

INTERNET USE BY THE OLDER ADULTS IN THE CZECH REPUBLIC

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Introduction

The problem of the developed countries is the aging of the population. Developing countries, for the time being, do not experience it so urgently yet due to the lower average age of the population, but their standard of living is also beginning to improve. In 2000, the percentage of older individuals aged 65+ years reached 12.4%. In 2030, this number should rise to 19% and in 2050 to 22% (Transgenerational, 2009). In Europe this population group aged 65+ represent 18% of the 503 million Europeans, which should almost double by 2060 (Patterson, 2006). This trend of aging population causes additional problems such as increased costs on the treatment and care of those elderly people (Maresova et al., 2015a; 2015b). Therefore, there is ongoing effort to extend the active life of this group of people in order to allow them to stay economically and socially independent. And current technological devices and services can assist them in this process.

There is a significant drop in the rates of internet adoption between the groups of older and younger individuals across all different contexts and subgroups among the nations (Dutton et al., 2009; Zickuhr & Madden, 2012). Even within the group of older adults can the relationship be defined as linear, because the group with lowest rates of internet usage are the most senior (Dutton et al., 2009; Friemel, 2016; Gell, Rosenberg, Demiris, LaCroix, & Patel, 2015; Zickuhr & Madden, 2012). For example, in the United states 79% of people in age under 45 years would go online, while in the group of people aged between 45 and 64 the rate drops to 76%, there is significant drop to 52% in that rate for people 65 years old and older. Furthermore, not only do older adults fall behind in simple internet access, they also fail to keep up with the widespread faster broadband connections. Seniors often choose

an offline, analogue, face-to-face alternative for the digital technologies that other parts of society include to their everyday lives (Taha, Sharit, & Czaja, 2009; Yuan, Hussain, Hales, & Cotten, 2016). While choosing comfort of these offline, analogue choices, seniors miss out on the many advantages provided by online interactions.

The advanced age leads to shrinking of the social networks of the older adults which often results in loneliness. Engaging in online activities can suppress such feelings. The digital divide by age is troubling, given the amount of diverse benefits for older adults who go online. (Cotten, Anderson, & McCullough, 2013; Fokkema & Knipscheer, 2007; Shillair, Rikard, Cotten, & Tsai, 2015). The internet users among older adults have also shown less limitations in their daily lives than the nonusers (d'Orsi, Xavier, Steptoe, de Oliveira, Ramos, Orrell, Demakakos, & Marmot, 2014). Using the internet has also shown an improvement in older adults' lives, their perception of themselves, satisfaction with their life and the meaning of it, their self-efficacy and how others evaluate them (Lelkes, 2013). The diversity in benefits of the internet use presses us to get a better understanding of the reasons that are holding more members of the populations from using online services.

Recent research studies (Hanson, 2009; Hernandez-Encuentra et al., 2009; Sayago et al., 2011; Heart & Calderon, 2013) have also proved that older generation of people, aged 58-77, are nowadays much more digitally aware than they used to be ten years ago. Currently, more and more people use the Internet. For example, in the USA 64% of older individuals aged 65+ years exploit the Internet (Pew Research Center, 2017), in the Great Britain the number of people aged 65+ years has reached 74% (Office for National Statistics,

2016), and in the Netherlands it is even more – 78% of older people use it (van Boekel et al., 2017). This is caused not only by acquiring more experience through different kinds of community and nationwide projects aimed at older people (Bishop, 2009; Godfrey & Johnson, 2009), but also their desire to communicate with their family, e.g. grandchildren, or to find the information they need. Seniors tend to have a lot of free time, so they use the internet to engage in networking and communications on social media and seek various entertainment online.

Generally, there are three main preconditions that are conducive to the rising use of ICT by older people. These include:

- an increase in the number of older people worldwide;
- ICT as a tool for providing older people with the promise of greater independence;
- the generation of “baby boomers” approaching retirement being relatively comfortable using ICT; they will bring many technology-related skills into their retirement years. (Virginia, 2011; Klimova, 2016)

Older adults do not form a heterogeneous demographic group since according to the declining age, they have different needs, which place the older people into three different groups: 55-64 years old, 65-74 years old, 75 and more years old. (Klimova et al., 2016; Klimova, 2017)

The purpose of this study is to explore the use of the Internet among older people in the Czech Republic with respect to their age.

1. Materials and Methods

The research methodology is introduced in four subchapters comprising (1) the research question and the main research objective, (2) research sample, (3) hypotheses and (4) the tool for testing the hypotheses.

1.1 Research Question and Objective

The current life is characterized by two main features: (1) living in the i-society, where ICT devices have penetrated all spheres of life, and (2) the growing amount of senior population, which requires supporting the development of important skills (competences) necessary for living in the i-society which might be new for them in some aspects.

Therefore, the answer to the question how seniors exploit the ICT devices and the Internet in common life is highly topical. Coherently, the

research questions focus on two areas:

- (1) Do seniors exploit the Internet?
- (2) Is the Internet exploitation impacted by respondents' age?

Reflecting the above mentioned, the **main research objective** is to discover whether seniors use the Internet and whether the Internet exploitation depends on user's age.

1.2 Research Sample

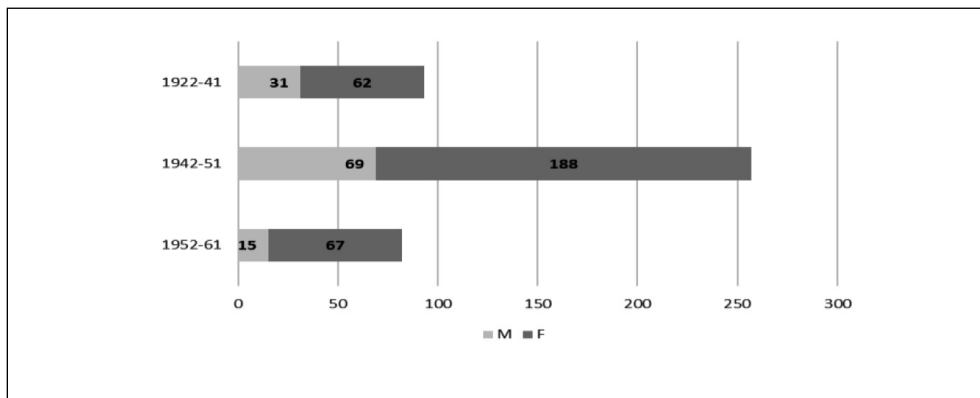
Totally, 432 respondents participated in the research. They all were residents of Hradec Kralove district and both seniors with active and passive approach to the ICT competence development were represented in the sample. All respondents were physically and mentally healthy and were structured in three groups:

- (1) the so-called ‘passive’ seniors, i.e., those who do not want to pay attention to acquiring any knowledge of the latest ICT and their exploitation, were represented by respondents living in senior houses (group 1, DD, n = 108);
- (2) the so-called ‘active seniors’ interested in their further education, particularly in the ICT field and who attended ICT courses held by the Hradec Kralove municipality (group 2, HK, n = 159);
- (3) the so-called ‘active seniors’ interested in their further education in general who attended courses of the University of the Third Age (group 3, U3V, n = 164).

As the ‘passive’ seniors are represented by one group of the institutionalized respondents and other ‘passive’ seniors have not been included in the sample, the authors are aware of the fact that the research sample is of a selective type, not representing the whole population but dealing with its characteristics in several features only, i.e. in the male/female structure. Consequently, the results cannot be generalized, but they can serve as an introductory study for further deeper research activities.

The age of 55 is the starting seniors' age in the Czech Republic (Czech Statistical Office, 2017a). The respondents' age ranged between 55 years (born in 1961) and 94 years (born in 1922) in 2016, when the research was conducted. The sample consisted of 317 female (F, 73%) and 11 male respondents (M, 17%) – this distribution follows the structure of the Czech senior population. (Czech Statistical Office, 2017b) There were 15 respondents

Fig. 1: Research sample: age/gender structure of the research sample (n)



Source: own

85+ years old – 12 females and 3 males. Most of the respondents (257; F 188; M 69) were born in the period of 1942-1951, i.e., they were 65-74 years old; the oldest ones were 87+ years old (Fig. 1). For the purpose of this research, respondents were structured into three age groups (55-64-year old: 82 respondents; 65-74-year old: 257; 75+-year old: 93), which is a rather common approach, cf. (Benáčková & Valenta, 2009; Slavik, 2012).

1.3 Hypotheses

Totally, five hypotheses were tested, three of them relating to the Internet exploitation by the seniors and other two to the impact of respondents' age on the Internet exploitation.

Ad1) Do seniors exploit the Internet?

H1₁: Respondents in group 2 (HK, participants of ICT courses) exploit the Internet more compared to respondents in group 1 (DD, living in senior houses).

H2₁: Respondents in group 3 (U3V, participants of U3V courses) exploit the Internet more compared to respondents in group 1 (DD, living in senior houses).

H3₁: Respondents in group 2 (HK, participants of ICT courses) exploit the Internet more compared to respondents in group 3 (U3V, participants of U3V courses).

Ad2) Is the Internet exploitation impacted by respondents' age?

H4₁: The proportion of Internet users in 55-64 age group is higher compared to 65-74 age group.

H5₁: The proportion of Internet users in 65-74 age group is higher compared to 75+ age group.

1.4 Research Tool

The questionnaire was distributed by the researchers in the senior houses, ICT courses and U3V courses. In the lounge of the senior houses, or after one of the course lessons respondents were provided with basic information on the purpose of the research and they filled in the questionnaire in the printed form.

The questionnaire took approximately 15 minutes and comprised 10 items covering

- personal data (Q1: gender, age, level of education),
- three yes/no questions (Q2: Did you use ICT in your profession?; Q7: Do you exploit the Internet?; Q9: Do you exploit the Internet in your mobile/smart phone?),
- five multiple-choice questions with one or more answers from 6-12 distractors (Q3: What ICT devices do you own?; Q4: What ICT devices do you use?; Q6: How did/do you acquire the ICT skills/competences?; Q8: What Internet services do you exploit?),
- one open-answer question (Q10: Can you imagine your life without electronic devices? Why?).

One year before the research started, the questionnaire had been piloted in the group of 22 respondents – participants of ICT courses

and adjusted to its present final form.

The collected data were processed by the 'R' software version 2.5.1. (The R Project for Statistical Computing, 2017)

2. Research Results

The presentation of the research results is structured into three parts which follow the research questions:

- (1) Do seniors exploit the Internet?
- (2) Is the Internet exploitation impacted by the respondents' age?

The process of testing hypotheses included

the following steps:

- collected data were displayed in the contingency table,
- Chi-Square Test of independence was conducted,
- Proportion and Confidence Interval were calculated and p-value computed.

2.1 Do Seniors Exploit the Internet?

The data in this field were collected from one item of the questionnaire. They are summarized in the contingency table below (Tab. 1), in total and in groups 1-3.

Tab. 1: Internet exploitation in Groups of Seniors: the contingency table and of qualitative characteristics

			Group of Seniors			Total
			DD	HK	U3V	
Using Internet	No	Count	60	14	27	101
		% within Group	55.0%	8.8%	16.5%	23.4%
	Yes	Count	49	145	137	331
		% within Group	45.0%	91.2%	83.5%	76.6%
Total	Count	109	159	164	432	
	% within Group	100.0%	100.0%	100.0%	100.0%	

Source: own

Tab. 2: Results of Chi-Square Tests for independence of the use of the Internet and Group of Seniors

	Value	df	p-value
Pearson Chi-Square	84.249	2	<2.2e-16
N of Valid Cases	432		

Source: own

Tab. 3: Proportion of the Internet exploitation in single groups

Group of Seniors	Proportion	95% Confidence Interval
DD	$p_{DD} = 0.450$	(0.355, 0.548)
HK	$p_{HK} = 0.912$	(0.854, 0.949)
U3V	$p_{U3V} = 0.835$	(0.768, 0.887)

Source: own

The results show that the Internet is widely used by the 'active' respondents in group 2 (HK, participants of ICT courses; 91.2 %), followed by group 3 (U3V, participants of U3V courses;

83.5 %), whereas more than half of the 'passive' respondents (DD, respondents living in senior houses; 55%) do not exploit the Internet.

Applying the Pearson chi-square test of independence on the 0.05 significance level, the following conclusion can be found: using internet is not independent of groups of seniors. The results are displayed in Tab. 2.

In order to receive detailed results in single groups, the proportions between them were compared. The calculations of proportion and confidence interval were based on the data in Tab. 1 and displayed in Tab. 3.

Further on, hypotheses H1, H2, H3 stating that:

H1_i: The proportion of respondents in group 2 (HK, participants of ICT courses) is higher compared to the proportion in group 1 (DD, living in senior houses).

H2_i: The proportion of respondents in group 3 (U3V, participants of U3V courses) is

higher compared to the proportion in group 1 (DD, living in senior houses).

H3_i: The proportion of respondents in group 2 (HK, participants of ICT courses) is higher compared to the proportion in group 3 (U3V, participants of U3V courses). were tested according to Tab. 4.

The z-test was applied for considering the difference of two population proportions (Groebner et al., 2007); the results are displayed in Tab. 5. In the table, instead of z-statistics, which shows an approximate normal distribution, the chi-square distribution of 1 degree of freedom is displayed, which is valid if the null hypothesis is verified.

The results show that on the 0.05 significance level, hypotheses H1, H2 and H3

Tab. 4: Hypotheses H1, H2, H3 on the proportion of the Internet exploitation in the single groups of seniors

	Null Hypothesis	Alternative Hypothesis
H1	$p_{HK} = p_{DD}$	$p_{HK} > p_{DD}$
H2	$p_{U3V} = p_{DD}$	$p_{U3V} > p_{DD}$
H3	$p_{HK} = p_{U3V}$	$p_{HK} > p_{U3V}$

Source: own

Tab. 5: Results of testing hypotheses H1, H2, H3 for the difference between two population proportions

Test	X-squared	df	p-value
H1	66.90	1	< 2.2e-16
H2	43.10	1	2.556e-11
H3	3.61	1	0.02873

Source: own

were verified; on the 0.01 significance level, hypotheses H1 and H2 were verified, whereas hypothesis H3 could not be statistically proved.

These results mean that on the 0.05 significance level there exist statistically significant differences between the groups of the respondents living in senior houses (Group 1, DD), attending ICT courses (group 2 ICT) and U3V courses (group 3, U3V) in the Internet exploitation as follows: respondents in group 2 (HK, participants of ICT courses) exploit the Internet more compared to the

respondents in group 1 (DD, living in senior houses); respondents in group 3 (U3V, participants of U3V courses) exploit the Internet more compared to group 1 (DD, living in senior houses); respondents in group 2 (HK, participants of ICT courses) exploit the Internet more compared to the respondents in group 3 (U3V, participants of U3V courses).

On the 0.01 significance level, statistically significant differences were detected between group 2 (HK, participants of ICT courses) whose respondents exploit the Internet more compared

to the respondents in group 1 (DD, living in senior houses) and group 3 (U3V, participants of U3V courses) who exploit the Internet more compared to the respondents in group 1 (DD, living in senior houses). Statistically significant differences between group 2 (HK, participants of ICT courses) and group 3 (U3V, participants of U3V courses) could not be proved.

(born 1952-1961), 65-74 year-old (born 1942-1951) and 75+ year-old (born 1922-1941). The structure is displayed in the Tab. 6.

The data show a continuous decrease in the Internet exploitation in relation to the respondents' age. Whereas the Internet was used by more than half (52.7%) of the oldest respondents (aged 75+, born 1922-41), which is rather high rate, the proportion surpassed 80% of the users in the respondents aged 74-65 (81.8%; born 1942-51) and those aged 64-55 (87.7%; born 1952-61). The results are displayed in Fig. 2 below.

2.2 Is the Internet Exploitation Impacted by the Respondents' Age?

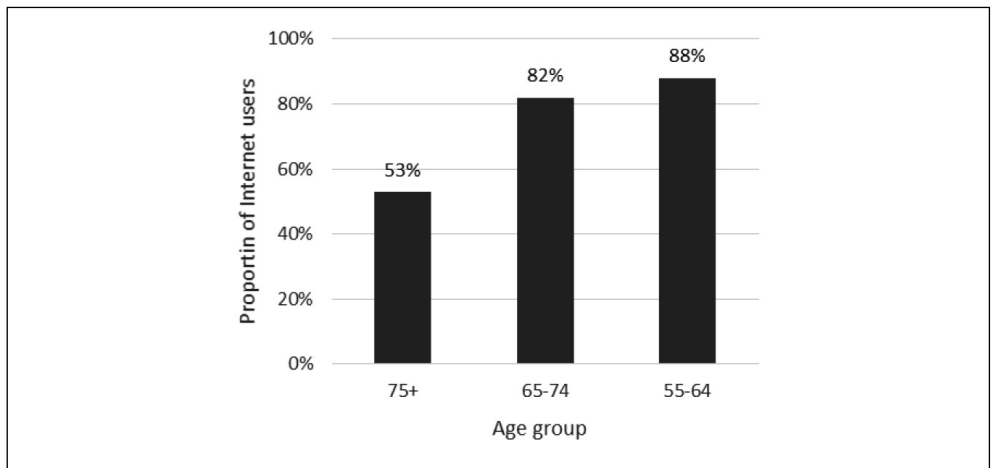
Reflecting on the date of birth, all seniors were categorized in three age groups: 55-64 year-old

Tab. 6: The Internet exploitation according to the respondents' age in the single groups of seniors: The contingency table of qualitative characteristics Internet exploitation and respondents' age

			Age groups			Total
			55-64	65-74	75+	
Exploiting the Internet	No	Count	10	47	44	101
		% within Age Group	12.3%	18.2%	47.3%	23.4%
	Yes	Count	71	211	49	331
		% within Age Group	87.7%	81.8%	52.7%	76.6%
Total	Count	81	258	93	432	
	% within Age Group	100.0%	100.0%	100.0%	100.0%	

Source: own

Fig. 2: The proportion of Internet exploitation (Internet users) in relation to three age groups (0: respondents who do not use the Internet; 1: Internet users)



Source: own

The tendency of increasing proportion of the Internet users in 'younger' age groups was tested by hypotheses H4 and H5 stating that:

H4_i: *The proportion of Internet users in 55-64 age group is higher compared to 65-74 age group.*

H5_i: *The proportion of Internet users in 65-74 age group is higher compared to 75+ age group.*

Hypotheses were verified according to Tab. 7.

The z-test was applied for considering two population proportions (Groebner et al., 2007); the results are displayed in Tab. 8. In the table, instead of z-statistics, which shows approximate normal distribution, the chi-square distribution of 1 degree of freedom is displayed, which is valid if the null hypothesis is verified.

The results show that on the 0.05 significance level, hypothesis H4 was falsified and H5 was verified.

These results mean that on the 0.05 significance level the statistically significant

Tab. 7: Hypotheses on the proportion of the Internet exploitation in single age groups of seniors

Null Hypothesis	Alternative Hypothesis
$p_{55-64} = p_{65-74}$	$p_{55-64} > p_{65-74}$
$p_{65-74} = p_{75+}$	$p_{65-74} > p_{75+}$

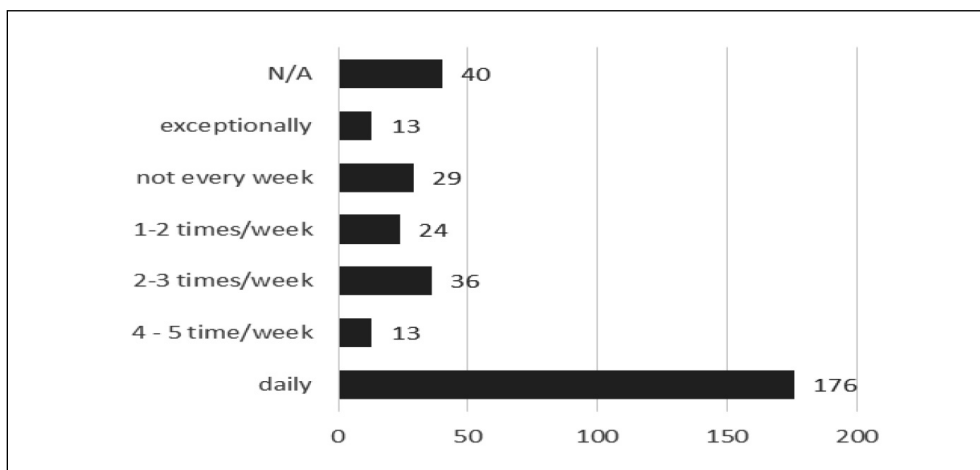
Source: own

Tab. 8: Results of testing hypotheses 4-5 for the difference between two population proportions

Test	X-squared	Df	p-value
H4	1.13	1	0.144
H5	28.6	1	4.368e-08

Source: own

Fig. 3: Frequency of the use of the Internet by the respondents



Source: own

difference was not discovered between groups of the 55-64 year-old respondents (born 1952-61) and 65-74 year-old ones (born 1942-1951). The statistically significant difference was detected between the respondents 65-74 year-old (born 1942-1951) and 75+ year-old (born 1922-1941).

In addition to the main hypotheses, the authors examined the frequency of the use of the Internet by these older individuals. The findings revealed that more than half of the respondents (53%) exploited the Internet on a daily basis and another 22% of the respondents used it at least once a week (Fig. 3).

Furthermore, the authors also dealt with the issue of the Internet activities seniors are engaged in. 72% of the respondents use the Internet for communication and the main tool for it is e-mail. Almost two fifths (38%) of seniors also use Skype for communication. Surprisingly, the second most used service on the Internet was electronic banking (e-banking – 40% of the respondents), closely followed by Skype, photo sharing – 38%). One third of the respondents also reported that they did shopping via the Internet (33% of the respondents) and the same number of seniors looked for health information on the Internet. A quarter of respondents read a variety of blogs (3% even actively created them) and 15% of them spent time on playing different online games.

The survey showed that almost none of these seniors nowadays cannot imagine life without the Internet. As they pointed out, it was part and parcel of their present life.

3. Discussion

The results reveal that more and more older adults exploit the Internet nowadays and more than half of them exploit it on a daily basis. This is especially true for the age groups (55 years up to 74 years). The breakthrough age in the decrease in the use of the Internet among these people is then 75 years, which is quite common in the developed countries and it is connected with the overall deterioration of cognitive functions at this age (Klimova & Maresova, 2017). This finding has been also confirmed by van Boekel et al. (2017) who report that people reaching the age 74+ years spend the least time on the Internet. The same was discovered by Smith (2014), de Veer et al. (2015), or Zickuhr and Madden (2012). Nevertheless, even in this age group (75+ years) the situation is improving

since the number has almost doubled in five years cf. (van Boekel et al., 2017; Smith, 2014).

The findings suggest that those attending specialized ICT courses had more experience in their use and thus, were more confident and frequent users than those in senior houses and the attends of the University of the Third Age. This fact was also indicated by Choi and DiNitto (2013), who claim that older people need to be trained in the Internet use for various purposes since the Internet plays the significant role in their social capital, as well as in removing their psychological barriers. Zheng et al. (2013) suggest that older individuals, especially those who feel lonely, should be a target.

Generally, older people use the Internet for communication purposes with the help of e-mail, the most frequent ICT tool for this generation group cf. (Hola & Pikhart, 2014; Gell et al., 2015; Sayago & Blat, 2010; Prior et al., 2008). Nevertheless, the findings of this study indicate that the second most common reason for the use of the Internet is the Internet banking, followed by Skype communication and photo sharing cf. (Benáčová & Valenta, 2009; Brush, 2008; Cerna & Svobodova, 2014). Similar results were achieved by Choi and DiNitto (2013), who report that their older Internet users were engaged in diverse types of Internet activities; almost 86% of the users sent emails/text messages, 51% shopped, paid bills, and/or did banking, and 45% conducted health-related tasks on the Internet. The most recent study by van Boekel et al. (2017) distinguished four main clusters of the older Internet users. These include minimizers, aged 74 years, who exploit the Internet the least; maximizers, below 70 years, who use the Internet for all activities; practical users, aged 71 years on average, who exploit the Internet for searching for information, comparing products or the Internet banking; and social users, mainly women, aged 71 years, who use the Internet for social and leisure activities. Most recently, more and more older people have used the Internet for searching for healthcare information (Bujnowska-Fedak, 2014; 2015). However, older people use only selected eHealth services which include, for example, obtaining information on their health, receiving reminders for scheduled visits, medication instructions, or consulting a doctor at a distance. Furthermore, they use Internet for searching health information about the right nutrition, exercise or weight issues, diseases

such as cancer, heart disease, or arthritis, high cholesterol, and health providers (Kaiser Family Foundation, 2013).

Research also shows that the use of the Internet by older population groups may have a positive effect on enhancement of their cognitive functions, e.g., Almeida et al. (2012), Dodge et al. (2015), and thus, help in aging diseases such as dementia. Almeida et al. (2012), for example, claim that the risk of incident of dementia was about 30% to 40% lower among older computer users than non-users. This has been confirmed by Tun and Lachman (2010) who state that the exploitation of computers is linked with improved cognitive competences in adulthood and old age.

The limitations of this study consist in a selective sample of the respondents located in one of the regions of the Czech Republic only and a lack of investigation of other factors such as educational or social status of the respondents.

Conclusions

Overall, the findings of this study indicate that the age (and respondents' previous experience in the Internet exploitation, e.g. at work) is a decisive factor in the use of the Internet by seniors. In fact, the use of the Internet falls with the increasing age, however, the breakthrough age seems to be 75+ years. The results also suggest that older people should be trained in the use of the Internet since the training may help them overcome both psychological and social barriers, which represent the constraints in their use of the Internet. Furthermore, seniors could be divided into three basic age groups according to their special needs, which should be considered when designing new technological devices or services for these aging population groups, which could help them to enhance cognitive functions.

The authors are aware of the fact that the research sample is not representative but selective. Therefore, the results are valid for the geographical area and 'active' seniors interested in education in general, particularly in the field of ICT, as defined in the sample description. Any similar research has not yet been conducted within an identical or closely similar research sample (which includes the participants of the University of the Third Age and ICT courses for seniors) in the Czech Republic. However, research activities exploiting remotely

resembling research samples were conducted e.g. by Rain and Svarcova (2010), Celer and Janska (2017) or by Slovak scholars, e.g. Hatar (2014), Jedlickova (2014) and Zimermanova (2012). The findings of this study contribute to the field of the Internet usage and relating services (activities). Mastering them is often connected with the family environment and family relations, as emphasized by Hatar (2014).

Future research should focus on each Internet activity mentioned in Fig. 4. The age level of 55 years defining the beginning of the senior age from the social view will probably not be increased in the future. However, the older adults falling in this group will have different (better) knowledge, as most of them will exploit ICT and the Internet for private and/or professional purposes. This is the main reason why the usage of the Internet will be topical in the future.

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Abstract

INTERNET USE BY THE OLDER ADULTS IN THE CZECH REPUBLIC**Blanka Klímová, Petra Poulová, Ivana Šimonová, Pavel Pražák,
Anna Cierniak-Emerych**

Ageing is becoming a big social issue nowadays. For example, in 2000 the percentage of older individuals aged 65+ years reached 12.4% worldwide. In 2030, this number should rise to 19% and in 2050 to 22%. Therefore, there is a need to prolong an active life of older people, especially by implementing non-pharmacological approaches. Current technological devices and services can assist them in this process. Therefore, the purpose of this study is to explore the use of the Internet among older people in the Czech Republic with respect to their age. The key methods exploited in this study include a questionnaire survey, statistical processing of data collection, as well as evaluation of both empirical and theoretical findings on the research issue. The results indicate that the age is a decisive factor in the use of the Internet by seniors. In fact, the use of the Internet falls with the declining age with the breakthrough age 75+years. Generally, older people use the Internet for communication purposes with the help of e-mail, the most frequent ICT tool for this generation group. Nevertheless, the findings of this study show that the second most common reason for the use of the Internet is the Internet banking, followed by Skype communication and photo sharing. The results also suggest that older people should be trained in the use of the Internet since the training may help them overcome both psychological and social barriers, which represent the constraints in their use of the Internet. Furthermore, seniors could be divided into three basic age groups according to their special needs, which should be considered when designing new technological devices or services for these aging population groups, which could help them to enhance cognitive functions.

Key Words: *Elderly, Internet, age group, Internet usage, survey.*

JEL Classification: *C12, C99, D64, I31, O35.*

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