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Disparities on the Internet Use among European Countries

Diferencias en el uso de Internet entre países europeos*

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Abstract: Internet Use among European Countries has been analyzed attending data provided by the European Social Survey (2016). The present article aims to offer broader information regarding Internet use and remark existing disparities among participant countries on the Survey. Sociodemographic variables as gender, age, education level or country have been taken into consideration for presenting a descriptive analysis of data. Furthermore, the frequency of internet use and time spent online, both, have been examined to explore differences among them. Results and conclusions are presented for discussion.

Keywords: Internet use; measurement; ESS; European countries.

Resumen: El presente estudio analiza el uso de internet entre países europeos a partir de los datos de la European Social Survey (2016), con el fin de de ampliar el conocimiento relativo a la proliferación de esta tecnología. Este estudio pretende analizar y ampliar la información relativa al uso de internet, así como presentar las diferencias entre los distintos países participantes en el estudio. En esta línea, se ha realizado un análisis descriptivo que incluye variables sociodemográficas como género, nivel educativo, o país. Además, se ha analizado la frecuencia de uso de internet así como el tiempo de conexión online, para explorar diferencias entre ambos. Se presentan resultados y conclusiones.

Palabras clave: Uso de internet; medidas; ESS, países europeos.

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1. INTRODUCTION

Internet dissemination is affected and conditioned by the level of economic development, geography, structural make-up, trade specialization of the economy, institutional policies or characteristics of each country (OECD 2017). Today, despite the quick blow-out of the Internet, nearly 60% of the world's population, four billion people, remain offline (OECD 2017).

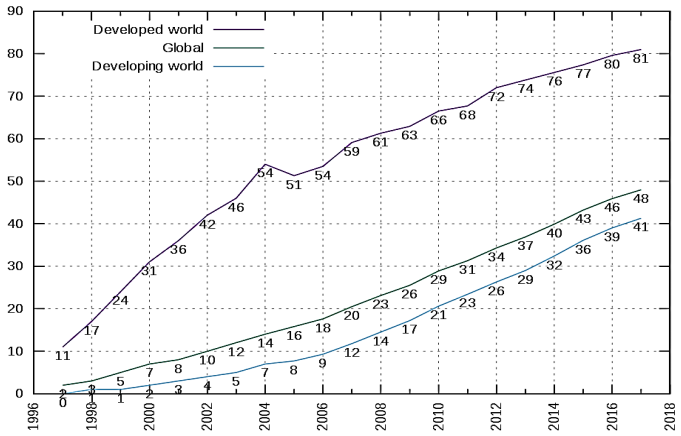
The number of Internet users is growing year by year. In June 2017, attending data published by Nielsen Online, by ITU, the International Telecommunications Union, there were 3.885 billion Internet users in the world. Geographically, although Asia was the continent with more Internet users (because it has more % population of World), North America followed by Europe were the regions with higher Internet penetration, being more than 80% people using the Internet.

OECD confirms that asymmetrical use of the Internet[1]. While nearly all (95%) adults in Iceland, Norway, Denmark, and Luxembourg accessed to the Internet in 2015, only half of the adult population did so in Turkey and Mexico, and 20% or less in India and Indonesia.

Those differences exist because digital infrastructures, necessary for support the Internet access, are nearly fully deployed and overgrowing beyond across OECD countries, while in other countries lasts more as Figure 1 displays. Although Internet access has overgrown in 20 years, there are still vast differences that base as more developed is the world region more Internet usage has. Thus, 81% population in Developed World has internet access versus to 41% in the Developing world.

[1] OECD based on ITU World Telecommunication/ITC Indicators Database and Eurostat Information Societe Statistics. Database, January 2017

Figure 1. Internet Users per 100 inhabitants developed and developing world



Source: International Telecommunications Union [2,3]

So, it is a fact, digital divide, a widely acknowledged term exists, at last between developed and developing world, and it affects its development. Digital divide consists on technological, economic and political divide, a split which sets the standings of access to citizenship itself, both within technologically developed regions and between wealthy and impoverished areas in the global system (Barney 2004).

However, digital divide concept has evolved and not should be reduced to the classic binary division between those who have access to the internet and those who do not. It tends to deepen the understanding of demographic and socioeconomic differences between users' adopters and non-adopters and their characteristics (Ferro et al. 2011). And it also refers to the usage and revenue everyone can get from the Internet (Norris 2001). Furthermore, it generates social and economic inequities caused by geographical, economic, physical, and linguistic barriers (de Los Santos et al. 2001; Goslee 1998; OECD 2000b), and that is a vicious circle.

1.2. Challenges and risks of Internet usage

[2] Individuals using the Internet 2005 to 2014", Key ICT indicators for developed and developing countries and the world (totals and penetration rates), International Telecommunication Union (ITU). Retrieved 25 May 2015.
[3]Internet users per 100 inhabitants 1997 to 2007", ICT Data and Statistics (IDS), International Telecommunication Union (ITU). Retrieved 25 May 2015. Archived May 17, 2015, at the Wayback Machine.

Technological change can be a powerful driver for reducing inequalities (Panel 2002; DiMaggio et al. 2001), because the Internet involved in the digital transformation process can be so disruptive that transforms the way individuals interact and change the structure and business models of the economy. Social networks and e-commerce are some examples of these changes.

The Internet helps disadvantaged groups connect and cooperate. It provides access for all individuals and business and would help people in specific areas, or disadvantaged groups benefit from the education, employment and health opportunities enabled by the digital network.

However, all these changes should be accompanied and combined simultaneously with high levels of fear and hope. As more people and things become connected to networks, new technologies can emerge. Trust is fundamental in this process. If people do not think this technology will improve the previous one and perceive the usefulness and ease of use of technology, they will not use it, and the same occurs with fear (Porter & Donthu 2006).

Individuals, businesses, and governments need reliable, affordable and widespread access to digital networks and services to benefit from digital opportunities and boost growth and well-being. Without trust, individuals, firms and governments will not be able to use digital technologies, and a significant source of potential growth and social progress will be left unexploited.

The Internet raises essential policy challenges that can help seize its benefits and mitigate the challenges and requirements to make it possible, including privacy, security among others. In this way, within the OECD context, significant progress on key aspects of policies inherent to lack of security in the "Internet of Things" has been made through many recent OECD instruments and Recommendations (*Council on Principles for Internet Policy Making, Council on Digital Government Strategies OECD - 2014b*) and the Declaration on the Digital Economy: Innovation, Growth and Social Prosperity.

Greater international co-operation in developing coherent strategies for digital ***security and privacy*** should be done. It will enhance the trust of individuals, implementing security and privacy risk management frameworks, essential to ensure the protection of individuals engaged in online activities, and at last, to foster Internet expand (OECD 2014b). Those are crucial challenges because each time people use technology (read an electronic book, listen to music) is making a copy of intellectual property, so laws should consider it (Groys 2008).

1.3. Digital Skills

The Internet offers significant challenges, but all individuals cannot benefit the Internet in the same way because it depends on their Digital skills. Differences in how successful people use the internet result in unequal opportunities to satisfy needs and extract benefits. Access to digital technologies can affect people's well-being in a variety of ways, both positive and negative (Van Dijk 2006; Afradi et al. 2017; Nowland et al. 2018; Lifshitz et al. 2018) and involve outcomes such as health and wellbeing (Kraut et al. 2002; Heo et al. 2015; Khalaila & Vitman-Schorr 2018).

Digital skills play a crucial role in the appropriation of digital technology. They are essential because all potential technologies only will happen if individuals have the skills required to use digital tools (Van Dijk 2006). Then, indicators of online skills have been established as indexes that measure the number of tasks that the individual claims to be able to develop on the internet (Krueger 2002).

Consequently, a growing body of research focuses on the differences in the skills and usages of the Internet citizens do, and also on the political and social consequences of this new form of digital inequality (Van Deursen & Van Dijk, 2011). Overall, the digital skill levels of the population need to be improved, because skilled internet users are more able to bargain with different kinds of information online and improve their cultural capital. They can reach out to more extensive networks of people and can exploit online opportunities to engage and participate in public life (Norris 2001). In this way, possible solutions are making digital media and technology more accessible or usable and apply educational solutions (Van Deursen & Van Dijk 2014). So, policymakers, governments, businesses, educational institutions, and organizations have an essential role.

1.4. The Internet measurement

As the Internet is an incredibly diverse medium, its measurement is complex. Average Internet user reports doing lots of different activities, and by various devices and technologies. Thus it must be specified what kind of use it has been examined, and the amount and type of use, when it is measured.

- The ***Channel or device*** describes the physical Internet access and distinguishing various devices people use to go online, for example, by

their degree of mobility. (DiMaggio et al. 2004; Van Dijk 2013; Van Deursen & Van Dijk 2011).

Nowadays, over 1 billion smartphones connect to the Internet, and over half of Internet activities take place via these smartphones (Attié & Meyer-Waarden 2016). The original 'Internet of PCs' is becoming an 'Internet of Things,' with 50 to 100 billion Internet-connected things expected by 2020 (Attié & Meyer-Waarden 2013; Chitturi et al. 2008). Also, it is supposed to considerably transform the way consumers and persons live (Dobbs et al. 2012; Porter & Heppelmann 2014).

- The ***Type of Internet Use*** and the ***Variety of use*** describes the activity carried on the Internet measures the number of different activities individuals can undertake online (e.g., Go into Facebook or browse in the Website) (Blank & Groselj, 2016). It includes anything from sending an e-mail, share data, make investments to gambling. It has been identified ten distinct types of Internet activities: entertainment, commerce, information seeking, socializing, email, blogging, production, traditional mass media, school, and work (Blank & Groselj, 2014; 2016).

  Today, active Internet usage looking at the extent (as opposed to directly access) varies across different population sub-groups, and gender effects, for example, men and women have different attitudes (Bimber 2000). That is because of its high perceived usefulness, defined as the degree to which people believe that using technology will help to improve their performance (Adams et al. 1992). And also, because people are more likely to adopt a technology when it is associated with functional benefits (King & He, 2006; Venkatesh & Davis 2000). By this way, enjoyment, and positive experiences related to the use of social networks have been associated (Durahim & Coşkun 2015; Bruner & Kumar 2005; Kim & Forsythe 2008; Kulviwat et al. 2007; Tadajewski et al. 2014; Van der Heijden 2004; Venkatesh et al. 2012).

– The ***Amount of use:*** It measures the frequency of Internet Use in day-to-day life, with a continuous variable that refers to the time (hours and minutes spent online for each day/week) (Blank & Groselj 2016).

  There are no standards or use rates. Internet usage accommodates within other activities and interests among healthy internet users, but it is critically important when people only want to be online and reject other activities, it is becoming an addictive use. There are lots of studies analyzing impact in how many hours spent online avoiding interpersonal

relationships with real and known people, as a way of escape from real-life difficulties, could be an essential criterion in the clinical interview to diagnose the Internet-addiction.

Compulsive internet use could be considered into the formal category of addiction or not depending on if it interferes with daily activities, relations, and health. Usually, there is an association between the lost interest in communicating with real people and psychological symptoms such as anxiety and depression, and sensation seeking or poor self-esteem predicts more extensive Internet use (Armstrong et al. 2000; Dowling & Quirk 2009; Gross 2004; Tonioni et al. 2012; Tripathi & Ahad 2017; Pal 2017, Odacı & Çıkrıkçı 2014; Pednekar & Tung 2017).

What is clear and well known is Internet use becomes compulsive or addictive[4] when: 1) users lose track of time while online or lies about it. When 2) sacrifices needed hours of sleep, time with family or friends or chores to spend time online; checks messages compulsively throughout the day. Alternatively, when 3) becomes agitated or angry when not online or online time is interrupted or 4) escapes into the internet to avoid responsibilities or real life among others.

Attending that classification, it has been examined how people were using the Internet all around the world, and it has been found in Europe[5], and concretely in Britain, in 2013, 37% households had access to a tablet; 57% Internet users access on displacement. Mobile phones are increasingly used for a range of Internet-related activities: email (54%), Internet browsing (52%), using social network sites (43%), playing games (43%) and listening to music (43%) (Oxford Internet Surveys (OxIS) 2013).

However, it is not an isolated picture. On the other side of the world, the Internet also is so accessible. American people increased their online time from 3,34 hours in 2011 to 5,56 hours in 2017, according to the eMarketer benchmarks. In 2017, also 57% of Internet users' access was on displacement**.** We should point a low decrease on desktop/laptop connection time from 2011 to 2017, and we suppose it is due to a vast majority of American adults are already using mobile

[4]Extract from: http://www.safetyweb.com/internet-addiction#References, and Kimberly Young, Director of the Center for Internet Addiction Recovery who identified the following potential warning signs for children with pathological Internet.

[5]Oxford Internet Surveys (OxIS) 2013 Report: "Cultures of the Internet: The Internet in Britain 2013.

devices, there changed the channel access.

Rates of internet related activities differ because in US survey exists the field "other activities" that represents near 40% of the time. When the type of Internet use was analyzed, on the same source, it has been found that the majority of the time spent on the Internet was within apps. In 2017, people spent an average of 3 hours and 23 minutes a day using mobile apps and 52 minutes on cellular browser activities, and the most important, both have duplicated its rate during this period, reflecting its popularity.

Other studies have analyzed demographic and drive variables (perceived ease of use, enjoyment, usefulness) related to Internet usage activities (defined in terms of messaging, browsing, downloading and purchasing). They found males are more likely to participate in downloading and buying activities while females are more likely to engage in messaging activities, and younger users engage in messaging and downloading activities than older users (Teo 2001).

Here have been presented data from European and American people. Aggregate data is similar everywhere but individually could differ long. Individuals use extensively from one user to others, attending multiple variables. It is difficult to establish "normal Internet Use." While one person can spend hours in one activity, others can do lots of activities in a short or long period. The real question is how to differentiate between 'normal' internet use and addictive or compulsive use.

2. METHODOLOGY:

2.1 Participants

For our study, that pretends offer broader information regarding Internet use and remark existing disparities among participant countries on the Survey, there has been considered data provided by the European Social Survey - Round 8 - 2016 2.0 version.

Data includes information of 33.123 individuals of 18 countries distributed by: Austria (5,8%); Belgium (5,1%); Switzerland (4,4%); Czech Republic (6,6%); Germany (8,2%); Estonia (5,8%); Finland (5,5%); France (5,9%); United Kingdom (5,6%); Ireland (7,9%); Israel (7,3%); Iceland (7,9%); Netherlands (4,8%); Norway (4,4%); Poland (4,9%); Russian Federation (7,0%); Sweden (4,5%) and Slovenia (3,8%). All countries and available data have been accepted.

No gender or age disparities distribution have been found on the sample.

Gender participation is balanced with 51% of female respondents and 47,9% male respondents at overall. Age distribution demonstrates there no exists relevant significances between age groups. Individuals from 15 to 30 years old represent 20,2% of the sample, those from 31 to 50 the 32% of the sample, those from 51 to 65 the 25,7% of the sample and those from more than 65 years old 21,8%. So, the group of individuals from 31 to 50 years represents more share because it involves 20 years-5 more than other groups.

2.2 Instruments

ESS survey includes questions regarding internet use and its measure and offers the capability to measure the digital divide between and within European countries. In ESS questions, respondents should include all internet use whether at home, work or on mobile devices, providing a measure of regularity´s use the internet. Specifically, it has been examined the following questions of the survey: 1. *People can use the internet on different devices such as computers, tablets, and smartphones. How often do you use the internet on these or any other devices, whether for work or personal use?* – measured with a scale from 1 to 5 being 1. Never; 2. Occasionally; 3. A few times a week; 4. Most days and 5. Everyday. And 2. *On a typical day, about how much time do you spend using the internet on a computer, tablet, smartphone or other devices, whether for work or personal use?* – Measured in duration: hours and minutes

Taking into consideration data provided by ESS several statistical analyses have been carried on. Specifically, the ANOVA test of one factor (P-value 0.000), post-hoc Bonferroni-Tukey' tests, and, comparison tests for column proportions[6], when it is required, have been considered to each analysis.

3. RESULTS:

It has been ensured consistency of data. Countries with a higher share of participants, like Germany or Russian Federation, respond to the higher size of the population. Only note the case of Ireland, that could have more significant participation than required for its size. It represents 7,9% of the sample, more than France or Great Britain while attending its population, it should be less than 50% of these countries.

Regarding the Internet Use, at overall, near 85% of interviewed people declares using it. Attending **frequency of Internet use**, 62,4% of individuals use it

[6] A Z test that performs pairs of column reducer equality in tables that estimated at least one category variable in rows and columns. The P values of the checks are Adjusted Using the Bonferroni method.

every day, 9,1% most of the days, 13% sometimes, and only 16,2 % declares not use it at all. Thus, six of each ten interviewed individuals use the Internet daily.

Taking into consideration the **gender** variable, Table 1 demonstrates there exist significant differences between female and male Internet use. While only 14,7% of males declare not use it never, the female rate is 3% higher (17,7%). The same occurs with daily rates, 3% more males than females declare use it daily (64,3% versus 61%).

Table 1. Frequency of Internet use by gender

USE OF INTERNET	GENDER			
	Female			Male
	Obs	%	Obs	%
Total	18069	100,0%	16687	100,0%
Never	3200	17,7%	2453	14,7%
Only occasionally	1078	6,0%	885	5,3%
A few times a week	1160	6,4%	1068	6,4%
Most days	1606	8,9%	1559	9,3%
Every day	11025	61,0%	10722	64,3%

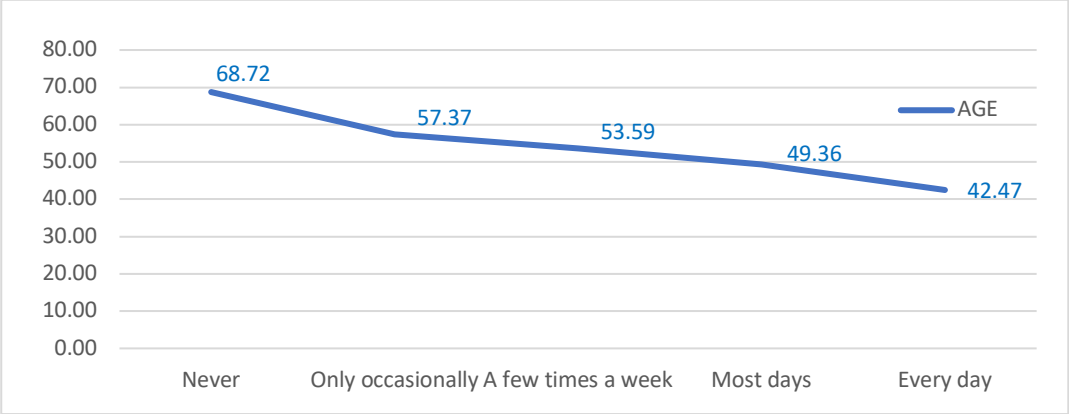
Source: Own elaboration

Pearson's Chi^2 test to compare proportions indicates (P-value 0.000) that there are significant differences among male and female. Comparison tests for column proportions suggest that among women there is more disuse and occasional Internet while among men there is more daily use.

Analyzing the **age** of individuals, as Figure 2 displays, at overall internet use, decrease with an increase in age. Thus, older people (mean of 68 years) never use the Internet, individuals ten years youngers use it occasionally, 20 years younger most of the days, and so far, younger, daily.

ANOVA test of one factor (P-value 0.000) indicates that there exist significant differences in the mean age of Internet use. The post-hoc Bonferroni-Tukey' tests show there exist a gradual decrease in the average age of individuals as the frequency of the Internet use increase.

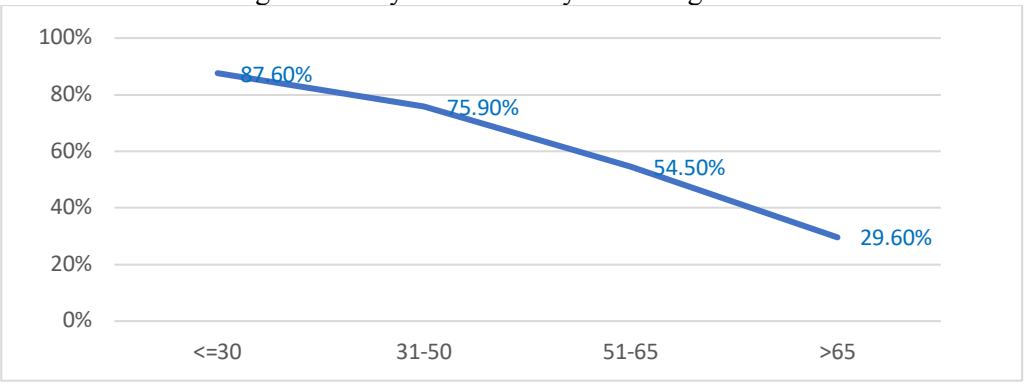
Figure 2: Frequency Internet use by average age



Source: Own elaboration

Considering interval ages, the same conclusions are obtained. Near 88% of individuals younger than 30 years use the Internet daily, while only 1% declares not use it never. By contrast, nearly 48% of elder claim not to use the Internet at all, and only 29% use it daily, as Figure 3 shows. Pearson Chi^2 test and comparations among rows reinforce conclusion the older people are the lower internet use they have.

Figure 3: Daily Internet use by interval age



Source: Own elaboration

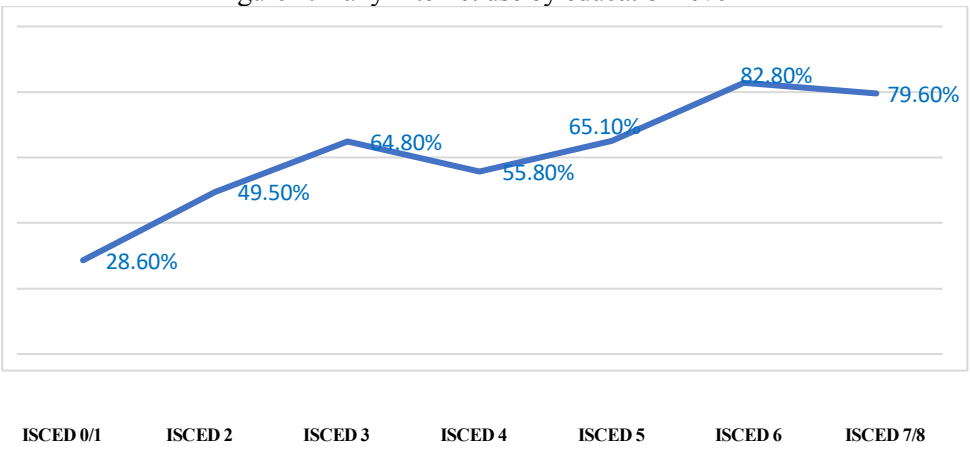
Considering the **education level**, and its relationship with Internet Use, it has been found a higher education level is correlated with broader internet use. Analyzed 16,3% of individuals never use the Internet; it is found 52% of them have not finished elementary education, and only 4,6% higher educated (IESCED 7/8). It could be

those rates respond to old people that, as it has been anticipated, present lower internet use, although it has not been checked.

Chi^2 test (P-value 0.000) and column comparison tests indicate that there is a positive correlation between education and Internet use (in fact, the coefficient of correlation of Spearman is 0.293). Thus, as higher is the education level of individuals, greater use of the Internet they present.

Graphically, as Figure 4 shows, 79,6% of individuals that have finished Master o doctoral grade (ISCED 7/8) use the Internet daily while this rate decreases until near one tertiary (28,6%) of individuals that completed (or not) primary studies (ISCED 0/1).

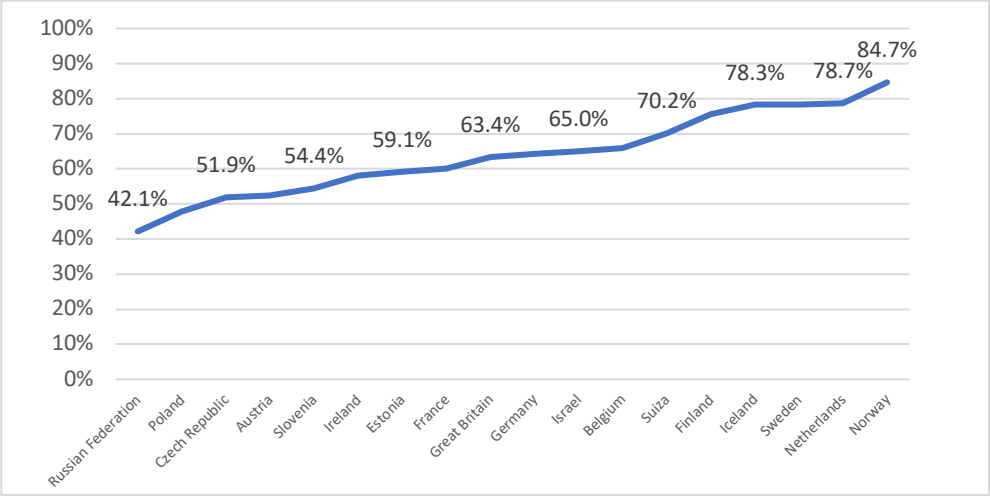
Figure 4. Daily Internet use by education level



Source: Own elaboration

Deepen in the 62,4% of individuals that declare using the Internet daily presented in Figure 3; Figure 5 displays differences in use among **countries** and citizens. While in the Russian Federation, Poland, and the Czech Republic less than 55% of individuals use the Internet daily, in Norway, the Netherlands, Sweden, and Iceland more than 78% do it. That is an interesting classification because, although there exist exceptions as Austria or Ireland, it remarks western EU countries, in general present lower rates of daily Internet use. It could be infrastructure and broadbands explain those differences.

Figure 5. Distribution of everyday Internet use by country

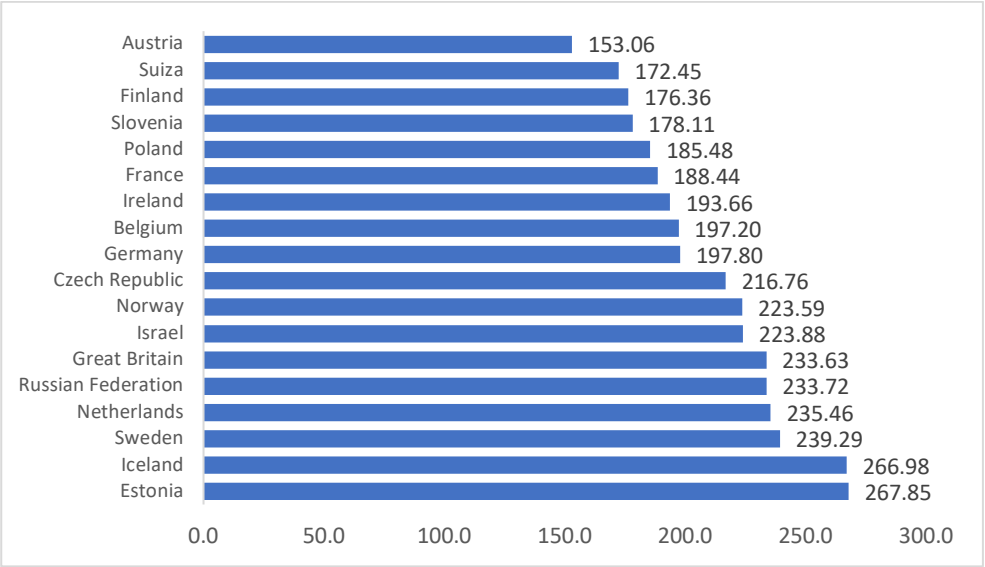


Source: Own elaboration

However, this classification only provides information about the percentage of citizens that daily use the Internet, and perhaps there could be considerable divergencies among **time users spent online**. By this way, time spent online of individuals that report using the internet every day on different countries has been analyzed. Moreover, as Figure 6, there not exist a correlation between the % of Internet users and time spent online between countries. For instance, in Norway where nearly 85% of citizens use the Internet every day, is not the country that more time spent-online has. Norway citizens use by mean 3,7h at day (216,76 minutes), while Estonia, that has 25% of citizens less using the internet daily, citizens do it 4,46h/day (267,85 minutes).

Consequently, the frequency of Internet use does not correlate with time spent online.

Figure 6. Daily time spent online by country (on minutes)



Source: Own elaboration

At last, the relationship between **income source** and Internet Use has been analyzed, and it has been found a positive correlation between income source and internet use.

Chi^2 test (P-value 0.000) and column comparison tests indicate that individuals whose income come from Investments, savings; self-employment and wages or salaries are those whom more frequent use of Internet has. From 70 to 77% of individuals in this group use the Internet daily. Individuals whose income come from Social benefits or grants and unemployment use Internet daily a fewer less. 60% of individuals in this group do it every day. At last, individuals whose income come from farming and pensions are those that lowest daily use present. Around 30-40% of individuals at this group use it daily, while similar rates (30-45%) never do it.

4. CONCLUSIONS/DISCUSSION:

Gender influences Internet use. Overall, males use more Internet than females. There exist significative differences between males and females that declare use the Internet daily, but also between those who declare not use it never. In both cases, disuse of females is 3% higher than males.

Age also influences the Internet use. Older people present lower rates of use than younger ones. It could be expected that that effect will be mitigated with time because middle age individuals are more active than older ones.

Education also impacts on Internet use. As more educated are individuals more internet use, they do.

There exist significative differences in use among countries that could be explained by disparities on digital infrastructures development. Nevertheless, there is no correlation between Internet access and time spent online by countries. Western countries present lower rates of daily Internet use, although more intensive use for those who declare use it.

Income sources influence also. Individuals whose income come from pensions and farming present the lowest rate use. This could be because of the age effect (they are older) or the poor infrastructures that generally exists on farming spaces. By contrast, self-employed or salaried individuals present a higher rate of use.

It would be interesting to deepen on the skills individuals have to relate them with Internet Use. It could be pointed age and education influence skills individuals have and explain differences in use, although it cannot be contrasted. Neither it could not be analyzed the channel or device used to connect to the Internet, even if as more time is declared, more mobile devices would be used.

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