COMPUTER SKILLS OF OLDER PEOPLE: CASE OF SLOVAKIA AND FINLAND

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Abstract

In today's world, computer skills have become a necessity. However, there are differences between countries in the level of computer literacy of people in different age groups. In the long term, Finland achieves the best results in the level of computer literacy. The goal of the research study is to specify the differences in computer skills in Slovakia and Finland. The research is focused on people aged 50+. SHARE questionnaire - Survey of Health, Aging and Retirement in Europe was used to achieve the goal. The total number of observations was 2158. Chi-square (χ2) Test for Independence, Cramér's V and adjusted residuals were used to achieve the goal. Based on the methods used, we accepted the hypothesis that there is a significant association between countries (Slovakia and Finland) and computer skills. In Slovakia, there is a large share of people aged 50+ who have never used a computer. An approach by the government to promote expansion of access to the Internet, similar to Finland, could contribute to improving computer literacy in the Slovak Republic.

Key words

Computer skills, Chi-square Test of Independence, SHARE

***JEL Classification**: C12, J24, C19* https://doi.org/10.52665/ser20220203

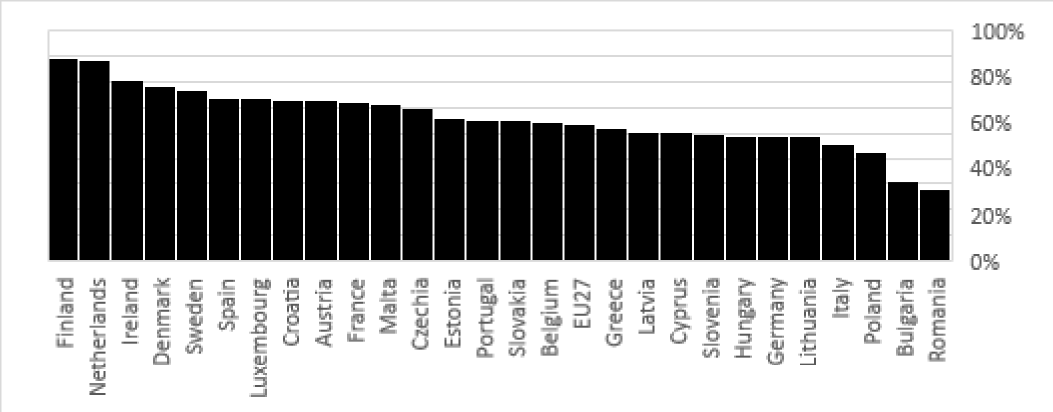
Introduction

One of the fundamental features of the current period is the spread of information technology in almost all areas. The use of computers and information technology has become a daily routine in many professions. Computer skills are a basic requirement for most employers. Due to great advances in the field of information technology, continuous expansion of computer skills has become a necessity.

Computer skills can vary according to age. The younger generation takes the use of information technology for granted. The older generation has not "grown up" with information technology and therefore feels disadvantaged compared to the younger generation. There are also large differences in computer skills and their use between countries. Comparisons are made on the basis of various surveys. Eurostat publishes annual figures for the share of people with different levels of computer skills. Finland has long been at the top of the rankings. Fig. 1 shows individuals with basic or above basic overall digital skills (%) in EU countries. The value indicators in the Slovak Republic are above average. However, there are large differences between the level of computer skills in Slovakia and Finland.

The scientific study aims to find out the specifics of computer skills of older people in Slovakia and Finland. A deeper research of the issue will allow a closer look at where the weaknesses of the Slovak Republic lie and what are the opportunities for improvement.

Figure 1 Individuals with basic or above basic overall digital skills (%) in 2021



Source: according Eurostat (2022)

Literature overview

The digitisation of national economies is a characteristic feature of EU countries in the current period. It brings new jobs to the labour market. On the other hand, new digital skills are increasingly required of workers. Improving digital skills is becoming a priority for governmental organisations. According to Stofkova et al. (2022) this priority was also formulated by the Ministry of Education, Science, Research and Sport of the Slovak Republic.

The required computer skills vary according to the type of work performed. However, it can generally be argued that a good level of computer skills has a number of positive implications not only for the employees, but also for the labour market and companies. According to Peng (2017, p. 31) "computer skills should facilitate worker reemployment." For this reason, computer skills have an impact on employment and influence the labour market. The use of information technology can be of strategic importance. However, it is important to use computer skills creatively. Workers with higher education have an advantage in this respect. Planning and management are very important for the expansion of IT skills (Nakayama, Sutcliffe, 2004). At company level, it is, therefore, necessary that the objectives of IT skills expansion are interrelated with strategic objectives. At the same time, continuous monitoring of the skills of the company's employees is necessary (Weritz, 2022).

According to Colbert (2016, p.737) "The digital competencies of the workforce and the ways in which technology is used in the workplace will continue to develop and change." The development of digital skills will lead to improved work efficiency. However, we should not forget the negatives that the expansion of the use of information and communication technologies can bring with it. It is important to examine and try to eliminate them.

Computer skills are influenced by the possibility to use the Internet on a daily basis. The Internet allows users to acquire more and more computer knowledge. However, access to the Internet is influenced by several factors. According to Dao (2017), the basic factors include the quality of the Internet, the affordability of the Internet and the affordability of computer applications. Their accessibility also varies depending on the economic development of the country.

In addition to Internet accessibility, computer skills are also influenced by the environment at the micro-level. Wicht et al. (2021) emphasize that an enabling environment at company and community level has an important impact on ICT skills.

The computer skills of older employees are influenced by several factors. According to Augner (2022), particularly important are the relationships between, on the one hand, the level of self-assessed computer literacy and, on the other hand, mental health, physical health and cognitive abilities. An interesting finding is that there was no significant relationship between the age and gender in the elderly. According to Vosner et al. (2012), increasing computer skills in the elderly has a positive effect of reducing feelings of loneliness. Thus, ultimately, improving computer literacy improves quality of life as well.

Older employees did not grow up with computer technology. This fact may be a disadvantage for them. According to Koegh (2009), for mature-age employees, certain specifics must be taken into account when increasing their computer skills. It is important not to use impractical training practices and to eliminate deficiencies in planning and miscommunication. The managers themselves, who are mostly of mature age, can be a hindrance too. At the same time, in ICT skills training, it is particularly important that trainers link new knowledge to the lifestyles and life needs of older employees in training (Schirmer et al., 2022).

Computer skills training may bring significant benefits to older employees. Lee et al. (2021, p. 32) state that "older workers can obtain significant benefits from job training, relative to the younger workers". Thus, we can summarize that training older employees may bring more benefits to them and the employer, and older employees may be more productive after training than younger employees. This finding is important because it points to the opportunities for increasing the productivity of older employees.

The computer skills of older employees may also influence their decision to retire. Currently, when the size of the workforce is shrinking, improving the computer skills of older employees may reduce the number of those who choose not to retire or to retire early. According to Biagi et al. (2011, p.11) "the combined effect of being skilled and using a PC at work is to reduce the probability of existing employment by 12 percentage points."

Sudden events, such as the COVID 19 pandemic, may lead to accelerating the improvement of older employees' computer skills. According to König and Seifert (2022), a large share of older employees aged 50+ in the EU28 who worked only from home reported that they had improved their computer skills. If the employees worked from home and at their usual workplace, the share of those who reported their computer skills had improved was significantly lower.

Goal and Methodology

Goal

According to Eurostat (2022), the share of employees with excellent computer skills in the Slovak Republic is lower than the share of employees with excellent computer skills in some of the most advanced EU countries. It is important to identify the specifics of these differences. As Finland has been in the top position in digital skills for a long time, we decided to identify the specifics in the level of computer skills between Slovakia and Finland. A deeper exploration of the specifics can contribute to the search for opportunities to increase computer skills in Slovakia. The goal of the research study is to specify the differences in computer skills in Slovakia and Finland. The research is focused on people aged 50+.

SHARE questionnaire - Survey of Health, Aging and Retirement in Europe Wave 8, the file sharew8_rel8-0-0_it.sav are used to achieve the goal (SHARE, 2022).

Methodology

According to Hendl (2015) when one of the variables is nominal we can use to finding association the Chi-square (χ^2) Test for Independence.

Pearson Chi-square statistic is calculated as:

$$\chi^2 = \sum_{i=1}^{R}\sum_{j=1}^{S}\frac{(f_{ij} - e_{ij})^2}{e_{ij}}, \quad (1)$$

where "f_{ij} is observed frequency for contingency table category in row i and column j

e_{ij} is expected frequency for contingency table category in row i and column j on the assumption of independence." (Anderson et al., 2014, p. 312)

The requirements of Chi-square Test of Independence are:

expected count of less than 5 is in less than 20% of cells,

expected count is more than 1 (Řezanková, 2007).

Cramér's V measures the strength of association. Measure has the value from 0 to 1. Cramér's V is calculated as:

$$V = \sqrt{\frac{\chi^2}{n(m-1)}}, \qquad (2)$$

χ^2 is Chi-square statistic,

n is number of subjects.

m is $min\{R, S\}$, where R is number of rows and S is number of all columns.

Standardized adjusted residuals expressed in IBM SPSS Statistics are used to determine where the relationship is. Adjusted residuals are calculated

$$r_{ij} = \frac{f_{ij} - e_{ij}}{\sqrt{e_{ij}(1-\frac{r_i}{N})(1-\frac{s_j}{N})}}, \qquad (3)$$

(Agresti, 2007), where

r_i is the sum of the i-th row,
s_j is the sum of the j-th column,
N is the total number of observations.
"When H0 is true, each standardized residual has a large-sample standard normal distribution. A standardized residual having absolute value that exceeds about 2 when there are few cells or about 3 when there are many cells indicates lack of fit of H0 in that cell." (Agresti, 2007, p. 38)

Findings

At the beginning of the analysis, are present the statistics of selected variables from SHARE questionnaire and the null hypothesis are presented.
Two variables are used: Computer skills and Country.
Answer options for variable Computer skills (it_003) in the questionnaire are: "Refusal", "Don't know", "Excellent", "Very good", "Good", "Fair", "Poor" and "I never used a computer".
Selected answer options for variable Country in the questionnaire are: "Finland" and "Slovakia".
The variable Country is nominal.
Null Hypothesis H0: there is no significant association between selected country and computer skills.
Alternative Hypothesis H1: there is significant association between selected country and computer skills.
The processed answers are only from respondents who answered both questions.

In the next step, a frequency table is created (Table 1) and the expected frequencies are calculated for contingency tables (Table 2).

Table 1 Observed Frequencies

	Refusal	Don't know	Excellent	Very good	Good	Fair	Poor	I never used a computer	SUM
Finland	1	2	64	106	337	339	202	110	1161
Slovakia	0	0	16	107	251	140	134	349	997
SUM	1	2	80	213	588	479	336	459	2158

Source: own calculations in IBM SPSS Statistics based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

Table 2 Expected Frequencies

	Refusal	Don't know	Excellent	Very good	Good	Fair	Poor	I never used a computer	SUM
Finland	0.54	1.08	43.04	114.59	316.34	257.70	180.77	246.94	1161
Slovakia	0.46	0.92	36.96	98.41	271.66	221.30	155.23	212.06	997
SUM	1.00	2.00	80.00	213.00	588.00	479.00	336.00	459.00	2158

Source: own calculations in IBM SPSS Statistics based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

The total number of observations was 2158. The number of respondents from Slovakia was 997 (46.2%). The number of respondents from Finland was 1161 (53.8%). Table 2 shows that they have not fulfilled the requirements of Chi-square Test of Independence. Six of the all expected counts are less than 1. For this reason, we left out the two categories: "Refusal" and "Don't know". The frequency table is in Table 3. The number of observations decreased by three.

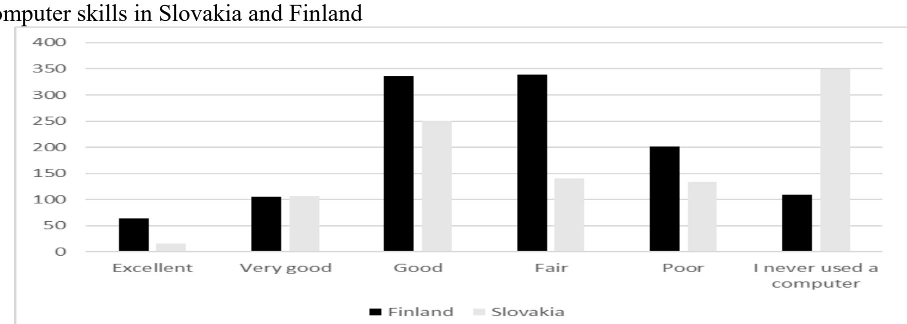
Table 3 Observed Frequencies- answers Refusal" and "Don't know" are omitted

	Excellent	Very good	Good	Fair	Poor	I never used a computer	SUM
Finland	64	106	337	339	202	110	1158
Slovakia	16	107	251	140	134	349	997
SUM	80	213	588	479	336	459	2155

Source: own calculations in IBM SPSS Statistics based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

Fig. 2 shows several differences between the answers of respondents in the Slovak Republic and Finland. The biggest difference is in the category "I have never used a computer". While this answer was chosen by 23.97% of respondents in Finland, in Slovakia it was 35.0%. This fact is to the detriment of Slovakia. Another weakness appears in the category "Excellent". While in Finland this answer was chosen by 5.5%, in Slovakia it was 1.6%.

Figure 2 Computer skills in Slovakia and Finland



Source: own calculations in Microsoft Excel based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

After adjusting the values, we again expressed the expected frequencies (Table 4). We determined whether the requirements of the Chi-square Test of Independence apply. The minimum expected count is 37.01. The requirement of Chi-square Test of Independence (expected count of less than 5 is in less than 20% cells) is fulfilled here.

Table 4 Expected Frequencies - answers “Refusal" and "Don't know" are omitted

	Excellent	Very good	Good	Fair	Poor	I never used a computer	SUM
Finland	42.99	114.46	315.96	257.39	180.55	246.65	1158.00
Slovakia	37.01	98.54	272.04	221.61	155.45	212.35	997.00
SUM	80.00	213.00	588.00	479.00	336.00	459.00	2155.00

Source: own calculations in IBM SPSS Statistics based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

Pearson Chi squares is 251.64. Degrees of freedom (df) is 5 and p-level is 0.000. From the above, we can conclude that we reject the Null Hypothesis H0 and accept the Alternative Hypothesis H1: there is significant association between country and computer skills.

We expressed Cramér's V in the IBM SPSS program. V. Its value is 0.342. The tightness of the dependency is medium.

To determine where the relationship manifests itself, we expressed the adjusted residual in IBM SPSS. Their values are in Table 5.

Table 5 Adjusted Residual

	Excellent	Very good	Good	Fair	Poor	I never used a computer
Finland	4.8	-1.2	2.0	8.5	2.6	-14.4
Slovakia	-4.8	1.2	-2.0	-8.5	-2.6	14.4

Source: own calculations in IBM SPSS Statistics based on data from Börsch-Supan et al. (2013), Gruber et al. (2014), Bergmann, Börsch-Supan (2021), Börsch-Supan (2022), Börsch-Supan, Gruber (2022), SHARE (2022)

We will look at the table from Slovakia's point of view. The large positive residuals are for the combination: “Slovakia” and “I never used a computer”. It means that, there were more Slovaks who “Never used a computer”, than the hypothesis of independence predicts.

The large negative residuals are for combinations:

1/ “Slovakia” and “Excellent”. It means that there were fever Slovaks who have excellent computer skills, than the hypothesis of independence predicts.

2/ “Slovakia” and “Fair”,

3/ “Slovakia” and “Poor”.

evaluation, it is necessary to pay the most attention to the differences between the answers “I never used a computer” and “Excellent”.

Discussion

One of the reasons for the differences in the answers “I have never used a computer” in Slovakia and Finland is that since 2010 access to the Internet has been regarded as a fundamental right in Finland. This has also had a significant impact on access to the Internet for older people and, ultimately, on their computer skills. Therefore, the share of the elderly who have never used a computer in Finland is significantly lower. In the Slovak Republic, there is a relatively high share of the elderly who have never used a computer. According to the results from the sources used, this may have a number of negative consequences. The most important include lower adaptability of the elderly in the labour market in the Slovak Republic and lower quality of life. Similarly, the difference in the answer “Excellent” is mainly due to the fact that the process of economy digitalisation in Finland started much earlier and with greater intensity than in the Slovak Republic.

In our opinion, the resources of a company that invests in making the Internet and computers accessible will see a very quick return and such an approach will translate into faster development of the company.

Conclusion

The goal of the research study was to specify the differences in computer skills in Slovakia and Finland. The research was focused on people aged 50+.

SHARE questionnaire - Survey of Health, Aging and Retirement in Europe was used to achieve the goal. The total number of observations was 2158. To achieve the goal, we used Chi-square (χ^2) Test for Independence, Cramér's V and adjusted residuals. We rejected the Null Hypothesis H0 and accepted the Alternative Hypothesis H1: there is significant association between country and computer skills. The tightness of the dependence between the variables is medium. Based on the adjusted residuals, we can conclude that the large positive residuals are for the combination: "Slovakia" and "I never used a computer". It means that there were more Slovaks who never used a computer than the hypothesis of independence predicts. This fact is the result of the availability of Internet use in Finland and the result of the great pace of digitization of society.

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This paper uses data from the generated easySHARE data set (DOI: 10.6103/SHARE.easy.800), see Gruber et al. (2014) for methodological details. The easySHARE release 8.0.0 is based on SHARE Waves 1, 2, 3, 4, 5, 6, 7 and 8 (DOIs: 10.6103/SHARE.w1.800,10.6103/SHARE.w2.800,10.6103/SHARE.w3.800,10.6103/SHARE.w4.800,10.6103/SHARE.w5.800,10.6103/SHARE.w6.800,10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800).

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