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Age Based Digital Divide in the City of Iasi

Virgil STOICA¹

Abstract

Information and communications technology (ICT) has been increasingly present in the last twenty years. While some societies or part of them quickly adapted and triggered the benefits of their use, others used the new technologies in a rather limited way. The term created to describe this new reality, the ‘digital divide’, was used to describe the perceived gap between those who have access and skills to use ICT and those who have limited or no access due to various socioeconomic and/or geographical reasons. Facilitating each person to have access and skills to use ICT is seen to have many benefits both to individuals as well as to society. Older people represent a growing percentage of population in western societies. For third age people, being digitally included can be an opportunity to preserve their independence, their quality of life, and their connections with others. Age based digital divide is an issue that was never researched in Romania. The objectives of this paper are to present results of a survey carried in the city of Iasi, to describe the digital divide between different category of age, regarding ICT access, skills and behaviors, and to raise awareness of this phenomenon.

Keywords: digital divide, age, Internet access, computer skills, digital behavior

Introduction

It is largely accepted today that the information and communications technology (ICT) is reshaping the world we knew. Under its influence, even the most conservative areas are rapidly transforming (Susskind, 2008) while the very nature of industrial production is changed by users taking part in the products making or adapting to their needs (Bruns, 2008). Over the last two decades, e-governance has rapidly advanced on the public agendas as it promised to offer miraculous solutions of quickness and transparency to classic governing dilemmas. However, there is no agreement on the long-term results of this process or on its benefits. On

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another hand, the change may be radical and may happen at a very fast pace. For instance, the e-governance could led to a “re-ordering of the state’s administrative structures and of government itself” (Lanzara, 2009) and, depending on specific socio-political realities, a country may be able to make impressive e-government progresses in a very short period of time (Misuraca *et al.*, 2010). The explosive development of Internet use in recent years and the rapid development of electronic commerce in the private sector have created important pressures on the public sector to serve citizens electronically. Information technology has become one of the cornerstones of administrative reform worldwide, and e-government has become an important element of governance in the European Union. This is evidenced by the inclusion of Digital Agenda 2020 goals.

The e-government is actually only one phenomenon in a much larger technological revolution that is transforming the very structure of our society. While some societies fully embarked for this new adventure, others seem to prefer a limited use of the new technologies. A technology that improves government efficiency but increases, at the same time, social exclusion can be criticized. There is a tendency to evaluate e-government projects in particular in terms of cost-benefit or technical effectiveness. But besides “how much?” and “does it work?”, there are questions most important to e-government. Does e-government offer more freedom than the traditional government? Does it offer more power to citizens? What is the relationship between e-government and equity? Is e-government a source of new divisions in society? As it has been the case throughout the entire modern history, the introduction of new technologies created new disparities among societies. A new term, digital divide, has been created to describe the newly appeared “gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies and to their use of the Internet for a wide variety of activities”(OECD, 2001). Put differently, the digital divide is about opportunities created or missed by having or using the new technology.

No doubt that, in the “knowledge era”, the ICT access is vital, but one should not fall in the trap of a technological determinism when explaining the digital divide (Malecki & Moriset, 2008). Indeed, when approaching the digital divide one should not overlook the classic discussion on social inequalities. In fact, the literature studying the ICT related evolutions has proved that the same ‘old’ factors are playing the significant in this phenomenon too. For instance, having Internet connections at home is influenced by income, education, age, race and ethnicity (Mossberger, 2003). Also, while the gender is not reflected into an Internet access divide, the men tend to use more the Internet than the women (Fallows, 2005). The traditional difference between rural and urban is also reflected especially in developing countries where the rural access to Internet represents a problem (Mahan, 2007). Older people represent a growing percentage

of population in western societies. For third age people, being digitally included can be an opportunity to preserve their independence, their quality of life, and their connections with others (Olphet & Damodaran, 2013). While many studies of digital divide consider age as a factor of exclusion, few explore this issue in any detail (Abbey & Hyde, 2009). Age based digital divide is an issue that was never researched in Romania. The objectives of this paper are to present results of a survey carried in the city of Iasi, to describe the digital divide between different category of age, regarding ICT access, skills and behaviors, and to raise awareness of this phenomenon.

Digital divide and its determinants

Expectations theoretical and empirical realities rarely match. This is especially true in terms of digital government. Empirical research has suggested the existence of several barriers to the expected success of e-government: insufficient tested technologies or technologies which become quickly outdated, public mistrust regarding the collection and use of personal data by the government, incoherent governmental strategies, and unevenly distributed computer and Internet skills within society. This last barrier makes those who are most excluded from the political process and have the greatest need for government services, to be also excluded from digital services. A number of studies showed that Internet users are distinguished from those who do not use by socioeconomic status, age and ethnicity (Thomas & Streib 2003; Carter & Belanger 2005). Moreover, the number of people using the Internet to interact with eGovernment is much smaller than that of Internet users in general (Thomas & Streib 2003).

The problem of the digital divide has attracted an increasing interest in recent years both from researchers and from those who design public policies. In Western literature there are research that measure and describe this phenomenon, that observe groups affected by it and the way they are affected by the introduction of new information technologies (Compain, 2001; Servon 2002, Moresberger *et al.* 2003; O'Hara & Stevens 2006). The term digital divide occurred in the mid-90s and is used to describe patterns of unequal access to information technology phenomenon due to income, education, race, age, ethnic origin or residence (Mossberger, 2003). Perspectives on digital divisions depend on the source of information. While the telecommunications industry and ITU (International Telecommunication Union) focuses on technological progress of various countries, social sciences research are concerned with issues such as social inclusion, the nature of governance, and the relationship between citizens and government (Cullen, 2006).

In a field as new as that of e-government it is necessary to combine different perspectives to understand the complexity of the digital divide problem and to

develop policy proposals that are adapted to the social, political, economic and cultural features of each country. Those who have studied the digital divide can be classified in several ways. A first classification is between those who believe that digital divide issue is one of maximum interest (Mossberger *et al.*, 2003; NTIA 2000) and those who question the existence of the phenomenon or its importance (Thierer, 2000; Compain, 2001; NTIA, 2004). Thierer, for example, considers that is premature for governments to intervene to eliminate the digital divide, because the market could solve this problem, after a time for adaption. The only policy instruments that the government should use in this issue are deregulation and tax cuts (Thierer, 2000). Compain believes that as society develops, and cost of the technology decreases dramatically, the digital divide between people is becoming smaller. Compain's argument starts from the fact that technological innovations of the twentieth century (electricity, radio, phone, cars, TV) all followed a similar path: they began at a small scale, they were very expensive and they were available only for the rich. Gradually, however, the market has grown up; manufacturing costs were reduced significantly, leading to a rapid diffusion of new technologies in society, thus reducing the gaps. The same thing would happen and with computers and Internet access (Compain, 2001).

Other authors disagree with these conclusions. They believe that the analogy between the diffusion of information technologies and other technologies such as cars or phones is a fake one (Van Dijk, 2005). Unlike other technologies, those related to computers and Internet is much more complex and can be considered a basis for knowledge. In addition, the Internet, unlike other communication technologies (radio, television) is an open environment that enables participation, giving users the opportunity to respond to the information received, and to produce their information if they have access and skills (Sanyal, 2000). Moreover, the Internet helps to create networks, individuals can join much easier and stay connected longer, in order to overcome the spatial barriers (Sevron, 2002).

Another classification of digital divide researchers is between those who believe that this phenomenon is determined by psychological factors, being inherent during the process of technological diffusion between different geographic areas and among different social groups (Adriani & Becchetti, 2003; Benjamin, 2001), and those who see the digital divide as a new source of social inequalities, which reflect the different situation of developed and less developed countries, or individuals, in terms of opportunities and quality of life (Warschauser, 2003; Chin & Fairlie, 2004; Cole *et al.*, 2004; Van Dijk, 2005). For the first group of researchers the situation does not require intervention through public policy, because personal interests and the free market will solve the problem. For those in the second category, public intervention is more than necessary, as the market proved unable to reduce the significant divisions created by e-government.

Defining digital divide is important not only in terms of the scientific community, but also in terms of public policy that can be developed and implemented in

order to reduce it. Typically, the digital divide is seen as a problem of access and would be the difference between those who have and those who do not have computer and/or Internet access. But as computers and the Internet are becoming more and more common, it can be assumed that these differences will diminish greatly (Min, 2010). But the digital divide is a phenomenon more complex, multilayered, which cannot be reduced to the problem of access (Norris, 2001; Van Dijk 1999). Therefore, some authors developed the concept of second level digital divide. According to this new conception of digital divide, a second dimension regards skills in using computers and Internet (Hargittai, 2002). A third dimension of digital divide is the psychological and motivational variables in the use of information technology (Stanley, 2003; Adam, Stubbs, & Woods, 2005). As with other media, the Internet can be used to search for information, to escape from reality or to be connected to a particular group (Compain & Weinraub 2001). Motivational differences thus lead to differences in the use of information technology by various individuals and various groups. A fourth dimension is the content of the digital divide, especially seen as information for users and their corresponding interests and abilities (Lazarus & Mora 2000).

Causes and consequences of digital divide have been the objective of other research. Gender, age, education, and race have been considered as main trigger factors in this phenomenon. More specific, some scholars explored the digital divide in terms of generational gap (Keil, 2005). Older people represent a growing percentage of Europe population: in 2003, population aged 65 and over represented 16.2%, and in 2013 it represented 18.2% (Eurostat 2015). Services based on Internet may have a significant role in reducing so-called “burden of care” associated with an ageing population (Olphert & Damodaran, 2013). Persons older than 60 can enjoy benefits such as communication with their family and friends, opportunities for learning, leisure activities, and information about health (Wagner, Hassanein, & Head, 2010). For older people, access to telehealth initiatives as well as other assistive technologies can help them to maintain their independence, their social links, to maintain a sense of worth in the face of declining health and capabilities, or even to offer new opportunities to improve their life (Wanberger *et al.*, 2007).

Methodology

To study the population of Iasi, we used a probabilistic sample. It was obtained by random selection of the sampling points, which consisted in 79 polling stations. The persons interviewed were also random choose. The volume of sample was 728 persons, inhabitants of Iasi, aged over 18 years. This sample is representative of the adult population of Iasi, the error being $\pm 4\%$. He was validated based on information from the National Institute of Social Statistics and Population Census of 2012. The survey took place from 16 to 21 June 2014, interviewers being Political Science students from Alexandru Ioan Cuza University of Iasi. Regarding the sample structure, 51.5% were women and 48.5% men; 16.3% were between 18 and 25 years old, 42.5% were between 26 and 45, 29.1% between 46 and 65, and 12.2% were older than 66; the education level of 19,9% was lower than high school, high school for 47.7%, and 33.6% (245) have college degree or more (Table 1).

Table1. *Demographic characteristics of respondents*

		n	%
Gender	Male	353	48.5
	Female	375	51.5
Age	18 - 25	119	16.3
	26 - 45	308	42.5
	46 - 65	212	29.1
	66+	89	12.2
Education	Middle school graduation	145	19.9
	High school graduation	347	47.7
	University graduation	245	33.6

The survey instrument consisted in 3 sections, and the unit dedicated to ICT behavior had 13 questions. The questions covered the ownership of an IT device, the Internet access (type, reasons for not having access, place of access), and Internet behavior (frequency and motives of use).

Research hypotheses

Hypothesis 1: *As age increase, the digital divide, in terms of IT device ownership also increases.*

Hypothesis 2: *As age increase, the digital divide, in terms of Internet access, also increases.*

Hypothesis 3: *As age increase, the digital divide, in terms of ICT skills, also increases.*

Hypothesis 4: *As age increase, the digital divide, in terms of Internet behavior, also increases.*

Results

It can be seen that, with age, the percentage of those who do not have any device that can be connected to the Internet increases (*Table 2*): if only 0.84% of the very young do not have an IT device, the percentage increases to 13.68 % for those between 46 and 65 years and reached 33.71% for those over 66 years. Differences between age groups appear to increase as the devices become smaller and more mobile: minor for desktops but growing for laptops, tablets and smartphones.

Table 2. *Owning an IT device*

IT device	Age (%)			
	18 - 25	26 - 45	46 - 65	66+
Desktop	44.53	60.39	58.02	46.06
Laptop	94.12	77.92	49.53	28.08
Tablet	34.45	35.06	16.03	5.62
Smartphone	73.11	64.61	28.77	10.11
Smart TV	15.96	27.59	15.09	8.98
None	0.84	1.29	13.68	33.71

If almost all respondents aged up to 45 years have Internet access at home, their share is reduced to 82.54% for those between 46 and 65 years and to 47.19% for those over 66 years (*Table 3*).

Table 3. *Internet access*

	Age (%)			
	18 - 25	26 - 45	46 - 65	66+
Internet access	100	99.37	82.54	47.19

The main reason for respondents aged between 46 and 65 and over 66 to not have access to Internet is the lack of knowledge in the use of ICT devices: 53.19% of the older respondents, and 53.12% for those between 46 and 65 years. The second reason, but at a distance from the first, is the cost of Internet subscription: 12.76% and 15.62%. The third reason seems to represent the lack of interest, content sites being considered uninteresting: 6.38% and 15.62% (*Table 4*).

Table 4. *Reasons for not having an Internet access at home*

	Age (%)	
	46 - 65	66+
The access cost is too high	15.62	12.76
The equipment cost is too high	12.50	6.38
Lack of skills	53.12	53.19
The content is not useful, not interesting	15.62	6.38
Physical disability	0	2.12
Other reasons	3.12	8.51
No answer	0	10.63

Accessing the Internet is mainly a domestic activity: the majority of respondents, regardless of age, do it at home. The percentage decreases from 72.26% for the youngest, at 37.83% for the elderly (Table 5)

Table 5. *Place of Internet access*

	Age (%)			
	18 - 25	26 - 45	46 - 65	66+
From home	72.26	70.49	62.13	37.83
From work	3.36	7.54	4.37	0
From school/university	2.52	0	0	0
Both from home and work	21.01	20.32	8.25	1.35
From public places	0.84	0.32	0	0
From other people home	0	0	0	1.35

The frequency of Internet use seems to repeat the same behavior already highlighted: the greater the age, the lower the frequency of Internet use. If 85.71% of young people up to 25 years it utilizes daily, the percentage drops to 66.71% for the category 26-45 years, to 47.42% for the people of 46-65 years, and reaches only 17.30% for those over 66 year old. (Table 6).

Table 6. *Frequency of Internet use*

	Age (%)			
	18 - 25	26 - 45	46 - 65	66+
Every day	85.71	66.78	47.42	17.30
Almost every day	14.28	22.69	16.00	19.24
At least once a week	0	7.24	10.86	11.53
Rarely than once a week	0	3.28	14.86	15.39
Never	0	0	10.86	36.54

In order to test computer and Internet skills, we use the same methodology as Eurostat. “Level of basic computer skills” was measured using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to computer use, without these skills being assessed, tested or actually observed. Six computer-related items were used to group the respondents into levels of computer skills: copy or move a file or folder; use copy and paste tools to duplicate or move information within a document; use basis arithmetic formula (add, subtract, multiply, divide) in a spreadsheet; compress files; connect and install new devices, e.g. a printer or a modem; write a computer program using a specialized programming language. The indicator has been generated by adding the percentages of respondents which declared 1-2, 3-4, or 5-6 computer abilities. The same procedure has been used in order to compute “Internet skills”. Level of internet skills was measured using also a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to internet use, without these skills being assessed, tested or actually observed. Six

Internet-related items were used to group the respondents into levels of Internet skills: use a search engine to find information; send an e-mail with attached files; post messages to chat rooms, newsgroups or any online discussion forum; use the Internet to make telephone calls; use peer-to-peer file sharing for exchanging movies, music etc.; create a web page.

Under the assumptions made above, skills in computer use drops dramatically with age, 74.15% of those over 66 years having no such abilities, compared to only 0.8% for young (*Table 7*). For the youngest group, structure of skills in computer use is similar: the fewer are those who know nothing, and the percentage increases to those who can perform all 6 jobs listed. The situation is reversed for those over 66 years.

Table 7. *Computer skills*

	Age (%)			
	18 - 25	26 - 45	46 - 65	66+
No skills at all	0.8	5.19	42.92	74.15
1 or 2 activities	8.41	15.58	17.45	16.85
3 or 4 activities	21.03	25.65	16.50	4.49
5 or 6 activities	69.75	53.57	23.11	4.49

The same digital divide can be observed in the case of Internet use skills: with age, the percentage of those who have no skills increase dramatically, from 0.8% to 2.9%, then to 33.49% and to 68.53% in (*Table 8*).

Table 8. *Internet skills*

	18 - 25	26 - 45	46 - 65	66+
No skills at all	0.8	2.9	33.49	68.53
1 or 2 activities	4.20	13.96	19.34	13.48
3 or 4 activities	24.37	27.92	19.81	11.23
5 or 6 activities	73.94	55.19	27.36	6.74

The main respondents' reasons for accessing the Internet are finding information about goods and services, communicating, sending messages, participating in social networks, reading newspapers, news magazines, and finding health information (*Table 9*). All these reasons are found in each of the four age categories, but their importance is different. If most of the young people (87.28%) say that social networking is the main reason for accessing the Internet, the same activity is barely 5th for those over 66 years. Online gaming is one of the activities that occur only for the very young. Age factor leads to a gradual degradation of health and, at the same time, it increases attention to finding information about it. Therefore, finding health information appears as the fifth motivator for those in 26 and 45, but becomes more important for those between 46 and 65, and becomes the most important motivation for those over 66 years. Buying goods or services on the Internet, Internet banking or online interaction with public authorities is between minor motivations for all ages.

Table 9. *Reasons for accessing Internet*

Age	First reason		Second reason		Third reason		Fourth reason		Fifth reason	
	Activity	%	Activity	%	Activity	%	Activity	%	Activity	%
18 - 25	Participating in social networks	87.28	Finding information about goods and services	86.44	Communicating, sending messages	86.44	Online gaming	72.88	Reading newspapers, news magazines	72.03
26 - 45	Finding information about goods and services	83.72	Communicating, sending messages	77.40	Participating in social networks	74.08	Reading newspapers, news magazines	70.09	Finding health information	68.77
46 - 65	Finding information about goods and services	69.93	Communicating, sending messages	62.74	Finding health information	58.82	Reading newspapers, news magazines	50.98	Participating in social networks	39.86
66+	Finding health information	63.33	Communicating, sending messages	60.00	Reading newspapers, news magazines	60.00	Finding information about goods and services	56.66	Participating in social networks	40.00

Contrary to our expectations digital behavior does not change dramatically with age: the same activities are found in all four categories used in the analysis, only their order is different.

Conclusions

Digital divide within societies may constitute barriers both in the development of electronic government in general as well as in access to benefits of modern society for some social groups. Age is one of the main drivers of the digital divide. In a society where elders' percentage is growing, Internet access can reduce pressures on the social assistance system, providing a sense of existence for these people or new opportunities to improve their lives.

Our research aimed to highlight the age factor as trigger of digital divide among the population of Iasi. A weakness of the research is the instrument used: a questionnaire measures respondents' opinions and not their behavior, the differences between what people do and what they say they do can be sometimes quite large. We appreciate that the constructions of the questionnaire, and the phrasing of questions, provide him a sufficiently robust internal validity. Results should be interpreted by the fact that Iasi is a big city (about 300,000 inhabitants), with an educated population with a higher standard of living than in many parts of Romania and a highly developed network of Internet. Therefore, external validity of the research is not very strong, the results may not be generalizable to the whole society, but, because random sampling, the results are generalizable to the population of Iasi, and, by logic extrapolation, to the Romania large urban communities.

Generally, the research results match the expectations from literature: as the age increases, the digital divide increases as well. This phenomenon is observable both in access to ICT devices/Internet and in digital skills. The population seems to be divided into two groups, with significant differences between them: those up to 45 years and people older than this age, especially those aged over 66. Lack of knowledge in using computers and the Internet is the main demotivating aspect of digital behavior, factor which is well above lack of money.

A rather unexpected result was obtained on digital behavior, where the digital divide caused by age was minor. The main motivations of those who access the Internet were relative homogeneous, and activities which involve spending (purchase of goods or services, and Internet banking) and interaction with public authorities were at the end of the ranking. This may suggest a cultural pattern. Social capital, trust in others, beyond family and friends, is a key factor in any transaction, especially in an environment in which people does not directly meet each other. The low level of Romanian social capital could explain such a digital behavior, but this is a hypothesis to be confirmed by further research.

The practical consequences of our research could be: (1) In terms of access: the lower and lower price of ICT equipment and Internet subscriptions, make the economic factor a not very important one regarding digital divide. As a consequence, the government should not intervene in this area: the market (through costs reducing) and civil society (by providing equipment for the disadvantaged) are sufficient to reduce the digital divide caused by access. Hot spots, free of charges Internet places, may be another solution, but it cannot solve the problem, accessing Internet being an activity carried out much more at home than in public places; (2) In terms of skills: here is found the most important digital divide and main demotivating factor in the use of ICT devices. Both the government and NGOs should provide training to those over 45 and especially to those over 66; (3) In terms of digital behavior: the differences caused by age are not very important; however the age affects the interests of people in certain Internet areas. The increased interest on health problems, which is growing by age, suggests the importance of developing consistent e-health policies. Moreover, the apparent lack of confidence in the Internet as a medium for economic and administrative interactions could be countered by public information campaigns.

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