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Digital Divide: From Computer Access to Online Activities – A Micro Data Analysis

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Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

English - Or. English

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR INFORMATION, COMPUTER AND COMMUNICATIONS POLICY

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Working Party on Indicators for the Information Society

DIGITAL DIVIDE: FROM COMPUTER ACCESS TO ONLINE ACTIVITIES

A Micro Data Analysis

English - Or. English

FOREWORD

The Working Party on Indicators for the Information Society (WPIIS) discussed this paper at its meeting in June 2010. The Working Party agreed to recommend the paper for declassification to the Committee for Information, Computer and Communications Policy (ICCP). The ICCP Committee agreed to the declassification of the paper in March 2011.

The paper was drafted by Pierre Montagnier, OECD's Directorate for Science, Technology and Industry Secretariat, and Albrecht Wirthmann, EUROSTAT, as part of the OECD work on the economic and social impacts of ICTs.

It is published under the responsibility of the Secretary-General of the OECD.

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MAIN FINDINGS

This study addresses issues of digital divide among households and individuals by using micro-data analysis of ICT usage patterns. The analysis includes data from 18 European countries (2008), Korea (2008) and Canada (2007). Inequalities in computer and Internet use are analysed in a two-step approach. First, the paper tries to better quantify and understand the factors that separate the 'haves' and the 'have-nots'. Second, it tries to explain observed differences in the frequency and type of Internet use as a result of the socio-economic characteristics of households and individuals.

The study applies logistic regression and multi-linear regression models to measure the influence of one variable while controlling for the other variables. In particular, age, gender, educational attainment, employment situation, geographical location, household income and composition are used to explain the observed differences in computer and Internet access and use (first part) and Internet frequency of use, selected Internet activities, and Internet scope of use (second part).

The study proves the feasibility of performing micro data analysis of surveys of ICT usage in households and by individuals. It shows that:

- *Low income is the single most important factor for non access to a computer and to the Internet.* On average, the odds that a high-income household in Europe has access to a computer and to the Internet are over 4 times higher than for a low-income household.
- *The presence of children is the second most important factor for the access to a computer and to the Internet*: on average, the odds for a household with one or more children in Europe are up to 3.9 times higher than for a household without children.
- *Living in a town in Europe increases the odds to have access to a computer and to the Internet by over 30% as compared to living in the countryside*.
- *Age and economic inactivity are by far the most important factors for having never used a computer or the Internet.* The odds are over 4 times higher for European inhabitants aged 65-74 years and up to 2.6 times for those out of the labour force. (Low) income, gender (female) and (lack of) children do play a role but their effect is smaller.
- *Becoming unemployed is the most important factor for stopping using the Internet.* The odds that a European inhabitant has not used the Internet over the last 3 months are about 2 times higher if he is unemployed or out of the labour force.
- *Education is the most important determinant of the intensity of Internet use*. The odds that an individual uses the Internet everyday increases by 2.4 times in Europe and by 3.6 times in Korea if he has a university degree and above.
- *Being a student is the second most important determinant of the intensity of Internet use* – the odds that a student uses the Internet every day are 2 times higher both in Europe and in Korea.
- *The third factor explaining the intensity of Internet use is income in Europe* (the odds are over 70% higher for the high-income households) *and broadband access in Korea* (the odds are 2 times higher for households with a broadband connection).
- *Young age and higher education are the main determinants for the scope of Internet use in Canada, Europe and Korea.*

DIGITAL DIVIDE: FROM COMPUTER ACCESS TO ONLINE ACTIVITIES

A Micro Data Analysis

1. Introduction

This paper is an attempt to revisit the digital divide among households and individuals, in the light of the micro-data which have recently become available in a number of countries.

According to Amartya Sen, every investigation on equality has to answer the question: "Equality of what?"(Sen, 1992). Many divides exist (Sciadas, 2002), and digital divide refers to different concepts of inequality leading to technological, immaterial, material, social and educational dimensions.

This paper tries to shed light on inequalities in computer and Internet use, based on a two-step approach.

First, it aims at better quantifying and understanding the factors that separate the 'haves' and the 'have-nots'. As ICTs diffuse, the policy interest has focused on the risk of being excluded from the "information society". The issue of social inclusion, therefore, is becoming more and more an issue of e-inclusion. This paper uses socio-economic characteristics, such as age, gender, educational attainment, employment situation, geographic location, household income and composition, to explain the observed differences in computer and Internet access and use.

Second, the analysis goes beyond the issue of connectivity and looks more closely at the 'haves' group. This part also uses socio-economic characteristics of households and individuals to explain observed differences in the frequency and type of Internet use.

The paper is organised as follows. Section 2 analyses the determinants of non access to and non-use of computer and the Internet; in particular:

- non access from home;
- non-use;
- Internet dropouts.

Section 3 looks at the determinants of Internet use, in particular:

- the intensity of Internet use;
- selected Internet activities;
- the scope of Internet use

Finally, Section 4 summarizes the main results of the study and suggests directions for further research.

The present study is the result of a joint initiative from Eurostat and the OECD.[1]

2. The connectivity: non access to -and non-use of- computer and internet

This study uses logistic regression models to explain households' behaviour – in relation to a computer or the Internet – as a result of their characteristics. For instance, the logistic model estimates the probability that a person never uses a computer as a function of his age, gender or educational level.

The main advantage of the logistic model is that the effect of each characteristic can be singled out. For instance, one can estimate the effect of age on the probability of having never used a computer, independently of the effects of gender or education. This feature has a clear value for policy-making as it permits to identify the most important factors and to prioritise policy targets accordingly.

For analysing the scope of Internet use measures, this study uses a multiple linear regression model. By using a multiple regression, the association between individual independent variables and scope of use is examined while controlling for other characteristic in the model. Further methodological details are provided in Annex 1.

The analysis is based on a set of micro data about individuals' behaviours and personal characteristics in year 2008. Data for European Union countries, Iceland and Norway are drawn from the Eurostat Community Survey on Household and Individuals 2009. Data for Korea are from the 2008 *Survey on the Internet Usage* provided by the Korea Internet & Security Agency (KISA).[2] Descriptive statistics of these two databases are provided in Annex 2.

The analysis of European countries has been carried out by Eurostat and the OECD jointly. Regression outputs for Korea have been provided directly by the KISA, based on the same model. Results are available only for the second part of the present paper (Internet intensity, activities and scope).

Australia has also contributed to this project. The Australian Bureau of Statistics (ABS) undertook the analysis of the various logistics regressions but results were unfortunately inconclusive (the summary is provided in Annex 2 part 2.3).

Finally, a very similar approach has been followed in Canada by Middleton *et al.* (2010). Although this analysis has been carried out independently and refers to 2007, its results are reported in this paper as a reference for the Canadian situation.

Section 1 of the paper covers European countries only, while Section 2 is enlarged to Korea and Canada.

Section 1 is an attempt to understand the causes for being on the "dark side" of the digital divide, *i.e.* not to have access to a computer or to the Internet at home, to have never used a computer, or to have never used the Internet. A special focus is also devoted to Internet dropouts.

2.1 Access

Access and non access are two faces of the same coin. The analysis provided in this section is based on modeling the probability of having access to a computer or to the Internet at home. The contributing factors to access reveal, negatively, the pattern of non access.

Households who have access to a computer at home

Table 1 shows the determinants of access to a computer.

The probability of having access to a computer at home generally increases with the population density of the region where the household lives. In the EU 18+2 aggregate area (European area), households located in urban areas have a 33% higher probability of having access to a computer at home than households living in thinly populated areas. In three countries only (Greece, Latvia, and the Netherlands), the probability follows a U shape pattern: it is the highest in medium-dense populated areas, the lowest in low-dense populated areas, and in between in the highly dense populated areas. Denmark and Bulgaria show the biggest gap between the different types of regions of residence: individuals located in urban areas are respectively 2.5 and 3 times more likely to have access to a computer at home than those living in thinly populated urban areas.

The probability of having access to a computer at home increases monotonically as the household income increases, and shows very important differences according to the income quartile. In one third of the countries, households from the lowest income quartile are less than 68% likely to have access to a computer at home compared to the reference group. Whereas households from the highest income quartiles are 4.7 times more likely to have access to a computer at home compared to the reference group in the European area. In the Netherlands and Norway, the probability is around 2.5 times higher, in Austria and Slovak Republic more than 3 times higher, and in all the other countries, above 4 times higher. In Portugal, it is more than 14 times higher.

In the Netherlands, it is also very interesting to note that the *household income quartile* has a lower influence on the dependent variable than in the European area. The different household income quartiles have odds ratios[3] varying from 0.64 (lowest income quartile) to 2.445 (highest income quartile). Households from the lowest income quartile have lower chances to have access to a computer at home compared to the reference group, but the probability is nevertheless higher than the equivalent of the European area. On the other hand, households from high income quartile have higher chances but the probability is nevertheless lower than the equivalent of the European area.

The presence of children significantly increases the probability of having access to a computer at home. In each country, the presence of children in the household, for a given number of adults, significantly increases the probability to access to a computer at home, with respect to the group of reference. In Italy, for instance, one adult with one or more dependent children is more than 4.5 times more likely to be in that situation compared to a single-person household. Two-adults with children are 2.7 times more likely to have access to a computer at home, whereas two-adults without children have a 25% lower probability to access to a computer at home compared to single-person households. And similarly for 3-or-more-adults households: those without children are less likely to have access to a computer at home than those with children (values of the odds ratio are respectively 2.451 and 3.205).

Compared to single-person households without children, those with dependent children are the most likely to have access to a computer at home in half of the countries. In Portugal, they are nine times more likely to access to a computer at home, and in Slovenia 31 times more likely.

In about one-third of the countries two-adult households without children are less likely to have access to a computer than single-adult households. A possible explanation could be that these two-adult households without children are more likely to have access to a computer at work.[4]

Overall, at the EU18+2 aggregate level, income level and presence of children appear to be the most influencing factors concerning household computer access at home. And there is still a clear geographical

divide. Those factors have to be born in mind with respect to the reverse side of the coin, that is, the non-access to the computer at home.

Typically, households who do not have access to a computer at home are living in rural area, belong to the lowest income quartile and do not have children. In about one third of the countries, they include two adults.

Table 1. Odds ratio[1] estimates[2] of logistic regressions for having access to a computer at home in EU18+2, 2008

Countries Explanatory variables[3]	All	AT	BE	BG	CY[4a,b]	DK	EL	ES	FI	HU	IS
Densely-populated area	1.330	2.070	1.335 *	3.049	1.252 †	2.538	2.410	1.689	1.739	2.024	-
Intermediate area	1.044 *	1.364	1.193 †	1.468 *	1.164 †	1.701	2.825	1.248	1.297 †	1.203 *	1.029 †
lowest quartile	0.535	0.998 †	0.557	0.688 *	0.233	0.593	0.300	0.312	0.546	0.396	0.288
second highest quartile	2.020	1.821	2.198	3.367	1.908	3.257	1.969	2.841	3.040	2.062	2.427 *
highest quartile	4.717	3.289	5.128	8.850	4.348	9.009	5.714	7.576	4.762	6.250	5.682 **
1 adult with one or more children	3.876	2.584	2.519	7.937	1.486 †	7.194	3.497 **	4.405	9.434	5.181	5.464 **
2 adults	0.688	0.934 †	1.037 †	0.649 **	0.374	1.159 †	0.534	0.903 †	1.255 †	0.863 †	1.070 †
2 adults with one or more children	2.392	6.452	3.610	2.770	2.778	3.333	2.500	3.012	8.197	5.025	3.610 **
3 or more adults	1.560	3.311	4.202	1.642 **	1.524 †	2.725	1.946	3.012	4.587	2.817	1.919 †
3 or more adults with 1 or more child.	2.415	5.464	4.831	2.299	3.831	4.464 **	3.175	4.630	9.346 *	3.817	12.658 *
C[5]	0.780	0.769	0.780	0.832	0.840	0.823	0.815	0.815	0.819	0.831	0.851

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
Densely-populated area	1.182	0.749 †	1.672	0.744 †	1.597	2.347 **	1.616	1.751	1.553 †	1.267 **
Intermediate area	0.956 †	0.827 †	1.919 *	1.439 †	1.618 **	0.871 †	1.189 †	1.361 †	1.511 *	-
lowest quartile	0.469	0.270	0.345	0.431 **	0.640	0.287	0.371	0.513	0.419	0.278
second highest quartile	1.838	2.016 **	2.320	2.410	3.279	1.245 †	2.941	2.770	2.451	2.445
highest quartile	4.274	3.906	6.757	6.623	2.445	2.525 †	14.286	10.870	9.174	3.155
1 adult with one or more children	4.545	8.929 *	5.181	5.319 *	5.319	6.024 **	9.174	3.788	31.250 **	3.344
2 adults	0.748	1.374 †	1.290 †	1.242 †	1.718	1.684 †	0.880 †	0.700 *	0.465 **	0.717 **
2 adults with one or more children	2.747	3.425	5.236	5.917	14.925	41.667 **	6.289	2.584	4.237	2.525
3 or more adults	2.451	5.747	4.695	4.739	7.407	-	4.237	2.985 *	3.802	1.980
3 or more adults with 1 or more child.	3.205	6.024 **	6.024	17.544	10.526	-	6.329	3.906 *	9.709	2.392
C	0.776	0.815	0.852	0.805	0.828	0.869	0.845	0.807	0.865	0.787

1. Odds ratios greater than 1.0 represent increased chances of having access to a computer at home, relative to the reference group; odds ratio less than 1.0 represent reduced chances relative to the reference group (reference group: single person households living in sparsely populated area and from the second quartile). In Belgium, households from the highest income quartile are 5.128 times more likely to have access to a computer at home, compared to the households of the second quartile of the reference group. Whereas households from the lowest quartile are less likely (0.557<1) to have access to a computer at home compared to the reference group: they are exactly (1-0.557=) 44.7% less likely. It can also be said that they are (1/0.557)=1.796 times more likely not to have access to a computer at home compared to the households of the second quartile (of the reference group).
2. Odds ratios are significant on the level of 99.9%; with 2 stars on 99%; with one star on 95% level; and odds ratios with "†" are not significant (below the 95% level).
3. For a detailed variable description, see the Annex 2.
4a. Footnote by Turkey: The information in this document with reference to « Cyprus » relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
4b. Footnote by all the European Union Member States of the OECD and the European Commission: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus."
5. C is an indicator for the quality of the logistic regression. Possible values for C range from 0.5 corresponding to a model which predicts the result randomly to 1 corresponding to a model perfectly discriminating the response. Values between 0.7 and 0.8 represent an acceptable predictive ability and values > 0.8 represent excellent predictive quality.

Source: Authors calculations, based on Eurostat database.

Households who have access to Internet at home

The analysis of access to the Internet at home (Table 2) reveals patterns very similar to those observed for access to a computer at home.

In a majority of countries, population density has a positive and monotonic effect on the probability of having access to Internet at home. Households located in densely populated areas have a 34% higher probability to have access to the Internet at home than households living in rural areas in the European area. The difference is particularly marked in some countries. In Bulgaria and Denmark, households living in urban areas are 2.5 times more likely to have access to the Internet at home compared to households living in rural areas of the reference group, and more than 2 times in Greece, Spain, Sweden and Slovak Republic. The evidence of an easier home Internet access in cities and urban areas in most of the countries clearly mirrors a geographical divide.

The higher the household's income, the higher the probability of having access to the Internet at home.[5] At the EU aggregate level, households from the highest income quartiles are 4.4 times more likely to have access to the Internet at home, compared to those from the second income quartile (the reference group). Whereas households from the lowest income quartile have a 42% lower probability to be in that case as compared to the reference group. In Denmark, Latvia or Portugal, the income influence is the strongest. In Portugal for instance, households from the highest quartile are 14 times more likely to have access to the Internet at home, whereas those from the lowest quartile are 63% less likely to be in that case. In Austria, Finland or the Netherlands, the income influence is still significant, but less than at the European area level. In Austria, for instance, the different households income quartiles have odds ratio varying from 0.953 (lowest income quartile) to 2.611 (highest income quartile), as the respective values for the European area are 0.577 and 4.444.

As observed for computers, the presence of children increases the probability of having access to Internet at home in all the countries. Households with children have a 86% higher probability to have access to Internet at home, as compared to households without children. In Finland or Norway, households with children are seven times more likely to have access to Internet at home as compared to those without children. In Greece, where the effect is the weakest, children's presence in the household increases its probability to have access to Internet at home from 50%.

In 8 out of 20 countries, single adult households with children are the most likely to have access to Internet at home. These countries are concentrated in the South of Europe (Spain, Italy, and Portugal) as well as in the East (Bulgaria, Hungary, Slovenia and Slovak Republic). In almost all the other countries, the largest households (three adults or more with children) are the most likely to have Internet access at home.

Typically, households without Internet access at home are very likely to be similar to those without computer access at home. They are living in rural areas, belong to the lowest income quartile and do not have children, and in about one third of the countries, are very likely to include two adults.

Previous results clearly show that in 2008, there are still significant signs of household inequalities as concerns computer and internet access. Households living in rural areas, with low income levels and without children are significantly more likely to endure deprivation of those key tools of the information society.

Table 2. Odds ratio estimates of logistic regressions for having access to Internet at home in EU18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
model 1											
Densely-populated area	1.340	1.931	1.435 **	2.786	1.613	2.506	2.114	2.037	1.916	1.815	-
Intermediate area	1.012 †	1.300 **	1.379 **	1.305 †	1.242 †	1.669	2.342	1.471	1.368 *	1.130 †	0.906 †
lowest quartile	0.577	0.953 †	0.589	0.749 †	0.242	0.502	0.320	0.353	0.645	0.371	0.432
second highest quartile	2.024	1.460	2.252	3.676	2.110	3.135	2.141	2.525	2.915	1.927	2.688
highest quartile	4.444	2.611	4.717	9.346	6.211	7.813	5.319	5.155	4.065	5.464	4.115
1 adult with one or more children	2.882	2.237	2.392	4.545	1.014 †	3.891	1.312 †	3.175	12.821	3.247	3.401
2 adults	0.718	1.037 †	1.036 †	0.612 **	0.338	1.093 †	0.574	0.991 †	1.406 **	0.858 †	1.312 †
2 adults with one or more children	1.639	3.509	2.809	2.304	1.054 †	3.135	1.449 **	1.949	7.813	3.030	4.587
3 or more adults	1.323	3.125	4.032	1.414 *	0.755 †	2.825	1.449 **	2.375	5.155	2.283	2.353 *
3 or more adults with 1 or more child.	1.664	3.891	4.329	1.724 *	1.403 †	4.115	1.709	3.058	22.727 **	2.222	6.024 **
C	0.756	0.732	0.768	0.822	0.800	0.821	0.779	0.784	0.816	0.809	0.812
model 2											
Densely-populated area	1.344	1.689	1.325 **	2.667	1.550 **	2.463	2.083	1.931	1.739	1.595	-
Intermediate area	1.017 †	1.193 *	1.333 **	1.328 †	1.174 †	1.658	2.320	1.449	1.274 †	1.095 †	0.876 †
lowest quartile	0.603	0.915 †	0.614	0.950 †	0.254	0.505	0.326	0.322	0.577	0.350	0.385
second highest quartile	2.028	1.610	2.584	4.202	2.227	3.289	2.392	2.564	3.401	2.188	3.021
highest quartile	4.651	3.817	6.711	12.346	6.757	9.009	6.173	5.587	5.618	6.897	5.405
household with dependent children	1.862	2.632	2.336	2.494	2.079	3.049	1.508	1.608	7.143	2.128	3.448
C	0.750	0.708	0.745	0.811	0.793	0.818	0.766	0.771	0.803	0.796	0.798

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
model 1										
Densely-populated area	1.366	0.786 †	1.639	0.823 †	1.684	1.805 *	1.686	2.016	1.733 *	1.992
Intermediate area	0.985 †	0.899 †	1.805 †	1.484 †	1.623	1.119 †	1.122 †	1.488 *	1.427 †	-
lowest quartile	0.525	0.343	0.352	0.437 **	0.731 **	0.502 **	0.367	0.410	0.433	0.300
second highest quartile	1.894	2.141 **	2.358	2.577	3.448	2.288 †	2.667	2.809	2.387	2.004
highest quartile	4.274	4.673	5.988	6.623	2.941	4.386 *	13.889	7.519	9.174	4.202
1 adult with one or more children	2.833	9.901 **	3.650	6.289 *	3.509	6.803	7.143	2.959	27.027	2.817
2 adults	0.770	1.408 †	1.179 †	1.340 †	1.789	1.961 *	0.785 †	0.709 **	0.481 **	0.778 *
2 adults with one or more children	1.972	2.976	4.651	5.208	14.286	14.286	3.311	2.793	3.390	1.675
3 or more adults	2.358	4.831	4.049	4.292	9.259	-	3.460	3.165 **	2.681	1.522 **
3 or more adults with 1 or more child.	2.439	5.848	4.608	12.987	10.870	-	4.016	3.968 *	4.425	1.592 **
c	0.756	0.810	0.839	0.794	0.838	0.850	0.830	0.814	0.849	0.764
model 2										
Densely-populated area	1.292	0.758 †	1.471	0.920 †	1.515	1.650 †	1.597	2.101	1.326 †	1.927
Intermediate area	0.974 †	0.882 †	1.603 †	1.626 †	1.580 **	1.035 †	1.159 †	1.502 *	1.164 †	-
lowest quartile	0.512	0.338	0.273	0.313	0.593	0.417	0.315	0.437	0.508	0.306
second highest quartile	2.008	2.294	2.646	3.704	4.237	3.077 *	3.115	2.770	2.710	2.242
highest quartile	4.950	5.348	7.634	9.615	4.386	6.803 **	15.385	7.519	12.987	5.025
household with dependent children	1.754	2.809	2.513	3.460	6.667	7.752	2.625	3.226	4.484	1.590
C	0.734	0.781	0.824	0.768	0.810	0.832	0.807	0.807	0.814	0.758

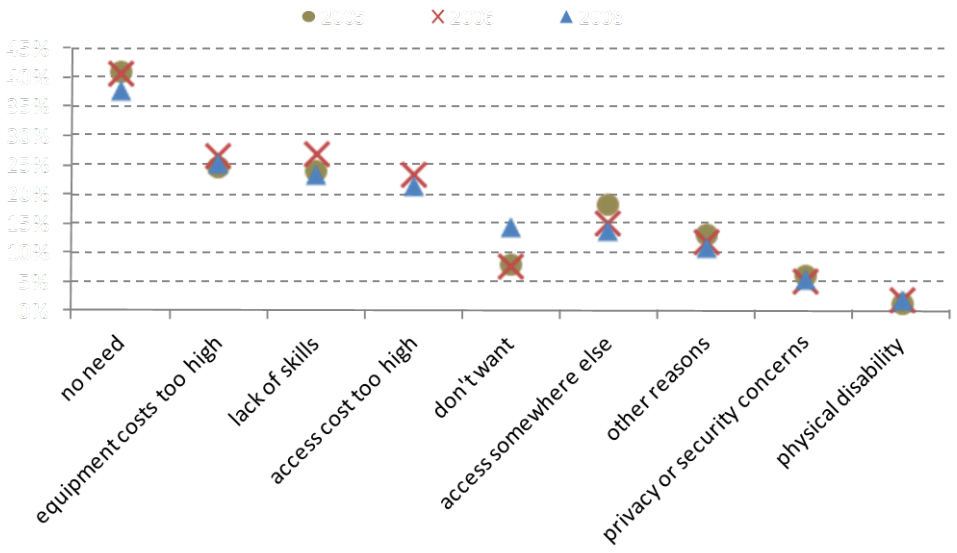
1. See notes from table 1.

Source: Authors calculations, based on Eurostat database.

Reasons for not having access to the Internet at home[6]

Households without an Internet connection at home have been regularly asked the reasons for not being connected since 2005 (Figure 1).

Figure 1. Why the household has no access to Internet at home? EU 27



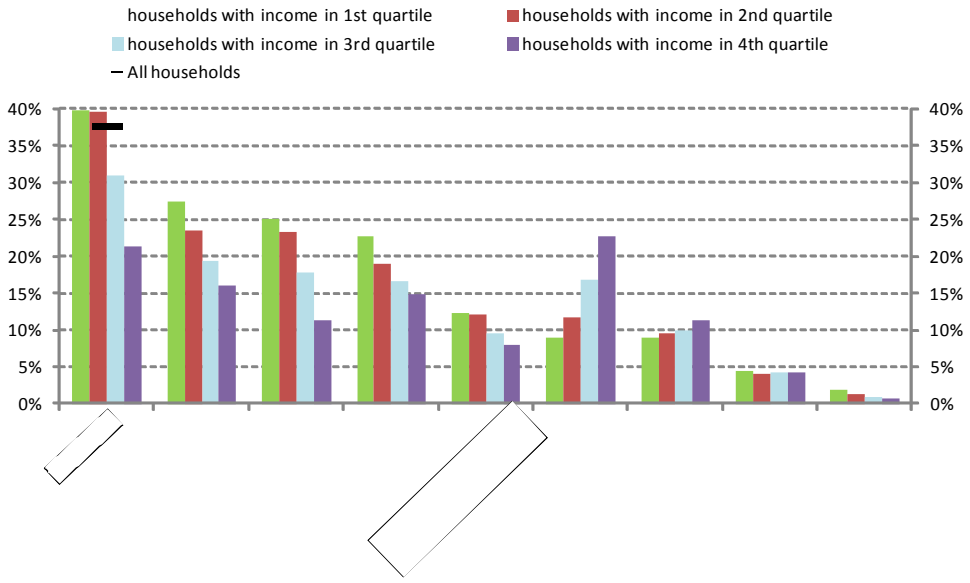
Source: EUROSTAT database.

The main reason for not being connected is the lack of need.[7] About one out of four households without connection do not see the utility of the Internet. High costs for equipments and access come as the second and fourth most important reason, respectively. Perceived lack of skills is the third reasons and explains lack of Internet connection in almost one household out of four.

This ranking has been fairly constant over 2005-2008, except for the answer: "household doesn't want Internet (content is harmful, etc.)". The share of household reporting this reason has increase from one out of twelve to one out of six.

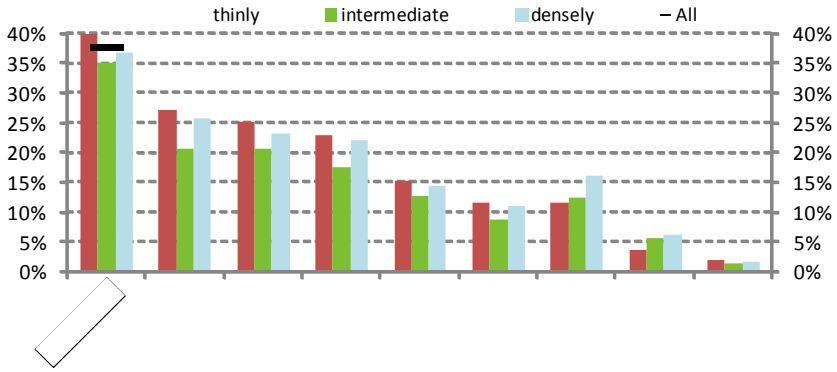
The reasons for not having Internet at home appear to be significantly affected by the level of *income*, as shown by the very strong differences between the lowest and highest income quartiles. Non connected households in the lowest income quartile are much more concerned with the lack of need, the cost of equipment and access, and the lack of skills, and much less by the possibility of having access somewhere else (Figure 2). When looking at the *population density*, households in scarcely populated areas provide a ranking very similar to the households in the lowest income quartile (Figure 3).

Figure 2. Reasons for not having Internet at home by income group in the EU27, 2008



Source: EUROSTAT database.

Figure 3. Reasons for not having Internet at home by density[1] of population, EU27, 2008



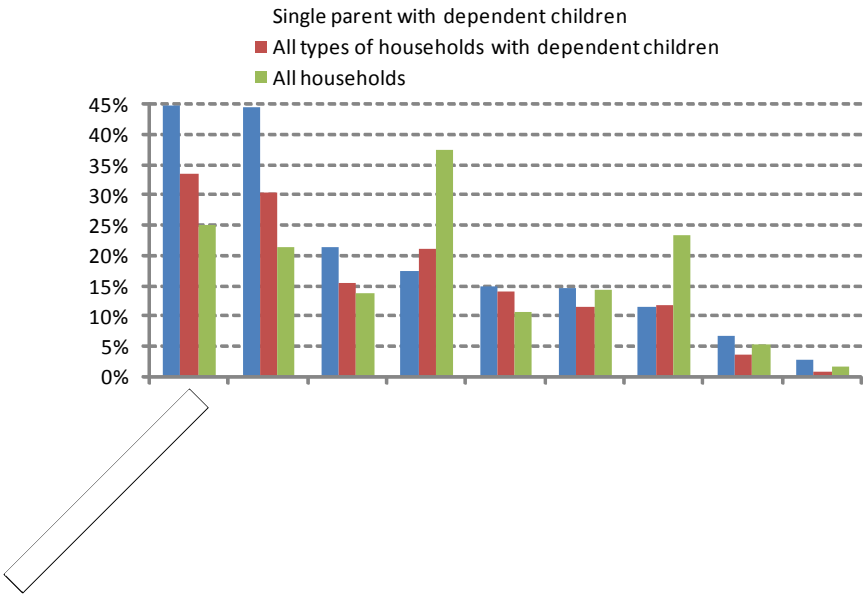
1. Densely-populated area: a contiguous set of local areas, each of which has a density superior to 500 inhabitants per square kilometre, where the total population for the set is at least 50,000 inhabitants; Intermediate area: density superior to 100 inhabitants per square kilometre, and either with a total population for the set of at least 50,000 inhabitants or adjacent to a densely-populated area; Thinly-populated area thinly: This is a contiguous set of local areas belonging neither to a densely-populated nor to an intermediate area.

Source: EUROSTAT database.

Similarly, the *presence of dependent children* affects the reasons provided for not being connected at home. Costs, and to a lesser extent the possibility of access somewhere else, are mentioned much more frequently by households with dependent children, as compared to the average household. Interestingly

enough, lack of need is reported less frequently, the presence of children playing an incentive to have an Internet connection at home (Figure 4).

Figure 4. Reasons for not having Internet at home for selected types of households, EU27, 2008



Source: EUROSTAT database.

2.2 Non usage

Not having access to a computer at home or to the Internet at home in 2008 is certainly a sign of being, if not excluded, at least left aside of the information society. But a step further in the direction of an increased distance with the information society is mirrored by the situation of never having used a computer or the Internet. To be in such a situation for an individual is the outcome of many different factors. In the following section, we are modeling how the socio-demographics characteristics influence its probability.

Individuals having never used a computer

When analysing the odds ratios for the probability of having never used a computer, it appears that most of the socio-demographic characteristics of the non-users are clearly associated with computer non-use (Table 3).

In all the countries, *age* monotonically increases the probability to be entirely disconnected from the computer use. Compared with the reference age class (age 35-44), the elderly (65-74) have on average more than 4.1-time chance to be in that situation in the European 18+2 aggregate area (European area). Their odds ratios are ranging from 3.3 times in Denmark to more than 12.8 times in Greece. Symmetrically, the youngest people (16-24) are the least likely to never have used a computer, compared with the reference age, in all the countries, with particularly low probability in Latvia, Denmark, Portugal and Slovak Republic.

In half of the countries, *to be a woman* is also significantly associated with a higher probability to be fully computer disconnected. The situation is particularly imbalanced in Luxembourg. On the other hand, in Latvia and Slovak Republic, women have a lower probability to be fully computer disconnected.

Employment situation is significantly associated with computer non-use. In all countries students are, as expected, the least likely to have never used a computer (compared to the reference group). On the other hand, retired people (who make the majority of the other category, not in the labour force -retired, inactive, in compulsory military service, etc.) are generally the most likely to be in that case. And being unemployed is systematically associated with a higher probability to never have used a computer, compared to employed people.

In all the countries, the probability to have never used a computer decreases monotonically with the levels of *educational attainment, density of population, and income.* The higher the levels, the smaller the probability. Education level has by far the strongest and the most widespread effect across countries. Compared to people with lower secondary educational level or less, those with an upper secondary educational level are 78% less likely to have never used a computer and those with a tertiary educational level more than 94% less likely.

Finally, in the countries where coefficients are significant, the household composition shows that the higher the number of households adult members, the higher the probability to be non-computer users. On the other hand, the presence of children is systematically associated with a lower probability to be non-computer users.

These findings corroborate observations already provided in many studies on the digital divide, where socio-demographic characteristics of individuals generally show a clear influence on their propensity to stay away from ICT.

Elderly people

Do elderly people who have never used a computer have characteristics differing from those observed in the general population of computer non-users?

A test was run to check if modelling the fact of never having used a computer for older people provided coefficients statistically different from those obtained for the population as a whole. In most of the countries, the test found a difference statistically significant for coefficients associated with the ISCED levels, income quartiles and household composition. This means that the older age class has, at least partially, specific results compared to the population as a whole concerning the probability of never having used a computer.

It was found that there are significant differences for education attainment and income levels (quartiles) in most of the countries, and for household composition in about one third of the countries.

Table 4 shows that among elderly people, being a woman greatly increases the probability of never having used a computer. In all the countries where this effect is significant, it is much stronger among elderly people compared with the whole population. *Educational attainment* still has a monotonic effect most of time: the higher the level, the lower the probability of never having used a computer. In addition, a lower probability to be a computer non-user among higher *quartiles of income* still holds among elderly people (according to countries and significance of the odds ratios). In Hungary, Italy and Portugal, for instance, among elderly people the higher the income quartile, the lower the probability of never having used a computer. Finally, in some countries (Bulgaria, Italy, Portugal and Spain), it appears that the probability of being a computer non-user increases with the number of adults in the household.

The effects of income and education levels at stake in the population as a whole are repeated for computer non-use, if not reinforced, specifically among elderly people. This is to a lesser extent also the case for gender – to the detriment of women – and the number of people in the household.

People with the lowest educational level (ISCED 0)

Links between socio-demographic characteristics and the probability of never having used a computer observed among less educated people are generally similar to those observed in the general population.

As for elderly people, a test was run to check if modelling the fact of never having used a computer for people with the lowest educational level provided coefficients statistically different from those obtained for the population as a whole. In most of the countries, the test found a difference statistically significant for coefficients associated with all the remaining socio-economic variables: age, employment situation, geographical location, income quartiles and household composition. The effects observed for people with the lowest educational level are in line with those observed in the general population, but are in addition really specific to this part of the population.

Table 5 shows that in all the countries where the odds ratios are significant, women with a low level of education attainment are more likely to have never used a computer, compared to men. The probability is for instance 50% higher in Denmark, Italy or Portugal. And it is also systematically higher compared to that in the whole population: the gender effect is stronger among people with a lower educational level.

Concerning the *employment situation*, as observed among the population as a whole, students are least likely to have never used a computer, followed by unemployed people. Retired people are on the other hand, the most likely to be in that case.

In most of the countries, the probability of never having used a computer for people with low level of education attainment generally decreases monotonically with the levels of *density of population, and income.* The higher the level, the smaller the probability. In Finland, for instance, people living in households from the lowest income quartile are 3.9 times more likely to have never used a computer, as compared to the reference group. Whereas people from the highest income quartile households are 78% less likely to be in that situation (the odds ratio vary from 3.9 to 0.22). Similarly, in that country people living in densely populated areas are 64% less likely to be in that situation compared to those from thinly populated areas.

There is no effect[8] due to the children, except in a few countries (Belgium, Greece and Hungary) where their presence decreases the probability of never having used a computer.

There is a significant age effect among people with a low educational level: the probability of never having used a computer increases monotonically with age. People aged between 65 and 74 are for instance more than five times more likely to have never used a computer in Austria, Italy or the Netherlands compared to the reference group (people aged between 35 and 44), and the probability is above seven times higher in 10 countries. Symmetrically, younger people (16-24) are 80% less likely to be in that situation compared to the reference group in the European area. The effect is significant in a much higher number of countries for older age classes (above 55) as compared to younger age classes (below 35).

Table 3. Odds ratios associated with never having used a computer in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
model1											
16-24	0.299	0.265	0.415	0.220	0.114	0.045 **	0.133	0.153	<0.001	0.205	<0.001
25-34	0.669	0.442	0.611	0.478	0.468	0.353 *	0.477	0.499	0.159 †	0.604	0.424 †
45-54	1.478	1.368 **	1.141 †	2.070	1.684	1.853 *	2.091	1.839	1.577 †	1.474	0.456 †
55-64	2.184	2.602	1.565	3.393	2.733	2.818	3.622	4.209	4.217 **	2.067	5.640 **
65-74	4.173	5.264	3.814	8.658	4.422	3.352	12.865	8.386	7.564	3.755	10.687
SEX (woman)	1.253	1.557	1.341	0.939 †	1.385 **	1.138 †	1.561	1.011 †	1.086 †	0.893 †	0.754 †
upper secundary education	0.214	0.195	0.314	0.079	0.147	0.365	0.171	0.178	0.505	0.233	0.169
tertiary education	0.061	0.047	0.092	0.009	0.031	0.107	0.038	0.072	0.086	0.103	0.081
unemployed	1.818	1.817	1.613	1.749	0.751 †	1.562 †	0.684 †	1.047 †	1.596 †	2.037	1.815 †
student	0.192	0.008 **	0.163	0.022	0.076	0.651 †	0.011	0.136	<0.001	0.287	0.692 †
other not in the labour force	2.381	2.603	2.129	2.659	1.519 **	2.944	1.914	1.952	2.176 **	2.306	0.743 †
Densely-populated area	0.909	0.628	0.791 †	0.498	0.639	0.581	0.669	0.686	0.575 *	0.597	-
Intermediate area	1.120	0.709	0.787 †	0.564	0.826 †	0.708 *	1.186 †	0.889 †	0.710 †	0.783 **	1.141 †
lowest quartile	1.474	1.373	1.558	0.986 †	2.177	1.700 **	2.612	1.920	2.598	1.919	1.742 †
second highest quartile	0.732	0.822 *	0.859 †	0.571	0.553	0.698 *	0.756 *	0.551	0.467 **	0.511	0.336 **
highest quartile	0.465	0.805 *	0.443	0.324	0.328	0.294	0.313	0.300	0.425 *	0.191	0.098 **
1 adult with one or more children	0.680	0.850 †	0.587 *	0.676 †	0.635 †	<0.001 †	0.514 †	0.866 †	0.578 †	0.268	<0.001 †
2 adults	1.716	1.381 **	0.924 †	1.114 †	2.576 **	1.076 †	1.622 *	1.377 *	1.319 †	0.941 †	0.921 †
2 adults with one or more children	1.631	1.251 †	0.694 **	0.910 †	2.188 *	1.105 †	1.279 †	1.330 *	1.225 †	0.367	1.067 †
3 or more adults	2.692	1.582	0.999 †	1.272 †	4.955	1.807 *	2.010	2.182	2.307 *	0.388	1.413 †
3 or more adults with 1 or more child.	2.734	1.678	1.153 †	1.644 **	4.146	1.681 †	1.517 †	2.303	2.151 †	0.368	1.178 †
C	0.879	0.871	0.870	0.918	0.920	0.889	0.941	0.916	0.922	0.918	0.942
model2											
16-24	0.375	0.290	0.489	0.190	0.152	0.049 *	0.142	0.196	<0.001 †	0.310	<0.001 †
25-34	0.697	0.436	0.569	0.483	0.464	0.376 *	0.541	0.466	0.066 *	0.747 *	0.249 *
45-54	1.648	1.470	1.353 **	2.115	1.935	2.117 **	2.179	2.043	1.824 †	1.372 **	0.546 †
55-64	2.239	2.755	1.823	3.075	2.585	3.068	4.294	4.382	3.646 **	2.398	3.634 *
65-74	3.882	5.471	4.353	7.305	3.686	3.687	12.227	7.817	7.628	4.702	9.215
SEX (woman)	1.218	1.528	1.266	0.868 *	1.411	1.093 †	1.533	0.964 †	0.904 †	0.781	0.755 †
upper secundary education	0.199	0.191	0.322	0.094	0.136	0.371	0.155	0.170	0.523	0.288	0.192
tertiary education	0.053	0.044	0.099	0.012	0.027	0.119	0.037	0.073	0.111	0.149	0.084
unemployed	2.069	1.865	1.404 **	1.957	0.889 †	1.146 †	0.740 †	1.081 †	1.272 †	1.745	1.828 †
student	0.211	0.008 **	0.197	0.028	0.065	0.779 †	0.013	0.132	<0.001 †	0.160	0.628 †
other not in the labour force	2.526	2.609	2.030	2.889	1.544 **	3.413	1.947	2.043	2.051 **	2.530	0.710 †
Densely-populated area	0.887	0.596	0.769 *	0.496	0.598	0.494	0.676	0.686	0.541 **	0.711	0.000 †
Intermediate area	1.121	0.687	0.792 †	0.619	0.804 †	0.691 **	1.002 †	0.897 †	0.629 *	0.771 **	1.181 †
lowest quartile	1.184	1.270 *	1.651	0.950 †	1.485 *	1.783	1.979 **	1.732	2.413	2.119	1.888 *
second highest quartile	0.844	0.892 †	0.805 **	0.539	0.640	0.731 *	0.738 *	0.560	0.600 *	0.359	0.461 *
highest quartile	0.600	0.933 †	0.410	0.382	0.419	0.380	0.319	0.327	0.469 *	0.086	0.097 *
household with dependent children	0.983 †	1.035 †	0.842 *	0.927 †	0.779 *	0.937 †	0.832 †	1.017 †	0.859 †	0.471	0.712 †
C	0.876	0.870	0.870	0.917	0.916	0.888	0.941	0.914	0.919	0.917	0.939

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Table 3. Odds ratios associated with having never used a computer in EU 18+2, 2008[1] (cont'd)

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
model1										
16-24	0.534	<0.001 †	0.031	0.201	0.101	<0.001 †	0.077	1.584 †	0.151 *	0.075
25-34	0.830	0.296 **	0.272	0.554 *	0.580 †	<0.001 †	0.483	0.819 †	0.456 *	0.327
45-54	1.399	1.579 †	2.685	1.601 †	2.009 *	2.472 †	1.844	6.499	3.385	1.674 *
55-64	2.168	2.615 *	5.453	3.385	2.407 **	2.404 †	2.648	9.368	2.013 †	2.059 **
65-74	4.812	9.139	10.683	5.996	6.550	2.768 †	7.279	9.891	5.898	3.962
SEX (woman)	1.502	2.842	0.829 *	1.280 †	1.184 †	0.780 †	1.499	1.233 †	0.955 †	0.717 **
upper secundary education	0.179	0.250	0.311	0.128	0.266	0.264 **	0.074	0.310	0.165	0.099
tertiary education	0.068	0.065	0.053	0.036	0.063	<0.001 †	0.035	0.034	0.020	0.028
unemployed	1.452	1.160 †	2.373	1.397 †	0.230 †	28.150 **	1.184 †	0.540 †	3.782 **	1.331 †
student	0.140	<0.001 †	0.160 **	1.103 †	0.373 †	<0.001 †	0.256	0.353 †	<0.001 †	<0.001 †
other not in the labour force	2.689	1.118 †	2.966	<0.001 †	2.171	9.691 **	2.187	1.695 †	2.751 **	3.643
Densely-populated area	0.828	1.285 †	0.879 †	0.779 †	0.535	0.856 †	0.620	0.968 †	0.754 †	0.770 †
Intermediate area	1.066 †	1.681 †	0.456 *	0.711 †	0.747 †	2.382 †	0.882 †	0.884 †	0.804 †	-
lowest quartile	1.610	3.722	2.071	2.666 *	1.262 †	1.921 †	2.172	3.038	1.348 †	1.166 †
second highest quartile	0.660	0.505 *	0.581	0.562 *	0.680 *	1.707 †	0.560	0.812 †	0.550 *	0.527
highest quartile	0.418	0.090	0.326	0.300	0.643 *	0.412 †	0.256	0.308	0.222	0.395
1 adult with one or more children	0.672 **	0.551 †	1.465 †	0.691 †	0.372 †	<0.001	0.822 †	1.787 †	0.780 †	0.820 †
2 adults	1.300	1.727 †	1.408 *	1.282 †	0.761 †	0.926 †	1.779	1.765 *	0.951 †	0.991 †
2 adults with one or more children	1.255	1.610 †	0.868 †	1.263 †	0.460 *	0.583 †	1.376 †	0.638 †	0.917 †	0.582 †
3 or more adults	1.614	1.773 †	1.597 **	1.920 †	1.186 †	0.971 †	2.631	1.097 †	1.414 †	0.924 †
3 or more adults with 1 or more child.	1.999	2.492 †	1.629 **	1.148 †	0.983 †	1.586 †	2.684	1.113 †	1.140 †	0.495 *
C	0.883	0.927	0.928	0.874	0.898	0.943	0.906	0.912	0.913	0.926
model2										
16-24	0.640	<0.001 †	0.032	0.222	0.191 *	<0.001 †	0.107	2.140 †	0.011 *	0.143
25-34	0.871 **	0.417 †	0.250	0.491 *	0.714 †	<0.001 †	0.475	1.309 †	0.253 **	0.371
45-54	1.555	2.494 *	2.707	1.459 †	2.555 **	2.214 †	2.023	8.670	2.572 **	1.925
55-64	2.333	3.357 **	5.427	2.928	2.440 **	1.752 †	2.671	15.107	1.570 †	2.584
65-74	4.805	12.671	10.454	5.189	7.076	2.263 †	6.494	15.518	4.530 **	5.409
SEX (woman)	1.468	1.948 **	0.818 **	1.323 †	1.017 †	0.897 †	1.527	1.205 †	0.776 †	0.845 †
upper secundary education	0.173	0.313	0.306	0.133	0.256	0.186	0.064	0.319	0.111	0.099
tertiary education	0.063	0.058	0.052	0.058	0.072	<0.001 †	0.040	0.029	0.022	0.025
unemployed	1.583	1.924 †	2.471	1.345 †	0.229 †	30.478	1.257 *	0.723 †	5.313	2.010 **
student	0.148	<0.001 †	0.173 *	1.361 †	0.420 †	<0.001 †	0.239	0.573 †	<0.001 †	<0.001 †
other not in the labour force	2.797	1.228 †	3.012	<0.001 †	2.532	10.610	2.117	1.821 *	2.424 **	3.125
Densely-populated area	0.824	1.255 †	0.859 †	0.864 †	0.522	0.407 †	0.581	0.858 †	0.862 †	0.809 †
Intermediate area	1.065 †	1.387 †	0.459 *	0.780 †	0.651 *	1.852 †	0.904 †	0.915 †	0.699 †	0.000 †
lowest quartile	1.511	3.872	1.820	2.367 *	1.434 *	1.906 †	1.753	2.354	1.214 †	1.326 *
second highest quartile	0.710	0.806 †	0.607	0.669 †	0.699 †	2.640 †	0.638	0.828 †	0.421	0.490
highest quartile	0.477	0.149 **	0.354	0.364	0.720 †	0.575 †	0.305	0.302 **	0.246	0.442
household with dependent children	1.040 †	1.265 †	0.887 †	0.738 †	0.641 †	0.144 †	0.874 †	0.851 †	0.947 †	0.698 *
C	0.881	0.922	0.927	0.873	0.897	0.937	0.903	0.910	0.911	0.927

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Table 4. Odds ratios associated with having never used a computer among elderly people (aged 65 to 74) in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
SEX (woman)	1.629	1.962	1.911 **	0.941 †	6.209	1.073 †	2.131 *	1.399 *	1.172 †	1.034 †	0.924 †
upper secundary education	0.187	0.193	0.405	0.130	0.099	0.358	0.147	0.113	0.450 *	0.423	0.281 **
tertiary education	0.082	0.055	0.172	0.043	0.055	0.144	0.036	0.107	0.131	0.217	0.192 †
unemployed	2.880 *	-	18.721 †	>999.9 †	-	<0.001 †	-	4.614 †	-	0.766 †	-
student	0.204 †	-	-	>999.9 †	-	-	0.236 †	-	-	-	>999.9 †
other not in the labour force	1.805	1.819 †	4.205 †	3.873 *	0.948 †	1.283 †	1.851 †	1.871 †	5.891 †	3.113 *	0.920 †
Densely-populated area	0.999 †	0.541	1.492 †	0.327 **	1.459 †	0.495 **	1.635 †	0.843 †	0.411 **	0.581 **	-
Intermediate area	1.002 †	0.595 **	1.624 †	0.873 †	3.630 †	0.735 †	1.933 †	0.724 †	0.351 **	0.930 †	0.734 †
lowest quartile	1.490	1.301 †	2.291	3.749 †	2.666 †	1.633 *	>999.9 †	3.538	2.584 *	2.055	1.677 †
second highest quartile	0.668	0.425	1.220 †	0.455 *	0.149	0.493 *	0.073	0.570 *	0.352 *	0.307	1.329 †
highest quartile	0.525	0.575 *	1.038 †	0.614 †	0.194 *	0.210 *	0.065	0.568 †	0.503 †	0.142	<0.001 †
1 adult with one or more children	1.456 †	>999.9 †	>999.9 †	>999.9 †	-	<0.001 †	-	>999.9 †	-	-	-
2 adults	1.639	1.072 †	1.283 †	5.256 *	2.712 †	0.861 †	2.182 †	1.518 *	1.075 †	1.635 *	0.567 †
2 adults with one or more children	1.324 †	>999.9 †	12.079 †	2.360 †	>999.9 †	>999.9 †	>999.9 †	3.154 †	-	0.132	-
3 or more adults	3.043	1.738 †	2.185 †	7.365 *	7.393 *	1.029 †	2.901 †	3.726	3.554 †	0.201	1.685 †
3 or more adults with 1 or more child.	2.349	1.202 †	6.756 †	12.794 †	>999.9 †	0.818 †	>999.9 †	3.174 †	-	0.069	<0.001 †
C	0.790	0.783	0.763	0.866	0.925	0.760	0.957	0.815	0.800	0.872	0.783

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
SEX (woman)	2.616	0.610 †	0.981 †	1.397 †	1.406 †	0.626 †	3.419	0.998 †	0.908 †	1.230 †
upper secundary education	0.148	0.395 †	0.200	0.128 *	0.365	0.159 *	0.074	0.443	0.031 **	0.070
tertiary education	0.065	0.068 **	0.038	0.037 **	0.189	<0.001 †	0.117	0.087	0.009 **	0.043
unemployed	>999.9 †	>999.9 †	<0.001 †	<0.001 †	-	-	>999.9 †	<0.001 †	35.046 †	-
student	-	-	-	-	-	-	<0.001 †	-	-	-
other not in the labour force	2.993	>999.9 †	4.136	-	-	>999.9 †	1.683 †	1.015 †	<0.001 †	>999.9 †
Densely-populated area	0.574	0.997 †	1.769 **	1.689 †	0.618 *	0.183 †	0.558 *	0.844 †	1.785 †	0.850 †
Intermediate area	0.782 †	1.038 †	0.733 †	5.999 †	0.586 †	2.667 †	0.551 *	0.603 †	0.724 †	-
lowest quartile	1.576 *	10.613	1.264 †	1.968 †	1.535 †	1.783 †	2.056 †	3.101	0.824 †	0.504 †
second highest quartile	0.669 **	1.307 †	0.421 **	1.513 †	0.606 †	17.832 †	0.316	0.522 †	0.096 **	0.294 †
highest quartile	0.489	0.450 †	0.333 **	0.547 †	0.243 **	1.326 †	0.155	0.255 *	0.084 *	0.167 †
1 adult with one or more children	0.690 †	-	>999.9 †	-	-	-	>999.9 †	>999.9 †	-	-
2 adults	1.415 *	1.202 †	1.395 †	0.663 †	0.675 †	0.670 †	2.363 **	1.636 †	1.896 †	0.773 †
2 adults with one or more children	0.721 †	<0.001 †	1.390 †	0.192 †	-	-	1.565 †	1.538 †	>999.9 †	>999.9 †
3 or more adults	1.540 *	0.182 †	1.955 †	0.643 †	0.884 †	-	17.404	0.962 †	46.724 *	0.452 †
3 or more adults with 1 or more child.	2.751 *	0.953 †	2.268 †	0.295 †	-	-	5.158 **	<0.001 †	3.481 †	-
C	0.854	0.879	0.835	0.773	0.755	0.823	0.877	0.814	0.892	0.839

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Table 5. Odds ratios associated with having never used a computer among people with low education level (Primary or lower secondary education, or no formal education) in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
SEX (woman)	1.183	1.812	1.373	1.403 †	1.624 *	1.496 *	2.263	0.956 †	0.844 †	1.074 †	0.914 †
unemployed	1.827	1.625 *	1.601	1.545 †	0.354 †	1.589 †	0.989 †	1.083 †	1.830 †	1.974	1.817 †
student	0.208	<0.001 †	0.272	0.014	0.012	0.886 †	0.011	0.177	<0.001	0.239	<0.001 †
other not in the labour force	2.177	2.735	2.066	2.806 *	0.974 †	3.035	1.411 †	1.811	1.972 †	2.114	0.777 †
Densely-populated area	0.836	0.794 †	0.946 †	0.330	0.661 †	0.713 †	0.465	0.625	0.360 **	0.544	-
Intermediate area	1.141	0.932 †	0.920 †	0.500 †	1.032 †	0.786 †	0.838 †	0.878 †	0.657 †	0.833 †	1.205 †
lowest quartile	1.680	1.277 †	1.612	0.421 †	2.209 *	1.547 †	2.343 *	2.064	3.918	2.163	2.001 †
second highest quartile	0.683	0.845 †	0.849 †	0.561 †	0.441 **	0.656 †	0.786 †	0.575	0.394 **	0.595	0.321 *
highest quartile	0.474	1.044 †	0.556	0.206	0.581 †	0.282	0.516	0.350	0.221 *	0.191	0.171 *
1 adult with one or more children	0.663	1.524 †	0.450 **	>999.9 †	>999.9 †	>999.9 †	>999.9 †	0.831 †	<0.001 †	0.288 **	<0.001 †
2 adults	1.414	1.850 **	0.995 †	0.735 †	1.373 †	1.060 †	0.806 †	1.281 †	2.105 *	1.016 †	1.122 †
2 adults with one or more children	1.459	1.725 *	0.818 †	0.712 †	0.994 †	1.975 †	0.593 †	1.186 †	<0.001 †	0.371	1.465 †
3 or more adults	2.507	1.432 †	1.070 †	0.934 †	2.538 †	2.238 *	1.005 †	2.145	2.997 *	0.392	1.651 †
3 or more adults with 1 or more child.	2.522	1.483 †	1.018 †	1.341 †	2.767 †	2.473 †	0.602 †	2.253	5.896 †	0.350	1.971 †
16-24	0.217	0.298	0.247	0.358 **	0.244	0.043 **	0.176	0.144	<0.001 †	0.207	<0.001 †
25-34	0.687	0.457 **	0.678 *	0.671 †	0.503 *	0.249 *	0.699 †	0.539	0.268 †	0.623	0.756 †
45-54	1.428	1.237 †	1.197 †	2.147 †	1.942 †	1.982 †	2.038	1.825	0.446 †	1.346 *	0.683 †
55-64	2.257	2.340	1.490 **	4.103 **	6.708	3.188 **	5.726	4.645	1.721 †	1.785	7.353 **
65-74	4.268	5.215	3.716	7.026 *	7.537	4.085	27.177	9.271	3.124 †	2.125	11.025 **
C	0.826	0.872	0.799	0.966	0.943	0.866	0.922	0.848	0.894	0.887	0.905

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
SEX (woman)	1.522	2.915	0.717 †	1.164 †	1.170 †	0.620 †	1.521	0.980 †	0.905 †	1.107 †
unemployed	1.589	1.164 †	1.490 †	1.048 †	0.260 †	27.168 †	1.143 †	0.857 †	0.675 †	1.735 †
student	0.134	0.658 †	0.218 †	1.292 †	0.375 †	1.615 †	0.282	0.365 †	<0.001 †	<0.001 †
other not in the labour force	2.362	1.046 †	3.409	<0.001 †	1.890 **	20.454 *	1.961	1.636 †	2.492 †	2.761
Densely-populated area	0.851 **	1.442 †	0.560 *	0.833 †	0.592 **	1.428 †	0.612	1.516 †	1.360 †	0.731 †
Intermediate area	1.096 †	1.859 †	0.197 *	0.717 †	0.748 †	1.743 †	0.886 †	0.805 †	0.966 †	-
lowest quartile	1.658	2.994	2.058 *	2.493 †	1.174 †	6.774 †	2.406	3.835	1.355 †	0.952 †
second highest quartile	0.610	0.387 *	0.445 **	0.611 *	0.517 **	2.258 †	0.550	0.897 †	0.406 †	0.478 **
highest quartile	0.404	0.103 **	0.167	0.331	0.729 †	<0.001 †	0.239	0.264 *	0.407 †	0.571 †
1 adult with one or more children	0.678 †	0.599 †	21.406 †	0.523 †	0.425 †	<0.001	0.792 †	2.556 †	-	0.977 †
2 adults	1.317 **	1.751 †	0.846 †	1.237 †	0.782 †	2.264 †	1.963	2.534 **	0.493 †	0.646 †
2 adults with one or more children	1.129 †	1.387 †	0.462 †	1.422 †	0.526 †	<0.001 †	1.515 *	1.241 †	<0.001	0.424 *
3 or more adults	1.730	2.001 †	1.128 †	2.003 †	1.119 †	<0.001 †	2.830	0.699 †	1.060 †	0.479 †
3 or more adults with 1 or more child.	1.996	2.252 †	1.752 †	1.332 †	1.036 †	<0.001 †	3.042	1.416 †	0.644 †	0.514 †
16-24	0.491	<0.001 †	0.039	0.262	0.102	<0.001 †	0.073	3.887 †	0.541 †	0.095
25-34	0.861 *	0.314 *	0.362 **	0.694 †	0.573 †	<0.001 †	0.504	<0.001 †	0.357 †	0.724 †
45-54	1.371	1.465 †	6.582	1.982 *	1.637 †	2.447 †	1.853	21.311 **	4.090 *	2.400 *
55-64	2.478	2.277 †	15.352	3.969	2.109 *	0.928 †	2.748	22.145 **	5.190 *	3.323
65-74	5.601	7.040	21.332	7.905	5.221	1.351 †	6.950	19.301 **	21.686 *	7.303
C	0.841	0.864	0.976	0.789	0.819	0.956	0.848	0.798	0.920	0.878

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Individuals having never used the Internet

Modeling the non-use of Internet reveals a high degree of similarity with the non-use of computer in the way the socio-demographic characteristics of non-users are associated with this occurrence.

The probability generally decreases when the population density of the region increases. Individuals living in thinly populated areas are the most likely to have never used the Internet, those living in densely populated areas the least likely. However, individuals in that case are living in intermediate areas in Finland and Latvia.

In all the countries, the probability to have never been connected to the Internet decreases monotonically with the levels of *educational attainment* and *income*. The higher the levels, the smaller the probability.

Similarly, *age* monotonically increases the probability of never having used the Internet. Compared with the reference age class (age 35-44), the elderly (65-74) are on average more than 4.3 times likely to be in that situation in the European area, ranging from almost 4 times in Denmark to more than 21 times in Slovenia. Symmetrically, younger people (16-24) are much less likely to have never been connected in all the countries. In Denmark and the Netherlands, where the diffusion of the Internet is quite advanced, it is even very unlikely for young people to be in that case.

As for computers, educational attainment and age have the strongest effects compared to other factors, and are the most widespread across countries.

In half of the countries, women are also significantly associated with a higher probability to be fully Internet disconnected. Mirroring the computer dimension, the situation is particularly imbalanced in Luxembourg whereas in the Slovak Republic, by contrast, women have a lower probability to be fully Internet disconnected.

Employment situations are significantly associated with Internet non-use. In all countries students are, as expected, the least likely to have never been connected to the Internet. On the other hand, retired people[9] are generally the most likely to be in that case. And being unemployed, as compared to employed, is systematically associated with a higher probability of never having used the Internet.

Finally, in line with computer cases, the household composition shows that the higher the number of adult members in the household, the higher the probability to have never used the Internet. However, differing from the case of computer, the presence of children is less systematically associated with a lower probability to have never used the Internet. The presence of children is associated with a lower probability in four countries (Belgium, Hungary, Netherlands and Slovak Republic), as in Italy, it is associated with a higher probability (Table 6).

Table 6. Odds ratios associated with having never used the Internet in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
model1											
16-24	0.230	0.250	0.446	0.233	0.152	0.046 **	0.146	0.157	<0.001 †	0.202	<0.001 †
25-34	0.623	0.490	0.659	0.505	0.484	0.465 *	0.609	0.487	0.119 *	0.603	1.024 †
45-54	1.401	1.462	1.262 *	2.146	1.912	1.936 **	1.946	1.737	2.452 *	1.619	1.637 †
55-64	2.114	2.445	1.832	4.112	3.582	3.256	4.370	4.203	4.956	2.391	7.905
65-74	4.299	5.086	4.722	10.541	6.472	3.950	12.752	9.883	9.778	4.702	14.986
SEX (woman)	1.238	1.560	1.380	1.082 †	1.552	1.105 †	1.510	1.131 *	0.859 †	0.888 †	1.039 †
upper secundary education	0.230	0.209	0.332	0.106	0.154	0.390	0.202	0.199	0.572 **	0.236	0.316
tertiary education	0.063	0.033	0.090	0.013	0.027	0.123	0.049	0.083	0.108	0.118	0.079
unemployed	1.886	2.097	1.618	1.958	0.632 †	1.734 †	0.896 †	1.001 †	1.515 †	1.719	2.135 †
student	0.241	0.031	0.162	0.049	0.073	0.471 †	0.134	0.231	<0.001 †	0.273	0.473 †
other not in the labour force	2.550	2.821	2.164	2.168	1.568 **	3.401	2.320	2.062	2.458	2.243	1.189 †
Densely-populated area	0.856	0.519	0.703 **	0.467	0.565	0.589	0.712	0.596	0.655 *	0.539	-
Intermediate area	1.072	0.678	0.788 †	0.557	0.762 †	0.728 *	1.086 †	0.813 **	0.539 *	0.811 *	1.143 †
lowest quartile	1.451	1.255 *	1.325	0.986 †	2.186	1.417 *	2.128 **	1.809	2.640	2.086	1.746 †
second highest quartile	0.696	0.863 †	0.746	0.545	0.537	0.632 **	0.689 **	0.493	0.520 **	0.562	0.558 †
highest quartile	0.443	0.771 **	0.455	0.312	0.319	0.261	0.260	0.244	0.285	0.173	0.255 **
1 adult with one or more children	0.668	0.796 †	0.491	0.648 †	1.065 †	0.443 †	0.625 †	0.969 †	0.625 †	0.559 †	<0.001 †
2 adults	1.299	1.307 **	0.829 *	1.053 †	3.768	0.867 †	1.515 *	1.358 *	1.365 †	0.923 †	0.972 †
2 adults with one or more children	1.457	1.080 †	0.610	0.964 †	4.315	1.004 †	1.615 *	1.402 *	0.696 †	0.438	1.187 †
3 or more adults	2.274	1.388 **	0.773 *	1.225 †	7.065	1.457 †	2.037	2.019	2.199 *	0.358	1.040 †
3 or more adults with 1 or more child.	2.310	1.479 **	0.873 †	1.658 **	6.103	1.764 †	2.405	1.908	1.156 †	0.441	1.877 †
C	0.880	0.863	0.874	0.914	0.918	0.894	0.934	0.918	0.929	0.918	0.922
model2											
16-24	0.283	0.272	0.452	0.246	0.179	0.059 **	0.172	0.182	<0.001 †	0.179	<0.001 †
25-34	0.642	0.484	0.640	0.505	0.493	0.469 *	0.632	0.492	0.116 *	0.607	0.849 †
45-54	1.548	1.559	1.296 **	2.201	2.123	2.147 **	2.077	1.901	2.603 *	1.701	1.586 †
55-64	2.093	2.602	1.862	4.188	3.434	3.264	4.511	4.182	5.051	2.755	7.453
65-74	3.849	5.379	4.854	10.762	5.133	3.860	11.645	9.061	9.815	6.014	14.079
SEX (woman)	1.214	1.542	1.361	1.074 †	1.483	1.095 †	1.493	1.129 *	0.850 †	0.868 *	1.015 †
upper secundary education	0.216	0.205	0.333	0.102	0.148	0.384	0.194	0.194	0.564	0.259	0.313
tertiary education	0.057	0.032	0.091	0.012	0.024	0.123	0.045	0.078	0.103	0.137	0.078
unemployed	2.077	2.125	1.622	2.069	0.767 †	1.653 †	0.937 †	1.035 †	1.471 †	1.508 **	2.197 †
student	0.260	0.033	0.165	0.052	0.083	0.462 †	0.135	0.243	<0.001 †	0.240	0.421 †
other not in the labour force	2.633	2.820	2.154	2.207	1.640	3.315	2.363	2.115	2.428	2.181	1.212 †
Densely-populated area	0.840	0.498	0.710 **	0.458	0.546	0.596	0.691	0.588	0.600 *	0.595	-
Intermediate area	1.062	0.662	0.787 †	0.563	0.747 †	0.738 *	1.033 †	0.807 **	0.519 **	0.828 *	1.118 †
lowest quartile	1.257	1.185 †	1.354	0.919 †	1.445 *	1.495 *	1.904 *	1.654	2.271	2.416	1.665 †
second highest quartile	0.769	0.917 †	0.724	0.536	0.615	0.631 **	0.741 *	0.513	0.564 **	0.472	0.563 †
highest quartile	0.543	0.862 †	0.437	0.361	0.401	0.278	0.296	0.271	0.331	0.122	0.286 **
household with dependent children	1.015 †	0.973 †	0.813 **	1.100 †	0.928 †	1.156 †	1.036 †	0.938 †	0.534 †	0.771 **	1.207 †
C	0.877	0.862	0.874	0.913	0.915	0.894	0.932	0.916	0.928	0.914	0.919

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Table 6. Odds ratios associated with having never used the Internet in EU 18+2, 2008[1] (cont'd)

Countries	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
Explanatory variables										
model1										
16-24	0.519	<0.001 †	0.044	0.183	0.016	<0.001 †	0.113	0.682 †	0.220 *	0.081
25-34	0.723	0.301 **	0.305	0.620 †	0.643 †	<0.001 †	0.489	0.429 †	0.521 *	0.421
45-54	1.374	1.354 †	2.709	1.753 *	1.562 †	2.150 †	2.016	4.856	4.018	1.713 **
55-64	2.338	2.664 *	5.466	3.998	2.150 **	2.473 †	2.981	8.133	3.538 **	2.301
65-74	5.767	14.609	13.508	10.050	5.543	4.553 *	9.243	16.165	21.913	7.007
SEX (woman)	1.569	2.782	0.864 †	1.440 *	0.957 †	1.049 †	1.648	1.381 *	1.269 †	0.705 **
upper secundary education	0.189	0.290	0.321	0.124	0.249	0.354 **	0.090	0.373	0.192	0.118
tertiary education	0.069	0.078	0.059	0.030	0.043	0.022	0.041	0.064	0.040	0.028
unemployed	1.446	1.367 †	2.101	1.453 †	0.314 †	2.730 †	1.213 †	0.789 †	2.269 *	2.541
student	0.153	<0.001 †	0.092	1.112 †	0.578 †	<0.001 †	0.187	0.232 †	0.316 †	0.038 **
other not in the labour force	2.869	0.884 †	2.797	<0.001 †	2.643	7.740	2.542	1.066 †	3.178	4.108
Densely-populated area	0.762	1.162 †	0.765	0.688 †	0.557	1.196 †	0.625	0.692 †	0.495 *	0.726 *
Intermediate area	1.031 †	1.408 †	0.345	0.565 †	0.741 †	1.746 †	0.922 †	0.796 †	0.768 †	-
lowest quartile	1.515	3.477	2.169	3.101 *	1.270 †	1.285 †	2.325	3.555	1.492 †	1.377 †
second highest quartile	0.643	0.385 **	0.553	0.486 **	0.662 *	1.011 †	0.590	0.616 *	0.532 *	0.628 **
highest quartile	0.390	0.174	0.318	0.320	0.644 *	0.184 †	0.253	0.327	0.188	0.292
1 adult with one or more children	0.824 †	0.461 †	1.684 †	0.990 †	0.386 †	<0.001 †	0.764 †	1.413 †	0.120 †	0.761 †
2 adults	1.425	1.305 †	1.379 *	1.271 †	0.647 **	0.562 †	1.732 **	2.336	1.167 †	1.118 †
2 adults with one or more children	1.545	1.410 †	0.922 †	1.490 †	0.302	0.274 †	1.338 †	1.090 †	1.377 †	0.866 †
3 or more adults	1.775	1.729 †	1.554 **	1.995 †	0.947 †	0.429 †	2.192	1.441 †	1.414 †	1.426 †
3 or more adults with 1 or more child.	2.298	2.877 *	1.737	1.443 †	0.827 †	0.988 †	2.563	1.871 †	1.361 †	0.980 †
C	0.884	0.921	0.927	0.887	0.909	0.949	0.916	0.919	0.927	0.921
model2										
16-24	0.621	<0.001 †	0.045	0.196	0.022	<0.001 †	0.139	0.754 †	0.228 *	0.083
25-34	0.764	0.318 **	0.279	0.621 †	0.629 †	<0.001 †	0.468	0.428 †	0.489 *	0.405
45-54	1.513	1.694 †	2.725	1.790 *	1.743 *	2.180 †	2.176	4.869	3.873	1.729
55-64	2.507	2.976 **	5.440	3.804	2.134 **	2.291 †	3.042	8.689	3.286 **	2.219
65-74	5.700	15.802	13.247	8.785	5.401	4.523 *	8.732	15.890	19.992	6.721
SEX (woman)	1.535	2.704	0.856 *	1.465 *	0.948 †	0.983 †	1.622	1.416 *	1.243 †	0.715 **
upper secundary education	0.183	0.276	0.314	0.124	0.247	0.369 **	0.085	0.363	0.185	0.117
tertiary education	0.064	0.075	0.058	0.029	0.044	0.023	0.036	0.061	0.038	0.027
unemployed	1.589	1.426 †	2.174	1.438 †	0.332 †	2.691 †	1.268 *	0.932 †	2.100 †	2.691
student	0.160	<0.001 †	0.099	1.182 †	0.516 †	<0.001 †	0.202	0.234 †	0.311 †	0.041 **
other not in the labour force	2.997	0.829 †	2.829	<0.001 †	2.554	6.884	2.647	1.259 †	3.104	4.186
Densely-populated area	0.757	1.242 †	0.748	0.701 †	0.562	1.229 †	0.589	0.610 *	0.479 **	0.703 **
Intermediate area	1.031 †	1.473 †	0.350	0.571 †	0.739 †	1.882 †	0.919 †	0.779 †	0.728 †	-
lowest quartile	1.410	3.078	1.934	2.547 †	1.452 *	1.695 †	1.913	2.429	1.418 †	1.220 †
second highest quartile	0.702	0.393 **	0.575	0.531 **	0.664 *	1.098 †	0.660	0.672 †	0.579 *	0.691 **
highest quartile	0.451	0.187	0.344	0.363	0.660 *	0.180 †	0.301	0.367	0.213	0.334
household with dependent children	1.146	1.233 †	0.958 †	0.846 †	0.539 **	0.443 †	0.917 †	0.805 †	0.943 †	0.730 *
C	0.882	0.919	0.926	0.885	0.907	0.945	0.913	0.916	0.926	0.921

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Elderly people

Do elderly people who have never used the Internet have characteristics differing from those observed in the general population of Internet non-users?

As for computer non-use, a test was run to check if modelling the fact of never having used the Internet for older people provided coefficients statistically different from those obtained for the population as a whole. In most of the countries, the test found a statistically significant difference for coefficients associated with the ISCED levels and income quartiles. Significant differences for the household composition were also found, though in less than half of the countries. This means that compared to the population as a whole, individuals aged between 65 and 74 have specific results concerning the probability of never having used the Internet (Table 7).

Among elderly people, being a *woman* greatly increases the probability of never having used the Internet. In all countries where this effect is significant, it is also much stronger compared the whole population. And similarly to what was observed in the whole population, e*ducational attainment* has a monotonic effect most of the time: the higher the level, the lower the probability of never having used the Internet. And elderly people among higher quartiles of income have a lower probability to have never used the Internet in a majority of countries.

As observed for elderly people having never used a computer, the effects of income and educational attainment level on the probability of never having used the Internet among the whole population are generally repeated among elderly people.

People with the lowest educational level (ISCED 0)

Table 8 shows that the effects of the socio-economic variables on the probability of never having used the Internet among people with the lowest educational attainment level are generally in line with to those observed for the whole population.[10] Gender, employment situation, geographical location, income quartiles, household composition and age all have a specific influence on the probability.

The most widespread influence across countries is linked to age, income, employment situation, the geographical location, and to a lesser extent, gender.

Among lower educated people, age generally increases monotonically the probability of never having used the Internet: in Latvia or Iceland, people aged between 65 and 74 are around 20 times more likely to have never used the Internet, compared to the reference group (people aged between 35 and 44). Similarly, to be out of the labour force has a similar effect, though with less amplitude. On the other hand, to be a woman, or to be living in a household belonging to the two highest income quartiles, or in an urban area decreases the probability.

These effects uncover increased risks for this particular population to stay away from the Internet use.

Table7. Odds ratios associated with having never used the Internet among elderly people (aged 65 to 74) in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
SEX (woman)	1.506	2.324	1.631	1.043 †	6.042 **	1.072 †	2.397 †	1.550 *	1.134 †	1.039 †	1.075 †
upper secundary education	0.190	0.157	0.302	0.090 **	0.151 *	0.362	0.259 †	0.086	0.607 †	0.542 **	0.362 *
tertiary education	0.074	0.036	0.093	0.027	0.048	0.150	0.016	0.081	0.129	0.257	0.206 †
unemployed	2.731 *	-	0.313 †	>999.9 †	-	>999.9 †	0.192 †	4.445 †	-	>999.9 †	-
student	0.049 †	-	-	>999.9 †	-	-	-	-	-	-	<0.001
other not in the labour force	2.051	2.409 *	1.336 †	5.332 **	0.454 †	2.411 †	2.333 †	3.208	8.970 †	6.385	0.787 †
Densely-populated area	1.114 *	0.574 **	1.036 †	0.326 **	1.708 †	0.506 **	2.073 †	1.034 †	0.732 †	0.782 †	-
Intermediate area	1.160 **	0.756 †	1.185 †	0.455 †	4.420 †	0.641 *	6.370 †	1.112 †	0.593 †	1.650 *	0.689 †
lowest quartile	1.592	1.362 †	1.471 *	6.201 †	5.055 †	1.140 †	>999.9 †	2.871	2.429 *	2.369 **	1.309 †
second highest quartile	0.696	0.494	0.893 †	0.324 **	0.124 **	0.495 **	0.231 †	0.355	0.439 *	0.369	0.771 †
highest quartile	0.554	0.474 **	0.606 *	0.492 †	0.365 †	0.243 **	0.118 *	0.354 **	0.394 †	0.166	<0.001
1 adult with one or more children	0.771 †	>999.9 †	>999.9 †	>999.9 †	-	<0.001 †	-	>999.9 †	-	-	-
2 adults	1.097 †	1.227 †	0.934 †	11.416 *	4.774 †	0.544 **	1.971 †	1.566 †	1.205 †	1.486 †	0.591 †
2 adults with one or more children	1.142 †	>999.999	0.375 †	19.860 †	>999.9 †	>999.9 †	>999.9 †	7.243 †	-	0.134	-
3 or more adults	2.268	1.728 †	0.688 †	15.107 **	39.296 **	0.730 †	1.186 †	2.259 *	15.302 **	0.191	0.885 †
3 or more adults with 1 or more child.	2.310	1.550 †	0.608 †	63.932 **	>999.9 †	>999.9 †	>999.9 †	6.738 *	-	0.079	>999.9 †
C	0.802	0.782	0.781	0.887	0.956	0.775	0.921	0.866	0.799	0.890	0.746

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
SEX (woman)	2.454	0.791 †	0.898 †	2.832 †	1.261 †	0.505 †	5.430	1.131 †	3.697 †	1.057 †
upper secundary education	0.141	0.355 †	0.303	0.161 *	0.317	0.124 **	0.089	0.471	1.200 †	0.112
tertiary education	0.066	0.177 *	0.065	0.071 *	0.058	0.014 **	0.071	0.153	0.451 †	0.042
unemployed	>999.9 †	>999.9 †	<0.001 †	<0.001 †	-	-	>999.9 †	<0.001 †	<0.001 †	-
student	-	-	-	-	-	-	<0.001 †	-	-	-
other not in the labour force	3.317	>999.9 †	4.407	-	-	>999.9 †	2.491 *	1.295 †	-	272.286 **
Densely-populated area	0.665 *	2.654 †	1.592 †	<0.001 †	0.420	0.798 †	0.832 †	0.552 *	0.393 †	1.007 †
Intermediate area	1.020 †	1.574 †	0.491 †	<0.001 †	0.480 *	1.881 †	1.097 †	0.564 †	1.395 †	-
lowest quartile	1.550 †	6.888 *	1.239 †	>999.9 †	1.215 †	1.911 †	2.762 †	4.445	>999.9 †	0.348 †
second highest quartile	0.573 **	0.527 †	0.316	0.969 †	0.672 †	5.757 †	0.243	0.577 †	0.275 †	0.301 †
highest quartile	0.394	0.433 †	0.262	0.613 †	0.337 **	0.635 †	0.206	0.247 **	0.273 †	0.338 †
1 adult with one or more children	0.391 †	-	>999.9 †	-	-	-	>999.9 †	>999.9 †	-	-
2 adults	1.353 †	0.865 †	0.895 †	<0.001 †	0.472 **	0.434 †	2.762 *	2.627 **	<0.001 †	0.553 †
2 adults with one or more children	0.407 †	<0.001 †	0.947 †	<0.001 †	-	-	0.774 †	3.521 *	131.843 †	>999.9 †
3 or more adults	1.579 *	0.304 †	1.396 †	<0.001 †	1.009 †	-	11.463	2.182 †	<0.001 †	0.182 †
3 or more adults with 1 or more child.	3.108 *	1.645 †	1.143 †	1.372 †	-	-	7.007 **	<0.001 †	12.334 †	-
C	0.868	0.880	0.835	0.842	0.789	0.816	0.910	0.819	0.887	0.842

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

Table 8. Odds ratios associated with having never used the Internet among people with low education level (Primary or lower secondary education, or no formal education) in EU 18+2, 2008[1]

Countries Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
SEX (woman)	1.190	1.992	1.389	1.534 *	1.775 *	1.371 †	1.937	1.020 †	0.751 †	1.128 †	1.082 †
unemployed	1.782	1.710 *	1.577 **	2.390 *	0.147	1.338 †	0.663 †	0.965 †	2.342 †	1.514 **	1.927 †
student	0.260	<0.001 †	0.242	0.034	0.016	0.626 †	0.169	0.302	<0.001 †	0.266	<0.001 †
other not in the labour force	2.313	3.057	2.099	2.555 *	0.570 †	3.693	1.709 *	2.007	2.483 **	1.843	0.905 †
Densely-populated area	0.805	0.585	1.049 †	0.388	0.395 **	0.791 †	0.553	0.542	0.348	0.522	-
Intermediate area	1.111	0.798 †	1.054 †	0.476 *	0.747 †	0.801 †	1.573 †	0.730	0.299	0.902 †	1.211 †
lowest quartile	1.620	1.104 †	1.353 **	0.594 †	3.082 *	1.250 †	2.056 †	1.948	3.811	2.238	2.029 †
second highest quartile	0.625	0.809 †	0.737 **	0.631 †	0.576 †	0.592 *	0.540 **	0.520	0.564 †	0.519	0.383 *
highest quartile	0.415	0.916 †	0.541	0.253	0.512 †	0.235	0.332	0.272	0.245 *	0.170	0.430 †
1 adult with one or more children	0.720 **	0.942 †	0.352	>999.9 †	>999.9 †	1.077 †	>999.9 †	1.019 †	0.886 †	0.417 †	<0.001
2 adults	1.440	1.320 †	0.852 †	0.479 †	3.586 †	0.904 †	1.375 †	1.279 †	1.602 †	0.843 †	1.164 †
2 adults with one or more children	1.588	0.968 †	0.664 *	0.689 †	4.782 †	1.461 †	0.929 †	1.232 †	<0.001 †	0.345	1.296 †
3 or more adults	2.575	0.923 †	0.814 †	0.845 †	6.674 *	1.820 †	1.467 †	2.209	1.619 †	0.298	1.274 †
3 or more adults with 1 or more child.	2.641	1.125 †	0.757 †	1.278 †	7.917 *	2.454 *	1.169 †	1.966	2.699 †	0.326	2.707 †
16-24	0.202	0.247	0.292	0.248	0.273 **	0.049 **	0.119	0.156	<0.001 †	0.192	<0.001 †
25-34	0.659	0.356	0.744 †	0.498 *	0.377 *	0.297 *	0.759 †	0.568	0.267 †	0.614	1.037 †
45-54	1.416	1.175 †	1.159 †	2.146 †	1.945 †	2.200 *	1.800 **	1.883	2.209 †	1.632	2.261 †
55-64	2.324	1.977	1.614 **	3.086 *	8.341 **	3.572	6.890	5.587	3.746 †	2.247	11.784
65-74	4.786	5.370	4.500	11.065 **	10.927 **	4.535	30.168	14.633	7.180 *	2.185	19.845
C	0.840	0.894	0.816	0.967	0.962	0.884	0.934	0.866	0.905	0.889	0.904

Countries Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
SEX (woman)	1.511	3.551	0.649 †	1.301 †	1.008 †	1.285 †	1.618	1.066 †	1.079 †	1.016 †
unemployed	1.594	1.227 †	1.644 †	1.109 †	0.390 †	<0.001 †	1.175 †	1.273 †	4.087 †	2.397 *
student	0.142	0.694 †	0.133 **	1.376 †	0.814 †	2.115 †	0.201	0.304 †	<0.001 †	<0.001 †
other not in the labour force	2.681	0.892 †	3.085	<0.001 †	2.584	5.154 †	2.163	1.113 †	3.535 †	3.419
Densely-populated area	0.782	1.229 †	0.534 *	0.777 †	0.602 **	2.749 †	0.603	1.077 †	1.052 †	0.818 †
Intermediate area	1.057 †	1.620 †	0.163 *	0.619 †	0.761 †	0.423 †	0.908 †	0.740 †	1.056 †	-
lowest quartile	1.624	3.563	1.953 *	3.009 *	1.170 †	2.543 †	2.546	4.497	0.831 †	0.628 †
second highest quartile	0.571	0.379 **	0.320	0.521 **	0.520 **	0.201 †	0.587	0.624 †	0.659 †	0.445 **
highest quartile	0.370	0.195 **	0.146	0.359	0.706 †	<0.001 †	0.235	0.318 **	0.332 †	0.233
1 adult with one or more children	0.802 †	0.536 †	17.017 †	0.936 †	0.481 †	<0.001 †	0.890 †	1.937 †	-	1.312 †
2 adults	1.600	1.503 †	0.811 †	1.513 †	0.664 *	0.946 †	1.862 **	3.217 **	1.463 †	0.639 †
2 adults with one or more children	1.481	1.377 †	0.688 †	1.932 †	0.326 **	<0.001 †	1.409 †	1.158 †	0.275 †	0.479 †
3 or more adults	1.987	2.527 *	1.513 †	2.345 †	1.015 †	<0.001 †	2.261	1.238 †	1.173 †	0.516 †
3 or more adults with 1 or more child.	2.475	2.868 *	1.460 †	1.895 †	1.013 †	<0.001 †	2.741	1.430 †	0.959 †	0.854 †
16-24	0.481	<0.001 †	0.045	0.236	0.015	<0.001 †	0.110	3.702 †	0.260 †	0.110
25-34	0.749	0.336 **	0.354 **	0.745 †	0.787 †	<0.001 †	0.511	<0.001 †	1.016 †	0.719 †
45-54	1.359	1.299 †	6.952	2.206 **	1.347 †	1.250 †	1.920	24.556 **	5.727 *	2.594 **
55-64	2.679	2.622 *	19.417	4.201	1.940 *	0.592 †	3.090	29.326 **	3.614 †	4.166
65-74	6.772	9.896	19.069	12.315	4.799	6.712 †	8.550	42.477	9.459 †	7.759
C	0.854	0.865	0.978	0.804	0.843	0.967	0.862	0.838	0.925	0.886

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

In 2008, there are still factors of inequality significantly influencing the probability to be left out of the information society, through non-use of two key tools of the information society, computers or the Internet.

Overall, the strongest and most widespread effect across countries is by far due to the educational attainment: on average, to be tertiary educated decreases by more than 16 times the probability of never having used a computer or the Internet compared to people with an upper secondary educational level or less.

The second effect, equally widespread but not as strong as the educational level, is due to age: elderly people (over 65) are over four times more likely to never have used computers and the Internet compared to the middle age class (35-44), and similarly youngster (16-24) are between 47 and 98% less likely to be in that situation.

Effects on the probability of never having used these ICT tools are similarly widespread across countries and relatively strong for the following socio-economic characteristics: to be out of the labour force and belong to the lowest income quartile are having an increasing effect. Whereas being a student has a very strong decreasing effect, though less widespread across countries. And finally, to live in a thinly populated area or to be a woman, also have an increasing effect (though less widespread and less marked, but still significant).

Some factors continue to have a significant influence on those parts of the population already more likely to be left out, leading to a possible cumulative effect. For instance among elderly people, the educational attainment has still a very strong effect, similar and as widespread as what is observed among the whole population. Similar observations can be seen for age and income level among people with a low educational attainment level attainment.

Even if people have made their first steps in the information society, the possibility for them to leave – even temporarily - is not excluded. What is the influence of the socio-economic variables on this possibility?

2.3 Internet dropouts

Using the Internet is becoming increasingly an everyday event: in 2009 more than 50% of individuals were using the Internet daily in the EU 27 countries, against less than 30% in 2005. In 2008, this share was around 43%. Therefore, the concept of Internet "dropout" may change with time. The Eurostat questionnaire (for the year 2008) does not include a specific question on people who once used the Internet but were not using it at the time of the survey. There are several possibilities to use a proxy for "dropouts": people having answered "more than three months ago" or "more than one year ago" to the question "When did you last use the Internet?" can be selected. An initial attempt to model the probability of being an internet dropout using "more than one year ago" as a proxy did not lead to a clear and coherent answer concerning the influence of the socio-economic characteristics. "More than three months ago" was then selected as a proxy to having stopped using the Internet. In this section, we are modelling according to socio-demographic characteristics the probability, for individuals who are internet users, not to have used the Internet within the last three months (Table 9).

At the aggregate EU level, among all internet users, the probability of not having used the Internet for 3 months is significantly influenced by age. On one hand, youngsters are less than 77% likely to be Internet dropout, compared to the reference group (age group 35-44). On the other hand, people aged above 65 have a more than 60% higher probability to be Internet dropouts. Compared to the reference group, Internet users aged 55-64 are also 14% more likely to be dropouts at the European level.

Women Internet users are 25% more likely to be Internet dropouts compared to men. And Internet users living in an urban area are 12% less likely to be Internet dropouts compared to those from rural areas.

Educational attainment has a strong effect on the probability of being an Internet dropout: reaching the intermediate level decreases the probability by 30% (compared to the reference group), and the highest level by 68%.

The employment situation is also having an effect, especially those Internet users who are not in the labour force or who are unemployed: they are respectively 88% and 92% more likely to be Internet dropout compared to employed people.

Income quartiles significantly influence the probability to drop out: in particular, Internet users from the highest income quartile are 38% less likely to be in that case compared to the reference group.

Finally, household composition have an influence within households with at least two adults. Compared to single households, two-adult households with children are 12% more likely to be internet dropouts, and the probability then increases with the number of people in the household. Overall, among the population of Internet users, the probability to be an Internet dropout is significantly influenced by the following socio-economic characteristics, at the European level as well as in a majority of countries (11 to 15 out of 20): a higher educational attainment level, and living in a household from the highest income quartile, strongly decrease the probability. On the other hand, to be aged 65 or older, and to be out of the labour force strongly increase the probability.

Age, educational attainment, income and labour force status not only influence the probability of staying out of the information society, but they also have a similar effect on the probability to – temporarily or not - leave it, showing a possible cumulative effect.

Table 9. Odds ratios associated with having used Internet more than 3 months ago in EU 18+2, 2008[1]

Countries / Explanatory variables	All	AT	BE	BG	CY	DK	EL	ES	FI	HU	IS
16-24	0.769	1.086 †	1.112 †	0.781 †	0.964 †	0.744 †	1.035 †	0.561 **	0.094 *	1.295 †	<0.001 †
25-34	1.068 †	0.889 †	1.129 †	0.872 †	1.624 *	1.209 †	1.118 †	0.934 †	0.462 †	1.022 †	0.557 †
45-54	1.054 †	1.012 †	1.143 †	1.232 †	0.819 †	1.733 †	1.519 †	0.982 †	1.752 †	0.915 †	2.613 †
55-64	1.140 *	1.436 †	1.262 †	1.974	1.924 †	2.564 **	1.196 †	1.366 †	1.700 †	1.256 †	3.931 †
65-74	1.634	1.952 **	1.624 †	3.449 **	2.223 †	3.320 **	7.446	1.877 *	2.217 †	0.898 †	8.350 *
SEX (woman)	1.253	1.191 †	1.210 †	1.063 †	1.235 †	1.363 †	1.359 *	1.479	0.792 †	1.237 †	0.667 †
upper secundary education	0.701	1.050 †	0.758 *	0.668 †	1.041 †	0.747 †	1.354 †	0.494	1.153 †	0.557	0.620 †
tertiary education	0.324	0.242	0.342	0.254	0.552 *	0.248	0.750 †	0.268	0.602 †	0.316	0.082 *
unemployed	1.923	1.587 †	1.668 **	1.289 †	1.340 †	2.562 †	2.224 **	1.142 †	1.618 †	0.889 †	<0.001 †
student	0.430	0.040	0.266	0.221	0.353 **	0.683 †	0.453 *	0.101	<0.001 †	0.129	<0.001 †
other not in the labour force	1.885	2.364	1.514 **	2.753	1.720 *	2.808	2.571	1.777	4.009	1.873	0.921 †
Densely-populated area	0.878	0.759 *	0.823 †	0.779 *	0.556	0.857 †	0.627 **	0.667	0.851 †	0.946 †	0.683 †
Intermediate area	1.000 †	0.891 †	0.876 †	0.783 †	0.624 †	0.953 †	0.627 †	0.770 *	1.258 †	0.915 †	1.192 †
lowest quartile	1.194	0.981 †	1.271 †	0.732 †	1.260 †	1.658 †	1.638 †	1.717	1.830 †	1.407 †	0.804 †
second highest quartile	0.814	1.061 †	0.803 †	0.702 *	0.524	0.945 †	0.760 †	0.857 †	0.503 *	0.679 *	0.583 †
highest quartile	0.623	1.003 †	0.601 **	0.479	0.465	0.577 †	0.617 *	0.391	0.380 *	0.316	<0.001 †
1 adult with one or more children	0.909 †	1.463 †	1.114 †	0.535 †	7.800 *	1.682 †	4.573 †	1.427 †	0.639 †	0.451 †	1.161 †
2 adults	0.894 *	0.724 †	0.790 †	0.788 †	2.393 †	0.697 †	1.261 †	0.921 †	0.860 †	0.855 †	0.922 †
2 adults with one or more children	1.126 *	0.746 †	0.729 †	0.674 †	4.371 **	1.060 †	1.857 †	1.237 †	0.599 †	0.689 †	0.750 †
3 or more adults	1.313	0.744 †	0.539	1.084 †	4.721 **	0.919 †	1.594 †	1.194 †	0.556 †	0.633 †	0.450 †
3 or more adults with 1 or more child.	1.317	0.877 †	0.426	0.758 †	5.607 **	0.859 †	1.836 †	1.373 †	1.566 †	0.495 *	-
C	0.691	0.707	0.733	0.724	0.705	0.802	0.717	0.763	0.853	0.743	0.893

Countries / Explanatory variables	IT	LU	LV	MT	NL	NO	PT	SE	SI	SK
16-24	1.020 †	<0.001 †	0.197	0.768 †	1.307 †	<0.001 †	1.321 †	0.397 †	0.890 †	0.553 *
25-34	1.158 *	1.831 †	0.542	1.203 †	0.930 †	1.811 †	0.848 †	0.578 †	0.775 †	0.903 †
45-54	1.052 †	5.056 *	1.496 *	1.805 †	4.135 **	4.368 †	1.090 †	1.782 †	0.860 †	1.636 *
55-64	1.153 †	6.232 *	1.138 †	3.593 †	2.306 †	1.721 †	2.053 **	3.078 **	0.193 †	2.112 **
65-74	1.785	11.048 *	1.151 †	<0.001 †	5.154 **	5.478 †	2.198 †	7.273	0.091 †	5.189
SEX (woman)	1.373	3.190 **	0.869 †	0.937 †	0.839 †	1.156 †	2.075	1.246 †	0.920 †	0.960 †
upper secundary education	0.542	0.328 *	0.553 **	0.335 †	0.468 **	0.946 †	0.386	0.910 †	1.141 †	0.390
tertiary education	0.354	0.470 †	0.134	0.372 †	0.101	0.377 †	0.283	0.402 **	0.282 †	0.113
unemployed	1.532	0.577 †	1.875 **	4.289 †	1.197 †	14.252 *	1.224 †	1.239 †	2.323 †	6.255
student	0.463	<0.001 †	0.377 **	0.540 †	0.222 †	<0.001 †	0.015	0.413 †	0.105 †	0.140
other not in the labour force	1.803	1.440 †	2.678	1.142 †	1.452 †	6.145 *	2.159	0.897 †	11.654 **	2.572
Densely-populated area	0.694	2.461 †	1.024 †	1.182 †	0.838 †	1.401 †	0.771 †	0.610 †	0.631 †	0.939 †
Intermediate area	0.904 †	0.617 †	0.643 †	0.804 †	1.071 †	0.727 †	0.899 †	1.098 †	0.857 †	-
lowest quartile	1.167 †	1.418 †	1.765 **	1.877 †	0.498 *	2.513 †	3.335	2.231 **	1.124 †	1.101 †
second highest quartile	0.810 **	0.575 †	0.754 †	0.483 †	0.311	0.251 †	0.714 *	0.705 †	0.646 †	0.802 †
highest quartile	0.647	0.260 *	0.482	0.324 †	0.347 **	0.288 †	0.334	0.295	0.301 *	0.522 **
1 adult with one or more children	0.771 †	1.562 †	0.411 †	<0.001 †	0.940 †	1.275 †	0.032 †	0.707 †	1.307 †	2.009 †
2 adults	1.010 †	0.932 †	0.829 †	0.602 †	0.534 *	0.888 †	1.113 †	1.229 †	0.722 †	1.064 †
2 adults with one or more children	1.253 *	2.923 †	0.589 *	1.208 †	0.274 *	0.737 †	1.560 †	0.851 †	0.342 †	1.489 †
3 or more adults	1.194 †	0.164 †	0.538 **	0.936 †	0.596 †	1.419 †	1.651 †	1.070 †	0.764 †	0.640 †
3 or more adults with 1 or more child.	1.562	0.759 †	0.769 †	0.732 †	0.166 *	<0.001 †	1.973 †	0.995 †	0.402 †	0.917 †
C	0.676	0.872	0.783	0.810	0.829	0.911	0.794	0.829	0.823	0.792

1. See notes from Table1.

Source: Authors calculations, based on Eurostat database.

3. Internet use: intensity, activities and scope

Information and communication technologies (ICT) are having an increasing influence on the daily life of citizens. In particular, the Internet is creating a new layer of participation of individuals in the societal and economic life. New services on the Internet affect a wide range of activities such as information retrieval, communication, training and education, commerce and finance, participation in social networks or leisure activities. Activities that have been performed offline are now offered as online services on the Internet. The growing pervasiveness of ICT leads to user friendlier applications on the one hand but requires access to ICT and Internet and computer skills on the other hand.

Beyond the digital divide observed as the differences between the haves and haves-not regarding access, inequalities in Internet use are also becoming an issue. They root in differences in how those who are online use the medium, with different online activities and skills. This "second level" digital divide can be indirectly observed through the diversity and variety of Internet use, and the very heterogeneous abilities of individuals to find information online in an efficient and effective way (Hargittai, 2002, as quoted in Pénard and Suire, 2006).

Direct measurement and quantification of a second level digital divide goes far beyond the scope of this paper. It rather provides, in this second part, an attempt to shed light on those inequalities through the analysis of the current influences of several socio-economic variables on the Internet use in selected countries.

As in the first part, models were constructed in distinguishing *i)* the Internet use intensity, expressed though the frequency; *ii)* selected online activities; and *iii)* the scope of the online activities. For the two first issues, modelling was done with logistics regressions and for the latter, a multiple linear regression (see Annex 1).

3.1 Intensity

Intensity of Internet use has been expressed by the frequency. The variable frequency of Internet use was split into 3 dichotomous variables. Intensive Internet users are those who use the Internet daily or almost every day, frequent Internet users access the Internet weekly but not every day and occasional users are those who access the Internet less than weekly including those who have never used the Internet. The model was calculated for the 3 variables and for the aggregate of the European area (which consists of 19 EU Member States plus Iceland and Norway), and for the countries separately, as well as Korea. Table 10 shows the odds ratios for the European aggregate and Korea.

The influence of the *age group* on being an intensive, frequent or occasional Internet user in the European area does exist. The odds ratios rank between 0.69 and 1.283 concerning the propensity for daily use of the Internet and between 0.7 and 1.34 for occasional Internet use. Individuals aged between 16 and 24 years have a 28% higher probability for being an intensive or daily Internet user than individuals of the reference group between 35 and 44 years. Whereas individuals aged between 65 and 74 are 31% less likely to be intensive Internet user than the reference group. However, we can observe that the odds for individuals in age group 6 (55-64) are at the same level as for those in the younger age group 5 (45-54). The opposite results are calculated for the occasional or non-Internet users with a 30% [30%=1-0.696] lower probability for the youngest age group and a 34% higher probability for the oldest age group to be an occasional Internet user.

Table 10. Odds ratio estimates[1] of logistic regressions for intensity of Internet use in EU19+2, and Korea, 2008

Explanatory variables [2] (socio-economic background characteritics)		EU19+2			Korea		
		Intensive (daily)	Frequent (weekly)	Occasional	Intensive (daily)	Frequent (weekly)	Occasional
Age	16-24	1.283	0.934*	0.696	1.637	0.666	0.282
	25-34	1.112	0.887	0.954†	1.225	0.794	1.389
	45-54	0.847	1.093	1.194	0.805	1.248	1.157
	55-64	0.858	1.126	1.134	0.824	1.154	1.483
	65-74	0.690	1.273	1.340	0.458	1.696	2.273
Gender	Female	0.763	1.208	1.238	0.770	1.269	1.292
Education	ISCED3	1.546	0.857	0.596	1.915	0.574	0.891
	ISCED5	2.384	0.712	0.330	3.633	0.319	0.339
Employment	Unemployed	0.815	0.840	1.676		n.a.	
	Student (not in the labour force)	2.019	0.613	0.506	2.010	0.521	0.156
	Other not in the labour force (retired, inactive, in compulsory military service, etc.)[3]	0.577	1.031†	2.389	0.781	1.189	1.476
Density	Densely-populated area	1.342	0.730	0.941	0.955	1.066	0.886
	Intermediate area	1.290	0.723	1.029†		n.a.	
Income[4]	Lowest quartile	1.021†	0.905	1.066†	0.773	1.189	1.574
	Second highest quartile	1.299	0.787	0.886	0.973	1.002†	1.030
	Highest quartile	1.685	0.606	0.774	0.955	0.966	1.481
Household composition	One adult with one or more children	0.884†	0.884†	1.450	1.053	0.895	3.064
	Two adults	0.753	1.164	1.327	0.968	1.043	1.792
	Two adults with one or more children	0.555	1.323	1.890	0.897	1.072	2.327
	Three or more adults	0.542	1.383	1.907	0.643	1.364	3.886
	Three or more adults with one or more child.	0.446	1.575	2.292	0.774	1.132	4.096
Household with a broadband connection		1.345	0.750	0.827	2.012	1.169	0.014
Individual having used Internet in the last 3 months at home		5.152	1.415	0.074		n.a.	
Individual having payed in the last 3 months for online audiovisual content		1.993	0.661	0.240		n.a.	
Individual accessing the internet with a mobile phone via GPRS		1.577	0.798	0.483	1.927	0.710	0.084
Individual accessing the internet with a mobile phone via UMTS (3G)		1.566	0.711	0.631		n.a.	
Individual accessing the internet with a handheld computer (palmtop, PDA)[5]		2.160	0.472	0.568	1.489	0.839	0.003
Individual accessing the internet with a portable computer (laptop) via wireless connection away from home or work		2.185	0.582	0.362		n.a.	
C		0.787	0.628	0.866	0.733	0.690	0.908

1. Odds ratios are significant on the level of 99.9%; with 2 stars on 99%; with one star on 95% level; and odds ratios with "†" are not significant (below the 95% level).
2. For a detailed variable description, see the Annex 2.
3. For Korea, includes the category "Unemployed".
4. For Korea, income quartiles could not be calculated: household income was split unto 4 groups using median income.
5. For Korea, includes laptop.

Source: Authors calculations based on Eurostat database, and KISA.

Concerning the influence of the *age group*, Korea displays relatively similar results, with nevertheless a much stronger effect for extremes. Individuals aged between 16 and 24 years have a 64% higher probability for being intensive Internet users than individuals of the reference group. Whereas individuals aged between 65 and 74 have a 54% lower probability for being intensive Internet users than the reference group. As for European countries, the odds for individuals in age group 6 (55-64) are at the same level as for those in the younger age group 5 (45-54). Occasional or non-Internet users also display the opposite results, with a 72% lower probability for the youngest age group and a 127% higher probability for the oldest age group.

The results support the observation that age strongly influences the propensity towards intensity of Internet usage.

Women have a considerably lower probability of being an intensive Internet user but a higher probability for frequent or occasional Internet use compared to *men*. The *educational attainment* level very much influences the probability of Internet use intensity.

Individuals with a *tertiary education* are more than doubling their probability for being an intensive Internet user (2.4 times in the European area and 3.6 times in Korea) and at the same time have a 37% lower probability for being an occasional Internet user.

The *employment situation* affects the probability of Internet use intensity. Students are two times more likely to use the Internet on a daily basis than individuals of the economically active population. By contrast, compared to the reference group, the probability for the unemployed is 18.5% lower in the European area, and together with other inactive persons, 22% lower in Korea. Unemployed and inactive persons have a considerably higher probability for being occasional Internet users. Unemployed persons have a 67% higher probability for being occasional or non-user than the economically active population in the European area, and together with other inactive persons, a 48% higher probability in Korea.

In Korea, *geographical location* has relatively no impact on the frequency of Internet use, except that the probability for being an occasional -or non- user is 11.4% lower for individuals living in urban areas. Along this line, in the European area, persons living in intermediate and urban areas are more likely to be intensive Internet users whereas they are less likely to use the Internet on a weekly basis. Only a small difference can be observed or the figures are not significant for occasional Internet users.

In the European area, persons living in a household of the highest *income quartile* have a considerably higher chance to be intensive Internet users. But the results for the lowest income quartile are not significant for daily and occasional Internet use. Individuals who live in a household of the two lowest income groups have a similar propensity concerning frequency of Internet use. This might be due to the fact that the first quartile includes students, who have generally a rather strong propensity to use the Internet daily.

In Korea, income seems to have a rather small impact on the likelihood of being an intensive or frequent Internet user. However, the impact is more pronounced for occasional or non-Internet users, but only for the extreme (lowest and highest) quartiles.[11]

In the European area, compared to the single person reference *household type*, the propensities of the other types of households for being a daily Internet user are considerably lower. The odds decrease with the number of persons in the household. In addition, the presence of children further decreases the probability of adults using Internet daily. The opposite observation can be made for occasional or non-Internet usage.

In Korea, compared to the single person reference *household type*, the propensities for being a daily Internet user are also generally decreasing with the number of persons. But the presence of children is further decreasing this propensity only in households with two adults, whereas the decreasing effect is weakened in other households.

As compared to narrow band, accessing the Internet via *broadband* increases the probability of being a daily Internet user by 34.5% in the European area, and is doubled it in Korea. In the European area, the broadband influence is of the same order of magnitude (around 34%) to that of the geographic location, when compared to the respective reference group.

In the European area, the variable with the highest influence as compared to the reference group is "using the Internet at home". Users who access the Internet at home are more than five times more likely to be a daily Internet user than individuals who have not accessed the Internet at home during the last 3 months. On the other hand, individuals having accessed the Internet at home are 92.6% less likely to be occasional users compared to individuals accessing the Internet from elsewhere than home. These results suggest that the presence of Internet access at home also leads to more intensive use of the Internet.

Accessing the Internet from a PDA or a portable computer is doubling the chances for being an intensive Internet user considerably. In the European area, the fact that users have already paid for audiovisual content has a similar effect.

General results for the European area and Korea

To be an intensive Internet user is influenced in a relatively similar way in the European area and Korea by age, gender, educational attainment, employment situation, broadband access, and Internet access via mobile or handheld computer. But the strength of the respective influences is generally higher in Korea. Age has a notably stronger influence in Korea (odds ratios varying from 0.458 to 1.637) than in the European area (odds ratios between 0.69 and 1.283), and similarly for educational attainment (odds ratio between 1.9 and 3.6 in Korea, and between 1.5 and 2.4 in the European area) and broadband access.

Differences are more marked for the geographical location and income level: both have a level of influence in Korea which is significant, but relatively weak compared to what is observed in the European area.

On the other hand, to be an occasional Internet user is influenced, in a relatively similar way in the European area and Korea, by age, gender, educational attainment and geographical location. In Korea, age has nevertheless a stronger influence (odds ratios varying from 0.282 to 2.273 vs 0.696 to 1.34 in the European area) and education a lower influence (odds ratios between 0.339 and 0891 vs 0.33 and 0.596 in the European area).

Overall, looking at the results of the logistic regression, being an intensive Internet user is influenced by age, gender, educational attainment level, employment situation, locality, household income level, household composition, the place of Internet access, the fact that a person has already paid for audiovisual content (in the European area) and using additional devices to access the Internet.

Typically, a daily or intensive Internet user is a man, has a high educational attainment and/or is a student, accesses the Internet from home with a broadband connection and additionally accesses the Internet with mobile devices and, in the European area, lives in intermediate or urban areas in a single household with a high income. Whereas the typical occasional Internet user is older, a woman, has a low educational attainment, is economically inactive or unemployed, belongs to a household with more than three members including children and, in the European area, does not have Internet at home.

European countries specificities

In addition to the analysis at the EU19+2 aggregate level, the logistic regressions were also performed country by country. However, it would be unrealistic to exhaustively describe the results of the logistic regressions by country.[12] Therefore we have picked some observations that differ from the observation of the 'EU19+2'-aggregate. The size of the sample by country is considerably lower than for the aggregate. Therefore, the significances for the estimates tend to be lower. In general, the explanatory variables with the highest impact on the estimates show up with the highest significances and can be included in the discussion of the results.

The differences between the various *household income quartiles* are more distinct as compared to the EU19+2 aggregate, for example in Finland, Norway and Hungary. In Finland and Norway, individuals living in a household with the highest income quartile have a propensity of 2.3 and 2.7 to be an intensive Internet user. The results for the other income quartiles are not significant. In Hungary, the probability for individuals in households of the highest income quartile is not as high (odds ratio 1.356) as that of the EU19+2 aggregate in relation to the respective reference group.

In Italy, it is very interesting to note that the *household income quartile* has a lower influence on the dependent variable compared to the reference group in the EU19+2 aggregate. The different household income quartiles have odds ratios varying from 0.856 (lowest income quartile) to 1.249 (highest income quartile) compared to the reference group. Individuals living in the lowest income quartile have lower chances to be intensive Internet users. On the other hand, individuals from high income quartile households have higher chances but the probability is lower that the equivalent of the EU19+2 aggregate.

We can also note that in Belgium, as in Norway and Finland, individuals belonging to the *age class* 16-24 years clearly have higher chances to be intensive Internet users ($1.4 \leq$ odds ratio ≤ 4.6). The odds ratios decrease from younger age groups to older age groups with the exception of age groups 5 and 6 as already described for the EU19+2 aggregate. In Bulgaria, Estonia and Latvia, the odds for the 16 to 24 years old are higher compared to the reference group (2.1 in BG – 3.8 in LV), while the odds for the oldest group are lower (0.33 in BG – 0.53 in LV). In Luxembourg, individuals in age class 5 (44-54 years) have a higher probability for being intensive Internet users than those of the reference group. In the Netherlands, individuals of the age class 35-44 years have a higher probability to be intensive Internet users than person aged between 25 and 34 years. Young Portuguese individuals (age classes 16-24 and 25-34) have a much higher probability (odds ratio = 1.703) to be an intensive Internet user as compared to the reference group at the 'EU19+2' level. In Sweden, the probability is 2.8 times higher (odds ratio = 2.826) for age class 16-24 years than for the reference group.

The *educational level* seems to have a very strong influence in Portugal. The odds ratio for individuals with a secondary education is 2.605 and individuals with a tertiary education even have a probability that is 4.824 times higher to be an intensive Internet user than the reference group. This result corresponds to higher odds ratio for Portuguese students (odds ratio 3.83) compared to economically active individuals, which form the reference group.

In Sweden it can be observed that the odds of *unemployed persons* for using the Internet daily are higher than for persons who are economically active. In Slovenia, the employment situation variable has the same behaviour as in the 'EU19+2'-aggregate, but with a stronger intensity, which means that Slovenian students have a much higher propensity to be intensive Internet users (odds ratio 5.443) as compared to the reference group, while unemployed (odds ratio 0.364), or economically inactive persons (odds ratio 0.211) have less chances than the economically active population.

In Estonia, *women* have a higher probability of being intensive Internet uses than men (odds ratio 1.423).

In Latvia, individuals living in *intermediate areas* have a chance almost twice as high of being intensive Internet user compared to individuals living in rural areas. The estimates for individuals living in urban areas are not significant. In Sweden, people living in densely-populated areas clearly have a higher propensity for being an intensive Internet user than those living in thinly-populated areas. Norway and Finland reveal the biggest differences between the different types of regions of residence: individuals living in densely populated areas have a higher propensity for being intensive Internet users than those living in thinly-populated areas (odds ratio around 1.8 and 1.9).

3.2 Online activities: selected examples

The previous section has shown that intensity of Internet use is clearly influenced by various socio-economic characteristics, with significant degrees of association. Does this hold for online activities? The current section uses logistic regression models to uncover potential relationships between user characteristics and selected online activities.

Downloads of audiovisual content (EU 19+2)

In the Eurostat questionnaire (for the year 2008), there was a question on the frequency of downloads of music or films, which was answered by regular Internet users, *i.e*. having accessed the Internet within the last three months. The classification of the frequency to intensive, frequent and occasional downloaders was done in the same way as for Internet users. As for the intensity of Internet use, the model was calculated for the 3 variables for the aggregate of the European countries as well as for the countries separately (Table 11).

Table 11. Odds ratio estimates[1] of logistic regressions for downloading of audiovisual content (music or films) in EU19+2, 2008

Explanatory variables [1] (socio-economic background cahracteritics)		EU19+2		
		Intensive (daily)	Frequent (weekly)	Occasional
Age	16-24	2.821	3.305	0.270
	25-34	1.663	1.730	0.559
	45-54	0.447	0.656	1.746
	55-64	0.238	0.432	2.823
	65-74	0.213	0.349	3.418
Gender	Female	0.528	0.614	1.853
Education	ISCED3	0.937†	0.969†	1.042†
	ISCED5	0.707	1.137	1.020†
Employmen	Unemployed	2.032	1.064†	0.697
	Student (not in the labour force)	1.670	1.109**	0.723
	Other not in the labour force (retired, inactive, in compulsory military service, etc.)	1.138†	1.108*	0.866
Density	Densely-populated area	1.582	0.912	0.918
	Intermediate area	1.714	0.694	1.078**
Income	Lowest quartile	0.751	0.908**	1.202
	Second highest quartile	0.942†	0.854	1.148
	Highest quartile	0.948†	0.883	1.122
Household	One adult with one or more children	0.544	0.700	1.574
compositio	Two adults	0.819	0.810	1.265
	Two adults with one or more children	0.636	0.683	1.571
	Three or more adults	1.019†	0.805	1.161
	Three or more adults with one or more children	0.810**	0.786	1.316
Household with a broadband connection		1.320	1.511	0.655
Individual having used Internet since the last 3 months		4.392	2.997	0.273
Individual having payed in the last 3 months for online audiovisual content		0.835	3.312	0.371
Individual accessing the internet with a mobile phone via GPRS		1.340	1.528	0.630
Individual accessing the internet with a mobile phone via UMTS (3G)		1.407	1.098**	0.797
Individual accessing the internet with a handheld computer (palmtop, PDA)		1.522	0.872**	0.917*
Individual accessing the internet with a portable computer (laptop) via wireless connection away from home or work		1.417	0.996†	0.868
	C	0.816	0.771	0.800

1. For the level of significance, see note 1 of the Table 10.

2. For a detailed variable description, see the Annex 2.

Source: Authors calculations based on Eurostat database.

The results of the logistic regression for intensively (daily), frequently (weekly) and occasional (less than weekly) downloading audiovisual content from the Internet follows by and large the pattern of using the Internet. However, the odds ratios for certain explanatory variables are more extreme than for the

frequency of Internet usage, and for some variables the odds ratios do not follow the pattern of Internet usage frequency.

There is a more explicit graduation between the age groups concerning intensive and frequent downloading of audiovisual content. The odds ratios vary from 2.8 for daily and 3.3 for weekly downloading for the youngest age class, with a steady decrease for the 2 oldest age classes to less than 0.21 for daily and 0.35 for weekly downloading. The opposite pattern can be observed for occasional downloading. Younger individuals tend to download audiovisual content more often from the Internet than older individuals, mirroring an age gap. Youngest generations are clearly in the information age and use Internet also to access audio-visual content. The era of television as the main audio-visual source is fading. This might heavily influence the distribution of audiovisual products in the future. Women have only half the probability of men for being intensive or frequent downloaders.

In contrast to Internet use, downloading is not dependent on educational attainment levels, but it does not follow an opposite pattern either. Individuals with tertiary educational levels have less probability for being an intensive downloader. The estimates for secondary education level are not significant.

The unemployed have a two times higher probability for daily downloading audiovisual content than economically active persons. There are only minor differences between the odds ratios for frequent downloaders by employment situation as compared to the reference group. However, the significant levels of the estimates are lower than for the other variables. Individuals living in urban and intermediate areas have a clearly higher probability for being an intensive downloader as compared to frequency of Internet use. Individuals living in a household in the lowest income quartile are less likely to be daily downloaders of music or files. The propensity for weekly downloading is highest for individuals living in a household of the reference group, while persons of reference households are less likely to be occasional downloaders.

Comparable to Internet use frequency, persons living in single households have the highest probability for downloading audiovisual content daily. The presence of children diminishes this probability. Unlike for Internet use frequency, the propensity increases from a household with two to more persons.

Connecting to the Internet via broadband increases the propensity of being a frequent or intensive downloader and decreases the probability for being an occasional downloader. As for Internet use frequency, accessing the Internet from home has the biggest influence on the propensity for intensive downloading and increases the probability by factor 3 for frequent downloading. Obviously, downloading audiovisual content is an activity that is performed at home.

In contrast to Internet use, the fact that individuals have paid for online visual content slightly diminishes the propensity for being an intensive downloader of music and films (odds ratio 0.83). However, having paid for audiovisual content strongly increases the chances for frequent (weekly) downloading of audiovisual content by a factor of 3.3.

A typical person who intensively downloads films and music from the Internet is young, male, unemployed or a student, does not live in rural areas, lives in a one person household, and has broadband connection and Internet access at home. He tends to have a lower educational level. The intensive audio-visual downloader is more inclined not to pay for downloading audiovisual content, contrasting with frequent downloaders who are obviously more willing to pay for downloading audiovisual content. The relationship between downloading and the propensity to pay is therefore more complex than a simple negative one.

Frequent downloaders are young, male, live in rural areas in a single household, access the Internet from home with broadband and have already paid for audiovisual content. Educational attainment and employment situation do not contribute to the probability for being a frequent downloader of films and music.

Internet activities (Korea)

Using logistic regression and similar variables as compared to European countries, the probability for Internet users to carry out various Internet activities has been modelled for Korea (Table 12). Frequency of Internet use has been integrated as explanatory variable. The elementary Internet activities were classified into nine clusters (or main groups) corresponding to a main theme. Due to the blurring nature of online activities, an elementary activity may belong to more than one theme and the clusters are therefore not necessarily exclusive from each other. The probability modelled for a cluster refers to an individual who carried out at least one of the elementary activities of the cluster (see Annex 2 Table A2.8).

Age has a very significant effect in almost all Internet activities: the probability of belonging to an online activity group decreases regularly with age. The only exception for this regularity is the e-Government services category, for which, compared to the reference group (Internet users aged 35-44), those aged 16-24 are logically less likely to belong to a group and those aged 25-34 are more likely to belong to a group.

After the *frequency of Internet use*, *age* is showing the strongest effect of all the explanatory variables, in particular for communication and active contribution to the Internet (or user created content - UCC): the difference of probability of undertaking those activities between the elderly and the youngest is the highest. E-commerce is also an Internet activity for which the younger generation is a relatively strong predictor. Symmetrically, compared to the reference group (age 35-44), elderly people (65-74 age group) are much less likely to be engaged in any of the Internet activities, with a relative level of probability quite similar in all the activity groups, except for downloading and e-government services.

Compared to men, women are more likely to be engaged in e-commerce activities, and to a lesser extent in information or UCC. The reverse situation is observed for communication, downloading and leisure-related activities. Interactive use of online services and training and education seem to be gender neutral Internet activities.

To live in an *urban area* has a notably strong positive impact on the information, communication and interactive use of online services. On the other hand, e-commerce and UCC seem to be geographically universally spread out in Korea.

Educational attainment has a significant effect in all Internet related activities: the higher the level of education reached, the more the Internet user is likely to undertake a group of activities. In a majority of the activities, the probability is roughly doubled for the highest educational level compared to the intermediate level. For e-government services and e-commerce, the effect is however stronger on the intermediate level, leading to a lower differential between intermediate and the highest level. And for training and education, this differential is even smaller. Educational attainment effect is the strongest in communication: compared to the reference group (lowest educational attainment level), more educated Internet users are more than 12 times likely to send or receive emails, phone or do video calls over the Internet, post messages to chat sites or practice instant messaging.

Employment situations have also a clear and significant effect as an Internet activity predictor: compared to the reference group (employee or self-employed), people who are not in the labour force or are unemployed (except students) are systematically less likely to be involved in online activities, except

notably e-Government services and e-commerce. By contrast, students are the most likely to be involved in any online activity, by far - as expected- in training and education, but also and especially in downloading and leisure.

Household income level is also a good predictor of the involvement in any of the Internet activities. The higher the income of the Korean Internet users, the more likely they are to be involved in the activity. The effect for the highest level of income is particularly strong for downloading, leisure, information and communication. For most of the activities, the lowest income level is associated with a lower probability compared to the reference group (the second income level). For only two activities - communication, and UCC-, the probability is very similar for the first two levels of income, and for UCC for the first three levels. The other exception is for training and education, where the third income level is decreasing the probability of undertaking this activity; for this activity, the highest income level is the only case for which probability is increased.

Concerning the household composition, two effect dimensions are at play. First, the *presence of children* has rather clear-cut symmetrical effects on the probability of being involved in online activities: real increase in some (*i.e*. information, downloading, education, leisure), real decrease in others (communication, active contribution to the Internet, and e-commerce). In the remaining cases, the effects interact with the second effect dimension: the *number of adults in the household*. For e-Government services, communication, and education and training, children's presence has a decreasing effect for households with only one adult. But for the latter two, the probability is increasing for households with two or more adults. And finally, compared to single person households, two-adult households without children are generally less likely to be involved in online activities.

Being able to access the Internet via a mobile phone very significantly increases the probability of being involved in online activities, and similarly for being able to access the Internet with a handheld computer (except for information and leisure). Broadband access increases the probability of being involved in most of the online activities, except for downloading (rather neutral effect), and leisure, (for which the effect is reverse). If broadband would be the only explanatory variable for leisure, the effect would be strongly positive (the probability would be doubled compared to no connection to broadband). In addition, it should be borne in mind that leisure (including games, etc.) is an internet activity widely used by anyone in an easy way, possible to carry out at places other than the home in many cases. Broadband Internet service is also available in schools, Internet cafes, public offices, etc. due to the developed Internet infrastructure in Korea.

Socio-economic variables deeply influence online activities

Overall, both in European countries and Korea, the socio-economic characteristics reveal various but rather clear and relatively coherent interactions with the probability of undertaking activities on the Internet.

There is a general age effect, strongly amplified for some activities and much more attenuated for others, but still present: the younger generation is more likely to be involved in Internet activities than older generations, especially for those activities which relate closely to the paradigm of the information age: UCC, downloading (including audiovisual content), communication, and, to a lesser extent, e-commerce.

Educational attainment is also playing a clear role: the higher the level, the higher the probability of being involved in an Internet activity. As for age, the effect is amplified or attenuated according to the activities. Intensive downloading of audiovisual content is an interesting exception of reverse effect: the probability of doing it declines with the level of educational attainment. Similar patterns have been found

in France for the use of instant messaging for chatting or for substitution effect between mobiles and fixed phones (Pasquier, 2005 and Sautory, 2007).

Income has similar effects on the probability, but generally with smaller amplitude of variation compared to educational attainment.

Internet activities are not always gender neutral: women are more likely to practice e-commerce and information, and men downloading (especially audiovisual content), leisure, and communication.

The probability of undertaking online activities also generally increases if the internet user is living in an urban area.

Compared to employees or self-employed, to be unemployed or students also increases the probability of undertaking selected clusters of Internet activities.

The presence of children in the household also generally increases the probability, an effect on which the number of adults is nevertheless interfering.

And finally, "appetite comes with eating": the frequency of Internet use is an extremely strong predictor of the probability of undertaking various clusters of internet activities.

It remains to be seen if these observations are confirmed in European countries for other activities than downloading audiovisual content, and in other countries for the various clusters of Internet activities.

Table 12. Odds ratio estimates of logistic regressions for Internet activities in Korea, 2008

Explanatory variables[2] (socio-economic background characteristics)		Group of activities[1]								
		Information	Communication	Interactive use of online services	Downloading	e-Government services	Training and education	Actively contribute to Internet	Leisure	E-commerce
Age group	16-24	1.457	4.195	1.553	1.894	0.936	1.171	6.736	1.676	2.392
	25-34	1.167	2.077	1.46	0.804	1.169	0.953	2.57	1.122	1.682
	45-54	0.591	0.498	0.679	0.964	0.901	0.743	0.457	0.737	0.501
	55-64	0.464	0.486	0.492	0.806	0.8	0.45	0.394	0.567	0.423
	65-74	0.161	0.208	0.302	0.474	0.524	0.209	0.238	0.224	0.27
Gender	Woman	1.277	0.786		0.767	0.908	0.943	1.108	0.782	2.127
level	upper secundary education	1.702	1.579	2.412	1.512	3.034	1.834	1.271	1.317	2.53
	tertiary education	3.062	12.036	4.617	3.166	4.702	2.756	2.228	2.932	3.972
situation	unemployed[3]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	student	1.766	5.311	5.569	11.406	1.194	11.487	2.493	7.099	2.084
	other not in the labour force[3]	0.698	0.475	0.716	0.958	1.031	0.704	0.689	0.732	1.105
locality	urban	1.517	1.404	1.428	1.229	1.105	1.241	1.059	1.383	0.952
	intermediate	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Household income[4]	below 50% of median income	0.704	1.034	0.923	0.607	0.849	0.936	1.005	0.684	0.789
	70 to 150% of median income	1.108	1.227	1.131	1.252	1.019	0.964	1.064	1.201	1.088
	above 150% of median income	1.824	1.711	1.4	2.124	1.097	1.172	1.218	2.007	1.121
composition	1 adult with one or more children	1.233	0.876	0.859	1.559	0.742	0.97	0.601	1.519	0.606
	2 adults	0.956	0.648	0.746	1.034	0.796	0.867	0.725	0.904	0.689
	2 adults with one or more children	1.24	0.519	0.822	1.371	0.809	0.935	0.566	1.323	0.56
	3 or more adults	1.321	0.626	0.597	1.662	0.69	0.906	0.733	1.289	0.635
	3 or more adults with 1 or more child.	1.617	0.507	0.704	1.832	0.677	0.961	0.7	2.056	0.508
Broadband connection (BB)		1.34	1.484	1.762	0.991	1.761	1.489	1.094	0.477	1.195
Accessed Internet with mobile phone		2.559	1.679	1.98	2.943	1.843	1.785	2.027	2.857	3.697
Accessed Internet with handheld computer[5]		0.936	1.448	1.484	1.048	1.431	1.438	1.34	0.904	1.11
Frequency of Internet use	Frequent (weekly)	121.524	50.26	19.597	14.558	16.979	16.174	23.129	30.816	15.743
	Intensive (daily)	>999.999	120.946	39.56	494.279	29.68	22.457	38.824	>999.999	29.487
C		**0.954**	**0.896**	**0.808**	**0.952**	**0.713**	**0.776**	**0.842**	**0.965**	**0.826**

1. For a detailed classification, see Annex 2 Table A2.8. For the level of significance, see note 1 of the Table 10.
2. For a detailed variable description, see Annex 2 Tables A2.7a and A2.7b.
3. Unemployed included with "Other not in the labour force".
4. Income quartiles could not be calculated: household income was split into 4 groups using median income.
5. Include palmtop, PDA and laptop.

Source: KISA, specific contribution for this study.

3.3 Online activities: variety and scope of use

Socio-economic characteristics are having an influence not only on the types of activities individuals are undertaking online, but also and primarily on the diversity and variety of those activities. Already in 2004, it was shown in Finland that the range and variety of Internet use was highly differentiated according to age, and to a lesser extent according to gender (Sirkiä *et al.*, 2005). Age, gender, and connection speed effects have been also observed at an aggregated level of data in Canada, France and Finland (OECD, 2007).

The use of micro-data allows looking at the influence of each of the socio-economic variables, independently of the others, on the scope of Internet use. Based on a recent study focusing on the 2007 Canadian results (Middleton *et.al.*, 2010), a similar multiple linear model was applied to European countries to evaluate the strength of association of several variables related to the number of online activities performed by the Internet users (Annex 1 part 1.2). The model was also applied to Korea by KISA, based on micro-data from the Korean annual survey on Internet usage (Annex 2 part 2.2).

The results (Table 13) provide evidence of the significant association of all the variables with the scope of Internet use, except for the labour force status in Canada and selected aspects of the household's composition (*i.e*. children's presence) in Korea. *Age*, for example, expressed as a continuous variable in Canada, displayed a negative relationship, with scope of use declining as age increases. The coefficient calculated suggests a user carries out about one fewer activity if he were 10 years older than another user. European countries and Korea confirm similar patterns for age, provided by 10 years brackets, although with some differences. In Europe, there is a regular diminution of the scope from 16 to 54, and a strong decline after 55. In Korea, the scope diminution seems to be more progressive, and starts earlier (after 45) compared to European countries.

In all countries, the number of Internet activities clearly increases with user's educational attainment and with the household's level of income, but is lower among female users compared to males. Living in a rural area also decreases the scope of use.

Canadian model shows that Internet scope increases with the level of Internet experience (measured by the number of years) and broadband access. The latter confirms the observations made in 2004 in Finland and in 2005 in France and Canada (OECD, 2007).

European countries and Korean models reveal a clear and interesting effect of the frequency of Internet use on the scope: the more frequently you use the Internet, the higher your variety of usage. This was not necessarily expected, as cases could be envisaged with high intensive Internet use and relatively poor variety of use. But this does not seem to be the case.

Finally, the size of household and the number of children have similar effects in European countries and Korea. In the European countries, a smaller number of members or a smaller number of children in the household is significantly associated to a broader scope of Internet usages. In Korea, for households without children, a smaller number of adults in the household increase the scope of use. But the presence of children neutralises this size effect. For households with children, a smaller number of adults lead to a slight decrease of the scope (instead of the increase observed for households without children).

The issue of the link between the socio-economic variables and the diversity of activities has been recently underlined in France for offline activities,[13] such as cultural activities and sport activities (Coulangeon and Lemel, 2009). On a cumulative scale of activities, the level is strongly linked to the educational attainment, even more than to the income level.

It is also interesting to note that, as observed for access, the degree of influence of the variables on the scope is likely to be very significantly modified with time. Figures 7 and 8 below show recent changes for selected age categories and by level of education in the Netherlands. It confirms that for one given point in time, the scope of Internet use is greater for youngsters compared to elderly and for people with high-level educational attainment compared to people with low level. It also confirms that within a rather short period of time (two to three years) the scope tends to broaden for all categories. During this period however, the increase of scope seems to be quicker among those who had already a broader scope, mirroring an increasing gap, especially between low and high educational attainment levels.

Figure 5. Internet users and scope of use in the Netherlands by age, 2005 and 2007

(for selected age categories)

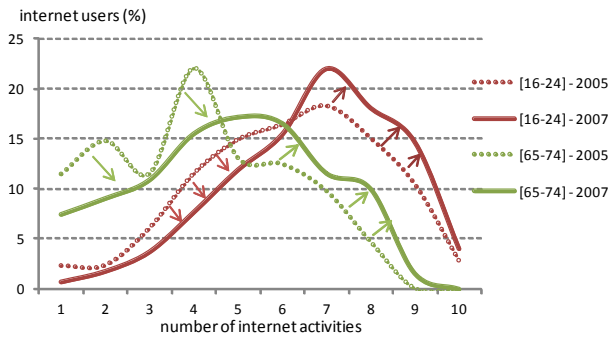
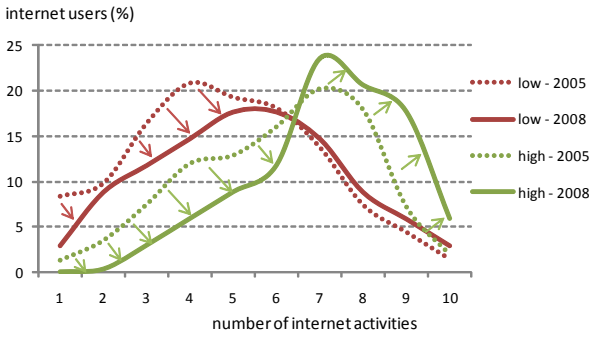


Figure 6. Internet users and scope of use in the Netherlands by educational attainment, 2005 and 2008

(by level of educational attainment)



Source: OECD, based on CBS ad-hoc tabulations.

Table 13. Linear regression results for scope of use in EU-17+2, Korea and Canada.

EU 17+2 (2008) [1]			Korea (2008) [2]		Canada (2007) [3]	
User characteristic	Group or category	Coefficient	Group or category	Coefficient	Group or category	Coefficient
	Intercept	1.532		n.a.		n.a.
AGE						
	16-24	2.562		2.147		
	25-34	2.301		1.886		
	35-44	1.600		1.293	per 1 year increase in age	-0.102
	45-54	1.016		0.640	(age 18 and older)	
	55-64	0.307		0.311**		
(reference group)	65-74					
SEX						
	male	0.464		0.057*	male *(reference group)*	
(reference group)	female				female	-1.053
EDUCATIONAL LEVEL						
	primary or lower secondary education	-1.424		-1.887		
	upper secundary education	-0.665		-0.902	High school (or less) *(ref. group)*	
(reference group)	tertiary education				Some post-secondary	1.379
EMPLOYEMENT SITUATION						
	employee or self-employed	-0.222		0.411		
	unemployed	0.282		n.a.	In the labour force *(ref. group)*	
	student	0.411		1.101		
(reference group)	other not in the labour force				Out of the labour force	0.265†
TYPE OF LOCALITY						
	densely-populated area	0.378		0.239	urban (reference group)	
	intermediate area	0.103		n.a.	rural	-0.252
(reference group)	thinly-populated area					
HOUSEHOLD INCOME						
	lowest quartile	-0.353		-0.427		
	second lowest quartile	-0.369		-0.393	Per 1 unit increase in log (base	0.948
	second highest quartile	-0.228		-0.254	10) of household income	
(reference group)	highest quartile					
FREQUENCY OF INTERNET USE						
	every day or alomost every day	4.021	*reference group*			n.a.
	at least once a week-but not every day-	1.612		-1.093		n.a.
(reference group)	at least once a month-but not every week-			-3.182		

1. Includes Austria, Belgium, Bulgaria, Cyprus, Denmark, Greece, Spain, Finland, Hungary, Iceland, Italy, Luxembourg, Latvia, Netherlands, Norway, Portugal, Sweden, Slovenia, and Slovakia. Data from Eurostat, ICT survey on diffusion and use among households and individuals, year 2008. The total number of activities is 19.

2. Data from the "Survey on the Internet usage", KISA. User characteristics variables are in line with the European definitions. Details for concordance and Internet selected activities are provided in the Annex 2.2.

3. Data from Statistics Canada, Canadian Internet Use Survey 2007. Includes individuals who used the Internet from home in the12 months preceding the survey and who had home connection at the time of the survey. Age and income were entered in the model as continuous control variables, and therefore no reference groups are displayed: the coefficients listed are associated with a 1-unit increase in the value of these variables. The total number of activities is 26.

Source: based on Eurostat, KISA and Middleton *et.al.* (2010).

Table 13. Linear regression results for scope of use in EU-17+2, Korea and Canada (cont'd)

	EU 17+2 (2008) [1]	Korea (2008) [2]	Canada (2007) [3]
HOUSEHOLD COMPOSITION			
Adults and children in the household			
single household	n.a.	0.487	n.a.
1 adult with one or more children	n.a.	-0.097†	n.a.
2 adults	n.a.	0.198	n.a.
2 adults with one or more children	n.a.	-0.006†	n.a.
3 or more adults	n.a.	0.079†	n.a.
(reference group) 3 or more adults with 1 or more children	n.a.		
Members in the household			
1	0.485	n.a.	n.a.
2	0.305	n.a.	n.a.
3	0.182	n.a.	n.a.
4	0.138	n.a.	n.a.
(reference group) 5+			
Children (-16) in the household			
0	0.107	n.a.	n.a.
1	-0.005	n.a.	n.a.
2	-0.059	n.a.	n.a.
(reference group) 3+			
INTERNET CONNECTION TYPE			
(reference group) Low speed			
High speed (broadband connection)	n.a.	-0.850†	1.972
ACCESS INTERNET WITH MOBILE PHONE			
No	n.a.	-1.363	n.a.
(reference group) Yes			
ACCESS INTERNET WITH HANDHELD COMPUTER			
No	n.a.	-0.507	n.a.
(reference group) Yes			
YEARS OF INTERNET EXPERIENCE			
(reference group) Less than 5 years			
5 years or more	n.a.	n.a.	3.379

1. Includes Austria, Belgium, Bulgaria, Cyprus, Denmark, Greece, Spain, Finland, Hungary, Iceland, Italy, Luxembourg, Latvia, Netherlands, Norway, Portugal, Sweden, Slovenia, and Slovakia. Data from Eurostat, ICT survey on diffusion and use among households and individuals, year 2008. The total number of activities is 19.

2. Data from the "Survey on the Internet usage", KISA. User characteristics variables are in line with the European definitions. Details for concordance and Internet selected activities are provided in the Annex 2.2.

3. Data from Statistics Canada, Canadian Internet Use Survey 2007. Includes individuals who used the Internet from home in the 12 months preceding the survey and who had home connection at the time of the survey. Age and income were entered in the model as continuous control variables, and therefore no reference groups are displayed: the coefficients listed are associated with a 1-unit increase in the value of these variables. The total number of activities is 26.

Source: based on Eurostat, KISA, and Middleton *et.al.* (2010).

4. Conclusion and next steps

The study could prove the feasibility for performing micro data analysis on the data of the survey on ICT usage in households and by individuals. With the help of logistic and multi-linear regressions, the influence of a number of socio-economic background characteristics could be proved on the following issues:

- non access to and non-use of computer and the Internet,
- intensity (frequency) of Internet use,
- propensity to undertake online activities,
- scope of Internet use.

Those facts correspond to "snapshots" based on 2008 (or 2007) micro data. The various socio-economic background variables have been proved to be significant predictors of non access to, or non-use of computer or the Internet for households and individuals. Those variables were also significant predictors, in a different way, of their Internet intensity of use, of a broad range of online activities, and the scope of those online activities. As such, those variables have a discriminatory power unveiling existing digital divides in access or use, but also contain a potential impact on the evolution of this divide, as illustrated by the scope of use example in the Netherland.

Geographical location has a significant effect on computer and Internet home access: living in rural areas still decreases the probability of benefiting from these key tools of the information age. Furthermore, age and educational attainment have a particular marked effect, leading to a cumulative dimension for non access and non-use, and, together with an existing gender effect, to a distorting dimension for the intensity of Internet use as well as various types -or the scope- of the Internet activities: belonging to younger generations and having reached a higher educational attainment level strongly increases the probability of being an internet intensive user, fo having a large scope of Internet use, and undertaking various specific online activities. Being a man also increases this probability, though less strongly. Income also has an influence, but less marked than age and educational attainment. Broadband access increases the intensity of internet use, the likelihood of being involved in most of the online activities, and the scope of activities undertaken online.

The paper also provides additional insight on the fact that the relationship between socio-economic status and the intensity and variety of ICT usage is not necessarily uniform across all applications, due to complex interactions. It confirms that differences in existing patterns of use seem to be magnified by the distorting power of the ICT tools (OECD, 2007).

With the cumulative dimension of the frequency of use and the amplification effect of educational attainment, the paper also sheds light on the potential risk of a growing second level digital divide, as it has been recently pointed out for the link between use of ICT by students and their performance, in particular concerning the role of the social capital (OECD, 2010, chapter 4).

The results of the study are preliminary. It is intended to include the United States –and if possible more countries- in the analysis and broaden the focus made on downloading audiovisual content for the European countries to the various clusters of online activities, *i.e.* information search, interactive use of online services, e-Government services, training and education, e-Commerce, etc., as made for Korea.

This should contribute in providing additional and valuable information to policy makers for implementation of measures to achieve the goals in the various policy areas related to the information society.

ANNEXES

ANNEX 1. METHODOLOGY

1.1 The logistic regression

The purpose of the analysis of micro data is to explain, in a statistical way, different patterns of access to computers or the Internet, non-use of computers or of the Internet, or the intensity of Internet use, with the help of additional background information. In most cases socio-economic background information on the age of the individuals, the gender, the educational attainment, the employment situation, the location of the household, and the income of the household have been included in the analysis. In addition to these characteristics, we also introduced variables such as "having a broadband connection" or "using the Internet at home" as additional explanatory variables (see Annex 2 Tables A2.2a, A2.2b, A2.7a and A2.7b).

The analysis was done using a logistic regression, which predicts the probability of the occurrence of an event with the help of a number of predictor variables, the socio-economic background characteristics. The probability for the occurrence of an event is modelled using the logistic function. The dependent variable is dichotomous whereas the independent variables can be either continuous or categorical. For the purpose of the analysis, the background characteristics were converted into binary values, indicating the membership of an individual to one of the categorical values. This was done for the purpose of calculating odds ratio estimates that indicate the probability of an event compared to a reference group. Values > 1 indicate a higher probability, whereas values < 1 indicate a lower probability, *e.g.* individuals with higher education have a 2.4 times higher probability of being a daily Internet user than individuals with lower education.

The logistic regression uses the logistic function as base formula. It takes as input any value between -∞ and +∞ whereas the result is limited to 0 and 1. In the case of the logistic regression, the output expresses the probability for the occurrence of a certain event. In order to determine the occurrence of an event (Y=1), it is assumed that an empirically not observable variable "Z" exist, which can produce the binary characteristic of the dependent variable Y as a function of the independent variables X_j.

Figure 1: Equation of the logistic regression

$$p_k(y=1) = \frac{1}{1+e^{-z_k}}$$ p is the probability of success

with $z_k = \beta_0 + \sum_{j=1}^{J} \beta_j \cdot x_{jk} + u_k$ z are called the logits

Odds: $\frac{p(y=1)}{1-p(y=1)} = e^z$

The model of the logistic regression function assumes the existence of a non-linear relation between the probability of success of the binary variable P(y=1) and the independent variables. However, the combination of the independent variables of the aggregated factor Z is modelled as a linear combination. The probability for the occurrence of an event is calculated as relative probability in comparison to a certain reference group in the case of dichotomous explanatory variables.

1.2 Multiple linear regression model

A multiple linear regression model has been constructed in order to evaluate the strength of association of several variables related to the number of online activities users performed. By using a multiple regression, the association between individual independent variables and scope of use could be examined while controlling for other characteristics in the model.

Using this approach, relationships between specific characteristics of users (including age, sex, educational attainment, household income, labour force status, urban-rural location, online experience, and connection type) and the number of activities users performed could be more closely studied.

The dependent variable of interest, scope of Internet use, is a count of the number of activities home Internet users performed online.

For Canada, these online activities were performed in a 12-month period. The values of the dependent variable are continuous, ranging from 0 to a maximum of 26, and are normally-distributed. Independent variables were either continuous (age and household income), or coded as dichotomous for the purposes of this analysis. Due to its skewed distribution, the continuous household income variable was transformed logarithmically, producing a more normal distribution for this variable. For a full list of variables included in the model, see the results appearing in Table 13.

The list of activities, for the count of activities, is provided in the table below. For Korea, see Annex 2 Table A2.8.

Table A1.1. Internet activities

Canada	**EU 17+2 countries, and Korea**
Activities conducted in the last 12 months from home:	*Activities conducted in the last 3 months from any location:*
- Email	
- Instant messaging	- Emails
- Searching for government information	- VoIP, video calls
- Communicating with government	- Posting messages, instant messaging
- Searching for medical or health information	- Finding information about goods or services
- Education, training or school work	- Services related to travel accommodation
- Travel information or making travel arrangements	- Web radio web TV (*)
- Searching for employment	- Uploading self created content
- Electronic banking	- Downloading software
- Researching investments	- Playing games or downloading images, films, music
- Playing games	- Reading online news
- Obtaining or saving music	- Looking for a job or applying for a job online
- Obtaining or saving software	- Seeking health related information
- Viewing news or sports	- Internet banking
- Obtaining weather reports or road conditions	- Information on education and training (*)
- Listening to Internet radio	- Online course

- Downloading or watching television programs - Downloading or watching movies - Researching community events - Researching other specific matters - General browsing for fun or leisure (surfing) - Contribute content or participate in discussion groups (blogging, message boards, posting images) - Making online telephone calls - Selling goods or services (through auction sites) *Activities conducted in the last 12 months from any location:* - Ordering goods or services - Window shopping for goods or services	- Consulting Internet with purpose of learning (*) - Any interaction with public administration *Activities conducted in the last 12 months from any location:* - Ordering over the Internet (*) (*) Activity not taken into account by Korea.

Source: based on Middleton *et.al.*(2010), Eurostat, and KISA.

ANNEX 2. DATA SOURCES

2.1 European countries

The European survey on the use of information and communication technologies in households and by individuals

Data for European countries are from the annual survey on the use of ICT in households and by individuals in Europe. The main purpose of the statistical data collection is to provide information on the development of the European information society and thus to fulfil the needs for monitoring the various political initiatives at European and at national levels. The European survey is based on an annual Commission Regulation that determines the subjects, their characteristics, the coverage, the reference periods and the socio-economic background characteristics of the statistical data collection.

The survey consists of two parts. The first part collects information by household and the second focuses on individuals living in the household. The household part provides data on households' ICT equipment (devices, Internet connection, broadband, etc). The second part contains questions on the individuals' frequency and location of computer and Internet use, the purpose and nature of their activities on the Internet and use of on-line services (*e.g.* for e-shopping, interaction with public services and administrations, e-learning, downloading content, arranging travel, etc), e-skills and barriers to Internet or broadband access. In addition to a defined set of core indicators, additional data is collected annually on a specific topic. The topics of the special modules are listed in the i2010 benchmarking framework.[14] In 2008, the special module focussed on advanced services.[15]

The scope of the survey is limited to households with at least one member aged between 16 and 74 years and individuals within this age range. In order to be able to analyse differences in access and use of ICT, the survey additionally collects a number of socio-economic background variables including age, gender, education attainment, employment situation, occupation, geographical location, type of locality, household composition, and household income. These background characteristics are mainly used for the purpose of analysing the digital divide in the context of the European eInclusion policy. In addition to these socio-economic variables, additional breakdowns are derived from filter questions, *e.g.* having a broadband connection or being a frequent Internet user. The reference period for most of the questions is the first three months of the year. The period is kept stable to exclude seasonal effects. Questions on e-commerce and eGovernment usage refer to the year before the survey.

The survey is mandatory in the EU member states and additionally conducted in countries of the European Economic Area and accession or candidate countries to the EU. In 2008, the total net sample size was about 159 000 households and 232 000 individuals within the European Union. Almost all surveys are using face-to-face or telephone interviews. All participating countries transmit aggregate data to Eurostat following a defined transmission format. Starting from 2007, some countries provide Eurostat with individual data records, which do not allow direct identification of the respondents. In 2008, a total of 23 countries transmitted micro data to Eurostat on a voluntary basis. The micro data offers new potential for statistical data analysis. This paper presents a new approach of data analysis, which is not possible with the current tabulated data. However, the analysis suffers from the lack of micro data from a number of big member states, *i.e.* Germany, France, the United Kingdom and Poland. Hence it is not possible to draw conclusions on the level of the European Union. The situation will change in the survey year 2011, when transmission of micro data will become mandatory for the member states of the European Union.

Preparation of the Eurostat database

The analysis of the micro data comprises data from 21 countries, 19 member states and Iceland and Norway. Due to data validation problems at the time of the data analysis, the data from Czech Republic and Malta could not be included. Table A2.1 gives an overview on the data availability.

Table A2.1. Micro data availability, for the survey data on ICT use in households and by individuals, 2008

Country		Micro data		Households		Individuals	
Name	Code	available	included in analysis[1]	Population in 1000	Share in analysis (%)	Population in 1000	Share in analysis (%)
Bulgaria	BG	Yes	Yes	2,723	3.4%	5,968	3.6%
Belgium	BE	Yes	Yes	4,054	5.1%	7,806	4.7%
Czech Republic	CZ	Yes	No	3,917		8,132	
Denmark	DK	Yes	Yes	2,258	2.8%	4,012	2.4%
Germany	DE	No	No	35,133		63,143	
Estonia	EE	Yes	Yes	553	0.7%	1,026	0.6%
Greece	EL	Yes	Yes	3,701	4.7%	8,236	5.0%
Spain	ES	Yes	Yes	15,080	19.0%	34,498	20.7%
France	FR	No	No	23,369		43,396	
Ireland	IE	Yes	Yes	1,466	1.8%	3,254	2.0%
Italy	IT	Yes	Yes	21,101	26.6%	44,885	27.0%
Cyprus[2]	CY	Yes	Yes	248	0.3%	576	0.3%
Latvia	LV	Yes	Yes	844	1.1%	1,778	1.1%
Lithuania	LT	No	No	1,388		2,571	
Luxembourg	LU	Yes	Yes	156	0.2%	358	0.2%
Hungary	HU	Yes	Yes	3,445	4.3%	7,618	4.6%
Malta	MT	Yes	No	132		311	
Netherlands	NL	Yes	Yes	6,542	8.2%	12,053	7.2%
Austria	AT	Yes	Yes	3,216	4.0%	6,243	3.8%
Poland	PL	No	No	12,592		29,056	
Portugal	PT	Yes	Yes	3,503	4.4%	8,024	4.8%
Romania	RO	No	No	6,818		16,947	
Slovakia	SK	Yes	Yes	1,897	2.4%	4,190	2.5%
Slovenia	SI	Yes	Yes	649	0.8%	1,588	1.0%
Finland	FI	Yes	Yes	2,300	2.9%	3,877	2.3%
Sweden	SE	Yes	Yes	3,746	4.7%	6,745	4.1%
United Kingdom	UK	No	No	22,618		43,683	
Total	**EU27**	**21**	**19**	**183,452**	**43.3%**	**369,976**	**45.0%**
Iceland	IS	Yes	Yes	110	0.1%	212	0.1%
Norway	NO	Yes	Yes	1,827	2.3%	3,411	2.1%
Croatia	HR	No	No	1,452		3,427	
Total		**2**	**2**	**3,389**		**7,050**	

1. Estonia and Ireland are **not** included in the analysis in part 1 and in part 2.3 of this paper.

2. See notes 4a and 4b of the Table 1.

It has to be noted that 45.6% of the households and 47.7% of the individuals represented in the analysis are from Spain and Italy. The aggregate of the variables are therefore very much determined by these two member states.

Background variables

The statistical analysis uses the available socio-economic background variables as explanatory variables for modeling the intensity of Internet use, downloading contents from the Internet or for performing different activities online. According to the division of the survey into a households' part and into an individuals' part, the background variables are related to either of them. Joining both parts enables attaching the household variables to the individual.

Table A2.2a. Socio economic background variables

Variable name	Code	Variable type	Description
AGECLS		Individual	Age classes
	2		16-24
	3		25-34
	4		**35-44 (Reference group)**
	5		45-54
	6		55-64
	7		65-74
SEX		Individual	Sex
	1		**Male (Reference group)**
	2		Female
ISCED		Individual	Educational level
	0		**Primary or lower secondary education, no formal education ISCED 0-2, (Reference group)**
	3		Upper secondary education, ISCED 3,4
	5		Tertiary education, ISCED 5,6
EMPST		Individual	Employment situation
	1		**Employee or self-employed (incl. family workers) (Reference group)**
	2		Unemployed
	3		Student (not in the labour force)
	4		Other not in the labour force (retired, inactive, in compulsory military service, etc.)
GEO_DENS		Household	Type of locality
	1		Densely-populated area
	2		Intermediate area
	3		**Thinly-populated area (Reference group)**
HH_IQ		Household	Household income quartile
	1		Lowest quartile
	2		**Second lowest quartile (Reference group)**
	3		Second highest quartile
	4		Highest quartile
HH_A_C		Household	Household composition
	10		**Single household**
	11		One adult with one or more children
	20		Two adults
	21		Two adults with one or more children
	30		Three or more adults
	31		Three or more adults with one or more children
HH_CHILD		Household	Household composition
	NO		**Without children**
	YES		With children

The variable household composition has been included into the models in two variations. The first series of variables distinguishes between the number of adults living in the household and the presence of children. The second binary variable only makes a distinction concerning the presence of children in the household. The latter variable should provide information on the influence of the presence of children concerning access to and use of ICT. The first set of variables should be able to make further distinction in relation to patterns of access and use of ICTs by size of household.

In addition to the above background characteristics, additional variables were introduced as explanatory variables in the analysis. These are "having a broadband connection", "having used the Internet at home within the last three months", "having paid for audiovisual content" and four additional variables describing wireless or mobile access to the Internet. These additional variables could add to explaining the intensity of Internet use and the characteristics of the different types of Internet users.

Table A.2.2b. Additional explanatory background variables

Variable name	Code	Variable type	Description
BB	**0** 1	Household	Do you use a broadband connection ('DSL'=1 or 'BBOTH'=1)? **No (Reference group)** Yes
IHM	**0** 1	Individual	Did you use the Internet at home in the last 3 months? **No (Reference group)** Yes
AVPAY	**0** 1	Individual	Did you pay in the last 3 months for online audiovisual content? **No (Reference group)** Yes
IUMPH	**0** 1	Individual	Do you access the Internet with a mobile phone via GPRS? **No (Reference group)** Yes
IU3G	**0** 1	Individual	Do you access the Internet with a mobile phone via UMTS (3G)? **No (Reference group)** Yes
IUPALM	**0** 1	Individual	Do you access the Internet with a handheld computer (palmtop, PDA) **No (Reference group)** Yes
IUPORT	**0** 1	Individual	Do you access the Internet with a portable computer (laptop) via wireless connection away from home or work **No (Reference group)** Yes

The values in the tables above which are marked in bold have been taken as reference for the logistic regression analysis, which is described below.

Descriptive statistics

Table A.2.3. Percentage of individuals who used the Internet within a defined time period by socio-economic breakdown within EU27, 2008

		Within last 3 months (Internet users)	Within last year	More than 1 year ago	Never used the Internet
Gender	female	59	62	38	35
	male	64	67	32	30
Household income	lowest	40	43	56	53
	2nd	47	50	50	47
	3rd	63	66	34	32
	highest	78	80	19	18
Education level	low	40	42	57	55
	medium	67	71	29	26
	high	89	91	9	8
Broadband connection		87	89	11	10
Type of locality	urban	67	70	30	27
	intermediate	62	65	35	33
	rural	52	55	44	42
Employment situation	inactive	29	31	68	65
	active	74	77	23	21
	students	94	96	4	3
	unemployed	52	57	43	38
Age group	16 - 24	88	91	9	7
	25 - 34	78	81	18	16
	35 - 44	72	75	25	22
	45 - 54	60	63	37	35
	55 - 64	42	45	55	52
	65 - 74	20	21	78	76
TOTAL		62	64	35	33

Table A.2.3 shows statistics on the last use of the Internet broken down by socio-economic background characteristics. Persons who have used the Internet within the last three month before the survey are classified as Internet users.

Sixty-two percent of the individuals aged between 16 and 74 within EU27 are Internet users. The difference between the Internet users and those who had used it within the last year is quite small. Most persons who use the Internet seem to be regular users, *i.e*. having used the Internet within the last months.

Comparable to the access to the Internet in households there is a difference in the last use of the Internet by socio-economic characteristic. A higher percentage of men than women use the Internet. The share of Internet users increases with the household income. The percentage of Internet users within the highest income quartile is almost double than the percentage in the lowest income quartile. Persons living in urban areas are more likely to be Internet users than persons living in rural areas. Students and economically active persons show higher percentages of Internet users than inactive or unemployed persons. The share of individuals who have used the Internet within the last 3 months declines sharply by age group.

In addition to the last access to the Internet, the survey collects statistics on the frequency of Internet use. Tables A2.4 and A2.5 display statistics on the frequency of Internet use for the European Union (EU27) and the European aggregate (EU19+2), which is generated for the purpose of the micro data analysis.

Table A2.4. Frequency of Internet use by background characteristics in EU27 in % of individuals, 2008

Socio-economic background characteristics		Internet use			
		Frequent (daily)	Weekly	Regular (at least weekly)	Less than weekly or never
Age group	16 - 24	66	17	83	17
	25 - 34	57	14	72	28
	35 - 44	49	16	64	36
	45 - 54	39	14	53	47
	55 - 64	28	10	38	62
	65 - 74	11	6	17	83
Gender	male	47	12	60	40
	female	39	14	53	47
Education level	I0_2	25	10	35	65
	I3_4	45	15	61	39
	I5_6	70	14	85	15
Employment situation	inactive	17	8	25	75
	active	52	16	68	32
	students	76	15	91	9
	unemployed	33	12	45	55
Type of locality	urban	49	13	62	38
	intermediate	43	14	56	44
	rural	33	14	46	54
Household income	lowest	26	9	35	65
	2nd	29	12	41	59
	3rd	42	14	56	44
	highest	59	14	73	27
Broadband connection		66	16	82	18
Sum		**43**	**13**	**56**	**44**

The summary statistics of the aggregates, EU27 and EU19+2, seem to be comparable. The differences are around 2–3 percentage points for most of the figures, with a maximum difference of 6 percentage points. More important are the relations of the variables by background characteristics. In both tables we can observe the same behaviour concerning the background characteristics. In brief, there is a clear distinction between the different age groups concerning daily and occasional (less than weekly or never) Internet use. The percentage of daily Internet users decreases with higher age group whereas occasional or non-use increases by age group.

There is a difference between the genders, a higher percentage of men use the Internet on a daily basis, whereas more women are occasional or non-Internet users. Only 21% of the individuals with lower educational attainment are daily Internet users in EU19+2 and 71% of the individuals with higher education are intensive Internet users. The percentages of occasional Internet users by educational attainment are diametrical. More than ¾ of the students and half of the active population are daily Internet

users, whereas only 30% of the unemployed and 14% of the economically inactive populations use the Internet daily. Almost half of the individuals living in urban areas use the Internet daily while this percentage is only 37% for individuals in rural areas. Only 24% of individuals of a household of the lowest income quartile are daily Internet users, but 60% of the individuals of households of the highest income quartile.

Nearly half of the individuals living in households with children are daily Internet users and 39% of individuals living in a household without children use the Internet daily. Two-thirds of the individuals who are members of a household with broadband access are daily Internet users and only 20% of these individuals are less frequent Internet users. Almost 4/5 of the individuals who accessed the Internet at home within the last three months are daily Internet users.

Table A.2.5. Frequency of Internet use by background characteristics in EU19+2 in % of individuals, 2008

Socio-economic background characteristics	Daily	Weekly	Daily or weekly	Less than weekly or never	Total by category
AGECLS					
16 – 24	67	14	81	19	14
25 – 34	56	12	69	31	19
35 – 44	47	12	59	41	21
45 – 54	38	11	50	50	19
55 – 64	26	8	34	66	16
65 – 74	9	4	13	87	12
SEX					
Male	46	10	57	43	50
Female	38	11	48	52	50
ISCED					
I0_2	21	8	28	72	43
I3_4	51	13	64	36	36
I5_6	71	13	84	16	21
EMPST					
Active	52	13	65	35	57
unemployed	30	9	39	61	6
Students	76	12	89	11	8
Inactive	14	6	20	80	29
GEO_DENS					
Urban	47	10	57	43	42
intermediate	40	9	49	51	26
Rural	37	12	49	51	31
HH_IQ					
1st	24	7	31	69	15
2nd	30	10	41	59	24
3rd	45	11	56	44	25
4th	60	10	70	30	27
HH_CHILDREN					
No	39	10	49	51	68
Yes	47	13	60	40	32
Broadband					
Yes	66	14	80	20	50
accessed Internet at home within last 3 months					
No	50	27	77	23	9
Yes	78	17	94	6	48
Not applicable					43
Sum	**42**	**11**	**52**	**48**	**100**

Nevertheless, half of the individuals who did not access Internet at home during the last three months are daily Internet users. This group makes up 4.5% of the total population. In summary the socio-economic and individual characteristics age, gender, educational attainment, the employment situation, the household income and the type of locality seem to have an influence on the frequency of Internet use. However, it is not possible to determine and separate from the aggregate statistics the level influence of the different characteristics on the behaviour of persons as regards to frequency of Internet use. Moreover, individuals might adhere to different socio-economic groups that diminish or enlarge their propensity as regards to intensive or occasional use of the Internet. Persons with a higher education might at the same time have a higher income and be economically active. Or they might use the Internet frequently although they are unemployed or economically inactive. Students are mostly part of the younger age groups, have a higher educational attainment but might live in a household of the lowest income group.

2.2 Korea[16]

Survey information

The micro data of the "Survey on the Internet usage", an official survey on use of ICT in households and by individuals in Korea, was used for this analysis.

Table A2.6. Survey information

Name of survey	Survey on the Internet Usage
Organization or department carrying out the survey	Korea Communications Commission (KCC) Korea Internet & Security Agency (KISA)
Year	2008
Type of survey (survey vehicle)	ICT stand-alone survey
Collection technique	Personal interview survey (face-to-face using paper)
Sampling frame	Census (Year 2005 Population and Housing Census)
Sampling design	Multi-stage stratified sampling with clusters
Sampling unit	Households and Individuals
Sample size	17,000 households and 41,466 persons
In-scope households	All households
In-scope individuals for ICT usage questions	Individuals age 3 and over
Frequency of ICT measurement	Annually
Weighting methods	Post-stratification using "Households Projections" and "Population Projections" for Korea as of 2008
Sampling error	Internet usage rate ±0.47%p at 95% confidence level
Reference period	June 1, 2008

Source: KISA.

Background variables

In this paper, 12 out of 16 background variables were analysed due to the difference in survey modules (refer to table 2 & table 3). Meanwhile, the variable ihm ("In the last three months, I have accessed the Internet at home") was excluded because almost all of Korean Internet users, 95.5%, used the Internet at home in the last 3 months so that there were rare cases for "NO" and it has high relevance with broadband.

We indicated and added more information in case there were some differences in the description of variables.

Table A2.7a. Socio economic background variables

Variable name	Code	Variable type	Description
AGECLS	2 3 **4** 5 6 7	Individual	Age classes 16-24 25-34 **35-44 (Reference group)** 45-54 55-64 65-74
SEX	**1** 2	Individual	Sex **Male (Reference group)** Female
ISCED	**0** 3 5	Individual	Educational level **Primary or lower secondary education, no formal education (Reference group)** Upper secondary education Tertiary education * Korean school system is composed with elementary school (6 years), middle school (3 years), high school (3 years), and college (2 years or 4 years) * Code '0' refers to middle school graduates or lower, including high school students or dropouts * Code '3' is high school graduates or lower, including college students or dropouts * Code '5' is college graduates or upper, including 2 year college
EMPST	**1** NA 3 4	Individual	Employment situation **Employee or self-employed (Reference group)** Unemployed Students (not in the labour force) Other* * "Other" includes 'Unemployed' as well as 'Other not in the labour force'
GEO_DENS	1 NA **3**	Household	Type of locality Densely-populated area Intermediate area **Less densely-populated area (Reference group)** * "Densely-populated area" refers to 'Dong area' of administrative district in Korea, and the others (Eup and Myeon area) are included into "Less densely-populated area"
HH_IQ	1 2 3 4	Household	Household income quartile Lowest quartile (below 50% of median income) **Second lowest quartile (50-70% of median income) (Reference group)** Second highest quartile (70-150% of median income) Highest quartile (above 150% of median income) * Question for household income is not open-ended so that income quartile can't be calculated. Therefore, we split household income into 4 groups by using median income
HH_A_C	**10** 11 20 21 30	Household	Household composition **Single household (Reference group)** One adult with one or more children Two adults Two adults with one or more children Three or more adults

	31		Three or more adults with one or more children
HH_CHILD	**NO** YES	Household	Household composition **Without children (Reference group)** With children
IFU	**0** 3 5	Individual	Frequency of Internet use **Occasional (less frequent) Internet users (Reference group)** Frequent Internet users (weekly), Intensive Internet users (daily)

Table A2.7b. Additional explanatory background variables

Variable name	Code	Variable type	Description
BB	**0** 1	Household	Do you use a broadband connection? **NO (Reference group)** YES
IHM	NA	Individual	Did you use the Internet at home in the last 3 months?
AVPAY	NA	Individual	Did you pay in the last 3 months for online audiovisual content?
IUMPH	**0** 1	Individual	Do you access the Internet with a mobile phone via GPRS? **NO (Reference group)** YES * It includes Internet access via 2G and 3G mobile phone
IU3G	NA	Individual	Do you access the Internet with a mobile phone via UMTS (3G)?
IUPALM	**0** 1	Individual	Do you access the Internet with a handheld computer (palmtop, PDA)? **NO (Reference group)** YES * Handheld computer in our survey includes palmtop, PDA, and laptop.
IUPORT	NA	Individual	Do you access the Internet with a portable computer (laptop) via wireless connection away from home or work?

Classification of Internet activities

Table A2.8. Classification of Internet activities

Type of activity	OECD & Eurostat	KOREA	
		Inclusion	Question
Information	Finding information about goods and services	O	19-(1)-①
	Reading or downloading online news	O	52-(5)
	Seeking health related information	O	19-(1)-③
	Looking for information about education, training, course offers	X	NA
	Reading weblogs, blogs	O	34
	Obtaining information from public authorities	O	19-(1)-⑤
Communication	Sending or receiving emails	O	19-(2)-①
	Telephoning over the Internet	O	19-(2)-④
	Video calls over the Internet	X	NA
	Posting messages to chat sites	O	19-(2)-②
	Instant messaging	O	19-(2)-②
Interactive use of online services	Services related to travel and accommodation	O	61-(14)
	Downloading software (other than games software)	O	19-(11)
	Internet banking	O	19-(6)-①
	Selling goods or services	O	19-(4)-②
	Doing an online course	O	19-(5)
Downloading	Downloading software	O	19-(11)
	Reading or downloading online news	O	52-(5)
	Downloading or listening to music	O	19-(3)-①
	Downloading or watching movies, short films or video files	O	19-(3)-③
	Peer-to-peer file sharing	O	47
	Using podcasts	X	NA
	Downloading computer or video games (incl. updates)	O	19-(3)-②
e-Government services	Obtaining information	O	19-(1)-⑤
	Downloading forms	O	19-(10)-③
	Sending filled in forms	O	19-(10)-④
Training and education	Doing an online course	O	19-(5)
	Consulting the Internet with the purpose of learning	X	NA
Actively contribute to Internet (Information publicly available)	Posting messages to chat sites, newsgroups or on-line discussion fora	O	19-(2)-③
	Creating or maintaining own weblog, blog	O	37
	Uploading self created content to any website to be shared	O	20-(7)
Leisure	Reading or downloading online news	O	52-(5)
	Using services related to travel and accommodation	O	61-(14)
	Reading weblogs, blogs	O	34
	Chatting	O	19-(2)-②
	Instant messaging	O	19-(2)-②
	Creating or maintaining own weblog, blog	O	37
	Listening to web radios, watching web TV	O	19-(3)-④
	Downloading or listening to music	O	19-(3)-①

Type of activity	OECD & Eurostat	KOREA	
		Inclusion	Question
Leisure (cont.)	Downloading or watching movies, videos	O	19-(3)-③
	Using podcast services	X	NA
	Downloading computer or video games	O	19-(3)-②
	Playing networked games	O	19-(3)-②
	Uploading self created content to any website to be shared	O	20-(7)
	Using browser based news feeds	X	NA
eCommerce (Orders or purchases)	Food or groceries	O	61-(8)
	Household goods (*e.g*. furniture, toys)		61-(15)
	Films, music	O	61-(10) & (11)
	Books, magazines, newspapers (including e-books), e-learning material	O	61-(1)
	Clothes, sports goods	O	61-(2)
	Computer software and –upgrades (incl. computer and video games)	O	61-(5) & 61-(6)
	Computer hardware	O	61-(4)
	Electronic equipment (incl. cameras)	O	61-(15)
	Share purchases, insurance policies and other financial services	X	NA
	Travel or holiday accommodation	O	61-(14)
	Tickets for events	O	61-(13)-①
	Lotteries and betting	X	NA
	Other	X	-

Descriptive statistics

Internet usage rate

Table A2.9. Percentage of individuals who used the Internet within a defined time period by socio-economic breakdown, 2008

Socio-economic background characteristics		Within last 3 months (Internet users)	Within last year	More than 1 year ago	Never used the Internet
Age group (AGECLS)	16~24	100.0	100.0	0.0	0.0
	25~34	99.3	99.4	0.6	0.4
	35~44	94.5	96.1	3.9	2.4
	45~54	72.2	79.2	20.8	17.0
	55~64	37.5	44.9	55.1	47.1
	65~74	19.2	25.7	74.3	71.6
Gender (SEX)	Male	83.2	85.9	14.1	12.4
	Female	73.3	77.0	23.0	19.9
Education level (ISCED)	Low	44.3	50.8	49.2	45.4
	Medium	84.4	87.7	12.3	9.6
	High	97.9	98.4	1.6	1.1
Employment situation (EMPST)	Employed	81.8	84.8	15.2	13.1
	Unemployed	NA			
	Students	100.0	100.0	0.0	0.0
	Other	62.7	67.9	32.1	28.4
Type of locality (GEO_EDNS)	Urban	81.1	84.1	15.9	13.6
	Intermediate	NA			
	Rural	65.9	70.4	29.6	27.0
Household income (HH_IQ)	Lowest	42.8	45.8	54.2	51.3
	2nd	76.3	81.7	18.3	15.5
	3rd	84.2	87.5	12.5	10.3
	Highest	94.2	94.7	5.3	3.5
Household composition (HH_CHILD)	No	67.7	71.6	3.0	25.4
	Yes	93.3	95.7	1.5	2.9
Broadband connection (BB)	No	9.7	11.0	89.0	85.6
	Yes	87.4	91.0	9.0	6.8
Accessed Internet at home (IHM)	No`	12.0	25.3	9.5	65.2
	Yes	100.0	100.0	-	-
Accessed Internet with mobile phone (IUMPH)	No	48.0	55.8	5.6	38.6
	Yes	100.0	100.0	-	-
Accessed Internet with handheld computer(IUPALM)	No	72.7	76.9	2.9	20.2
	Yes	100.0	100.0	-	-
Total		78.2	81.5	18.5	16.1

Internet usage frequency

Table A2.10. Frequency of Internet use by background characteristics in % of individuals, 2008

Socio-economic background characteristics		Internet use				
		Intensive (daily)	Weekly	Daily or Weekly	Less than weekly or never	Total by category
Age group (AGECLS)	16~24	87.0	12.8	99.9	0.1	15.4
	25~34	84.0	14.4	98.4	1.6	20.7
	35~44	73.9	18.7	92.7	7.3	22.5
	45~54	45.7	22.1	67.8	32.2	20.6
	55~64	21.4	12.8	34.2	65.8	11.9
	65~74	7.4	9.2	16.5	83.5	8.9
Gender (SEX)	Male	66.3	15.0	81.3	18.7	50.3
	Female	53.6	17.2	70.8	29.2	49.7
Education level (ISCED)	Low	28.1	13.6	41.7	58.3	25.0
	Medium	62.5	19.1	81.6	18.4	46.6
	High	83.9	13.3	97.2	2.8	28.4
Employment situation (EMPST)	Employed	63.4	16.4	79.7	20.3	54.0
	Unemployed	NA				
	Students	88.1	11.8	99.9	0.1	14.0
	Other	42.0	17.5	59.5	40.5	31.9
Type of locality (GEO_EDNS)	Urban	62.4	16.6	79.0	21.0	81.1
	Intermediate	NA				
	Rural	49.8	14.0	63.8	36.2	18.9
Household income (HH_IQ)	Lowest	29.8	10.8	40.6	59.4	14.3
	2nd	57.5	16.5	74.1	25.9	15.3
	3rd	65.3	16.9	82.1	17.9	59.1
	Highest	74.2	17.6	91.8	8.2	11.3
Household composition (HH_CHILD)	No	50.7	14.8	65.5	34.5	58.9
	Yes	73.4	17.9	91.3	8.7	41.1
Broadband connection (BB)	No	6.5	1.7	8.2	91.8	11.8
	Yes	67.2	18.0	85.2	14.8	88.2
Accessed Internet at home (IHM)	No	1.3	2.4	3.7	96.3	24.7
	Yes	79.3	20.5	99.9	0.1	75.3
Accessed Internet with mobile phone (IUMPH)	No	27.7	15.9	43.5	56.5	41.8
	Yes	83.3	16.2	99.5	0.5	58.2
Accessed Internet with handheld computer (IUPALM)	No	54.0	16.1	70.1	29.9	79.9
	Yes	83.9	16.1	100.0	0.0	20.1
Total		60.0	16.1	76.1	23.9	100.0

Table A2.11. Internet users' distribution

Socio-economic background characteristics		Number of cases (persons)			Total
		Daily	Weekly	Occasional	
Age group (AGECLS)	16~24	3,230	463	4	3,697
	25~34	4,316	743	51	5,110
	35~44	5,366	1,362	147	6,875
	45~54	2,959	1,448	278	4,685
	55~64	912	591	148	1,651
	65~74	258	329	122	709
Gender (SEX)	Male	9,021	2,190	306	11,517
	Female	8,020	2,746	444	11,210
Education level (ISCED)	Low	2,249	1,278	284	3,811
	Medium	8,158	2,643	405	11,206
	High	6,634	1,015	61	7,710
Employment situation (EMPST)	Employed	9,682	2,706	374	12,762
	Unemployed	NA			
	Students	3,060	416	2	3,478
	Other	4,299	1,814	374	6,487
Type of locality (GEO_EDNS)	Urban	12,949	3,617	528	17,094
	Intermediate	NA			
	Rural	4,092	1,319	222	5,633
Household income (HH_IQ)	Lowest	1,393	544	125	2,062
	2nd	2,963	928	148	4,039
	3rd	10,707	2,947	397	14,051
	Highest	1,978	517	80	2,575
Household composition (HH_A_C)	1 adult	1,181	236	14	1,431
	1 adult with +1 children	214	50	9	273
	2 adults	2,460	769	125	3,354
	2 adults with +1 children	6,647	1,560	150	8,357
	+3 adults	4,274	1,640	326	6,240
	+3 adults with +1 children	2,257	680	126	3,063
Broadband connection (BB)	No	226	63	58	347
	Yes	16,815	4,873	692	22,380
Accessed Internet at home (IHM)	No	99	202	717	1,018
	Yes	16,942	4,734	33	21,709
Accessed Internet with mobile phone (IUMPH)	No	3,972	2,352	653	6,977
	Yes	13,069	2,584	97	15,750
Accessed Internet with handheld computer (IUPALM)	No	12,454	3,973	747	17,174
	Yes	4,587	963	3	5,553

2.3 Australia[17]

The Australian Bureau of Statistics (ABS) undertook the analysis of the various logits models to determine which dependent variables had close enough substitutes in the Australian Household Use of IT (HUIT) dataset.

None of the following variables were directly available using HUIT data:

CU3 – When did you last use a computer = more than one year ago

IU3 – When did you last use the Internet = more than one year ago

CU4 – When did you last use the computer = never used one

IU4 – When did you last use the Internet = never used it

On average how often did you use the Internet in the last 3 months?

IFUI – Every day or almost every day

IFUF – At least once a week (but not every day)

IFUM – At least once a month (but not every week) or less than once a month or NA

On average how often did you download music and/or films in the last 3 months?

DFUI – Every day or almost every day

DFUF – At least once a week (but not every day)

DFUM – At least once a month (but not every week) or less than once a month or NA

For IU3 and IFUI, the closest equivalents from the HUIT dataset were:

- for IU3 – did/did not use the Internet at any site in the last 12 months (the ABS substitute for IU3 is a combination of OECD IU3 and 4)

- for IFUI – uses / does not use the Internet from home every day (almost the same as OECD variable except for time period [1 year instead of 3 months] and wording doesn't include "almost every day")

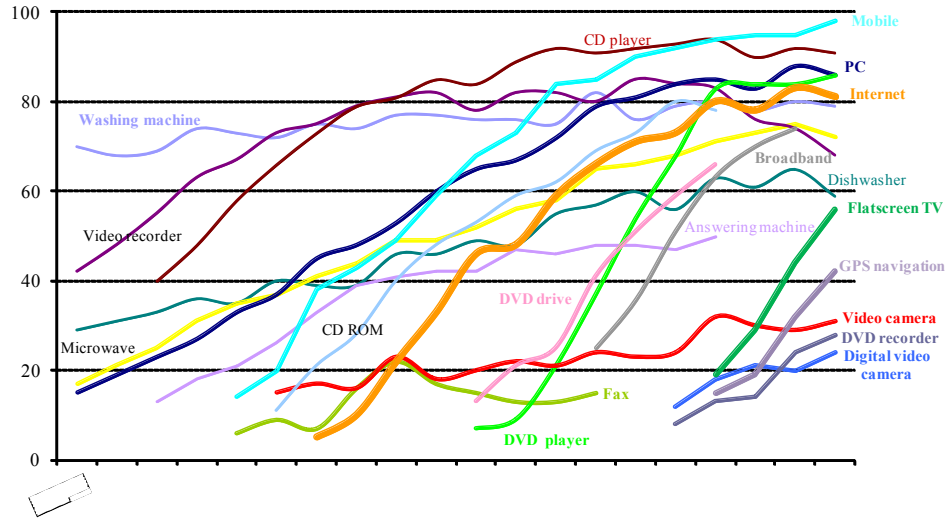
However, after further investigation it became apparent that neither model was adequate, due to insufficient numbers in one of the dependent variables (IU3). There were just 146 people in one of the dependent variable categories for this model, with 6404 in the other category. As a result, the model had poor predictive power for determining who did not use the Internet at any site in the prior 12 months.

For the model of IFUI, the ABS dataset lacked many of the independent variables that were included in the model. Also, model diagnostics suggested a poor model fit.

ANNEX 3. DIFFUSION, ACCESS AND EVOLVING DIGITAL DIVIDE: SELECTED RECENT EXAMPLES

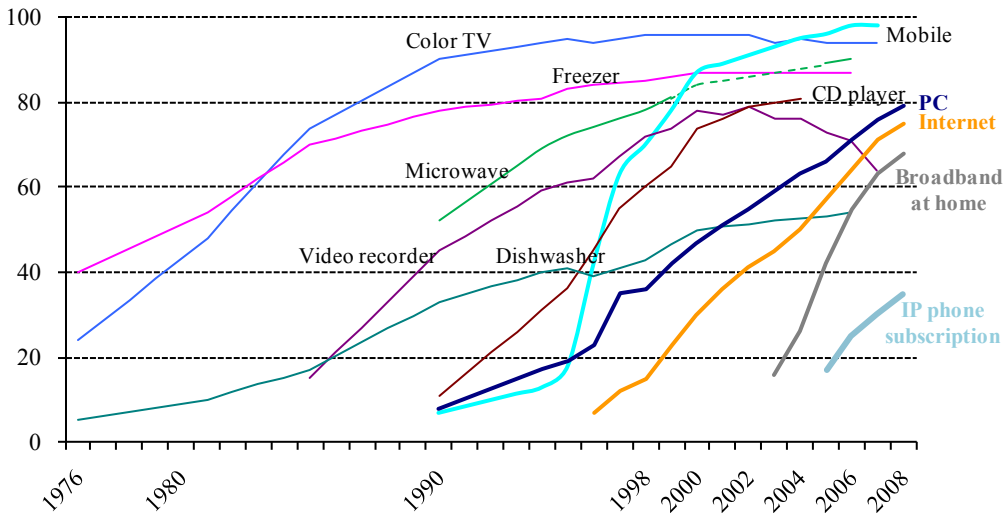
3.1 Diffusion

Figure A3.1. Denmark
(% of households)



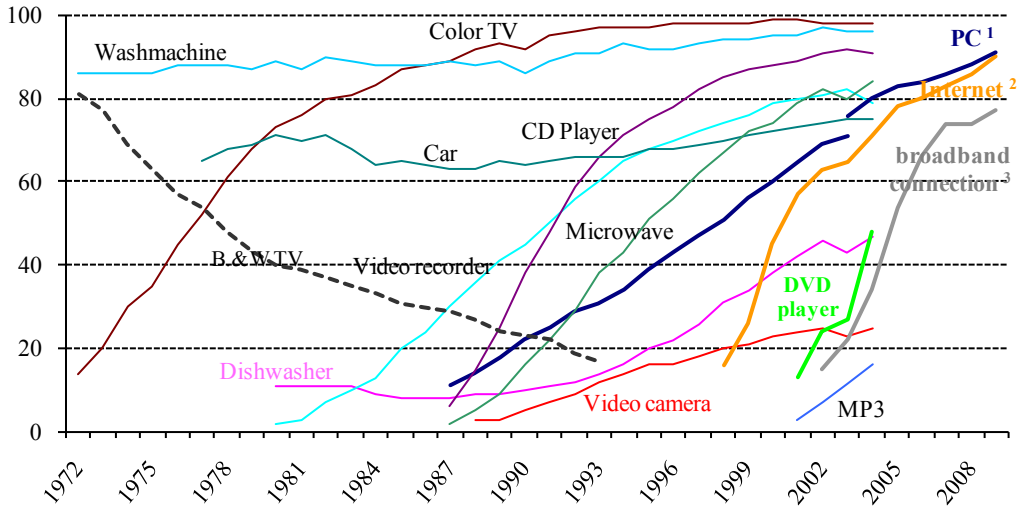
Source: compiled from Statistics Denmark.

Figure A3.2. Finland
(% of households)



Source: compiled from Statistics Finland.

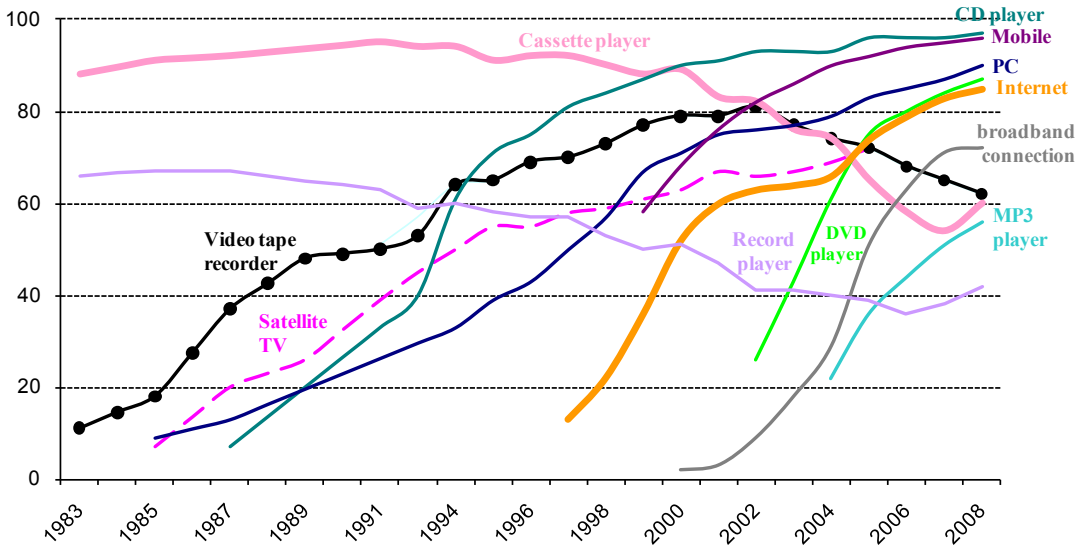
Figure A3.3. Netherlands
(% of households)



1. Break in series in 2004.
2. Internet connection at home
3. Households with Internet broadband connection.

Source: compiled from Statistics Netherlands.

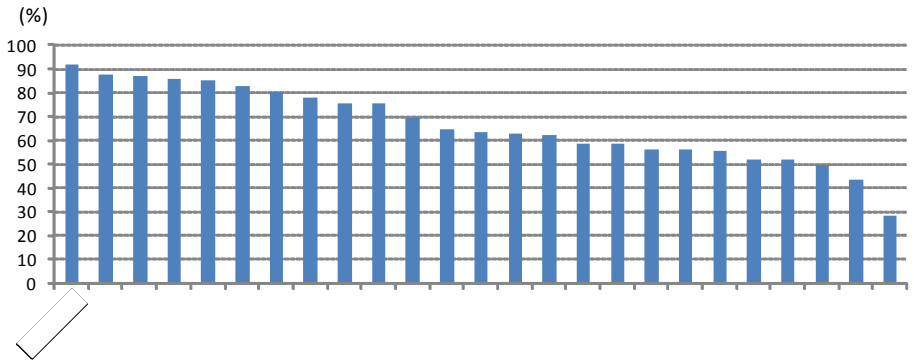
Figure A3.4. Norway
(% of individuals [1])



1. Percentage of individuals who has access to the different type of media and electronic services at home.
Source: compiled from Statistics Norway.

3.2 Access

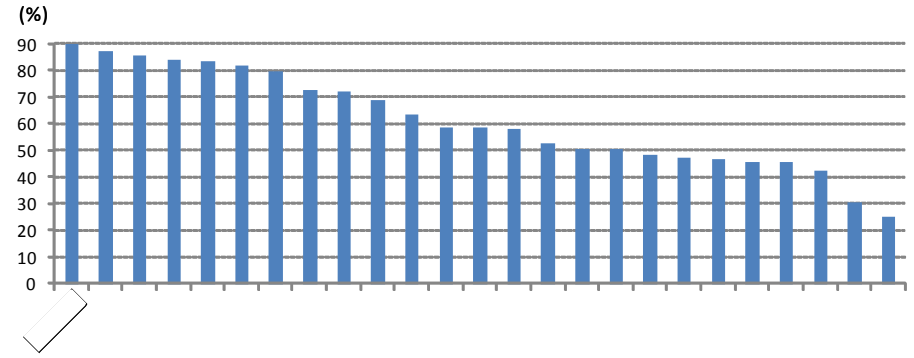
Figure A3.5. PC access at home in selected countries in 2008.



1. 2007 for Canada.

Source: OECD and Eurostat database.

Figure A3.6. Internet access at home in selected countries in 2008.



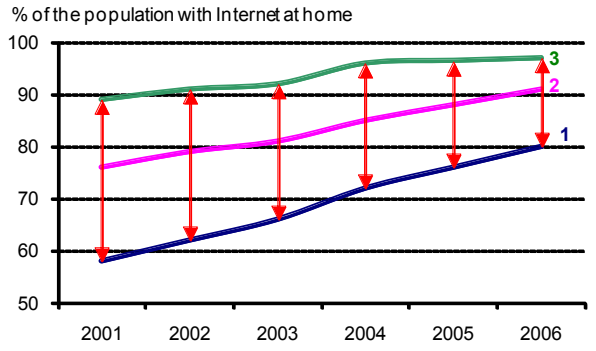
1. 2007 for Canada.

Source: OECD and Eurostat database.

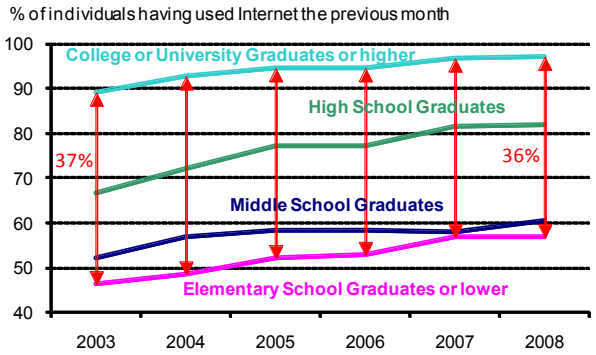
3.3 Examples of evolving digital divide

Figure A3.7. Internet access or use by educational attainment in selected countries[1]

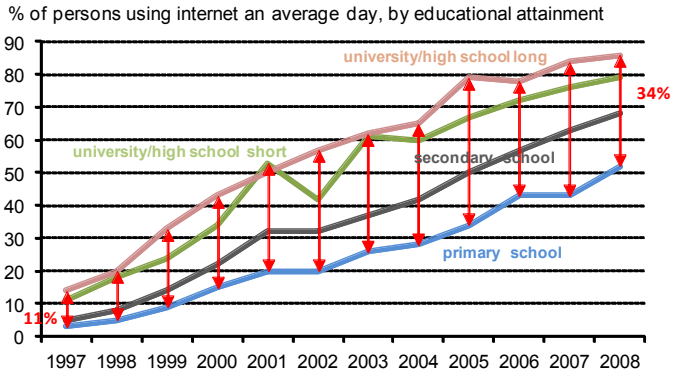
Denmark[2]



Korea



Norway



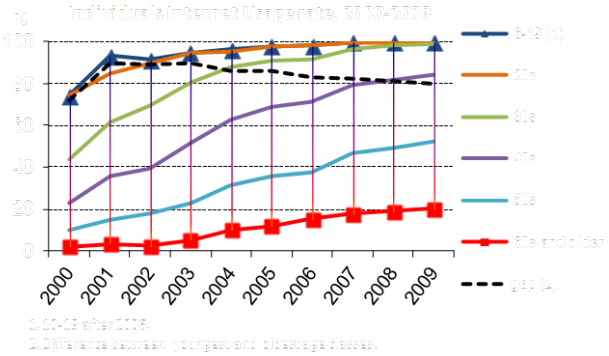
1. Levels of education, locations and populations (households or individuals) vary among the selected countries.

2. Levels of education: 1=Primary education/lower secondary; 2= Upper secondary education; 3=Tertiary (university) education.

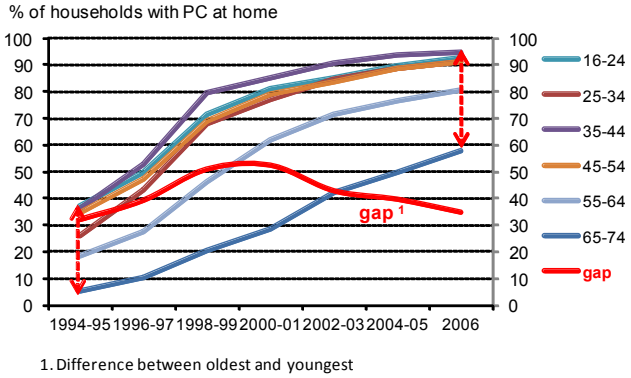
Source: based on data from national statistical offices and KCC–NIDA (Korea).

Figure A3.8. Internet or PC access or use by age in selected countries[1]

Korea (Internet)



Sweden (PC)

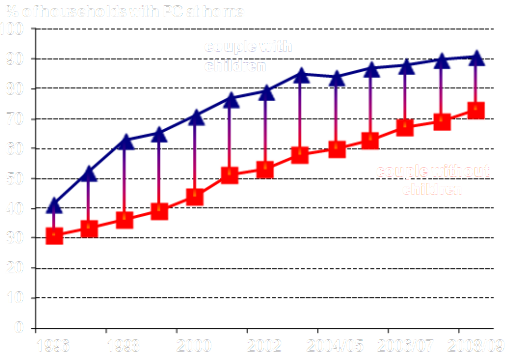


1. Age categories, locations and populations (households or individuals) vary among the selected countries.

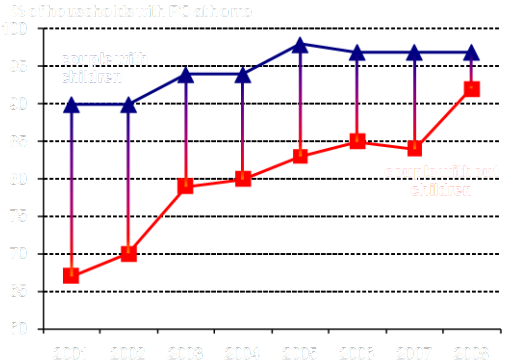
Source: Based on data from national statistical offices and KCC–NIDA (Korea).

Figure A3.9. Children's presence and PC at home in selected countries

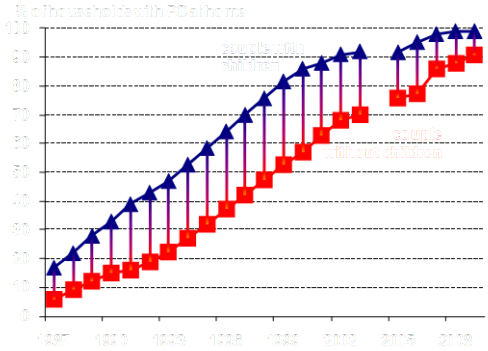
Australia



Denmark



Netherlands[1]



1. Break in series in 2004.

Source: Based on data from national statistical offices.

NOTES

1. The current version draws on a paper presented in September 2009 in Praha (Wirthmann, 2009), a supplementary work presented by the OECD Secretariat at the March 2010 Eurostat meeting of the Working Group on Information Society Statistics, and specific contributions from Korea and Australia to this project received by the OECD Secretariat. Middleton *et.al.* (2010) developed an analysis using a very similar approach for the Canadian situation, and their paper is used as additional source.

2. The survey (KCC and NIDA, 2008) was run by the National Internet Development Agency of Korea (NIDA). Following the government's plan on making governmental public agencies advanced, NIDA, KISA (Korea Information Security Agency), and KIICA (Korea IT International Cooperation Agency) were united to create the Korea Internet & Security Agency (KISA) on 23 July 2009.

3. In the logistic regression model, odds ratio greater than 1.0 represent higher odds (increased chances) of the outcome specified (*i.e.* having access to a computer at home), relative to the designated reference group; odds ratio lower than 1.0 represent reduced chances relative to the reference group. See also footnote 1 of Table 1.

4. The existing dataset does nevertheless not allow any fact-based evidence confirmation of this.

5. The effect is also generally monotonic, except for an inversion between the 3rd and 4th income quartile in the Netherlands.

6. This section is based on EU 27 data.

7. This probably covers, in most cases, an unawareness of the Internet advantages.

8. Results not shown in Table 5.

9. Retired people make the majority of the “other” category, not in the labour force - retired, inactive, in compulsory military service, etc.

10. Tests also found that the effects observed among the population of people with the lowest educational attainment are also statistically different from the effects observed among the whole population, for age, employment situation, geographical location, income and household composition.

11. Bearing in mind that for Korea, the quartiles have been defined using a scale based on the median income.

12. Detailed tables by country are not included in the current version.

13. Watching TV was the only activity directly involving ICT.

14. i2010 benchmarking framework. See: http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm

15. See the Eurostat Methodological Manual 2009. Available at: http://circa.europa.eu/Public/irc/dsis/emisannexes/library?l=/data_-_database/theme_3__popul/isoc/methodological_informati&vm=detailed&sb=Title

16. This annex is based on a working document provided as a specific contribution to this study by the Korea Internet & Security Agency (KISA) to the OECD Secretariat.

17. This Annex is based on the ABS contribution to this study, received by the Secretariat in February 2010.

REFERENCES

Coulangeon, Philippe, and Lemel, Y. (2009), *Les pratiques culturelles et sportives des Français : arbitrage, diversité et cumul*, Economie et Statistiques n° 423.

Hargittai, E. (2002), *Second-Level digital divide. Differences in people's online skills*, First Monday. Available at: http://chnm.gmu.edu/digitalhistory/links/pdf/introduction/0.26c.pdf

I2010 high level group: i2010 benchmarking framework (2006). http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm

KCC and NIDA (2008), "Survey on the Internet Usage", Korea Communications Commission, National Internet Development Agency of Korea, November.

Middleton C., B. Veenhof and J. Leith (2010), *Intensity of Internet use in Canada: understanding different types of users*, Business Special Surveys and Technology Statistics Division Working Papers, Statistics Canada. Available at: http://www.statcan.gc.ca/pub/88f0006x/88f0006x2010002-eng.pdf

OECD (2007), *Broadband and ICT access and use by households and individuals*, December. Available at: http://www.oecd.org/dataoecd/44/11/39869349.pdf

OECD (2010), *Are the New Millennium Learners Making the Grade? – Technology Use and Educational Performance in PISA*, Centre for Educational Research and Innovation, April.

Pasquier, D. (2005), *Cultures lycéennes. La tyrannie de la majorité*, Éditions Autrement, Paris.

Pénard, T. and R. Suire (2006), *Le rôle des interactions sociales dans les modèles économiques del'Internet*, Cahier de Recherche MARSOUIN n°11, November. Available at: http://www.marsouin.org/IMG/pdf/Penard_Suire_11-2006.pdf

Sautory, O. (2007), L'accès des ménages à bas revenus aux technologies de l'information et de lacommunication (TIC), DREES, études et résultats n° 557, Ministère de la Santé et des Solidarités, February. Available at: http://www.sante.gouv.fr/drees/etude-resultat/er557/er557.pdf

Sciadas, Georges (2002), Unveiling the Digital Divide, Connectedness Series, N°7, Statistics Canada. Available at: http://www.statcan.ca/english/research/56F0004MIE/56F0004MIE2002007.pdf

Sen, Amartya (1992), Inequality Reexamined. Oxford University Press, Oxford, England.

Sirkiä, T., V. Muttilainen, P. Kangassalo and J. Nurmela (2005), Finnish people's communicationcapabilities in interactive society of the 2000s, Part 2, Reviews 2005/2, Statistics Finland (in Finnish only). Unpublished English translation of Part 2, Ways of using Internet.

Wirthmann, Albrecht (2009), Micro data analysis of Internet use in Europe, paper presented at the International Statistical Conference "Investment in the Future" in Praha, September. http://www.czso.cz/conference2009/proceedings/data/stat_society/wirthmann_paper.pdf