Interactions With and Through Mobile Phones: What About the Elderly Population?

Mireia Fernández-Ardèvol

Wi: Journal of Mobile Media, *Spring 2011*

The online version of this article can be found at:

https://doi.org/10.65968/DGRE1503

Fernández-Ardèvol, Mireia. "Interactions With and Through Mobile Phones: What About the Elderly Population?". Wi: Journal of Mobile Media. Spring (2011). Web. https://doi.org/10.65968/DGRE1503

Interactions With and Through Mobile Phones: What About the Elderly Population?

Mireia Fernández-Ardèvol

Introduction

Age plays a role in the adoption and uses of mobile telephony. This evidence has been discussed since the first stages of popularization of this technology (see for instance, Ling, 2002; Castells, Fernández-Ardèvol, Qiu, & Sey, 2006). Furthermore, as we have argued elsewhere, there is a general trend "toward the general diffusion of mobile communication within the whole population, with age continuing to specify the type of use rather than the use itself" (Castells et al., 2006, p. 41).

It seems that elderly persons are less inclined to use mobile communication; however, they are "catching up to the levels of mainstream innovation, but largely lag behind in the use of new services integrated into the technology" (Karnowski, von Pape, & Wirth, 2008, p.191). Recent statistics on the use of mobile phones and the use of advanced mobile services from Eurostat confirm this trend (Eurostat, 2010).

Despite lower acceptance rates of mobile telephony among the elderly population, which indeed are quite high compared to other ICTs, seniors must be carefully studied when it comes to understanding the use and appropriation of mobile communication. Ageing is a key characteristic of European societies (Giannakouris, 2008). In 2008, 17% of the total population in EU27 was aged 65 years old or over; while this proportion will increase to 20% in 2020, and up to 30% by 2060. Therefore, it is of great interest to study the current situation and the future evolution of adoption and use in this age cohort. Future studies, as well, should take into account the evolution of mobile use as those that became mobile users during their youth get older. At present, however, most of the research focus is on individuals who have been introduced to mobile communication later in their lives.

This short paper is organized as follows; in section two I present the conceptual framework based on the most relevant current knowledge on the field. In section three I discuss the most recent quantitative data from Eurostat on how different generations use mobile telephony. Finally, in section four I conclude with an analytical explanation that gathers the available evidence regarding the elderly population in a developed context like Europe. I will argue that among senior populations, mobile telephony is an extra layer in the whole set of communication tools but it is not perceived as being central to their everyday life.

Mobile Phones and The Elderly: What Do We Know?

Personal communication is affected by age, and so are the information and communication technologies (ICT) mediating these communications (Charness, Parks, & Sabel, 2001). Ageing is related to socio-cultural aspects; thus personal values and

interests change over one's lifetime. Moreover, ageing shapes physical characteristics as well: from cognition or reading capacity, to more basic abilities, like handling small featured devices. As argued by Charness and Boot (2009, p. 255), "in a very literal sense, older adults may perceive technology differently than younger adults do."

Hence, the main concerns regarding elderly users are ergonomics and usability. Since the early launch of the Japanese raku-raku (or "easy-easy") in 2001 by Docomo, the market has experienced an increased uptake of mobile handsets specifically designed for the elderly. A number of different operators and handset producers have introduced "non-frill" mobile phones in the market. For instance, the "Vodafone Simply" handset appeared in 2005; while in 2006 Jitterbug Wireless was created, a USA company focused on "easy-to-use" services and mobile phones. An increasing number of studies are devoted to the identification of features and characteristics a mobile device should have to properly fit elderly attitudes and aptitudes (for instance, Duh, Do, Billinghurst, Quek, & Husueh-Hua, 2010; Kurniawan, 2008; Kurniawan, Mahmud, Nugroho, 2006; Mohd, Hazrina, & Nazean, 2008). While these studies discuss ergonomic issues and propose solutions, an interesting result also comes up: few elderly people buy "non-frill" handsets (Karnowki et al., 2008) because they are not interested in mobile phones targeted to aged people (Oskman, 2006).

The effective use of mobile devices is not only related to ergonomic and usability issues, but also to communicative habits, which among the elderly, are mainly centered on the maintenance of family relationships (Oskman, 2006; Kurniawan, 2008; Kurniawan et al., 2006). In terms of use, older people are more likely to use mobile phones in emergencies or unexpected situations (Hashizume, Kurosu, & Kaneko, 2008;

Kurniawan, 2008; Kurniawan et al., 2006; Mohd et al., 2008) when they consider it to be the most efficient tool to communicate with. They usually do not use their mobile phones for casual conversations, except when they need to call another mobile phone and the cheapest way to establish contact is by using a mobile (Kurniawan et al., 2006). Thus, even though other means of communication seem to be preferred among this age cohort, older people will tend to use a mobile phone largely when it is perceived as necessary. For elderly people, as well as for teenagers, mobile phones need to be useful, social and enjoyable in order to be adopted (Conci, Pianese, & Zancarano, 2009). However, despite the common supporting logic explaining the adoption process of mobile phones, the final result is not the same in each age cohort because intensity and patterns of use differ. As Karnowski et. al. remark, "it seems that the elderly are always behind [regarding innovative services] while the younger are always ahead, already using the latest technologies when the elderly are still trying to catch up on yesterday's innovation" (Karnowski et al., 2008, p.189). Hence, the significance of the mobile phone is different for an adolescent than for a senior citizen (Oskman, 2006).

The most important mobile phone service for elderly people is voice calls, whereas they are less likely to text (Ling 2002, 2004, 2008; Lenhart, 2010; Kurniawan et al., 2006). Oskman observes that, "initial use is characterized by caution" (Oskman, 2006, p.14). Once the elderly person is accustomed to it, the device is incorporated into everyday use. However, very often it is the members of the elderly person's personal network who are the proactive part of the communication (Ling, 2008; Mohd et al., 2008). This is the case at least in the first stages of adoption while some differences in the pattern of use have been described for different countries. For example, in northern Italy (Conci et al.,

2009) or in England (Kurniawan, 2008), reported uses by the elderly are more basic than those reported in Finland (Oksman, 2006). From the elderly perspective, use depends on personal willingness as well as on the expectations that others put on them to use mobile features. However, such reluctance could turn into acceptance if the service meets the needs of the person (Ling, 2008).

To be incorporated into everyday life, mobile phones must demonstrate an acceptable level of usability, compared to other means of communication that would satisfy similar communicative necessities of the individuals. Indeed, the use of mobile phones should be considered as one element of the personal system of communication channels. We define this as the set of communication channels that are used on a regular basis: fixed phone, mobile phone, Internet, face-to-face communication and even letters or telegrams. Each person will identify a different set of channels in their everyday life. The set of channels might be framed by individual attitudes and aptitudes, as well as by personal interests and socially imposed interests or pressures. Accessibility and availability of communication tools become critical aspects, as it is use and not ownership which is the key element that defines the personal system of communication channels.

The personal system of communication channels is framed by individual attitudes and aptitudes, as well as by personal interests and socially imposed interests and pressures. While among teenagers the mobile telephone plays a central role (see, for instance, Ling 2004; Castells et al., 2006), for the elderly population this does not seem to be the case, as can be deduced from available evidence discussed above. The senior population is quite likely to dispose of a fixed phone line at home, which could occupy a central

position in the system. Adults having a fixed phone line at home would prefer it to a mobile phone as the cost of communication is lower, both in monetary terms and usability terms. Regarding monetary cost, elderly persons might only call with a mobile phone when it is necessary (emergencies or last minute coordination) or when calling another mobile phone. Regarding cost of use, ergonomics is important. Fixed phones might be more user-friendly for some elderly people partly because fixed telephony is a well known technology for them.

Mobile Adoption in Europe: What Does the Data Say About Elderly Users?

In 2008, there were 121.7 active mobile subscriptions per 100 inhabitants in EU27 while in 2009 the penetration rate increased to 124.6 (ITU, 2010). Does that mean that every European citizen is a mobile phone user? Statistics from the industry fail to give details on the socio-demographic distribution of mobile telephony. However, household statistics enable us to answer this question and to better understand the distribution of this general purpose technology (Jovanovic & Rousseau, 2005) among different segments of the population. As well, not all the mobile subscriptions in a country correspond to those living there, as any non-resident, for instance a tourist, can easily buy a prepaid mobile. But none of these surveys address whether mobile users have more than one mobile subscription.

European Union (EU27): An Aggregate Description

In 2008, 87% of the EU27 population between 16 and 74 years old claimed to be mobile users (Table 1). Indeed, almost every young person (16-24 years old) and adult (25-54 years old) use mobile telephony (97% and 93%, respectively). In this landscape of very

high diffusion, the senior population shows a sizeable difference as only 79% of those between 55 and 64 years old declare being mobile users, while the figure falls to 62% for elderly seniors (65-74 years old).

Table 1. *Use of Mobile Phone by Age Cohort in European Union (EU27), Year 2008.*

Age cohort	**All**	**Youth**	**Adults**	**Seniors**		
	16-74	**16-24**	**25-54**	**55-74**	**55-64**	**65-74**
Mobile user (% individuals)	**87**	**97**	**93**	**72**	**79**	**62**
Male	88	96	93	75	–	–
Female	86	97	92	69	–	–
Low education	79	94	87	63	–	–
Medium formal education	91	98	93	77	–	–
High formal education	95	100	97	87	–	–

-: not available.Source: Eurostat (2010).

On the other hand, the allocation of users between genders is quite balanced (88% of men and 86% of women) while the most uneven situation is observed among senior citizens. In the 55-74 age cohort there are 6 percent points of difference between men (75%) and women (69%). In addition, differences regarding education level are most

pronounced among seniors (55-74), as in this age cohort mobile users are 87% among those with high formal education and 63% among those with low education (odds ratio equals to 1.4). Finally, it should be noted that socio-demographic differences among youth are markedly low because of mobile telephony saturation with practically every person from 16 to 24 years old using them.

Table 2. *Type of Subscription to Mobile Telephony, by Age Cohort in European Union (EU27), Year 2008*

Age cohort	**All**	**Youth**	**Adults**	**Seniors**	
	16-74	**16-24**	**25-54**	**55-64**	**65-74**
Subscription (% of users)					
Pre-payment	39	42	35	45	55
Post-payment	47	47	52	41	29
Post-payment with flat rate for Internet access via mobile phone	4	5	5	2	–

Note: in the original, figures do not add 100.-: not available.

Source: Eurostat (2010).

In terms of billing plans (Table 2), it can be seen that more than one third of the users have prepaid subscriptions (39%). Youth (42%) are slightly over the average, as when first introduced, the mobile phone tends to be a prepaid one. The young population turns to postpaid plans as they get older which are associated with higher consumption

capacity levels (Castells et al., 2006). The senior population ranks even higher than youth, with 45% of subscriptions being prepaid among the 55-64 cohort and 55% in the 65-74 cohort. Elderly people are later adopters of mobile telephony, which may be partially explained by their use and ownership of fixed telephones. Therefore, as in the case of children and teenagers, it is more likely that the first mobile phone will be a postpaid one. In the future, it would be interesting to study the evolution of billing plans, when those adults that used to have prepaid plans become seniors. Finally, a recent billing package of postpaid bills with a flat rate for Internet access are just beginning to take off (4% on average).

From ITU (2010) data, we also know that 56% of all active mobile subscriptions were prepaid in the European Union in 2008.[1] This figure would suggest that more than one half of the users have prepaid plans. However, figures from Eurostat do not seem to support this hypothesis. These two indicators seem to be reporting contradictory results even though they measure different aspects of the same phenomenon. One possible interpretation is that second or third phone lines that some individuals may use could be prepaid, although not reported in the household survey (which only gathers the use of at least one mobile telephone). Moreover, the survey is addressed to the population living in private households between 16 and 74 years of age. This excludes children up to 15 years who are heavy users of prepaid mobile phones;[2] as well as those persons trapped in the economic margins, such as the homeless, who may only access prepaid mobiles.

Table 3. *Use of Mobile Phone Advanced Services in the Previous 3 months, Percentage of Individuals in Each Age Cohort in European Union (EU27), Year 2008*

Age cohort	All	Youth	Adults	Seniors	
	16-74	**16-24**	**25-54**	**55-64**	**65-74**
Sending (photos, video…)	20	41	20	7	3
Internet browsing	7	13	7	1	0
e-mail	5	8	6	3	1
Uploading (photos, video…)	4	11	3	1	1
Receiving subscription-paid information (news, weather forecast, sports results…)	4	6	4	2	1
Personal navigation, use of location-aware services (receiving nearby travel, shopping and event information)	3	4	3	1	1
Watching/downloading TV or video	1	3	1	0	0
Payments (instead of credit card or cash)	1	2	2	1	0
Source: Eurostat (2010).					

Basic uses, voice calls and SMS are widespread across the whole population, with the elderly preferring voice communication. However, the use of advanced services in the European Union seems to be more restricted. Table 3 shows that sending pictures or videos is the most popular advanced service, as some 20% of mobile users have shared

these kinds of files in the previous three months. This activity is followed by Internet browsing (7% of mobile users) and e-mail (5%), while the rest are practiced by less than 5% of users. Now, we begin to see more pronounced age differences as youth double the average regarding some services (for instance, 41% photo or video sending, or 13% Internet browsing) while seniors hardly show users in the 55-64 cohort, with a notable exception being the 7% of mobile users that send photos or videos, and almost no users in the 65-74 cohort.

Scandinavian Countries Lead in the Adoption of Mobile Phones by the Elderly

While this data provides an overview of the European Union, can we identify any country specifically regarding the level of mobile telephony use among the elderly population? To answer this question, a cluster analysis was conducted including all the country-level data available from the household survey in 30 countries (Eurostat, 2010; see Table A.1 in the Annex). In this instance, two variables were considered: share of mobile users in the 55-64 and 65-74 age cohorts. Both are quantitative variables with similar range width, so there was no need to standardize the data. The selected method included average linkage between groups with squared Euclidean distance as distance measure. The resulting dendrogram helped to identify four clusters.

Table 4. *Mobile Subscriptions and Percentage of Mobile Users in the Indicated Age Cohort in 30 European countries, Year 2008*

Age cohort	**Subscriptions**	**All**	**Seniors**

	per 100 hab.^	**16-74***	**55-64***	**65-74***	
Cluster 1: markedly over the averageN= 5 countries	122.2	96.6	94.6	86.6	
Cluster 2: over the averageN= 11 countries	131.3	91.5	486.3	71.3	
Cluster 3: below the averageN= 8 countries	113.7	87.5	78.1	56.3	
Cluster 4: markedly below the averageN = 6 countries	124.6	78.7	62.5	35.0	
Total sampleN = 30 countries	123.7	88.7	80.7	62.5	
Reported figures are simple averages in each group.Statistical significant differences between groups at 1% level: *; at 5% level: **; at 10% level: ***. ^: Differences are not statistical significant at usual levels. See Table A.1 for country-level detailed data and sources.					

The first cluster brings together the European societies in which senior citizens show higher use of mobile telephony and is mainly comprised of Scandinavian countries: Finland, Iceland, Luxembourg, Norway and Sweden. They have an average of 94.6% mobile users among younger seniors (55-64) and 86.6% among older seniors (65-74). Table 4 shows that the cluster also stays markedly over the average in terms of the whole population, which reaches 96.6% in cluster 1, above the 88.7% of the total sample. Cluster 2 shows values above the total sample average, with 86.3% of users in the 55-64 cohort and 71.3% in the 65-74 cohort. This cluster includes 11 countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Germany, Hungary, Italy, The

Netherlands, Slovakia and United Kingdom). In terms of the whole population, cluster 2 is the second one in terms of diffusion (91.5% users).

Cluster 3, on the other hand, is below the sample average but close to it, with 78.1% users among young seniors and 56.3% among older seniors. The eight countries in the cluster are Cyprus, France, Latvia, Lithuania, Malta, Portugal, Slovenia and Spain, and the average of mobile users in the whole population is 87.5%. Finally, cluster 4 is markedly below the average with 62.5% users in the 55-64 cohort and just one third (35.0%) in the 65-75 cohort. Its six countries (Bulgaria, Croatia, Former Yugoslav Republic of Macedonia, Greece, Poland and Romania) have an average share of 78.7% users in the whole population.

Figure 1. Users of mobile phone (%), by age cohort. 30 European countries, year 2008.

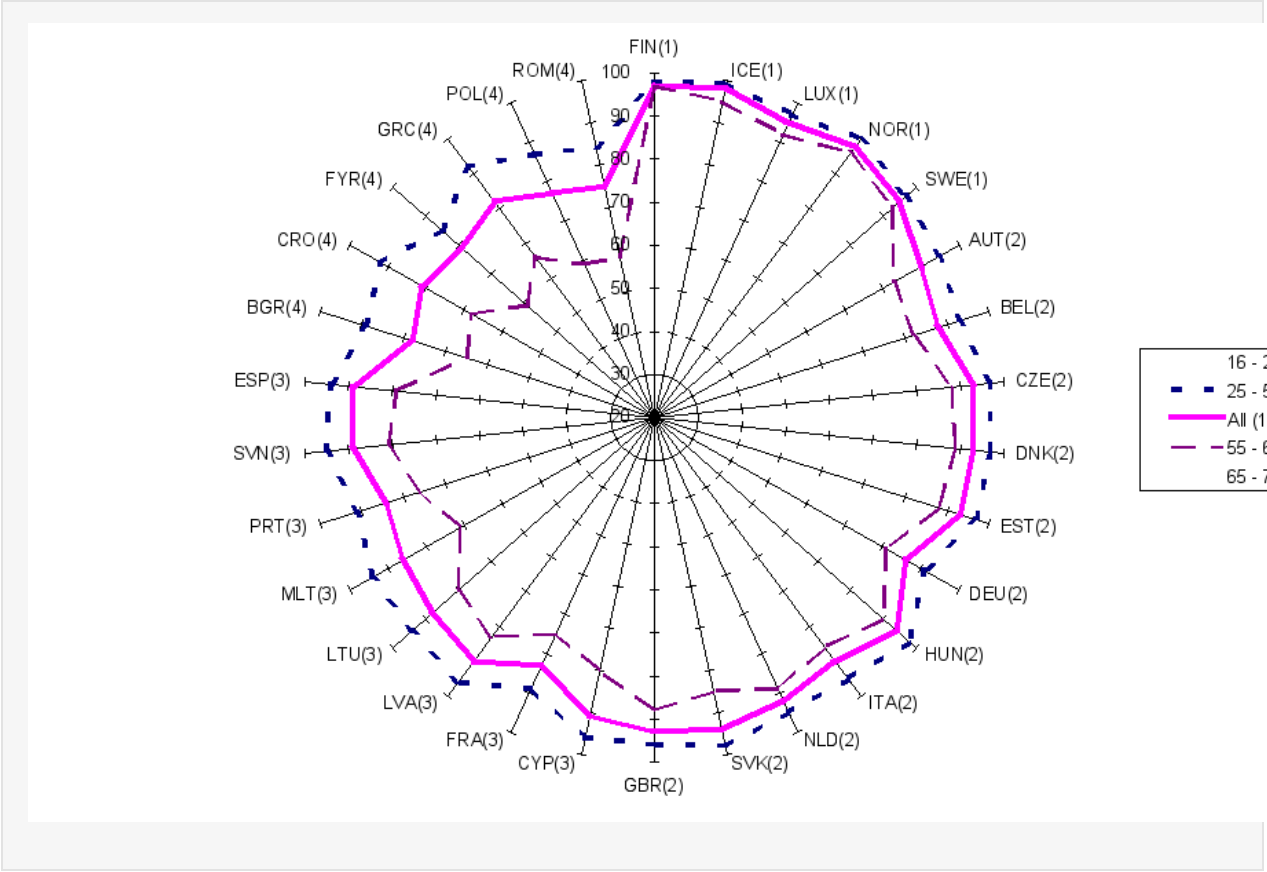

Figure 1. Users of mobile phone (%), by age cohort. 30 European countries, year 2008.

See Table A.1 for data and sources.

These results reveal that the higher the average diffusion of mobile telephony at an individual level, the higher it is among the elderly population. Cluster 1 has almost reached a situation of saturation, and this is the path followed by seniors despite the fact that the most aged in the sample (65-74 years old) still show notable differences compared to the young senior cohort (55-64). These differences increase when diffusion drops, as can be seen in cluster 4. Moreover, Figure 1 shows that youth (16-24) and adults (25-54) are always above the total population average, while seniors (55-64 and 65-74) are always below it.

However, penetration rates do not shape the same general trend described for mobile users. On the contrary, Cluster 1 ranks below the total sample average (122.2 vis-à-vis 123.7 mobile subscriptions per 100 inhabitants) and has lower penetration than cluster 4 (124.6, see Table 4). Therefore, we can state that penetration rates are not good predictors of effective individual access despite the fact that in a couple of years, it seems that throughout Europe every person between 16 and 75 years old will use a mobile phone.

Table 5. *Use of Mobile Phone Advanced Services in the Previous 3 Months, Percentage of Individuals in European Countries by Cluster, Year 2008*

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**	**All**
Sending (photos, video…)**	28.6	18.7	18.6	16.3	19.9
55-64 years old*	15.4	6.6	4.9	3.0	7.0
65-74 years old*	8.3	2.9	1.1	0.3	2.8
Internet browsing*	14.8	5.9	7.5	3.7	7.4
55-64 years old*	6.0	1.9	0.7	0.3	2.1
65-74 years old***	1.0	0.4	0.0	0.0	0.3
e-mail*	10.2	5.8	5.6	3.5	6.0

55-64 years old*	6.8	3.3	2.0	1.0	3.1	
65-74 years old**	2.8	1.1	0.5	0.0	1.1	
Uploading (photos, video…)^	4.0	5.3	5.6	4.0	4.9	
55-64 years old**	2.5	1.7	0.7	1.0	1.4	
65-74 years old**	1.0	0.6	0.0	0.0	0.4	
Receiving subscription-paid information (news, weather forecast, sports results…)^	5.4	2.9	4.1	2.5	3.6	
55-64 years old^	3.0	1.4	1.0	1.0	1.5	
65-74 years old^	0.8	0.4	0.6	0.3	0.5	
Personal navigation, use of location-aware services (receiving nearby travel, shopping and event information)*	9.2	2.4	1.9	1.4	3.3	
55-64 years old*	4.0	1.1	0.3	0.3	1.5	
65-74 years old**	1.0	0.1	0.2	0.0	0.3	
Watching/downloading TV or video^	1.8	1.0	1.4	1.0	1.3	
55-64 years old*	1.0	0.1	0.2	0.0	0.3	
65-74 years old^	0.3	0.2	0.0	0.0	0.1	

Payments (instead of credit card or cash)*	5.4	2.1	1.4	2.3	2.6	
55-64 years old*	2.8	1.0	0.0	0.5	0.9	
65-74 years old^	0.5	0.3	0.0	0.0	0.2	
Source: Eurostat (2010).Reported figures are simple averages in each group. Statistical significant differences between groups at 1% level: *; at 5% level: **; at 10% level: ***. ^: Differences are not statistical significant at usual levels.						

The analysis of the use of advanced mobile services reveals these differences as well (see Table 5). Cluster 1 ranks first among the two cohorts of senior population, always clearly above the sample average. However, for the whole population (16-74 years), uploading photos or videos to Internet is the only service that is not over the average in cluster 1. On the opposite extreme, cluster 4 lies below the average with lower levels of users in all service categories, especially among the senior population. Cluster 2 usually ranks higher than cluster 3 with values closer to the sample average. Finally, in each of the four clusters the use of advanced services markedly decreases among the senior population.

These four clusters, exclusively built on data of elderly users, are associated with the diffusion in different age cohorts and in the whole population under study. Hence, the identified clusters are homogeneous and provide information on the situation at a country level.

The reach of the present analysis, however, is conditioned by two limitations. First, Eurostat individual statistics on advanced mobile uses are based on research that covers

only one year, therefore only cross-sectional analysis is possible. Furthermore, 74 years old is set as the standard upper limit, so there is a lack of information regarding an older European population and making it difficult to obtain more in-depth knowledge of the issue under study.

Conclusion

Three main issues arise from the analysis of Eurostat data on mobile adoption and use by individuals aged between 16 and 74. First, elderly people can be considered to be the last adopters of mobile telephony in aggregate terms, while they are likely to become users. Young seniors (55-64 years old) show a faster path adoption than older seniors (65-74 years old). They always constitute the age group in which penetration is lower but seem to reach saturation (that is, almost all of the individuals are mobile users) once the younger cohorts do. Therefore, in countries where diffusion is comparatively lower on average (below 80% of users), senior mobile users have a smaller presence (around 30% in the 65-74 cohort, and around 65% in the 55-64 age group). In those countries where an average of 95% of the population are mobile users, diffusion in the 65-74 cohort is above 80%, and above 90% in the case of the 55-64 group. This is confirmed as well by the cluster analysis.

Second, the three most popular advanced mobile services in Europe are sending pictures or videos, Internet browsing and e-mail. However, their use remains low and shows a high correlation with mobile use rate. In such context, senior mobile users show distinctly lower percentages of advanced services use. And lastly, penetration of mobile telephony, the indicator that accounts for the active mobile subscriptions per 100 inhabitants, is not associated with the percentage of users among individuals and,

therefore, is not a valid predictor of the effective importance of mobile telephony among different age segments.

In analytical terms, taking into account the obtained results together with the qualitative evidence discussed above, we can state the following hypothesis: Within the personal system of communication channels of the European elderly population, the mobile telephone occupies a peripheral position. The peripheral situation of mobile telephony would justify the higher rates of prepaid billing among the elderly population. Mobiles tend to be introduced for safety and security reasons; they are not always likely to be used extensively but only on limited occasions as an extra layer in the communication system. The mobile phones, indeed, might be perceived as a distant device. Thus, it seems that there is not an economic reason for changing to postpaid billing, as younger users do once the budget devoted to mobile telephony increases.

All in all, secondary data show that interactions through and with mobile phones among the elderly population in Europe follow a distinctive pattern than younger age groups. This different appropriation process might be due to the peripheral position that the mobile telephone has in the personal system of communication channels.

Notes

1 EU27 data, without Latvia.

2 For instance, in Catalonia 66% of children between 10 and 15 years old had a mobile phone in 2008. Source: INE (2008).

This is an improved version of the paper presented at ECREA Conference 2010. 3rd European Communication Conference Hamburg, 12-15 October, 2010.

References

Castells, M., Fernández-Ardèvol, M., Qiu, J. L., & Sey, A. (2006). *Mobile communication and society: A Global perspective*. Cambridge, MA: MIT Press.

Charness, N., & Boot, W. R. (2009). Aging and information technology use: potential and barriers. *Current Directions in Psychological Science*, 18 (5), 253-258.

Charness, N., Parks , D.C., & Sabel , B. A. (Eds.). (2001). *Communication, technology and aging: Opportunities and challenges for the future*. New York: Springer Publishing Company.

Conci, M., Pianese, F., & Zancarano, M. (2009). *Useful, social and enjoyable: Mobile phone adoption by older people* (INTERACT, Part I, LNCS 5726, 2009), 63-76.

Duh, H.B.-L., Do, E.Y.-L., Billinghurst, M., Quek, F., & Husueh-Hua, V. C. (2010). *Senior-friendly technologies: Interaction design for senior users*. CHI, April 10-15, 2010, Atlanta, USA.

Eurostat (2010). Statistics on the use of mobile phone. *Special Module 2008: Individuals – Use of Advanced Services*, (last updated 09-08-2010).

Giannakouris, K. (2008). Ageing characterises the demographic perspectives of the European societies. *Eurostat Statistics in Focus*.

Hashizume, A., Kurosu, M., & Kaneko, T. (2008). The choice of communication media and the use of mobile phone among senior users and young users. In S. Lee et al. (Eds.), *APCHI* (2008, LNCS 5068), 427-436.

INE. (2008). Encuesta sobre equipamiento y uso de tecnologías de la información y

comunicación en los hogares. *Instituto Nacional de Estadística*.

ITU. (2010). *World Telecommunication/ICT Indicators Database 2010*. Geneva, Switzerland: International Telecommunication Union.

Jovanovic, B., & Rousseau, P. L. (2005). General purpose technologies. In P. Aghion & S.N. Durlauf (Eds.), *Handbook of Economic Growth* Vol. 1B, (pp. 1181-1224).

Karnowski, V., von Pape, T., & Wirth, W. (2008). After the digital divide? An appropriation-perspective on the generational mobile phone divide. In M. Hartmann, P. Rössler, & J. Höflich (Eds.), *After the mobile phone? social changes and the development of mobile communication*, (pp.185-202). Berlin: Frank & Timme.

Kurniawan, S. (2008). Older people and mobile phones: A multi-method investigation. *International Journal of Human-Computer Studies* 66, 889-901.

Kurniawan, S., Mahmud, M., Nugroho, Y. (2006, April 22-26). A study of the use of mobile phones by older persons. *CHI 2006*, Montréal, Canada.

Lenhart, A. (2010). Cell phones and American adults: They make just as many calls, but text less often than teens. *Full Report: Pew Internet & American Life Project*.

Ling, R. (2002). Adolescent girls and young adult men: two sub-cultures of the mobile telephone. *Revista de Estudios de Juventud* 52, 33-46.

Ling, R. (2004). *The Mobile connection: The cell phone's impact on society*. San Francisco, CA: Morgan Kaufmann.

Ling, R. (2008). Should we be concerned that the elderly don't text? *The Information Society* 24, 334-341.

Mohd, N., Hazrina, H., & Nazean, J. (2008). The use of mobile phones by elderly: A study in Malaysia perspectives. *Journal of Social Sciences* 4 (2), 123-127.

Oskman, V. (2006). Young people and seniors in Finnish 'mobile information society'.

Journal of Interactive Media in Education 2, 1-21.

Pew Research Center (2009). Pew internet & American life project methodology. Interviewing conducted by *Princeton Survey Research Associates International* (November 20 – December 4, 2008).

Biography

Dr. Mireia Fernández-Ardèvol holds a PhD in Economics (University of Barcelona). She is a full-time researcher at the Internet Interdisciplinary Institute (UOC, Open University of Catalonia) where she is the co-director, together with Manuel Castells, of the Research Program "Mobile Communication, Economy & Society." Besides, she is part time lecturer at the Department of Econometrics, Statistics and Spanish Economy (University of Barcelona). Mobile communication has been one of her main areas of study since 2003. With a combined sociological and economic focus, she approaches to this issue both with qualitative and quantitative methodologies. Her interests are set both in developed and in developing countries. Mobile communications among the elderly constitute her main research focus in developed areas, while the contribution of mobile communication to social and economic development in Latin America is her focus of interest regarding less developed contexts.

Highlighted books:

Mobile communication and society: A global perspective. Cambridge, MA: MIT Press. Castells, M, Fernandez-Ardevol, M., Linchuan Qiu, J. and Sey, A. (2006).

Comunicación móvil y desarrollo social y económico en América Latina, Ed. Ariel Fernández-Ardèvol, M.; Galperin, H.; and Castells, M. (dirs.) (2011, in press)