Digital factors promoting women's entry into the Serbian labour market

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Abstract: This paper presents the development of digital skills among women active in the Serbian labor market focusing on the need for such skills in the marketplace for those that do not already possess them. Based on the microdata received from the Statistical Office of the Republic of Serbia (SORS) and the application of proprietary SPSS, 34.2% of the populace of the Republic of Serbia are computer literate, while 14.8% are only partly computer literate (the remaining 51% are partially or entirely computer illiterate). While men are found to more likely have digital skills, women in possession of them are more likely to be employed. However, this paper finds that only 53.4% of female respondents have used a computer in the last three months, indicating insufficient opportunities and access to information regarding the employer market. Moreover, it is worrying that 38.3% of the respondents have never used a computer. It also may be concluded that implementing a strategy for the development of digital skills may bear a strong positive influence on the employment rate in such countries where there is a rift between digital skill development. These results may prove useful for further research into women's employability vis-a-vis their digital skills.

Keywords: digital skills; women; labour market; Serbia; ICT.

I. Introduction

The development of Information Communication Technologies (ICT) has led to changes in doing business throughout all sectors of the economy as well as has had a significant impact on individual career development. The number of experts in the labor market is evidence of the importance of ICT and the corresponding activities [1].

As demonstrated through current strategies such as Europe 2020 and Agenda 2030, digital skills are essential for competitiveness and economic development. Europe 2020 has launched seven flagship initiatives, among them is one focusing on digital-skills development. The Europe 2020 strategy also focuses on three interconnected priorities; the most important of which is smart growth that seeks the development of a knowledge and innovation-based economy, including the development of a digital society. Europe 2020 also envisages inclusive growth by raising the participation and integration of women in the labor market.

Furthermore, out of a total of 17 goals in Agenda 2030, the ninth goal is to build adaptable infrastructure, promote industrialization and achieve innovation, which implies the development of IT in all sectors of the economy and in society. In addition to the emphasis on the development of digital technology in society is women's empowerment in the labor market as a priority area, presented as the 5th goal of the 2030 Agenda. Therefore, both the Member States and States seeking to join the EU are educating teachers as well as primary and secondary school students on ICT. Based on the Agenda 2030 and Europe 2020, both EU and developing countries have been implementing strategies [2].

The Western Balkans are highly ranked in the use of digital technologies. In recent years, the region has begun to implement strategies that address the development of digital skills. In the Republic of Serbia, 34.2% of the populace are computer literate, while 14.8% are only partly computer literate (the remaining 51% are partially or entirely computer illiterate). The Digital Agenda of Serbia, implemented from 2010 to 2020, aims to improve the use of ICT. It states that development "should be geared towards harnessing the potential of ICT to increase efficiency, economic growth, higher employment and improve the quality of life of all people." The Strategy was created on the initiative of the Europe 2020 Strategy where ICT is recognized as a major factor influencing economic growth and innovation.

The aim of the paper is to present the development of digital skills in Serbia, with particular emphasis on the inequality of possession of them. Based on the microdata received from the Statistical Office of the Republic of Serbia (ROS) and the application of SPSS software, the result may prove useful for further research to be carried out into women's position in the labour market vis-a-vis their digital skills.

II. Literature review

The European Commission defines digital competence (also sometimes called digital literacy) as the confident and critical use of ICT for work, leisure and communication. Digital skills have become integrated into modern societies, economies, education and employment. The digital age has been characterized by the rise of the digital society [1][3] where a knowledge based economy and digital information are found ubiquitously in all areas of life. In the framework of globalization, digital skills have become globally considered to be the primary criteria for employment.

Several authors have recognized the impact of digital literacy on the labor market. On the basis of examining the disconnect between the needs of the labor market the digital skills available to Romanians, Titan, et al. (2014) found that there is a mutual link and impact between digital literacy and the labor market. Prizada and Khan (2013) measured the impact of digital skills on

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employability, concluding that all observed variables (computer, communication, internet, and advanced digital skills) were positively correlated with employability.

Expertise in the use of digital tools is one of the primary advantage's students may have when entering the job market as it allows them to establish a foothold based on already acquired experience and expertise. This claim may be substantiated by Van Doursen and Van Dijk (2010) who found that observed skill patterns in ICT differ across gender, age, and education, which are all crucial variables related to skill inequalities [4]. Age in particular, although not necessarily surprising, shows a decrease in ICT familiarity with an increase in age. Studies that account for both technical and substantial internet skills generally find that age has a negative relation with technical skills, while the relationship with substantial skills is not significant or even positive [4][5]. However, gain in operational and formal Internet skills do occur among those older in showing better performance on information internet skills, which still points to a lack of ICT familiarity.

What is more important is that Van Doursen and Van Djik (2008) also noted that education was not an equalizing factor among all groups, noting specifically that the higher educated one was, the higher the level of all four internet skills would be but not necessarily inversely true (i.e., lower educated individuals may have fewer internet skills) [6]. This indicates that a skill gap may be seemingly present between the higher educated, on the one hand, and the lower / middle educated, on the other. Bennett reports that those who are well-equipped with an understanding of the use of e-services have the distinct advantage over the long term in the form of educational progress, job enrichment and overall status [7].

Although a broad range of social sectors have been adopting an equally broad expanse of electronic means, the development of digital skills or tools for education and the job market has run together, thereby creating a teaching and learning environment [8].

ICT skills as a field of research must tackle measurement problems by creating more subtle classifications of internet skills of populations at large as stated by a number of researches [4][9][10].

III. Methodology

The data was obtained from SORS (2017). Using proprietary SPSS software, all characteristics of employed women are noted below.

1,763 female respondents participated in the study on the use of information technologies among women in Serbia. The demographic characteristics of the sample included 47.5% of respondents from Central Serbia, 28.2% from Vojvodina and 24.3% from Belgrade. Employment factors were also observed, where 26.1% were employed, 23% unemployed, 1.9% students and the remaining 48.9% not active in the labor force (pensioners or military service). The components taken into consideration as output variables were questions of: "What is your internet access at home? When was the last

time you used a computer (at home, at work or elsewhere)? How often have you used a computer in the last 3 months? When was the last time you used the Internet (via a computer, laptop, mobile phone, or smartphone)? How often have you used the Internet in the last 3 months? How often have you used cloud services to store data (documents, pictures, music or video files) such as Google Drive, Dropbox, Windows ONE drive, iCloud, Amazon cloud drive? How often in the last 3 months have purchased or ordered goods or services over the Internet for private purposes (via a website or app from any device: desktop computer, laptop, mobile phone or smartphone)? How often have you purchased / ordered goods or services over the Internet for private purposes in the last 3 months? and What is the amount of money you have spent on the Internet for private purposes in the last 3 months?" The Software package SPSS was used for data analysis. The results of the survey are presented through the crosstabulation of the respondents' work status and the IT variables previously mentioned.

A. Research results

The survey results show that unemployed women more frequently do not have access to the Internet (Table 1) which may result in women having less ability to research employment opportunities. With a score of 17.8%, the majority of respondents who do not have internet access come from Central Serbia. Belgrade has the highest internet access, with only 5% not having access. A similar trend is noticeable for other variables relative to territory. Only 53.4% of female respondents have used a computer in the last three months, indicating insufficient opportunities and access to information regarding the employer market. It is worrying that 38.3% of the respondents have never used a computer (Table 2). Of those who use a computer every day, 39.8% are employed, 22.2% unemployed, and 22.8% not active (Table 3). A slightly higher percentage of internet usage is found to be through mobile phones (Tables 4-5). Modern cloud solutions usage is practically non-existent among women, as well as online purchases (Tables 6-9), but the data expresses that employed respondents are more likely to use online payments.

IV. Conclusion

Technological change does require that individuals maintain skill levels that can complement these changes if they wish to remain active in the labour market. While it may be true that it is difficult to acquire these skills and that technological change may limit job creation at lower levels, hope of finding and keeping employment does seem to be distinctly related to possessing digital skills.

In the framework of globalization, digital skills are becoming more extensive and are considered a prerequisite for securing professional employment all over the world. Education is probably the most consistent global predictor of the use of ICTs, especially concerning internet proficiency [10]. Men have more stereotyped attitudes regarding who is capable of using the internet

Table 1. Crosstabulation between respondents' work status and IT aspect on access to the Internet.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
Do you or anyone in your household have access to the Internet at home, regardless of whether they use it?	No	Count	31	92	0	472	595
		% of Total	1.8%	5.2%	0.0%	26.8%	33.7%
	Yes	Count	430	314	34	390	1168
		% of Total	24.4%	17.8%	1.9%	22.1%	66.3%
Total		Count	461	406	34	862	1763
		% of Total	26.1%	23.0%	1.9%	48.9%	100.0%

Table 2. Crosstabulation between respondents' work status and IT aspect on last time they used computer.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
When was the last time you used a computer (at home, at work or elsewhere)?	In the last 3 months	Count	403	242	34	263	942
		% of Total	22.9%	13.7%	1.9%	14.9%	53.4%
	More than 3 months ago (< 1 year)	Count	6	12	0	4	22
		% of Total	0.3%	0.7%	0.0%	0.2%	1.2%
	More than a year ago	Count	10	27	0	86	123
		% of Total	0.6%	1.5%	0.0%	4.9%	7.0%
	I have never used one	Count	42	125	0	509	676
		% of Total	2.4%	7.1%	0.0%	28.9%	38.3%
Total		Count	461	406	34	862	1763
		% of Total	26.1%	23.0%	1.9%	48.9%	100.0%

Table 3. Crosstabulation between respondents' work status and IT aspect on how often they use computer.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
How often have you used your computer on average in the last 3 months?	Every day or almost every day	Count	375	209	30	215	829
		% of Total	39.8%	22.2%	3.2%	22.8%	88.0%
	At least once a week	Count	11	13	4	26	54
		% of Total	1.2%	1.4%	0.4%	2.8%	5.7%
	At least once a month	Count	14	15	0	17	46
		% of Total	1.5%	1.6%	0.0%	1.8%	4.9%
	Less often than once a month	Count	3	5	0	5	13
		% of Total	0.3%	0.5%	0.0%	0.5%	1.4%
Total		Count	403	242	34	263	942
		% of Total	42.8%	25.7%	3.6%	27.9%	100.0%

Table 4. Crosstabulation between respondents' work status and IT aspect on the last use of Internet.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
When was the last time you used the Internet (via computer, laptop, mobile phone, smartphone)?	In the last 3 months	Count	417	271	34	279	1001
		% of Total	23.7%	15.4%	1.9%	15.8%	56.8%
	More than 3 months ago (< 1 year)	Count	8	6	0	9	23
		% of Total	0.5%	0.3%	0.0%	0.5%	1.3%
	More than a year ago	Count	2	11	0	45	58
		% of Total	0.1%	0.6%	0.0%	2.6%	3.3%
	I have never used one	Count	34	118	0	529	681
		% of Total	1.9%	6.7%	0.0%	30.0%	38.6%
Total		Count	461	406	34	862	1763
		% of Total	26.1%	23.0%	1.9%	48.9%	100.0%

Table 5. Crosstabulation between respondents' work status and IT aspect on how often they use Internet on average.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
How often have you used the Internet on average in the last 3 months?	Every day or almost every day	Count	375	222	34	210	841
		% of Total	37.5%	22.2%	3.4%	21.0%	84.0%
	At least once a week	Count	35	37	0	52	124
		% of Total	3.5%	3.7%	0.0%	5.2%	12.4%
	At least once a month	Count	6	10	0	13	29
		% of Total	0.6%	1.0%	0.0%	1.3%	2.9%
	Less often than once a month	Count	1	2	0	4	7
		% of Total	0.1%	0.2%	0.0%	0.4%	0.7%
Total		Count	417	271	34	279	1001
		% of Total	41.7%	27.1%	3.4%	27.9%	100.0%

Table 6. Crosstabulation between respondents' work status and IT aspect on the use of cloud services to store the data.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
Have you used cloud services to store data (documents, pictures, music or video files) such as Google Drive, Dropbox, Windows ONE drive, iCloud, Amazon cloud drive?	No	Count	321	226	21	255	823
		% of Total	32.1%	22.6%	2.1%	25.5%	82.2%
	Yes	Count	96	45	13	24	178
		% of Total	9.6%	4.5%	1.3%	2.4%	17.8%
Total		Count	417	271	34	279	1001
		% of Total	41.7%	27.1%	3.4%	27.9%	100.0%

Table 7. Crosstabulation between respondents' work status and IT aspect on purchase over the Internet.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
Last time you purchased or ordered goods or services over the Internet for private purposes (via a website or app from any device: desktop computer, laptop, mobile phone, smartphone)	In the last 3 months	Count	110	60	15	32	217
		% of Total	10.2%	5.5%	1.4%	3.0%	20.1%
	More than 3 months ago (< 1 year)	Count	63	36	8	25	132
		% of Total	5.8%	3.3%	0.7%	2.3%	12.2%
	More than a year ago	Count	42	25	2	17	86

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
	Never	% of Total	3.9%	2.3%	0.2%	1.6%	7.9%
		Count	212	167	9	259	647
		% of Total	19.6%	15.4%	0.8%	23.9%	59.8%
Total		Count	427	288	34	333	1082
		% of Total	39.5%	26.6%	3.1%	30.8%	100.0%

Table 8. Crosstabulation between respondents' work status and IT aspect on purchase over the Internet in the last three months.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
How often have you purchased / ordered goods or services over the Internet for private purposes in the last 3 months?	1-2 times	Count	57	37	12	16	122
		% of Total	26.3%	17.1%	5.5%	7.4%	56.2%
	3-5 times	Count	39	16	3	12	70
		% of Total	18.0%	7.4%	1.4%	5.5%	32.3%
	6-10 times	Count	8	6	0	1	15
		% of Total	3.7%	2.8%	0.0%	0.5%	6.9%
	More than 10 times	Count	6	1	0	3	10
		% of Total	2.8%	0.5%	0.0%	1.4%	4.6%
Total		Count	110	60	15	32	217
		% of Total	50.7%	27.6%	6.9%	14.7%	100.0%

Table 9. Crosstabulation between respondents' work status and IT aspect on amount of money purchased over the Internet.

			Respondents' work status				Total
			Employed	Unemployed	Student	Others	
What was the amount of money purchased or ordered via the Internet for private purposes in the last 3 months?	Up to 5000 dinars (up to 50 EURO)	Count	58	32	10	14	114
		% of Total	26.7%	14.7%	4.6%	6.5%	52.5%
	5 000 - 10 000 dinars (50-100 EUR)	Count	33	17	0	6	56
		% of Total	15.2%	7.8%	0.0%	2.8%	25.8%
	10 000 - 50 000 dinars (100-500 EUR)	Count	11	8	1	9	29
		% of Total	5.1%	3.7%	0.5%	4.1%	13.4%
	50 000 - 100 000 dinars (500-1000 EUR)	Count	5	1	0	0	6
		% of Total	2.3%	0.5%	0.0%	0.0%	2.8%
	Over 100,000 dinars (over 1000 EUR)	Count	0	0	1	1	2
		% of Total	0.0%	0.0%	0.5%	0.5%	0.9%
	I do not know	Count	3	2	3	2	10
		% of Total	1.4%	0.9%	1.4%	0.9%	4.6%
Total		Count	110	60	15	32	217
		% of Total	50.7%	27.6%	6.9%	14.7%	100.0%

NOTE: "Others" means "Others not included in the labor force (pensioners, on military service)" in Tables 1–9.

and self-assessments consistently showthat women exhibit lower levels of internet skills [11]. In actual performance tests, however, the measures of skills of men and women do not differ significantly [3][4]. Jung, JY, Qiu, JL, Kim, YC (2001) concluded that gender may not directly influence the level of internet skills, but it does come into play in one's perception [3].

Currently, digitalization seems to favor women in the labour force, since the face a lower risk of being replaced by technology, as compared to men. It would therefore seem that digitalization offers a variety of opportunities for women in the workforce, as a levelling factor, resulting in possible more equalized female participation in the labour market.

European Union has introduced and back a number of programs aimed at increasing the digital literacy rate and increasing basic digital skills in order to ensure life skills and thereby increase employability, but these programs only train for basics over the short term. While that is good as a starting point, digital literacy and skills require long term development and use [12].

The results in the paper will be useful for the further development of future strategies in the field of digitalization where the Republic of Serbia, or similar countries, shall be better able to increase the employability of women in the labour market.

Acknowledgement

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