In regards to age and work related email communication, the graph further below shows that users of the group age 30 – 39 are more active than other groups.
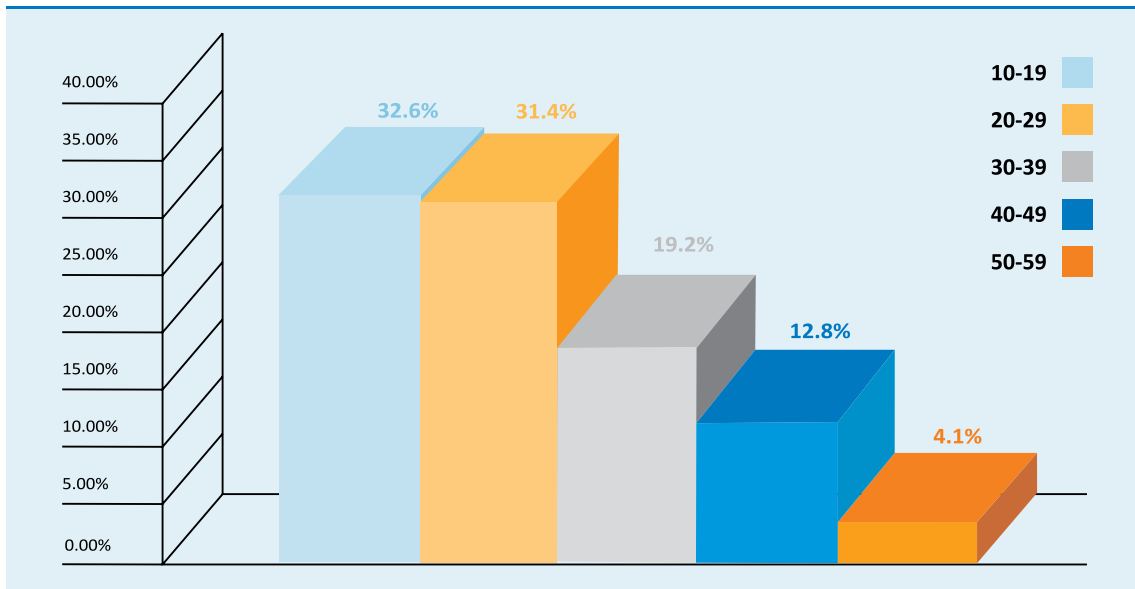
Personal e-mail usage

Figure 38: Personal e-mail usage by age

Personal e-mail usage
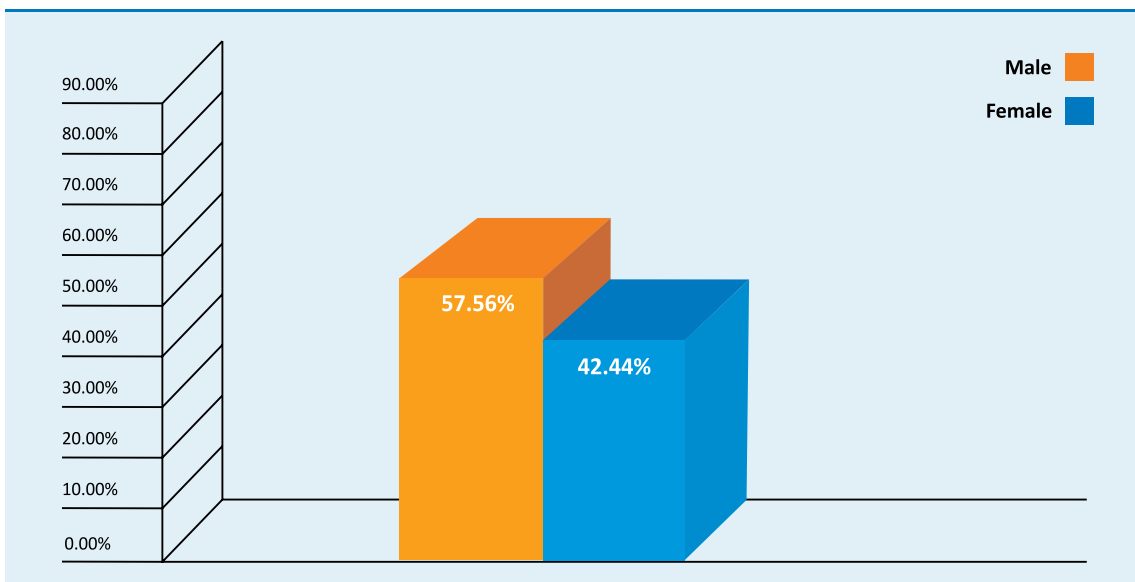
Figure 39: Personal e-mail usage by gender

INTERNET PENETRATION AND USAGE IN KOSOVO

Work related e-mail usage
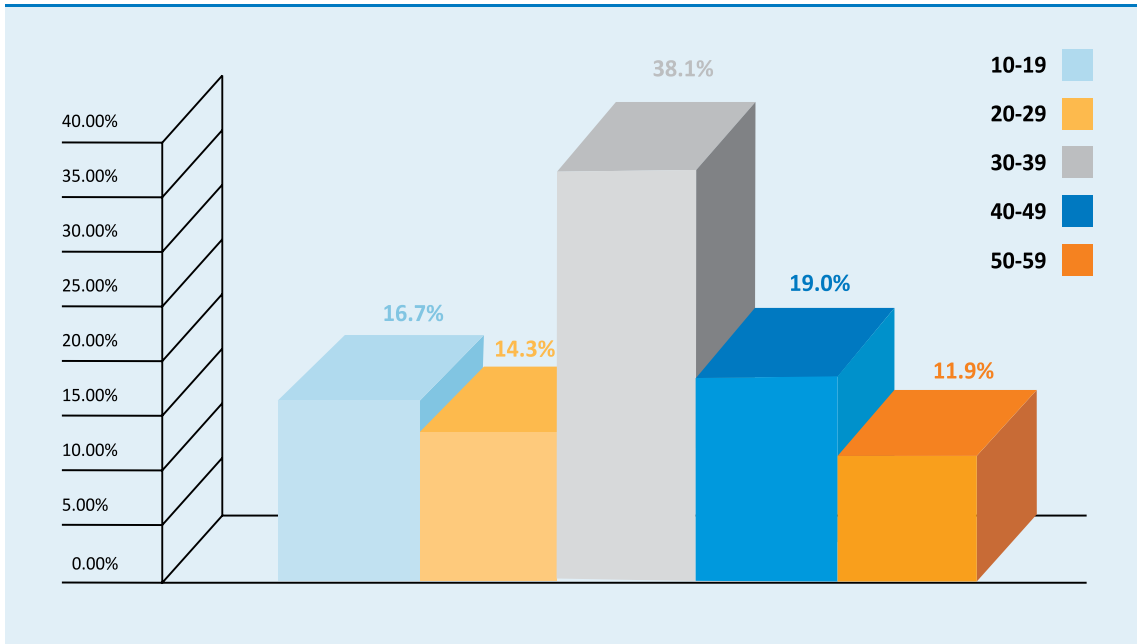
Figure 40: Work e-mail usage by age

Legend: 10-19, 20-29, 30-39, 40-49, 50-59

Values: 16.7%, 14.3%, 38.1%, 19.0%, 11.9%

Work-related email usage

Figure 41: Work e-mail usage by gender

Legend: Male, Female

Values: 81.0%, 19.0%

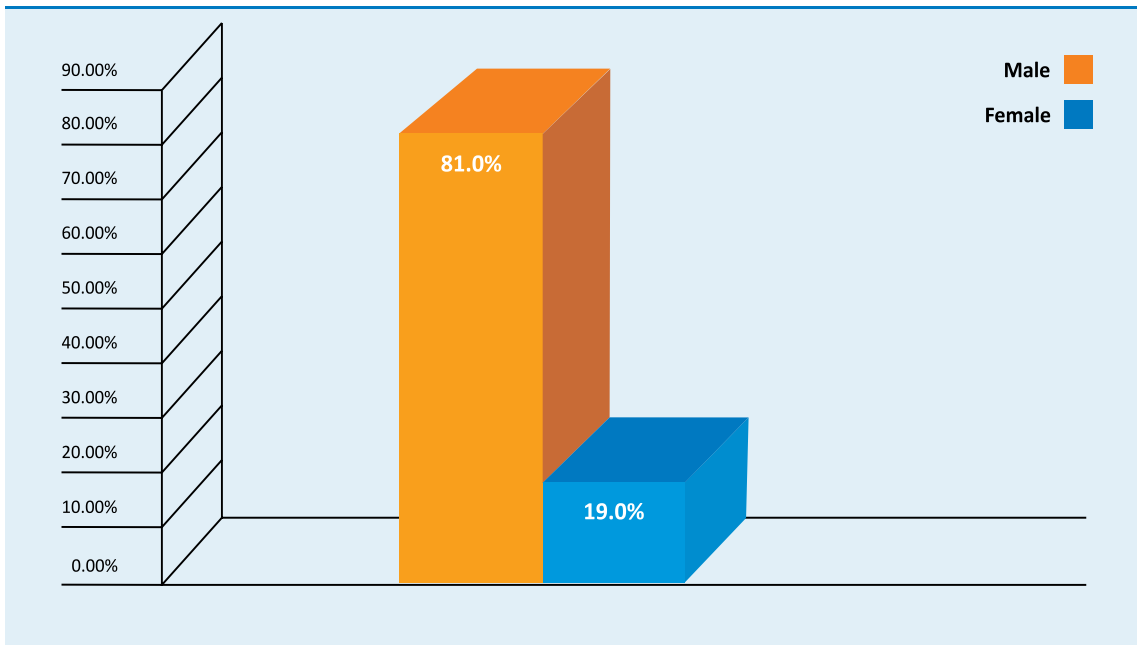## 6.5.2.5. YOUTUBE

Younger female population is ahead of male population during the young ages. However from 30 and onwards, the male population is more active in using this service.
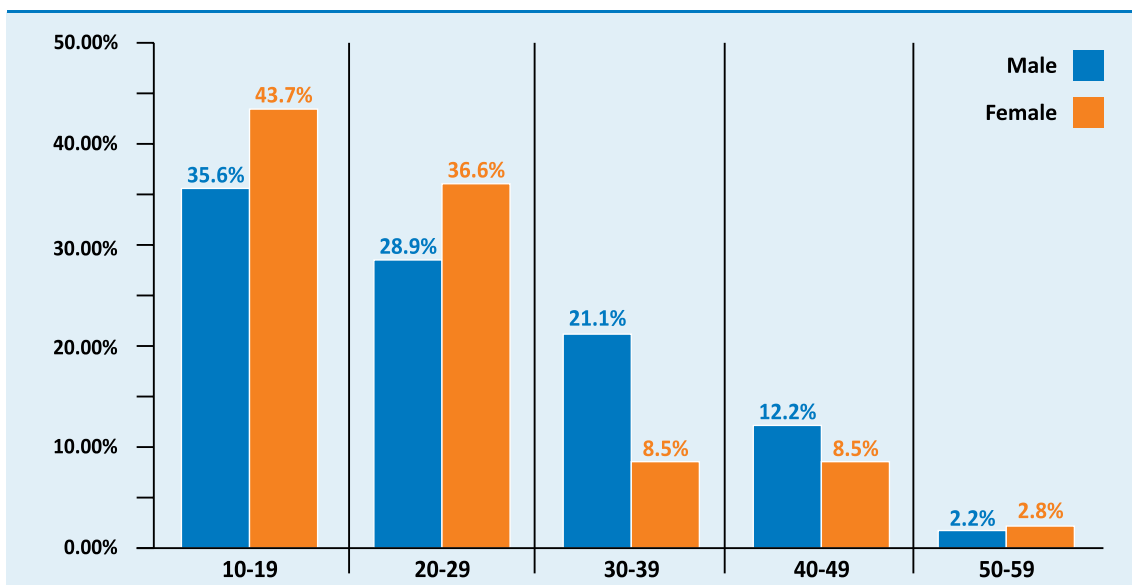
Internet usage for Youtube

Figure 42: Internet usage for Youtube services

6.5.3. LIFESTYLE

Compared to male population, female population is the leader in using the Internet for lifestyle and dressing ideas.

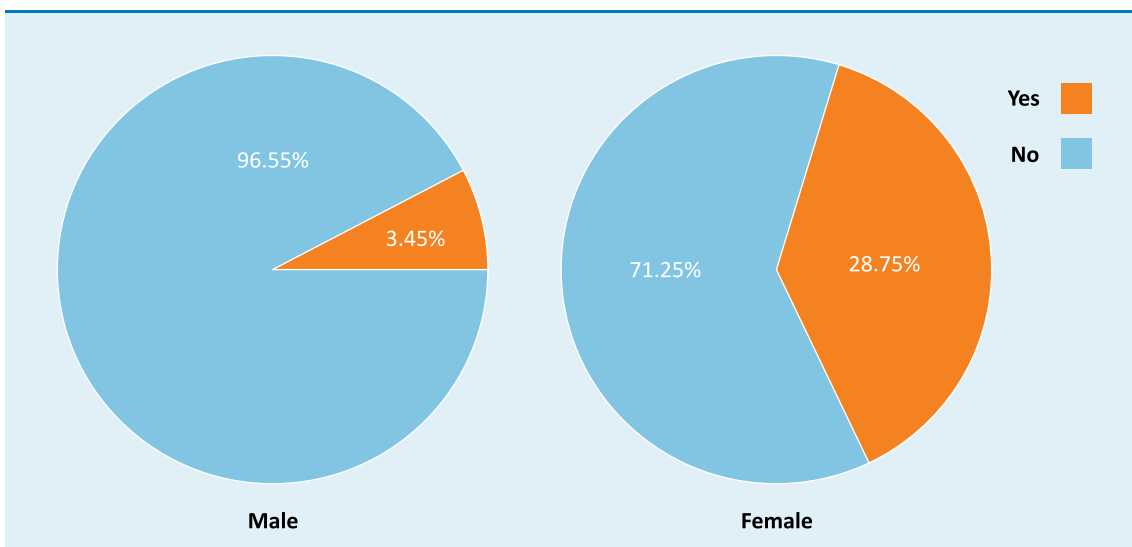**Do you use internet for Lifestyle and Dressing Ideas?**

Figure 43: Internet and lifestyle

6.5.4. RESEARCH AND STUDY

Similar to the section above in regards to General Internet browsing, female young population is much more active in using the Internet for research and studying. Similar to email usage, once this population group passes the age of 30, the male population is ahead of using the Internet for research and studying. The reason for this shift (and other similar results in other graphs) could be hypothesised using cultural values, i.e. women mainly tending to the house chores and raising family.

Internet usage for research and studying

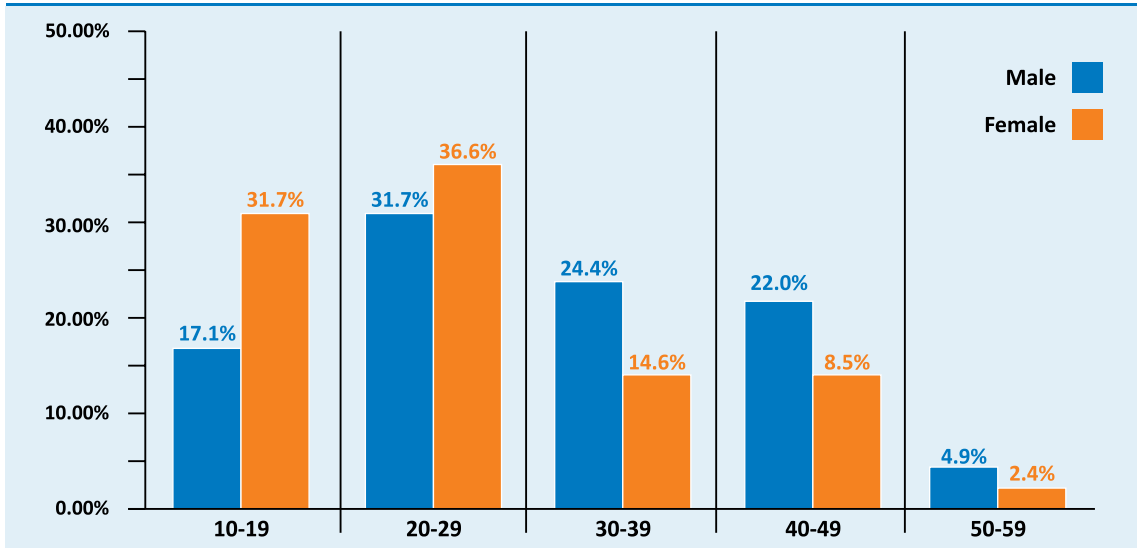**Figure 44: Internet utilization for research and studying**

7. e-GOVERNMENT

The graph below shows the awareness of population in regards to services offered by the Government of Kosovo through utilizing the Internet.

Are you informed that when you apply for official documents (ID, passport, driving license), you can check your application status online?
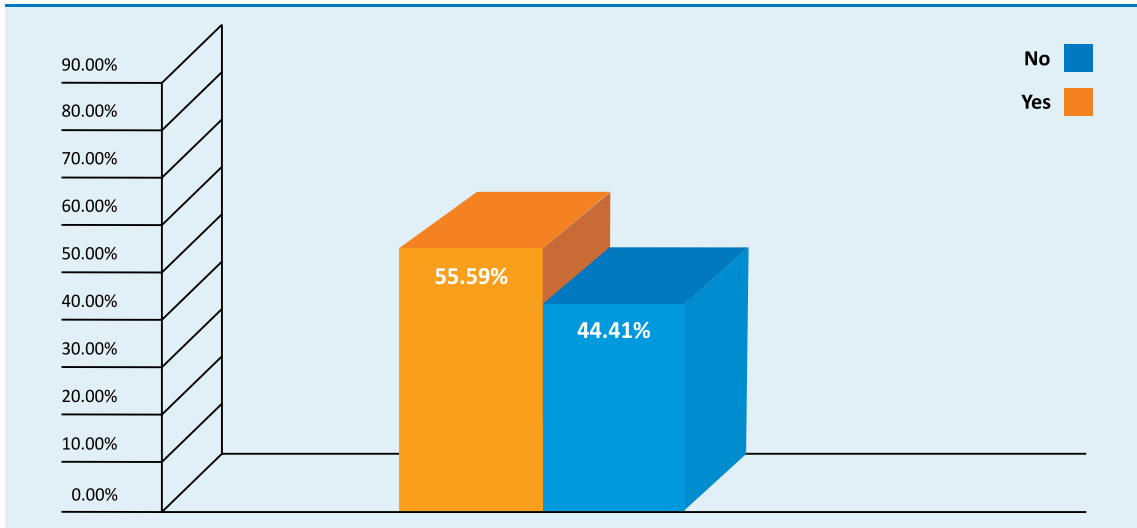

Figure 45: e-Government services

8. CONCLUSIONS AND RECOMMENDATIONS

The Internet penetration and Internet usage in Kosovo is comparable with regional middle income countries such as Greece and Bulgaria. However, as this study reveals, it is evident that there is a lack of meaningful initiatives and coordination in the ICT sector in Kosovo with the aim of providing better value for money to end-users and opportunities to the youth who are active and capable in utilising the Internet and communications in general. The ICT sector needs to further cooperate in terms of developing joint activities and information exchange, as well as define a common strategy of the ICT sector from the perspective of youth inclusion and empowerment.

According to the findings of this study, the Internet usage and behaviour is highly heterogeneous. Women and men, young and old, have different needs and types of Internet usages.

Further, this study also reveals the data gap in the area of Internet penetration. The existing set of data that is being collected by the relevant authorities needs to be further enriched with disaggregated indicators. As Kosovo is aiming towards fulfilment of International standards in ICT sector, corresponding sets of information shall be gathered and processed accordingly i.e. information provision such as contention ratio, which is a very important parameter of quality of service. Subsequently, it is imperative for the Kosovo political agenda to begin immediately with the development of ICT indicators that can and will be measured regularly and presented to general public and most importantly interested parties[45]. This study has aimed to provide baseline data on Internet penetration and usage that can be further developed, expanded and adopted.

Using the findings of this study, and considering the fact that there is a lack of public information in regards to infrastructure mapping, it is recommended to strengthen joint programmes by initiating joint projects among all relevant stakeholder with the aim of documenting and mapping the Internet and telecom infrastructure. The data to be made publicly available after security aspects of it have been fully considered. Currently, wireless technologies are the main driver of broadening the geographical aspects of connectivity, albeit in short ranges. The issue of wireless security (in addition to overall constant Internet security threats) needs to be further analysed with a specific focus on raising awareness of end-users combined with more transparency on provided offers by Internet Service Providers.

It is further recommended that relevant stakeholders to intensify awareness raising among the population on Internet security, Internet-based financial transactions and parental control.

As a last word, this study has aimed at providing baseline data that can be measured regularly on annual basis. This could produce invaluable information related to trends, attitudes and behaviour. It was also the aim of this study to initiate a discussion on Internet penetration and usage, and governance among relevant stakeholders.

45 http://www.unescap.org/idd/pubs/st_escap_2353.pdf

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