DO OLDER PEOPLE BENEFIT FROM DIGITAL SERVICES?

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Abstract

Numerous literature sources as well as practice studies evident numerous benefits enabled by information and communication technology (ICT) implementation in society. Namely, information and communication technology has been contributed to broadband access to (i) education, (ii) governance (iii) administration and public institution (iv) health and medical services, (v) touristic activity, etc. The purpose of the paper is to understand how older people have been adapted in the complex process of informatisation. In that context, the benefits of digital society for the older population will be discussed. The potentially related obstacles will be analyzed, too. Our presumption is that informatisation significantly facilitated the integration of services. The related question is: Is the mentioned process followed by inclusion or by marginalisation of older people as users? In the empirical part the comparative analysis between older population in Croatia and Belgium will be provided. In the final part the authors will integrate the theoretical presumptions with data interpretation based on the sample (n=70) collected in both countries. Data interpretation, as well as research implications are enclosed in the conclusion.

Keywords: Information and communication technologies (ICT), digital services, social inclusion, elder population

1. INTRODUCTION

Concerns about social inclusion in the information based world (also known as e-society) as well as about sharing benefits from the digital services enabled by the wide ICT integration in the society, has been already discussed for a longer period of time, and related to the different factors and inducements. Earlier, the approaches to the concerns were quite simple and based on negative effects of globalization, only (Beck, 1992, Castells, 1999). Over time, the process of social inclusion has been recognized as more complex than before. In accordance with that, the research focus related promotion of social inclusion and attention has been shifted to wider range of social resources, namely social, physical, digital and human resources (Zheng & Walsham, 2008, p. 223). Moreover, Warschauer (2002) closely related the issues of social exclusion in an information based society with the expression "digital divide", stressing just the access to technological resources as starting point for social inclusion problem solving.

Although digital divide is discussed from various perspectives (Finn & Wright, 2011), in this research we focus on older population and follow Gilhooly et al. (2009, p. 19) consideration that "the digital divide is mainly by age". In the context of e-society inclusion, the digital divide impends the potential of further isolation of older people as those mainly without ICT skills, since the growing number of public, commercial, private and any other services are transferred into the Internet.

Following the above mentioned research, the intention of this study is two-sided. Firstly, we present relevant theoretical framework for outstanding area considerations, and secondly, to explore the ICT integration in two EU countries from the perspective of elderly, and thus provide an insight into the social inclusion of knowledge base of the elderly.

1.1. ICT potential and society

The ICT potential refers to different technological solutions and plaftorms, with the capacity to improve all human activities in the society. It includes some, even elder, ICT solutions and trends, such as (i) multicore and hybrids, (ii) cloud computing and cloud/Web platforms, (iii) user interface developments, (iv) social networks and social software, (v) Web mashups, (vi) ubiquitous computing, (vii) contextual computing, augmented reality, (viii) semantics and (ix) virtualization (Gartner Research, 2008). ICT potential also includes latest, even disruptive technologies, such as: (i) artificial intelligence and advanced machine learning, (ii) intelligent apps, (iii) intelligent things, (iv) Digital Twin, (v) blockchain and distributed ledgers, (vi) conversational system, (vii) service architecture, (viii) digital technology platforms and (ix) adaptive security architecture (Gartner Research, 2016).

In spite of quite astonishing ICT potential to serve and improve activities on supply and on demand side, Global Information Technology Report

(WEF 2015) indicates, general lag in current ICT solution recognition, as well as in its readiness to use it and apply it in the society. The stated report also indicates a certain gap between countries that use the Internet technologies and social media and, and on the other side, those who do not use that ICT potential. Accordingly, the same source states that, developed countries continue to be the leading countries in the world in the context of readiness to use ICT, followed by post-transition and developing countries as the others who are still tipping.

1.1.1. ICT integration into the society

ICT arguably has the potential to provide human benefit in a number of areas in order to achieve the above and other humanistic goals. Such humanistic goals include improvement of education, provision of social and other services to the public, health, and well-being, work-life balance, environmental sustainability, democracy and self-determination, freedom, emancipation, poverty reduction, and social equity (Venable, Pries-Heje, Bunker, & Russo, 2011, p. 210). ICT acts as an integration tool that bridges people (Zheng & Walsham, 2008, p. 223), specially has the potential for elderly and other deprivileged groups of society to take part in social matters. There is a sense of the "imperative" – that it is increasingly a requirement, rather than a matter of choice, to own or to have easy access to a networked computer (Simon, 2006, p. 484). We take this fact for granted although it has not been like that forever. Information circulates via the internet, television, radio, books, newspapers and magazines or is transported by travelers, who help spread them. Thus, "urban/virtual tribes", instead of staying as locally attached "tribes", have become part of the scenery of each and every city worldwide (Rodriguez, Busco, & Flores, 2015, p. 71). During the period 2010–2014, services especially adapted for wireless communication networks had the highest entropy value and the highest binding force; and visible signaling systems were associated with several technology fields having a high potential to converge with other technology fields (Han & Young Sohn, 2016, p. 1).

Mainly the old and frail have been disenfranchised from a healthy social life. New technology promises to greatly reduce this problem (Pearson, 2006, p. 10). However, likelihood of internet engagement is shown to rapidly decrease with age, and patterns of disengagement are most pronounced amongst older people (Hill, Beynon-Davies & Williams, 2008).

Luo and Bu (2016, p. 200) present the logic that ICT enhances firm performance as important channels or facilitators of effective knowledge sharing and integration. ICT is critical investment that generates satisfactory returns for emerging economy enterprises, yet this investment–return relationship is further contingent upon the macro- and micro-level conditions facing these enterprises. ICT actually adds more value to productivity when a focal emerging economy is less economically developed, and when a focal firm reaches foreign markets or its quality control and assurance is superior (Lu & Bu, 2016, p. 200). Tutusaus, Schwartz and Smit (2016) state that organizational factors (financial and managerial autonomy), size, networks, individual factors, intrapreneurship, maturity and technological lock impact ICT's investments and adoption.

Almerich et al. (2016) consider that technological competences influence on pedagogical competences. Hsieh and Zmud in (Aparecida de Mattos & Barbin Laurindo, 2017, p. 49) noted that, through infusion, the introduction of technology to business processes and learning can lead to innovative use of ICT. Tacit knowledge is a necessary element in enhancing innovation, but it is not sufficient, as cognitive and normative closeness may reduce the number of innovation by reducing access to new information and by reducing the ability to recognize the value of such information (Johannessen & Olsen, 2011, p. 160). Despite the promising benefits the spontaneous virtual teams can provide, they are confronted with great challenges throughout their lifecycles (Tong, Yang, & Teo, 2013, p. 361).

Information and Communication Technology's (ICT) integration through the existence of a critical mass of Internet users allows quick diffusion of electronic communication in the medical practice, which translates as a new way to look at the doctor-patient relationship (Reis, Pedrosa, Dourado, & Reis, 2013, p. 1303). Authors also challenge the simplistic view that implementing health management information systems will translate directly to efficiency gains (Noir & Walsham, 2008, p. 313). The goal of the Internet of Things is to create an integrated ecosystem for devices to communicate over the Internet through efficient inter-operation among Device to Device communication technologies that make up the ecosystem (Bello, Zeadally, & Badra, 2017, p. 52). Vragov and Kumar (2013, p. 440) propose in their paper the policy that requires that governments should invest more in technologies that support multi-lateral communication and negotiation among citizens, and that citizens should use better voting mechanisms than simple majority voting to make decisions. Recent developments in ICT can change the way strategic organizational decisions are negotiated and voted upon (Vragov & Kumar, 2013, p. 440).

ICT (Nocentini, Zambuto, & Menesini, 2015, p. 52) constitutes suitable tools for interventions with children and adolescents promoting their emotional, psychological and social wellbeing. Recently, in the field of bullying and cyberbullying prevention, some programs started to be implemented using the benefits offered by the virtual environments (serious game, virtual reality, online platforms, internet activities, technological solution). Exposure to higher education reduces the digital divide in ICT's usage (Zaidi, Fernando, & Ammar, 2015, p. 95). However, within the sample of battered immigrant women religiosity contributed to the increase of the digital divide and ICT's usage (Zaidi, Fernando, & Ammar, 2015, p. 95).

Individual end-users appear to be best integrated within a virtual platform or through local public-private partnerships where they do not necessarily have to travel, to benefit from collaboration and share their views (Finn & Wright, 2011, p. 284). Lee, Son and Kim (2016, p. 51) state that in an always connected communication environment, users of social networking services (SNSs) need to pay continuous attention to the overwhelming volume of social demands from SNSs. These increased energy requirements may cause SNS fatigue, which can lead to physical and psychological strain. Using the

transactional theory of stress and coping as the overarching theory, the study of Lee et al. (2016, p. 51) regards overload (i.e., stressors) as a core determinant of SNS fatigue (i.e., strain) and identifies three dimensions of overload: information overload, communication overload, and system feature overload. Lee, Lee and Hwang (2015, p. 426) confirmed the well-known negative effect of extrinsic motivation on intrinsic motivation in the context of the ICT acceptance.

1.2. Role of Digital Services for the elderly

The growing number of the ageing population will put pressure on the social care and health care systems and will lead to a reduced availability of care staff. To deal with these challenges ICT and assistive technologies will play an important role to help people stay healthy and live independently at home for a longer time (Siegel & Dorner, 2017, p. 32).

Whilst it is encouraging that managers are generally positive about older hotel employees, older workers are still under-represented in many hospitality businesses (Jenkins & Poulston, 2014, p. 64).Older workers make less use of ICT in their job, use less complicated applications and have more difficulties in using ICT (de Koning & Gelderblom, 2006, p. 467). Elderly ICT's empowerment is not a matter of social skills, ICT skills, or complementary skills, but is more likely to result from their being interested in ICT and ICT-based activities. Learning activities in ICT-based activities and participation frequency were found to be predictors of both meaning and competence/self-determination dimensions (Hur, 2016, p. 318). Despite increased Internet access and affordability, older people still face challenges in learning Internet skills. Country type, economic challenges and cultural beliefs need to be considered in minimizing the grey divide. Governments recognize the importance of funding such teaching but evidence-based research must continue to inform policy to maximise funding and solve the many physical age and cultural issues affecting older people's access to Internet skills learning (Nycyk & Farooq, 2017, p. 1).

Vacek and Rybenska (2016, p. 453) state that: "*Generally we can say that the older the person is the more likely it will be for him or her that the controlling, and especially the understanding, of ICT will be complicated. Other factors that may affect the ability to learn how to operate a computer and navigate in ICT can be attained from the person's education level or economic situation, or by the fact of what kind of life the senior citizen leads. Finally, it is also necessary to take into account the problems that senior citizens often face with the very technical aspects of the device that they are trying to use. A recurring problem seems to be the fact that they don't sufficiently understand the individual steps and principles of the use of ICT*". It is necessary to identify functions and features of ICT products and applications that fit with individual dispositional characteristics of older adults and to invest in resources to train and facilitate their understanding, autonomy, and self-realization of the benefits of ICT (Vroman, Arthanat, & Lysack, 2015, p. 165).

Communication solutions could provide beneficial effects to keep in touch with family and friends. ICT systems can give aged people the possibility

to feel less lonely by having regularly video-based talks to relatives, friends, neighbors or caregivers. In residential settings increased social support via ICT could lead to a decreased level of social isolation and depression in elderly and can have positive effects to health and satisfaction (Siegel & Dorner, 2017, p. 34). Meneses Fernandez et al. (2017, p. 342) have stated that senior citizens use ICT to find information, and that they have a need and desire to communicate with others and to be entertained.

Obviously, the rising concerns of the ICT literature became the digital divide. Although the digital divide refers primarily to the distinction between those who use ICT, such as the internet, email and mobile phones, and those who do not (Abbey & Hyde, 2009, p. 225), over time, it became one of the main ethical issues regarding ICT in society, peer to peer to the privacy, data protection, intellectual property. Forthcoming challenges to society faces with include changes to the way humans are perceived and the role of humans and technology in society. This includes changing power structures and different ways of treating humans (Stahl, 2011, p. 140).

2. EMPIRICAL RESEARCH

2.1. Research question, hypothesys and methods

The main research question set as "Are elderly included in the society"? is considered as presumption of the benefit from digital services. The related sub-questions are:

- Are the elderly using computers, Internet services, and mobile devices?
- What is their general perception (attitude) of ICT?
- How do they perceive (evaluate) own ICT skills?

In accordance with above stated, we define the main research framework based on variables such as: a) ICT usage by elderly, b) ICT perception by elderly, and c) ICT knowledge/skills perception by elderly.

With broader intention to retrieve general insight in social inclusion of elderly in Croatian and Belgium information based society, we set the following hypothesis:

The elderly in Belgium are better included in information based society than the elderly in Croatia.

The research participants are older people (i.e. 60 and more) in two country, Croatia and Belgium. Croatia and Belgium, are both European countries, with different historical and political backgrounds. Croatia is post transition developing country, still new member of European Union; Belgium, is developed country with older EU membership.

Each variable is examined by particular items accociated with its nature (Table 1)

Table 1

Research variables, types and items

Variable name Question type		Item (survey question)	Item code
ICT usage	YES/NO answers	Do you have own computer?	A1
		Have you ever used a computer?	A2
		Have you ever attended any ICT related course?	A3
		Have you ever used web searching engines?	A4
		Have you ever use Internet banking?	A5
		Does ICT help you in public services providing?	A6
		Have you ever ordered products via the Internet?	A7
		Do you use electronic mail (e-mail)?	A8
		Do you have own mobile phone?	A9
		Do you have Internet access on mobile device?	A10
ICT persuasion	Accordance with the statements	„Internet is safe“	B1
		„Someone might steal my personal information over the Internet“	B2
		„Internet is tricky thing”	B3
		„My family members spend too much time at computer“	B4
		„The computer has a useful purpose“	B5
		„ICT leads to alienation and solitude“	B6
		„ICT is useful in education“	B7
		„ICT destroy health“	B8
		„ICT is useful in public services“	B9
ICT knowledge/skills perception	1-5 scale use	General ICT literacy	C1
		Web navigation skills	C2
		Keyboard buttons familiarity	C3
		Social network familiarity	C4
		Computer terminology awareness	C5
		E-mail frequent use	C6
		Microsoft Office tools familiarity	C7
		Global ITC trends awareness	C8
		Internet banking familiarity	C9
		Mobil devices usage	C10

Source: Authors' research

Within previously defined research framework, the questionnaire was used as the research instrument, containing questions relevant for the analysis of each research variables. The authors designed elemental questionnaire to cover the all main research purpose and offer answers to all research sub-questions.

To verify the hypothesis the set of 3 observed varaibles presented above in Table 1 is analyzed. The questionnaire was distributed as a voluntary option to the basic sample of 100 people. The total of 70 (70%) participants, more specifically, 35 in Croatia and 35 in Belgium fulfilled the questionnaire. For processing the collected data MS Excel 2013 is used. To test set hypotheses, descriptive statistics analysis were performed on the mentioned data set.

2.2. Research results and interpretation

The results enclosed in Table 2 present the percentage of positive answers regarding ICT usage by elderly in both country.

Table 2

Answers „yes“ (%)

Item code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Croatia	51,4	54,3	8,6	57,1	22,9	45,7	25,7	51,4	80,0	42,9
Belgium	74,3	74,3	42,9	37,1	74,3	80,0	51,4	71,4	65,7	57,1

Source: Authors' research, N=70

General insight in the results (Table 2) indicated that Croatian population mostly provides themselves with mobile devices (80%). It is also notable the certain familiarity with Internet search provided by using web searching engine (57,14%). The computer (54,29%) and e-mail (51,43%) is also used by more than half respondents. Furthermore, as presented in the same table, the Belgian population are recognized ICT role in public services providing (80%), owning mobile device (65,71%), using computer (74,29%) and web search engines (74%).

The results enclosed in Figure 1 indicate the significant difference in ICT usage among Croatian and Belgium older people. The Belgian older people in 8 of 10 items reveal better ICT habits comparing with Croatian people. Only web searching engine usage mobile device hold are revealed as closer to Croatian people. It means that 20% more Croatian older people practice web search and 14, 29 % more Croatian people comparing with Belgium have mobile devices. The t test value (p=0,015) approve that the elderly in Belgium are better in ICT usage than the elderly in Croatia. The visualisation of results is enclosed in Figure 1.

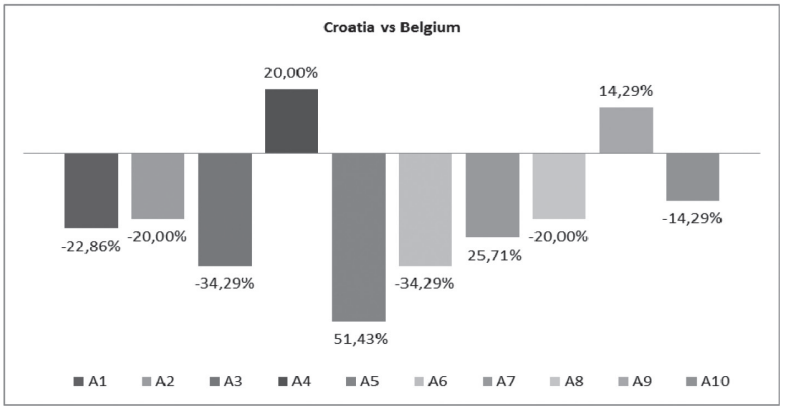

Figure 1 Differencies in ICT usage by countries

Source: Authors' research, N=70

Regarding variable ICT persuasion by elderly, the results are presented below, in Table 3 numerically and Figure 2 visually:

Table 3

Accordance with statements (%)

Level of accordance	Not agree		Not sure		Completely agree	
Item code	Croatia	Belgium	Croatia	Belgium	Croatia	Belgium
B1	25,7	31,4	51,4	57,1	22,9	11,4
B2	8,5	11,4	34,3	17,1	57,1	71,4
B3	20	5,7	20	8,6	60	85,7
B4	28,6	54,3	17,1	20	54,3	25,7
B5	2,9	17,1	17,1	11,4	80	71,4
B6	17,1	14,3	20	42,9	62,9	42,9
B7	0	2,9	11,4	8,6	88,6	88,6
B8	22,9	25,7	28,6	42,9	48,6	31,4
B9	2,9	8,6	2,9	8,6	82,9	82,9

Source: Authors' research, N=70

Furthermore, neither the Croatians (51,43%) neither the Belgians (57,14%) are quite sure if the Internet is safe or not. ICT is perceived as useful in public services (82,86%) according each country outputs. The majority of Croatians (57,15) as well as Belgians (71,43) are assured in possibility of stealing private information over Internet. Croatian elder population perceives ICT as a means with useful purpose (80%), quite close to Belgian (71,43%). The relevant percentage of Belgians (85,71%) perceive Internet as „tricky thing", the Croatians are just a little bit less dubious (60%). Unlike the Belgians, the majority of Croatians are in accordance with the following: associated family members spend too much time at the computer (54,29%) and ICT correlate with solitude (62,86%). Usefulness of ICT in education is highly approved (88,57%) in both samples. The visualisation of differences between ICT persuasion according both countries is presented in Figure 2.

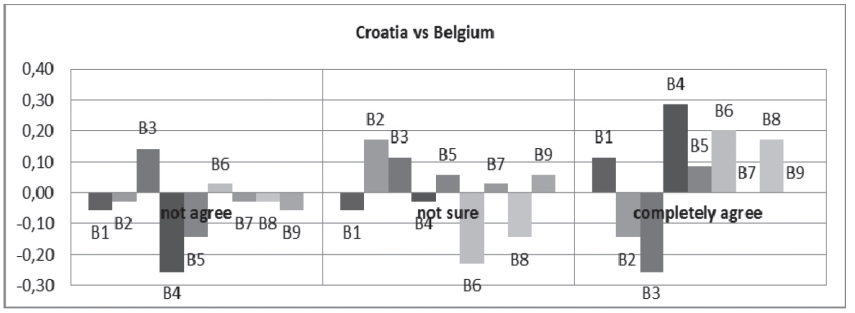

Figure 2 Differences in ICT persuasion by countries

Source: Authors' research, N=70

Although the differences in ICT persuasion by elderly are evident, according t tests (p>0, 05) they are not statistically significant.

Processing data related to third research variable output the results presented in Table 4.

Table 4

Assessment of ICT knowledge/skills perception (%)

Item code	Scale / County	1	2	3	4	5
C1	Croatia	43	9	31	14	3
	Belgium	26	14	46	14	0
C2	Croatia	40	17	20	9	14
	Belgium	9	9	23	34	26
C3	Croatia	43	17	11	20	9
	Belgium	23	9	20	37	11
C4	Croatia	46	20	14	14	6
	Belgium	37	0	37	20	6
C5	Croatia	51	26	14	5	3
	Belgium	23	20	43	11	3
C6	Croatia	49	6	14	14	17
	Belgium	26	3	0	29	43
C7	Croatia	49	17	20	9	6
	Belgium	37	3	26	14	20
C8	Croatia	71	9	9	6	6
	Belgium	37	29	26	9	0
C9	Croatia	71	6	11	3	9
	Belgium	23	6	11	20	40
C10	Croatia	23	26	23	17	11
	Belgium	0	17	37	37	9

Source: Authors' research, N=70

As far as ICT knowledge/skills are considered, Belgian population assessed its own ICT knowledge/skills as average regarding 1 to 5 scale. Quite interestingly is the fact that 40% of them are highly familiar with internet banking and rate their related knowledge with the highest grade (i.e grade 5). Almost half of them (43%) rate their email using skills with the highest grade, too. The percentage of Croatian people rating their knowledge with the worst grade (i.e.grade 1) is higher than percentage of Belgians according each observed item. The visualisation of differences between ICT knowledge/skills perception according both country is present in Figure 3.

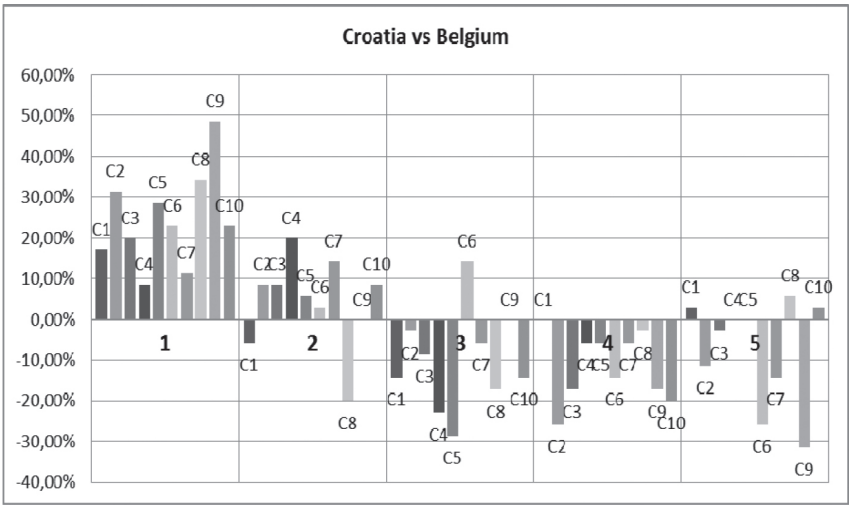

Figure 3 Differences in ICT knowledge/skills perception by countries
Source: Authors' research, N=70

According t test value (p=0,00) the relevant difference is present only between Croatians and Belgians regarding perception of theirs knowledge with the lowest grade (i.e.grade 1). For each other grade the difference is not statistically significant (i.e. p>0,05). Generaly, the visualisation of differences (Figures 1-3) between both countries regarding all observed variables, indicates that Belgian people are more ready to new technology acceptance at the daily level.

And last, but not the least, the research results shows that 70% Belgians use Google Chrome as preferred Internet browser, while 45% Croats use Google Chrome followed by Internet Explorer (30%) and Mozzila Firefox (25%).

Among portals, such as Booking.com, Tripadvisor.com, Airbnb.com Expedia.com and Cheaptickets.com, the Booking.com is the preferred portal in each countries (35% users in Belgium and 25% in Croatia.). On the other side, 35% Croats as well as Belgians do not use any portal for accomodation reservation, while 54% Belgians and 77% Croatians do not use any on line channels namely Cheapflights. com, Kayak.com or some air company web pages, for air ticket purchasing. Finally, online shopping is also unfimiliar category regarding the both countries.

In summary, the proposed hypothesis can be accepted from the aspect of ICT usage variable, only. Regarding other two variable, the hypothesys can not be accepted, what leads to the conclusion that, although the elderly in Belgium more benefit from the digital services and thus are better included in information based society than elderly in Croatia, the differences are not statisticaly significant. In any case, we consider possible opportunity that some further research based on the larger sample would not necessary output the same comparative analyses results.

CONCLUSION

Brief insight in the above enclosed results indicates the presence of social inclusion process in progress. In spite the fact that the Belgian elderly reveal better and above avarage ICT usage comparing with Croatian elderly, both populations recognize and use ICT, mainly for business purposes, quite less as entertainment media. We consider those results as an indicator of slow, but certain shift towards having more benefits from the digital services enabled by the broad ICT integration in the society.

Furthermore, neither the Belgians neither Croatians are confident in the fact whether Internet is safe or not. This output is expected and argued as closely related with numerous ICT security problems and threats (Grimes, 2012) including hacking user profiles, cyber crime, hacktivists, malware mercenaries, intellectual property theft, *all in one* maleware, phishing, and sometimes even compromised Web, which, unfortunatelly, appears on daliy base globally. On the other side, Neves and Navaro (2012) study focused on how the elderly in Lisbon use and perceive ICT, the authors argue that Internet was also recognized as insecure, moreover dangerous place, by all participants, "but never conceptualized as an obstacle or a motive to prevent its usage".

Finally, following the ICT knowledge/skills perception results, Croatia, more than Belgium has to face with the fact that relevant efforts have to be taken particulary by younger and educated people to achieve proper inclusion of elderly in information based society.

This reserch supports the presumption that informatisation facilitates the integration of services, just if followed with the social inclusion of all society members. Theoretical insight in ICT integration into the society as well as the role of ICT for elderly presented various aspects and approaches to social inclusion. It also highlights the complexity of an outstanding area and induce new dedicated research.

Having in mind relatively small research sample as the main research limitation we are aware that research based on the larger sample will provide less or more different results. Undoubtly, the results of such research would enable, to a certain extent, modified research topic interpretations, such as: the majority of the elderly perceive themselves as ready to new technology acceptance; or just the opposite, the majority of the elderly present themselves as technophobic faced with numerous difficulties in e-society including lack of digital literacy or problems of accessibility and usability. Anyhow, the younger generation is expected to provide quite appropriate support to encourage elderly in information based society and help them to benefit more from digital services.

Consequently, one of the fruitful future research should be design to analyze the supporting role of younger generation in social inclusion of elderly in information based, even more sustainable, society.

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