Challenges for the internet of future and *non-digital* Spanish generation: national data 2017

Retos de internet del futuro y generación española *no digital*: datos nacionales 2017

Desafios da internet do futuro e geração espanhola *não digital*: dados nacionais 2017

NATALIA PAPÍ-GÁLVEZ, Universidad de Alicante, Alicante, España (natalia.p@ua.es)

RAQUEL ESCANDELL-POVEDA, Universidad de Alicante, Alicante, España (r.escandell@ua.es)

ABSTRACT

This article analyzes the differences in access, use and information, communication and online management skills of Spaniards born before 1965. It applies a cluster with age, sex, studies and income, to a representative national sample, which concludes in two profiles. Bivariate tests (X2, t Student) show intergroup differences in favor of the youngest group, consisting of more men, better income and studies, but with more internal gaps. In a few years, the elderly will be technologically more integrated although the gaps must be reduced and online participation encouraged betting on a digital communication that helps to strengthen the machine-person relationship.

RESUMEN

El artículo analiza las diferencias de acceso, uso y competencia informativa, comunicacional y de gestión online de los españoles nacidos antes de 1965. Aplica un clúster con edad, sexo, estudios e ingresos, a una muestra nacional representativa, que concluye en dos perfiles. Test bivariables muestran diferencias intergrupo a favor del más joven, compuesto por más hombres, mejores ingresos y estudios, pero con más brechas internas. En unos años los mayores estarán tecnológicamente más integrados aunque deben reducirse las brechas y fomentar la participación online apostando por una comunicación digital que contribuya a estrechar la relación máquina-persona.

RESUMO

Este artigo analisa as diferenças de acesso, uso e competência informativa, comunicacional e de gestão online dos espanhóis nascidos antes de 1965. Para isso, se aplica um cluster com idade, sexo, estudos e ingressos, a uma amostra nacional representativa, que conclui em dois perfis. Testes bivariáveis mostram diferenças intergrupo a favor do mais jovem, composto por mais homens, com melhores rendas e estudos, mas com mais brechas internas. Em alguns anos, os maiores estarão tecnologicamente mais integrados, mesmo que devem se reduzir as brechas e fomentar a participação online apostando por uma comunicação digital que contribua para o estreitamento da relação máquina-pessoa.

INTRODUCTION. NEW HORIZONS

This research approaches the study of the population as a user of digital technologies and, therefore, as an online media audience. It focuses in the definition and knowledge of the user, key in the person-machine interaction, which forms a basic relationship for digital communication and, especially, for advertising. Technological innovation significantly impacts advertising as a creative industry, transforming its structures and processes (Kaufmann, 2017). The disruption of the Internet leads to a greater orientation towards digital audiences, whose profile is particularly marked by age (Asociación para la Investigación de Medios de Comunicación, AIMC, 2019). Therefore, this approach connects with social studies on digital divides and has edu-communicational implications in the society of the future, in which at least two trends are detected.

On the one hand, in the coming years an unprecedented increase in devices connected to the Internet is estimated. International analyzes predict that in 2021 there will be 25 billion connected objects (IANS, 2018; Gartner, 2018), which represents an average of 3.2 devices per person considering the 7.8 billion inhabitants estimated by the Organization of the United Nations (UN) for 2021 (ONU, 2019). In Spain, there will be more than 7.5 connected devices per inhabitant in 2021 (Cisco, 2018).

The economic impact of the consolidation of what Ashton calls Internet of Things (IoT) is one of the main reasons why the European Union (EU) promotes an alliance for its development, present in the Horizon 2020 program (UE, 2015). The growth is of such magnitude that a worldwide phenomenon, that Cisco named as the Internet of everything (IoE), is predicted. Communication between machines will increase exponentially as daily life is digitalized.

At this point, machines are a great source of data, in addition to offering services of different nature, without requiring the direct intervention of the user, but they do not replace the machine-person relationship, still considered necessary for the digital media to remain, in addition, communication media.

In fact, the application of advanced information and communications technologies (ICTs) environments has a reason of a social nature, since the user is at the center of this development. It is intended to help them (Torres-Vargas & Arias Durá, 2014) and, to do so, it must use a large number of technologies, among which mobile devices are essential (Urueña, Del Arco, & San Segundo, 2014).

On the other hand, the population will continue to grow and age (United Nations, 2015). In fact, for the first time in history, in 2018, those over 64 exceeded those under five (ONU, 2019). In 2050, Spain will be the fifth country in Europe with the highest population of advanced age (60 years or more) (United Nations, 2018). The population over 59 will have increased by 4% in 2020 and 55% in 2050 compared to 2018 (Instituto Nacional de Estadística, INE, 2018a). This forecast is joined by the growth of single-person households in the next two years (2%) (INE, 2018b).

In this context, the Internet of the future, or the new generation of services for the Internet (De Miguel, 2011), can offer everyday solutions, especially for the elderly. Improvements in housing conditions and distance assistance (González-González, Mora-Carreño, Giulianelli, Cruzado, & Rodríguez, 2014) are applications that can contribute to the quality of life of older generations. A certain degree of acceptance of technology and competences seems appropriate for its integration into the daily life of the elderly.

In Spain, 85% of the population aged 65 to 75 use the mobile phone, but only 46% use a computer or the Internet, compared to 97% and 98% of the youngest group, between 16 and 24 years old (INE, 2017a). However, a decade earlier there was even more polarity. The percentages of the youngest cohort were above 85%. The mobile phone was used by 52% of those over 65 to 75 years, the computer by 7.7%, and the Internet, by 6.6%. The generational effect is observed, especially, in the use of the computer and in the access to the network.

Consequently, it is necessary to continue observing the relationship with the new technologies and digital media of the most mature age groups, and deepen the factors involved in their access and frequency of use, some of which are included in various reports (for example, Cabrera & Malanowski, 2009; Zickuhr, 2013; Abellán García, Ayala García, & Pujol Rodríguez, 2017) or studies focusing on the gray divide (such as Friemel, 2016; Yu, Ellison, McCammon, & Langa, 2016; Hunsaker & Hargittai, 2018; Barrantes Cáceres & Cozzubo Chaparro, 2019).

From the framework of digital advertising communication, the number research on the elderly reflects the interest of scientific literature (Mancebo, 2014). This evidence indicates the relevance that they have as potential audiences since before the Internet disruption (Ramos-Soler, 2005) and, in particular, coincides with other approaches in the need to deepen the relationship with the digital medium.

Big data, and more specifically, data mining that allows to extract knowledge for its application (Hernández-Leal, Duque-Méndez, & Moreno-Cadavid, 2017), represents a new paradigm for the knowledge of Internet audiences that enables the customization of information and services. The content is adapted to each user in a unique way in each of the contact points derived from Internet uses, which contain from anonymous attitudes (such as searching and reading information), or online transactions, to more creative and social uses, such as content publishing. The digital skills of the population related to information and online communication are very important for advertising. Delving into the uses of the network is imperative for efficient advertising digital communication, in the same vein of other approaches (Hough & Kobylanski, 2009; Peral-Peral, Arenas-Gaitán, & Ramón-Jerónimo, 2014).

FRAMEWORK AND LITERATURE REVIEW
DIGITAL GENERATIONS AND INTERNET-RELATED SKILLS

In this context, competences are knowledge, skills and attitudes that each person develops, oriented to the use of computers and their utilities, including information management capabilities (García-Valcárcel, 2011). Such competences allow the user to reach their goals, so they "(...) are revealed when a task is executed (...)" (Sevillano-García & Quicios-García, 2012, p. 157). Among them are the Internet-related computer skills that facilitate the performance of specific actions (van Deursen & van Dijk, 2014).

The European digital competency framework (Vuorikari, Punie, Carretero, & Van den Brande, 2016) proposes 21 competences grouped into five areas: 1) information and data literacy, associated with the efficient search for information; 2) communication and collaboration, i.e., interaction with other people and participation; 3) digital content creation, oriented to editing and content development; 4) safety or protection of data and devices, and 5) problem solving, as the ability to deal with technical problems and as an initiative to overcome training limitations. Other studies, promoted by professional associations on communication and digital advertising, such as the Interactive Advertising Bureau of Spain (IAB Spain), consider relevant the observation of the use of the Internet through mobile devices to have a better knowledge of the sector. They find up to 23 activities grouped into four main areas (IAB Spain, 2018): 1) social (for example, use of social networks); 2) consultative (on several topics, include clicking on advertising); 3) ludic (listen to music), and 4) functional (use of electronic banking). These categories also emerge in qualitative research aimed at specific groups, such as those over 55 in Spain (Llorente-Barroso, Viñarás-Abad, & Sánchez-Valle, 2015). In that study, four groups are defined that incorporate information, communication, transactional and administrative skills, as well as leisure and entertainment. As can be seen, many of these activities would be included in some areas defined by the European framework of digital skills and coincide with a large part of those collected by the Spanish TIC-H survey. These activities also provide information on possible points of contact with advertising.

Other works of academic profile focus their interest in the use of the network, at least in two senses: as an information space and as "places of relationship" (Sevillano-García & Quicios-García, 2012, p. 153). The first responds to an image of ICTs as a tool to send and receive information. It would be associated with Web 1.0 and other online services and, therefore, with the first of the areas highlighted by the European Union. The second becomes a reality with the possibilities offered by Web 2.0 (Friemel & Signer, 2010; Area & Pessoa, 2012) and, consequently, is related to the second of the five areas posed by Vuorikari et al. (2016). In this second case, the digital world is part of the vital experiences: "This gives us a satisfactory explanation for the man-machine relationship" (García del Dujo, 2009, p. 123). It would be an image of ICTs closest to that of the digital natives considered by Prensky (2001), whose main demographic difference with digital immigrants and non-digital generations is age.

Five generations are usually differentiated (Dimock, 2019): the two groups that constitute the digital natives, born after 1980; the Generation X or digital immigrants, between 1980 and 1965, and the previous cohorts, which in the United States would correspond to the demographic explosion (Boomers), born between 1946 and 1964, and with the groups that have no relationship with it (Silent), born before 1946. In Spain, these last two would correspond to the population between approximately 54 and 72 years, and to those over 72 years. As is known, this classification addresses the relationship that, broadly speaking, those generations have with ICTs, although these constitute large population groups and, therefore, are heterogeneous.

In this regard, a study focused on smaller but homogeneous samples in the Spanish context

(Peral-Peral et al., 2015) observes the differences of a psychological nature in the use of social networks by the elderly. Among its conclusions, it shows the existence of excessive stereotyping as a collective, therefore not subject to intragroup reality. The approach of another study that describes the discourse of the younger generations is similar because, although it detects sociocultural differences between the age groups, it also highlights the limiting character of the labels (Garrido-Lora, Busquet-Durán, & Munté-Ramos, 2016).

Thus, different relationships are established with the technologies within the defined generations that, in turn, may reflect different degrees of preparation in one of the competency areas considered.

AGE, ACCESS AND INTERNET USER POPULATION

The access and intensity of Internet use are not distributed equally across all layers of the population, as some demographic and socioeconomic features seem to directly influence access to technology. The level of income, education, gender and age are especially relevant (Helsper, 2010; Zickuhr & Smith, 2012; Friemel, 2016). These features largely explain the digital divide, i.e., the distance between people who have access to the Internet or not, the intensity and speed of technology management, the uses of digital environments and even the gap in the efficiency of its use (Ragnedda & Muschert, 2013; Leaning, 2017). The growing presence of the Internet in the daily life of society leads to the fact that being excluded of the network triggers a social exclusion.

In addition, in a society such as the Spanish one, in which Internet access is made through mobile devices (90% of Internet users, INE, 2017a), the acceptance of smartphones is increasingly significant to understand the opportunities to use some services. As research focused on the most mature groups show, the relationship between mobile technology and the use of its functionalities as an Internet access device is not always direct (González, Fanjul, & Cabezuelo, 2015; Poveda-Puente, Pinazo-Hernandis, Pérez-Cosín, & Lois, 2015) because, in general, optimal levels of digital literacy are required (Abad-Alcalá, 2016), for which the acquisition of skills related to participation is essential.

When age is at the origin of inequalities, it is called the gray divide (Morris & Brading, 2007). For example, in 2012, 46% of seniors (65 and older) in the United States did not use the Internet, compared to 4% between 18 and 29 years old (Pew Research Center, 2018). Of 77% with mobile phones, only 18% of the elderly had a phone with which they could connect to the Internet (Smith, 2014). In 2018, years later, the figures grow in the mature age group. 34% of those over 64 do not access the Internet, compared to 2% of the youngest age group (Pew Research Center, 2018).

The data show the distance between the adoption of the Internet by the elderly population and other age groups, but also its favorable progression. For example, in Europe, in 2012, 64% of the population between 65 and 74 had not accessed the Internet in the last three months but, five years later, that figure is reduced to 16% (Eurostat, 2018). The progression of the use of mobile phones to connect to the Internet is also favorable for the population aged 65 to 74 (from 4% in 2012 to 24% in 2017) (Eurostat, 2018). In Spain something similar happens. In five years, the population between 65 and 74 using the mobile to access the Internet grew by 28%. Other national reports show the same results (Abellán-García et al., 2017).

However, non-digital generations are far from forming a homogeneous group. Smith (2014) detects two large segments for the United States. The first, which includes the youngest ages and with highest education, has relatively important technological resources and has a positive view on the benefits of online platforms. The second, that of people located in the upper age groups, with fewer resources and greater health problems, is much more disconnected from the world of digital tools and services, both physically and psychologically. In this regard, although in the European countries there is a smaller digital divide for basic or structural reasons, there are differences regarding skills that feed inequality (Ramírez García, González Fernández, & Sedeño Vald, 2017; Íñiguez-Berrozpe, Valero-Errazu, & Elboj-Saso, 2018; Van Deursen & Van Dijik, 2019).

For Spain, age, educational level, income level and gender are explanatory variables of Internet access for the elderly (Arenas-Gaitán, Peral-Peral, & Ramón-Jerónimo, 2014; Peral-Peral, Arenas-Gaitán, & Ramón-Jerónimo, 2013; Peral-Peral, et al., 2014), or the acceptance of technology within the framework of media competencies (Tirado-Morueta, Aguaded-Gómez, & Hernando-Gómez, 2018), in line with other international research (Hill, Beynon-Davies, & Williams, 2008; Cresci, Hossein, & Morrell, 2010).

Consequently, this study proposes the observation of the competences associated with the uses of the

Internet linked to its informative, communicational or management function, since they are significant for advertising, of the age groups less present in the online medium, considering that the relationship with the environment is determined by the cumulative effect of several demographic and socioeconomic features that may be representing, in turn, the different generations and thus facilitate the identification of audience profiles.

RESEARCH OBJECTIVES

The new horizons, which are presented in the medium term for digital communication, make it relevant to observe the population that will become part of the group of 65 years and older in the coming years. As a general purpose, this study aims to explore the relationship with the digital medium of the generations less present in it. In particular it seeks to:

1. Identify the profiles, according to the relevant demographic and socioeconomic features (age, gender, level of education and income level), of those born before 1965 in Spain.

2. Find out if there are inter and intragroup differences in the use of the Internet and mobile phones, the frequency of use of the online media and access to the Internet via mobile phones.

3. To know if there are significant inter and intragroup differences in Internet uses linked to the competences of information, communication and other management utilities.

MATERIAL AND METHODS
DESIGN AND DATA SOURCE

The data were extracted from the TIC-H survey (INE, 2017b), which follows Eurostat's recommendations and responds to the community statistics of the information society (UE, 2016). It is a nationally representative survey, with a systematic collection of information. Its use guarantees not only the observation of the evolution of a phenomenon, through sample sizes sufficient to apply specific analyzes, but also offers the operationalization of the concepts previously discussed within the framework of the European Union. In this regard, many uses of the Internet included in the questionnaire would be linked to areas defined in DigComp2.0.

The national survey uses a three-stage sampling, which starts from the census sections and the selection of households to interview members older than 15 years. The field work of the analyzed matrix was conducted during 2017, with a sample of 17,337 cases (INE, 2017c).

This research focused on the responses provided by household members born at least a decade before the beginning of the transition to democracy[1], which coincides with the year of birth of the last Boomers (BB) and also includes the Silent, generations defined in its inception for the United States. The analysis focuses on those over 52 years (53 years and older), to match them with the age limits of the BB plus the Silent for the year 2017 (n=8,855).

VARIABLES
POPULATION CHARACTERISTICS

We selected the following: gender (1. male, 0. female), age (min. 53), level of education –1) without studies and primary education, SE or EP; 2) first stage of secondary school, ES1; 3) second stage of secondary education, non-superior post-secondary education and higher level training, ES2 or EPS; 4) university education, EU– and monthly net household income –1) <900 euros; 2) 901-1,600 euros; 3) 1,601-2,500 euros; 4) 2,501-3,000 euros; 5)> 3,000 euros. The educational level responses were grouped to have enough frequency in all of them. As in other investigations, the values *cannot be coded*, *dn/da* and *others* were considered missing values.

FREQUENCY OF USE OF THE INTERNET AND MOBILE DEVICES

The identification of *senior onliners* (Eurostat, 2015; Friemel, 2016) was carried out through the question: "When was the last time you used the Internet?" (INE, 2017d, p. 11) with four response options: 1) in the last month; 2) more than a month ago and less than three; 3) more than three months and less than a year ago, and 4) more than 1 year ago. Question 15 acted as a filter: "Have you ever used the Internet?" In this regard, those *onliners* over 53 (sum of answers 1 and 2) amounted to 4,069, of which 3,560 interviews replied that they did so on a weekly or daily basis (question 17). Similarly, the observation was focused on mobile phones through questions 14 and 18: "Have you used the mobile phone in the last 3 months?" (INE, 2017d, p. 10), and that related to access Internet through these, with two possible values: yes (1) or no (0). This second question could only be answered by *onliner* adults.

INTERNET ACTIVITIES

We included 14 activities that excluded the work environment. The different items, extracted from the survey (INE, 2017d), were grouped, a priori, into the following three competency dimensions, according to the different proposals previously exposed:

- Information: 1) Read or download news, newspapers or online magazines; 2) seek information on health issues; 3) look for information about goods and services.

- Participation: 1) Participate in social networks; 2) upload own content (...) on a webpage to be shared; 3) issue opinions on social or political matters on the network (...); 4) take part in online consultations or in voting on civic and political matters (...).

- Other utilities: 1) Receive or forward email; 2) use services related to travel and accommodation; 3) electronic banking; 4) electronic commerce; 5) sell goods or services (...); 6) obtain information from the Administration's web pages; 7) send completed forms (...).

All previous uses had two response options, with the values: yes (1) or no (0).

STATISTICAL ANALYSIS
COMPETENCY AREAS

The selected activities were previously treated with factor analysis to check if the groupings of the 14 uses were consistent with the theoretical proposal. The principal component extraction method with Varimax rotation was applied for polychoric matrices and Bayesian estimates in the interviewees who had accessed the Internet in the last three months (n=4069) with the FACTOR.10.9.02.WIN64 program (Ferrando & Lorenzo -Seva, 2017).

The previous 14 uses were grouped into two factors (table 1). The first component corresponded to the information functions and other utilities related to the use of the Internet. The second incorporated the activities of participation, but the item online consultations and voting on political or civic matters was not decisive. Likewise, seeking health information or private sales were not actions that were definitely related to a component. The two factors explained

62% of the variance (table 2) (Mislevy & Bock, 1990). The statistics in table 3 provide guarantees on the application of the analysis performed.

INTER AND INTRAGROUP PROFILES AND DIFFERENCES

Cluster analysis was applied in two phases with: age (n=8,855) (continuous), gender (n=8,855), education (n=8,812) and income (n=7,193) (categorical). The analysis was performed with 7,180 cases due to the non-response in education and income. The measurement of the cohesion and separation silhouette of this analysis provided a quality index of 0.2, considered correct (IBM, n.d.).

The groups were determined automatically (log-likelihood and BIC). Pearson contingency tables and Chi-square tests were used to determine the independence between the four previous variables. For the combination with age, we observed the quartiles of the distribution and grouped them accordingly (p25=57, p50=61, p75=67). All combinations of gender and age with income and educational level of the population aged 53 and over showed independence (p <0.001). To respond to the second and third objectives, we performed bivariate analyzes with Pearson's Chi-square test for categorical variables and contrast of medians (T-test, independent samples) for age (continuous). In addition, intragroup bivariable analyzes were also applied. The calculations were made with the statistical program SPSS.

RESULTS
PROFILES OF NON-DIGITAL GENERATIONS

The classification analysis concluded in two subgroups with differences in all the variables introduced: gender, age, level of education and of income. The first profile was formed by 3,059 respondents (34.5%), and the second, by 4,121 cases (46.5%).

The first segment concentrated to a greater extent women, less young people, groups with incomes below 1,600 euros and without studies or with primary studies. The second segment included the complementary characteristics (men, younger, income over 1,600 euros and studies from primary school).

Both the level of education and income showed polarity. 100% of the cases in the first group had no studies or had primary studies, and 100% of the income above 1,600 euros were in the second group. The average age was higher (average=74.4; α=9.98) than that of the second (average=64.8; α=9.18).

Internet uses	Component	
	1	2
Email	**0.790**	0.255
Participate in social networks	0.084	**0.868**
Upload own content	0.133	**0.867**
Read or download news	**0.600**	0.292
Search health information	**0.560**	0.317
Search real estate information	**0.730**	0.214
Issue opinions on social/political issues	0.265	**0.840**
Online consultations and voting political/civic matters	0.476	**0.612**
Travel/accommodation	**0.773**	0.131
Private sale	**0.557**	0.203
Electronic banking	**0.808**	0.121
Electronic purchase	**0.821**	0.229
Administration's information	**0.830**	0.150
Send administration forms	**0.778**	0.043

Table 1. Rotated component matrix

Source: TIC-H'17 data and analysis conducted with FACTOR.10.9.02.WIN64.

Component	Variance	Proportion of explained variance (0.406 + 0.216 = 0.622)	Reliability
1	5.683	0.406	0.910
2	3.030	0.216	0.835

Table 2. Explained variance and reliability of rotated components

Source: TIC-H'17 data and analysis conducted with FACTOR.10.9.02.WIN64.

Matrix determinant	Bartlett statistics	Kaiser-Meyer-Olkin (KMO)
0.03277025308815	13886.6 (df = 91; P=0.00001)	0.87352

Table 3. Adaptation to the correlation matrix

Source: TIC-H'17 data and analysis conducted with FACTOR.10.9.02.WIN64.

The T test of contrast of medians concluded in significant differences for age (T=41.421; 95% IC=9.086-9.988) and Pearson's χ^2 test showed differences for the rest of the variables (p<0.001). 48% of women were concentrated in the first segment, compared to 35% of men.

DIGITAL USERS (ONLINERS) AND MOBILE DEVICES

The intergroup analysis detected differences in access to the Internet by clusters (17.8% and 72% respectively). Of this population, the vast majority had accessed before the last three months (91% and 96%) and 75.4% of the cases that make up the first
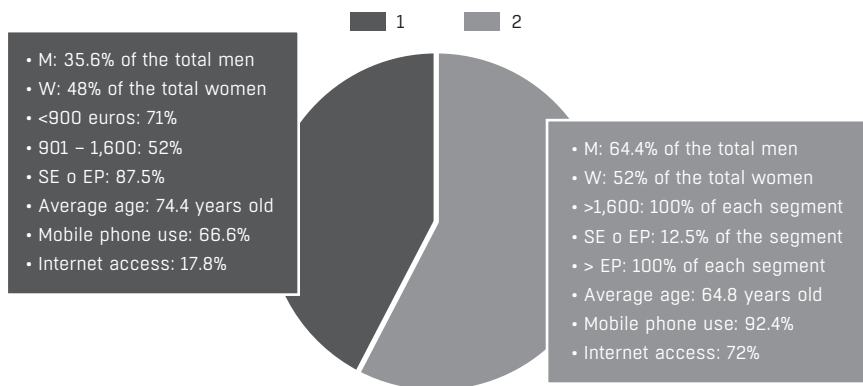
Figure 1. Profiles over 52 years (valid%) and use of mobile phones and the Internet

Source: Own elaboration based on TIC-H'17.

cluster had done so, in addition, with a weekly or daily frequency, compared to 90.2% of the second cluster. The differences between them, in all cases, were significant according to Pearson's χ^2 test (p<0.001).

The first group used the mobile phone in the last three months (66.6%), although in the second cluster the frequencies were also significantly higher (92.4%) (p<0.001).

The groups were different in Internet access through mobile phones, outside their usual household or workplace (p<0.001). In the first group, 68.5% of the *onliner* population with weekly or higher frequency stated that they had access to the Internet using the mobile phone, compared to 77.6% of the second group (p<0.001).

The intragroup analysis of the first cluster showed that there were no differences by gender or by being *onliner*, nor in the access to the Internet through the mobile phone, but they were observed in the use of the latter (p<= 0.01). 64.9% of women used it compared to 69.5% of men. In addition, there were significant differences in the three variables of frequency of Internet use and mobile access and use by income (p<0.05; p<0.001, p<0.01, respectively). The percentages were always better for the highest segment in that segment, from 901 to 1,600 euros.

In the second cluster, differences were detected between being or not weekly or daily *onliner* by gender (p<0.01). In this group, 88.6% of the women were frequent users of the Internet, compared to 91.6% of the men. There were also significant scores by level of income and education (p<0.001), as they usually focused on the last segments. Finally, there were no differences between women and men when observing Internet access in the last three months, nor in the use of mobile phones; neither in Internet access through the latter, but there were some regarding the educational level and income (p<0.001).

INTERNET USES

All activities showed significant differences between the two groups according to Pearson's χ^2 (table 4). The intergroup analysis revealed that more population from the second profile used the indicated services. The two groups used the network for informational purposes. On the other hand, there was a smaller number of people who did so with a communicative purpose (participation). The greatest differences between populations were found in the field of management, as group 2 used the network significantly to conduct economic or administrative transactions.

The intragroup approach showed significant differences between genders in five of the 14 activities, in the first group. The uses of an economic nature and those related to the Administration were male domain. The same happened with the income in four of the 14 services analyzed, but this time all related to economic transactions.

The second group had more differences by gender (11 of 14), studies (all cases) and income (11 of 14). In this segment, women were more into seeking information related to health and participating in social networks. The rest of the utilities were male domain. There were also large differences between the first and the last educational level. University students used the network especially for informational and management purposes. More high-income population also used the services observed.

Usos de internet	Intergroup analysis			Intragroup analysis				
	Group1	Group2	χ²	Group1*		Group2		
	%Yes	%Yes	p<	Gender	Incomes	Gender	Studies	Incomes
				%female- %male	%(1) - %(2)	%female - %male	%(1) - %(4)	%(1) - %(5)
Information (average)	45.6	71.5						
Read or download news	52.9	77.5	0.001	-	-	74.2 - 80.8 p<0.001	64.3 - 85.4 p<0.001	62.6 - 90.7 p<0.001
Search health information	43.1	65.6	0.001	-	-	**68.1 - 63.1** p<0.005	43.5 - 71.9 p<0.001	56.4 - 74.2 p<0.001
Search real estate information	40.7	71.4	0.001	36.2 - 47.9 p<0.05	-	68.2 - 74.6 p<0.001	53.2 - 82 p<0.001	56.1 - 87.5 p<0.001
Participation (average)	16.4	23.8						
Participate in social networks	36.3	44.7	0.001		-	**46.8 - 42.7** p<0.005	33.1 - 43.3 p<0.005	-
Upload own content	18.4	24.1	0.01	-	-	-	16.9 - 28.2 p<0.05	-
Issue opinions political / civic matters	6.6	14	0.001	-	-	-	7.8 - 16.1 p<0.05	-
Online consultations or voting political / civic matters	4.4	12.2	0.001	-	-	-	3.2 - 16.9 p<0.001	7.8 - 17.8 p<0.001
Other utilities (average)	15.6	45.3						
Email	33.1	71.1	0.001	29.8 - 38.4 p=0.05	25.1 - 38.2 p<0.005	65.8 - 76.8 p<0.001	45.5 - 88 p<0.001	55.9 - 91.7 p<0.001
Travel / accommodation	17.6	49.4	0.001	-	11.8 - 21.3 p<0.01	45.9 - 53 p<0.001	25.9 - 75.4 p<0.001	31.8 - 29.5 - 64.7** p<0.001
Electronic banking	17.6	52	0.001	12.9 - 25.3 p=0.001	10.8 - 22 p=0.001	45.6 - 58.5 p<0.001	27.9 - 66.6 p<0.001	31 - 73.7 p<0.001
Electronic purchase	13.7	49	0.001	10.9 - 18.4 p<0.05	6.5 - 18.5 p<0.001	42.6 - 55.5 p<0.001	25.3 - 66 p<0.001	29.4 - 75.7 p<0.001
Private sale	3.4	8	0.001	-	-	6.8 - 9.2 p<0.05	5.2 - 10.8 p<0.001	5.9 - 12.3 p<0.001
Administration information	16.1	50.1	0.001	11.8 - 23.1 p=0.01	-	43.7 - 56.6 p<0.001	21.2 - 69.4 p<0.001	36.6 - 73.6 p<0.001
Send administration forms	8	37.5	0.001	-	-	31.2 – 43.8 p<0.001	17.9 – 57.4 p<0.001	19.6 – 57.6 p<0.001

Table 4. Summary of contingency tables and Pearson's χ^2 calculation for 53+ years

There are no differences by level of studies, since the entire population is concentrated in the first segment.

** *The second figure corresponds to the second segment of income from which it rises to the fifth one.*

Source: Own elaboration based on TIC-H'17.

DISCUSSION AND CONCLUSIONS

One of the first steps in any communication strategy is the definition and knowledge of the population, in order to adapt the services to their needs and deliver them satisfactorily. In the same way, it is essential that the Internet of the future and the improvement of the interaction with that user of the future considers this phase of knowledge of the type of people that will constitute the society, including their abilities to interact with an increasingly interconnected, technology-dependent, environment.

In a few years, not only will the number of devices connected to the Internet have increased, but so will the population over 64, so it is necessary to see the generations considered *non-digital* as potential users of technological advances that may favor their social participation and improve their quality of life.

The results of this study contribute to a greater understanding of the population's relationship with new technologies, considering its use from both a communicational and competency approach. Therefore, the research aims to show the main profiles of the Spanish population, whose vital trajectory was mostly developed away from ICTs, and to observe their relationship with them, specifically regarding the use of the Internet and mobile devices. In the light of the theoretical framework, we deepen into the activities conducted in the online medium that provide information on possible common points and digital competences.

In response to the first objective, the classification analysis of those over 52 years of age concludes in two segments whose average age and standard deviation could place them in the generations known as Boomers and Silent in United States of America. Thus, the second segment, the youngest, has an average age of 65 years, ± 9 years (56 and 74). The BB generation includes the ages between 53 and 71 years, so the analyses of this study extend in six years, symmetrically, the BB.

In Spain, this age group would correspond to people who were between 17 and 35 years old when the democratic regime was established in 1978. As expected, this population, young people in the transition[2], enjoys a better level of education and income than the previous one. A greater proportion of men is also concentrated in this segment.

Such results empirically confirm the desirability of observing the elderly in two age groups (young olds and middle-old olds) also for the Spanish population, as Montaña, Estanyol and Lalueza (2015) state, whose theoretical limit placed them in 71 years old. The average force of the validity test applied could be explained by the intragroup heterogeneity detected.

As for the second objective, the two groups formed show different behaviors towards technology. The Internet user population (*onliners*) is significantly concentrated in the second cluster (the youngest) and has better scores in the variables of mobile phone use, showing differences in gender, age, studies and income.

In this regard, the analysis of the profiles shows that the level of studies is especially decisive, since it is a defining variable in the construction of the two conglomerates. This finding is observed in other local and international studies, and contributes to the idea that the perception of utility and motivation are above the physical conditions that may prevent seniors from making a more intensive use of the Internet (Friemel, 2016). Such consideration is reinforced with the intragroup analysis of the youngest group, which shows a close relationship between the educational level with being a frequent *onliner*, using a mobile phone and accessing the Internet through this device.

The second feature that stands out in the formation of the segments is the level of household income. The two profiles present external and internal differences in the frequency of Internet use and mobile use by economic level. The disparities found in the first conglomerate suggest that the economic situation makes access to the technology difficult for this group. The second conglomerate shows not only economic capacity to acquire technology, but also, if observed together, the possibility of a certain work activity, perhaps in positions where ICTs could be present.

Gender differences between the two profiles show a structural situation in which the greater life expectancy for women in Spain coincides (INE, 2018c), which enlarges the proportion between the Silent and the evident social inequalities in access to studies and better income of women of these generations. Regarding the intragroup analysis, other investigations (Arenas-Gaitán et al., 2014) focused on finding out the explanatory capacity of such variables between users and non-users also find differences by gender. In this study, gender acts differently depending on the cluster. In fact, if we observe how the frequency of Internet use variable behaves in each profile, we can see that there is a predominance of the economic gap in the more mature group, compared to the gender gap in the younger one.

The variables related to the mobile phone also behave differently in the two profiles by gender. In the first one, the telephone may not necessarily imply a digital functionality in this group by gender, in line with the claims of other authors (González et al., 2015) and may be reflecting the role of the care of the grandchildren or the presence of younger generations at home (Barrantes Cáceres & Cozzubo Chaparro, 2019). There is a possible association between the use of mobile phones and Internet access according to socioeconomic status, in both groups, and according to gender, in the youngest group, for which it would be appropriate to use statistics on the relationship between variables.

In response to the third objective, the groups formed are also different in the 14 activities observed. Reading or downloading news is the task done by the vast majority. At the other extreme, also for both groups, there are private sales, possibly because they are associated with specific circumstances. However, a great weight of the activities related to the informative function can be seen in the first profile, compared to the informative and management uses of the second, according to the calculated averages.

This analysis shows that the distance between populations is both quantitative and qualitative, since the younger segment is more willing to conduct economic transactions through the Internet, an action that not only shows the skills needed to carry it out but also confidence in technology (González et al. 2015; Peral-Peral et al., 2015). In this regard, among all the services related to management, electronic purchase stands out, as it is the most accepted by the two populations. The interaction with the Administration through its websites or apps has an informative purpose. Other possible functionalities of e-Administration are not used by a large majority.

At this point, the correspondence, at an operational level, of Internet uses with those proposed by Llorente-Barroso et al. (2015) in their exploratory analysis with qualitative design should be highlighted. The factor analysis would form two components, one of them associated with the communicational function of the Internet.

In this sense, the intergroup analysis shows the need to deepen the degree of participation of the population aged 53 and over, according to other authors (Montaña et al., 2015). Although the position adopted before the collaborative or communication function differs between populations, the younger group has a greater weight since social networks are the most used by all of them; as a whole, this competence dimension does not represent high percentages among clusters, so participation is not a predominant feature.

The intragroup analysis of Internet uses reveals more differences in the second of the profiles by level of studies and income. Regarding gender, there is a relationship between male and female tasks in those statistically different utilities. In the first group, the most mature, men excel in activities that are masculine; most of them are management ones. In the second group, the youngest, all the different tasks belong, in the same way, to the public sphere, except social networks, with a more narrow relationship with the private sphere, as

well as health-related information, associated with the field of care or beauty.

In summary, this study helps to understand the phenomenon that is occurring in the cohorts that have been treated by other authors as populations with greater difficulties to integrate technology into their daily lives. The use of the TIC-H'17 survey allows the application of a representative cross-sectional analysis for the Spanish sphere, with standardized variables at European level and systematized data.

The research detects key profiles that form a relevant observation framework for similarities and differences between and within the group in a set of uses or digital activities that are also significant, since they give rise to two substantial competency dimensions. The analysis concludes in two large age groups that divide the Spanish population over 52 years of age, and that coincide with the generations previously defined for other countries and with the groupings of other studies in Spain. The basic structural variables are defining to understand the relationship of seniors with technology and deepen its implications.

Both groups have a prominent number of frequent users among those who access the medium, so they could not be considered strictly *non-digital*. However, the youngest group would represent most of *onliners*, given the high presence of this population in it, and since the observational analysis of the rest of the variables shows that the relationship between technology and communication is closer in this profile. Therefore, we can affirm that, in a few years, all age groups will be digitally more active. Adults over 52 years of age, who are currently using ICTs in their daily and, surely, professional, lives will reach the most mature segments. In the light of the results, the difference between users will be marked by the educational trajectory, but we detect the need to promote access and use of the Internet from *places of relationship*, so as not to aggravate the gray divide in the digital society from the future. Thus, on the one hand, it is necessary to improve the skills related to communication and build oriented spaces so that the interaction between machines and people is more satisfactory. In this regard, public and private agents can play an essential role, generating user-centered environments that favor the approach to technology and facilitate new ways of peer relations. In their communication strategies, brands have the possibility of creating platforms that act as multidirectional channels and allow to share knowledge, receive and give support or take part in joint actions with other members, among

many other actions. The possibility of creating online communities and new communicative environments also allows the creation of social networks of people with common interests.

On the other hand, the lack of competences of the groups of low educational levels, lower income, older age and with more presence of women, can lead to a greater exclusion of a large number of people. In an increasingly interconnected world, where relationships, both personal and administrative, are conducted through the Internet, ignorance or distrust in the greater use of ICTs limits the participation of this group in daily tasks, such as bank transactions, the interaction with the Administration or even communicate with their relatives. Therefore it is required, first of all, to know the interests of these groups to propose applications adapted to their preferences and, on the other, to promote their approach to new technologies. Training aimed at managing online tools is considered of importance, as well as conducting trust campaigns on new technologies to integrate them into everyday tasks. Similarly, intrafamily education can be promoted, as digital generations can act as companions in the process of digital immersion of their families.

By way of closure, several challenges emerge from the results of this study. On the one hand, it is necessary to continue betting on reaching higher levels of literacy in seniors about the different possibilities that ICTs can grant them, emphasizing in Web 2.0. On the other hand, measures to reduce digital gaps in these groups, but especially those of gender, must be reinforced, focusing on literacy, targeting specific groups, as well as measures aimed at promoting equality in the performance of tasks, trying to break the gender stereotype.

Perhaps IoT is part of the solution, by taking over everyday objects daily, giving them more features than they usually have. It will possibly evolve at the pace demanded by the demand, which is expected to be exponential, so that greater immersion in the technological age will allow companies to launch more products related to mobility, healthcare or leisure oriented to seniors, main segment of the future digital society. In this regard, the real challenge of the Internet of the future lies in its own essence, i.e., building advanced environments that allow the interaction of everyday objects with senior users who are not necessarily experienced with technology, and also reconcile this purpose with the promotion of the necessary skills so that all social groups acquire digital skills that favor an efficient relationship and communication through new technologies.

Digital communication, which includes advertising, must bear in mind this new relationship with digital objects and environments, offering solutions from its new competence framework, i.e., designing effective communication strategies that include technological innovations adjusted to the needs of the more mature generations. In this future, advertising has the opportunity to play an active role in improving digital communication among the oldest *onliners*.

NOTAS

1. The years known as the Spanish transition represent a key historical stage, when the dictatorial regime ended, which started with the death of the dictator in 1975 and ended with the implementation of the democratic system. The approval of the Spanish Constitution took place at the end of 1978.

2. Relevant period in contemporary Spanish history.

REFERENCIAS

Abad-Alcalá, L. (2016). La alfabetización digital como instrumento de e-inclusión de las personas mayores (Digital literacy as a tool for e-inclusion of the elderly). *Revista Prisma Social*, (16), 156-204. Retrieved from https://revistaprismasocial.es/article/view/1256/1319

Abellán García, A., Ayala García, A., & Pujol Rodríguez, R. (2017). Un perfil de las personas mayores en España, 2017. Indicadores estadísticos básicos (A profile of the elderly in Spain, 2017. Basic statistical indicators). *Informes Envejecimiento en red,* (15), 1-48. Retrieved from http://envejecimiento.csic.es/documentos/documentos/enred-indicadoresbasicos17.pdf

Asociación para la Investigación de Medios de Comunicación (AIMC). (2019). *Audiencia de Internet* (Internet audience). Retrieved from http://internet.aimc.es/index.html#/main/perfilporedad

Area, M. & Pessoa, T. (2012). De lo sólido a lo líquido: Las nuevas alfabetizaciones ante los cambios culturales de la Web 2.0 (From Solid to Liquid: New Literacies to the Cultural Changes of Web 2.0). *Comunicar, 19*(38), 13-20. https://doi.org/10.3916/C38-2012-02-01

Arenas-Gaitán, J., Peral-Peral, B., & Ramón-Jerónimo, M. A. (2014). Gender in the Elderly Internet Users. In I. Gil-Pechuán, D. Palacios-Marqués, M. Peris-Ortiz, E. Vendrell, & C. Ferri-Ramírez (Eds.), *Strategies in E-Business* (pp. 67-75). New York: Springer Science.

Barrantes Cáceres, B. & Cozzubo Chaparro, A. (2019). Age for learning, age for teaching: the role of intergenerational, intra-household learning in Internet use by older adults in Latin America. *Information, Communication & Society*, 22(2), 250-266. https://doi.org/10.1080/1369118X.2017.1371785

Cabrera, M. & Malanowski, N. (Eds.). (2009). *Information and Communication Technologies for Active Ageing: Opportunities and Challenges for European Union*. Amsterdam: IOS Press.

Cisco. (2018). *VNI Forecast Highlights*. Retrieved from https://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html

Cresci, M. K., Hossein N. Y., & Morrell, R. W. (2010). Pro-Nets Versus No-Nets: Differences in Urban Older Adults' Predilections for Internet Use. *Educational Gerontology*, 36(6), 500-520. https://doi.org/10.1080/03601270903212476

De Miguel, T. (2011). La internet del futuro y la I+D (The Internet of the future and R&D). *Lychnos. Cuadernos de la Fundación General del CSIC*, (7), 55-60. Retrieved from http://www.fgcsic.es/lychnos/upload/publicacion.11.ficPDF_castellano.Lych_07_cast_web.pdf

Dimock, M. (2019, January 17). Defining generations: Where Millennials end and post-Millennials begin (blog post). Retrieved from https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/

Eurostat. (2015). *Estadísticas sobre la sociedad de la información – Hogares y particulares* (Information society statistics - Households and individuals). Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Estad%C3%ADsticas_sobre_la_sociedad_de_la_informaci%C3%B3n_-_Hogares_y_particulares

Eurostat. (2018). *Information society. Database*. Retrieved from https://ec.europa.eu/eurostat/data/database

Ferrando, P. J. & Lorenzo-Seva, U. (2017). Program FACTOR at 10: origins, development and future directions. *Psicothema*, 29(2), 236-240. https://doi.org/10.7334/psicothema2016.304

Friemel, T. N. (2016). The digital divide has grown old: Determinants of a digital divide among seniors. *News Media & Society*, 18(2), 313-331. https://doi.org/10.1177/1461444814538648

Friemel, T. N. & Signer, S. (2010). Web 2.0 Literacy: Four Aspects of the Second-Level Digital Divide. *Studies in Communication Sciences*, 10(2), 143-166. https://doi.org/10.5167/uzh-44984

García del Dujo, A. (2009). Comunidades virtuales prácticas de alfabetización múltiple (Virtual communities of practice multiple literacy). *Teoría de la Educación: Educación y Cultura en la Sociedad de la Información, 10*(2), 66-85. Retrieved from http://revistas.usal.es/index.php/eks/article/view/7509

García-Valcárcel, A. (Coord.). (2011). *Integración de Las Tic en la Docencia Universitaria* (Integration of ICTs in University Teaching). Salamanca: Netbiblo.

Garrido Lora, M., Busquet Durán, J., & Munté-Ramos, R. À. (2016). De las TIC a las TRIC. Estudio sobre el uso de las TIC y la brecha digital entre adultos y adolescentes en España (From ICT to ICRT. A study of ICT use and the digital divide among adults and adolescents in Spain). *Anàlisi: quaderns de comunicació i cultura*, (54), 44-57. https://doi.org/10.7238/a.v0i54.2953

Gartner. (2018, November 7). *Gartner Identifies Top 10 Strategic IoT Technologies and Trends* (press release). Retrieved from https://www.gartner.com/en/newsroom/press-releases/2018-11-07-gartner-identifies-top-10-strategic-iot-technologies-and-trends

González, C., Fanjul, C., & Cabezuelo, F. (2015). Uso, consumo y conocimiento de las nuevas tecnologías en personas mayores en Francia, Reino Unido y España (Use, Consumption and Knowledge of New Technologies by Elderly People in France, United Kingdom and Spain). *Comunicar, 23*(45), 19-28. https://doi.org/10.3916/C45-2015-02

González-González, C. S., Mora-Carreño, A., Giulianelli, D., Cruzado, G. S., & Rodríguez, R. (2014). Ambient Intelligence and Healthcare: Hybrid Network Approach based in IPv6. In *Proceedings of the 3rd International Conference on SETECEC*. ALAIPO – AINCI.

Helsper, E. J. (2010). Gendered Internet use across generations and life stages. *Communication Research*, 37(3), 352-374. https://doi.org/10.1177/0093650209356439

Hernández-Leal, E. J., Duque-Méndez, N. D., & Moreno-Cadavid, J. (2017). Big Data: una exploración de investigaciones, tecnologías y casos de aplicación (Big Data: an exploration of research, technologies and application cases). *TecnoLógicas*, *20*(39), 17-24. https://doi.org/10.22430/22565337.685

Hill, R., Beynon-Davies, P., & Williams, M.D. (2008). Older people and internet engagement: Acknowledging social moderators of internet adoption, access and use. *Information Technology & People*, *21*(3), 244-266. https://doi.org/10.1108/09593840810896019

Hough, M. & Kobylanski, A. (2009). Increasing elder consumer interactions with information technology. *Journal of Consumer Marketing*, *26*(1), 39-48. https://doi.org/10.1108/07363760910927037

Hunsaker, A. & Hargittai, E. (2018). A review of Internet use among older adults. *New Media & Society*, *20*(10), 3938-3954. https://doi.org/10.1177/1461444818787348

IAB Spain. (2018). *Estudio Anual Mobile Marketing 2017* (2017 Mobile Marketing Annual Study) (PDF file). Retrieved from https://iabspain.es/wp-content/uploads/estudio-mobile-2017-vcorta.pdf

IANS. (2018, November 10). 25 billion connected things will be in use by 2021: Gartner. *ETtech, Economic Times*. Retrieved from https://tech.economictimes.indiatimes.com

IBM Knowledge Center. (n.d.). *Vista resumen del modelo* (Summary of the model). Retrieved from https://www.ibm.com/support/knowledgecenter/es/SS3RA7_sub/modeler_mainhelp_client_ddita/clementine/entities/clusterviewer_modelsummary_panel.html

INE. (2017a). *Encuesta de Equipamiento y Uso de TIC en los Hogares, TIC-H'17. (Resultados)* (Survey of ICT Equipment and Use in Households, TIC-H'17. (Results)). Retrieved from https://www.ine.es/jaxi/Tabla.htm?path=/t25/p450/base_2011/a2017/l0/&file=04011.px&L=0

INE. (2017b). *Encuesta de Equipamiento y Uso de TIC en los Hogares, TIC-H'17 (Microdatos)* (Survey of ICT Equipment and Use in Households, TIC-H'17. (Microdata)). Retrieved from https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176741&menu=resultados&secc=1254736194629&idp=

1254735576692

INE. (2017c). *Encuesta de Equipamiento y Uso de TIC en los Hogares, TIC-H'17. Informe metodológico* (Survey of ICT Equipment and Use in Households, TIC-H'17. Methodological report) (PDF file). Retrieved from https://www.ine.es/metodologia/t25/t25304506617.pdf

INE. (2017d). *Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los Hogares (TIC-H). 2017. (Cuestionario)* (Survey on Equipment and Use of Information and Communication Technologies in Homes (TIC-H). 2017 (Survey)) (PDF file). Retrieved from https://www.ine.es/metodologia/t25/t25p450_tich_cues_17.pdf

INE. (2018a). *Proyecciones de población 2016-2066. Resultados nacionales* (Population projections 2016-2066. National results). Retrieved from https://www.ine.es/dynt3/inebase/index.htm?type=pcaxis&path=/t20/p278/p01/2016-2066/&file=pcaxis

INE. (2018b). *Proyecciones de Hogares* (Household projections). Retrieved from https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176954&menu=ultiDatos&idp=1254735572981

INE. (2018c). *Esperanza de vida. Mujeres y hombres en España 2017* (Life expectancy. Women and men in Spain 2017). Retrieved from https://www.ine.es/ss/Satellite?L=es_ES&c=INESeccion_C&cid=1259926380048&p=1254735110672&pagename=ProductosYServicios/PYSLayout

Íñiguez-Berrozpe, T., Valero-Errazu, D., & Elboj-Saso, C. (2018). Hacia una Sociedad de la Información inclusiva. Competencia tecnológica y habilidades relacionadas con las Tecnologías de la Información y la Comunicación (TIC) de los adultos maduros (Towards an Inclusive Information Society. Technology proficiency and ICT Skills of Mature Adults). *Revista Mediterránea de Comunicación, 9*(2), 25-40. https://doi.org/10.14198/MEDCOM2018.9.2.9

Kaufmann, J. (2017). *La transformación digital de la agencia de publicidad* (The digital transformation of the advertising agency). Madrid: AEACP.

Leaning, M. (2017). Digital Divides: Access, Skills and Participation. In M. Leaning, *Media and Information Literacy. An Integrated Approach for the 21st Century* (pp. 101-114). Oxford: CP Chandos Publishing. https://doi.org/10.1016/B978-0-08-100170-7.00006-8

Llorente-Barroso, C., Viñarás-Abad, M., & Sánchez-Valle, M. (2015). Mayores e Internet: La Red como fuente de oportunidades para un envejecimiento activo (Internet and the Elderly: Enhancing Active Ageing). *Comunicar, 23*(45), 29-36. https://doi.org/10.3916/C45-2015-03

Mancebo, J. F. (2014). Mayores, publicidad y medios de comunicación: Una revisión teórica (Elderly, advertising and media: A theoretical review). *Historia y Comunicación Social, 19*, 573-588. https://doi.org/10.5209/rev_HICS.2014.v19.45050

Mislevy, R. J. & Bock, R. D. (1990). *BILOG 3 Item analysis and test scoring with binary logistic models.* Mooresville: Scientific Software.

Montaña, M., Estanyol, E., & Lalueza, F. (2015). Internet y nuevos medios: estudio sobre usos y opiniones de los seniors en España (Our seniors' challenge to the new media: uses and opinions). *El profesional de la información, 24*(6), 759-765. https://doi.org/10.3145/epi.2015.nov.07

Morris, A. & Brading, H. (2007). E-literacy and the grey digital divide: a review with recommendations. *Journal of Information Literacy, 1*(3), 13-28. https://doi.org/10.11645/1.3.14

ONU. (2019, June 17). La población mundial sigue en aumento, aunque sea cada vez más vieja (The world's population continues to increase, although it is getting older). *Noticias ONU.* Retrieved from https://news.un.org/es

Peral-Peral, B., Arenas-Gaitán, J., & Ramón-Jerónimo, M. (2013). El papel de las variables sociodemográficas en el uso de las aplicaciones basadas en internet por los mayores (The Role of Socio-Demographic Variables in the Use of Internet-Based Applications by Older People). *Innovar, 23*(48), 55-65. Retrieved from https://revistas.unal.edu.co/index.php/innovar/article/view/40490

Peral-Peral, B., Arenas-Gaitán, J., & Villarejo-Ramos, A-F. (2015). De la brecha digital a la brecha psico-digital: Mayores y redes sociales (From Digital Divide to Psycho-digital Divide: Elders and Online Social Networks). *Comunicar, 23*(45), 1-11. https://doi.org/10.3916/C45-2015-06

Peral-Peral, B., Arenas-Gaitán, J., & Ramón-Jerónimo, M. A. (2014). Technology Acceptance Model y mayores: ¿la educación y la actividad laboral desarrollada son variables moderadoras? (Technology Acceptance Model and elderly: Are education level and profession moderator variables?). *Revista Española de Investigación de Marketing, 18*(1), 43-56. https:/doi.org/10.1016/S1138-1442(14)60005-X

Pew Research Center. (2018). *Internet use by age*. Retrieved from https://www.pewresearch.org/internet/chart/internet-use-by-age/

Poveda-Puente, R., Pinazo-Hernandis, S., Pérez-Cosín, J. V., & Lois, J. M. B. (2015). Personas mayores usuarias habituales de tecnología de la información y la comunicación: Análisis del perfil (Older People Users of Information and Communication Technologies: Profile analysis). *Azarbe, Revista Internacional de Trabajo Social y Bienestar, (4)*, 51-58. Retrieved from http://revistas.um.es/azarbe/article/view/229211/0

Prensky, M. (2001). Digital Natives, Digital Immigrant. *On the Horizon, 9*(5), 1-6. https://doi.org/10.1108/10748120110424816

Ragnedda, M. & Muschert, G. W. (Eds.) (2013). *The digital divide: the internet and social inequality in international perspective*. New York: Routledge.

Ramírez García, A., González Fernández, N., & Sedeño Vald, A. M. (2017). La competencia mediática en la población mayor. Diagnóstico de la realidad española (Media competence in the elderly population. Diagnosis of Spanish reality). *Signo y Pensamiento, 36*(70), 94-111. https://doi.org/10.11144/Javeriana.syp36-70.cmpm

Ramos-Soler, I. (2005). *El estilo de vida de las personas mayores y la comunicación publicitaria: un análisis empírico* (The lifestyle of the elderly and advertising communication: an empirical analysis) (Doctoral dissertation). Retrieved from https://rua.ua.es/dspace/handle/10045/11492

Sevillano-García, M. L. & Quicios, M. P. (2012). Indicadores del uso de competencias informáticas entre estudiantes universitarios. Implicaciones formativas y sociales (Indicators of computer skill use among university students. Educational and social implications). *Teoría de la Educación. Educación y Cultura en la Sociedad de la Información, 24*(1), 151-182. Retrieved from http://revistas.usal.es/index.php/1130-3743/article/view/10336

Smith, A. (2014). *Older Adults and Technology Use: Adoption Is Increasing, But Many Seniors Remain Isolated from Digital Life*. Washington, DC: Pew Research Center.

Tirado-Morueta, R., Aguaded-Gómez, J. I., & Hernando-Gómez, A. (2018). The socio-demographic divide in Internet usage moderated by digital literacy support. *Technology in Society, 55*, 47-55. https://doi.org/10.1016/j.techsoc.2018.06.001

Torres-Vargas, G. A. & Arias Durá, R. (2014). El cómputo ubicuo y su importancia para la construcción del internet de las cosas y el big data (The ubiquitous computing and its importance for the construction of the internet of things and big data). *Revista General de Información y Documentación, 24*(2), 217-232. https://doi.org/10.5209/rev_RGID.2014.v24.n2.47401

UE. (2015, March 24). Launch of Alliance for Internet of Things Innovation. Retrieved from https://ec.europa.eu/digital-single-market/en/news/launch-alliance-internet-things-innovation

UE. (2016). Reglamento (UE) 2016/2015 de la Comisión, de 17 de noviembre de 2016, por el que se establecen disposiciones de aplicación del Reglamento (CE) n.º 808/2004 del Parlamento Europeo y del Consejo, relativo a estadísticas comunitarias de la sociedad de la información (Texto pertinente a efectos del EEE) (Commission Regulation (EU) 2016/2015 of 17 November 2016 implementing Regulation (EC) No 808/2004 of the European Parliament and of the Council concerning Community statistics on the information society (Text with EEA relevance)). *Diario Oficial de la Unión Europea. L 312/1*. Retrieved from http://data.europa.eu/eli/reg/2016/2015/oj

United Nations. Population Division. Department of Economic and Social Affairs. (2015). *World Population Ageing 2015*. New York: United Nations. Retrieved fom https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf

United Nations. Population Division. Department of Economic and Social Affairs. (2018). *World Population Prospects 2017* (Data). Retrieved from https://esa.un.org/unpd/wpp/DataQuery/

United Nations. DESA/Population Division. (2019). *Special Aggregates. World Population Prospect 2019*. Retrieved from https://population.un.org/wpp/Download/SpecialAggregates/EconomicTrading/

Urueña, A., del Arco, J., & San Segundo, J. M. (Coords.). (2014). *Tecnologías orientadas a la movilidad: valoración y tendencias* (Mobility-oriented technologies: assessment and trends). Fundación Vodafone España/Red.es.

Van Deursen, A. J. A. M. & van Dijk, J. A. G. M. (2014). Modeling Traditional Literacy, Internet Skills and Internet Usage: An Empirical Study. *Interacting with Computers*, 28(1), 13-26. https://doi.org/10.1093/iwc/iwu027

Van Deursen, A. J. & Van Dijik, J. A. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media & Society, 21*(2), 354-375. https://doi.org/10.1177/1461444818797082

Vuorikari, R., Punie, Y., Carretero, S., & Van den Brande, G. (2016). *DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model*. Sevilla: Join Research Centre. Retrieved from https://publications.jrc.ec.europa.eu/repository/bitstream/JRC101254/jrc101254_digcomp%202.0%20the%20digital%20competence%20framework%20for%20citizens.%20update%20phase%201.pdf

Yu, R. P., Ellison, N. B., McCammon, R. J., & Langa, K. M. (2016). Mapping the two levels of digital divide: Internet access and social network site adoption among older adults in the USA. *Information, Communication & Society*, 19(10), 1445-1464. https://doi.org/10.1080/1369118x.2015.1109695

Zickuhr, K. & Smith, A. (2012, April 13). Digital Differences (blog post). Retrieved from https://www.pewresearch.org/internet/2012/04/13/digital-differences/

Zickuhr, K. (2013, September 25). Who's Not Online and Why (blog post). Retrieved from https://www.pewresearch.org/internet/2013/09/25/whos-not-online-and-why/

ABOUT THE AUTHORS

Natalia Papí-Gálvez, senior lecturer of the Universidad de Alicante; is teaching Research and Planning of Advertising Media since 2001, and director of the Study Group on Strategic Communication (E-COM). Her main lines of work are research, strategy and planning of advertising media –with special focus on new media and digital communication– and gender, policies and advertising effectiveness.

Raquel Escandell-Poveda, assistant lecturer of the Universidad Alicante in the Degree of Advertising and Public Relations. Currently Ph.D. student of the Economics, Business and Society program of the that same university. Graduated with extraordinary prize in Advertising and Public Relations from the Universidad de Alicante. She has been part of several research networks in university teaching such as: Research and Advertising Planning and Technologies in Digital Communication. She combines teaching and research with her work as a consultant in digital marketing.