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DIGITAL COMPETENCES PERFORMANCE OF SERBIAN FEMALE ENTREPRENEURS

Abstract: *This paper aims to examine Serbian female entrepreneurs' performance related to digital competences based on real-life scenario questions. The research was conducted on a sample of 114 female entrepreneurs. The method used for collecting data was an online survey (Google form). The survey questions were based on Digital Competence Framework (DigComp) focusing on the first two areas, "Information and data literacy" and "Communication and collaboration". The results showed that the female entrepreneurs in Serbia achieved better performance (i.e., answered the questions correctly) in the area "Information and data literacy" especially in the segment "Browsing, searching, and filtering data, information and digital content". On the other side, lower performance of Serbian female entrepreneurs was achieved in the area "Communication and collaboration", where nine questions from thirteen were not answered correctly. Segments "Engaging in citizenship through digital technologies", "Collaborating through digital technologies" and "Netiquette" were identified as the most problematic because there was no correct answer. The authors can conclude that skills incorporated in the segments of the second area need to be improved and boosted to be in line with market demands.*

Key words*: digital competences, performance, female entrepreneurs, DigComp, Serbia*

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1. Introduction

As the world is going digital due to structural changes: jobs are also transforming to digital[1]. According to United Nations (2018) over 90% of jobs worldwide have a digital component.[2] That information has led digital competences to be listed as one of the crucial 21st century competences for the world's development (economic, social, etc.) and one of the eight lifelong learning[3] competences. The digital competences is a term used to explain the ability to use information technology in a specific context[4]. As the authors Ivanović and Simović[5] noted, the changes that are constantly happening in the world will influence that every person need to possess a wide range of skills and competences. Also, individuals will have to continuously develop them throughout life. During the time, there is ambiguity about defining differences between skills and competences. Those terms were explained by Beckett (2018)[6]:

- Skills can be defined as specific learning activities
- Competences identify the observable behaviors that successful performers demonstrate on the job

The easier way for understanding is given by the following formula:

Skills + Knowledge + Abilities = Competences[7]

In recent years, the term of digital competences got plenty of synonyms as information communication technology (ICT) skills, technology skills, information technology skills, 21st-century skills, information literacy, digital liter-

1 OECD. (2018): "Gender Equality".
Available at https://www.oecd.org/gender/data/women-in-the-digital-era-internet-use-and-skills-at-work.htm (23.08.2021.)

2 UNICEF. (2021): "What we know about the gender digital divide for girls: A literature review". Available at https://www.unicef.org/eap/reports/innovation-and-technology-gender-equality-0 (24.08.2021.)

3 European Parliament and of the Council. (2006): "Recommendation of the European Parliament and of the Council": Official Journal of the European Union.
Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006H0962 (02.08.2021.)

4 Rizza, Caroline. (2014): "Digital Competences", *Encyclopedia of Quality of Life and Well-Being Research*. 1614-1619.

5 Ivanović, Đina, Simović, Vladimir. (2020): "Digcomp okvir-Metodološki okvir za merenje digitalnih kompetencija". *Trendovi u poslovanju.* 1/2020. 83-92

6 Beckett, Sarah. (2018): "What's the difference between skills and competencies?" Human Resource Systems Group. Available at https://resources.hrsg.ca/blog/what-s-the-difference-between-skills-and-competencies#skills (09.08.2021.)

7 Ibid

acy, and digital skills[8]. Given the need for digital skills, European Commission created Digital Competence Framework (DigComp), a reference framework for measuring digital competences. The aim of measuring digital competences levels is to give feedback for improving and boosting individuals' digital competences. The importance of digital competences has also been pointed out by the EU Science hub[9] considering following statement posted on their website: "Digital Competence Framework can help with self-evaluation, setting learning goals, identifying training opportunities and facilitating job search".

According to the authors Carretero, S., Vuorikari, R., & Punie, Y. (2017)[10] the DigComp framework is combined from five competence areas (explanation):

- "Information and data literacy (to articulate information needs, to locate and retrieve digital data, information and content; to judge the relevance of the source and its content; to store, manage, and organize digital data, information and content);
- Communication and collaboration (To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity; to participate in society through public and private digital services and participatory citizenship; to manage one's digital identity and reputation);
- Digital content creation (To create and edit digital content, to improve and integrate information and content into an existing body of knowledge while understanding how copyright and licenses are to be applied; to know how to give understandable instructions for a computer system);
- Safety (to protect devices, content, personal data and privacy in digital environments; to protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion; to be aware of the environmental impact of digital technologies and their use);
- Problem-solving (to identify needs and problems and to resolve conceptual problems and problem situations in digital environments; to use digital tools to innovate processes and products; to keep up-to-date with the digital evolution)".

In this paper, the DigComp framework, which was the start point for the survey of the project "Digital Competences Development System (DCDS)[11]" was also used as the base for this paper' survey.

[8] Ilomäki Liisa, Kantosalo Anna, Lakkala, Minna: "What is digital competence?" In Linked portal. Available at http://linked.eun.org/web/guest/in-depth3 (02.08.2021)

[9] "DigComp - Being digitally competent – a task for the 21st-century citizen", EU Science Hub - European Commission. Available at https://ec.europa.eu/jrc/en/digcomp (02.08.2021.)

[10] Carretero, Stephanie, Vuorikari, Riina, Punie, Yves. (2017): "The digital competence framework for citizens". Publications Office of the European Union. Available at https://publications.jrc.ec.europa.eu/repository/handle/JRC106281 (10.08.2021.)

[11] Kluzer, Stefano, Padroni, Rodolfo. (2018). "Contents of the self-assessment tool "[Ebook].https://all-digital.org/wp-content/uploads/2019/01/D5.-Contents-of-Self-Assessment-Tool.pdf (09.08.2021.)

The two reasons for conducting this research topic were:

- the high demand for digital technology and consequently higher necessity for different digital skills (which need to be measured on different focus groups)
- still not researched in Serbia and other related countries (the Balkans').

2. Literature review

There is none literature in the world on measuring female entrepreneurs' digital competences by using DigComp framework. The importance of measuring digital competences performance of the entrepreneurs, especially women is high considering that entrepreneurial activity requires to constantly keep up with the pace of digitalization.[12] The authors of the Web Foundation (2015) noted that the women are for about 50% less likely than men to use the internet in poor urban communities[13]. Also, some authors (Cooper, 2006; Correa, 2010; Fallows, 2005; Livingstone & Helsper, 2007; Losh, 2004; Pinkard, 2005; Wilson, Wallin, & Reiser, 2003)[14] citrated in Dixon et. al.[15] pointed out that men own and use computers and the Internet more than women, spend more time online, take more technology classes and show more motivation to learn digital skills.

[12] Rajahonka, M., & Villman, K. 2019. "Women Managers and Entrepreneurs and Digitalization: On the Verge of a New Era or a Nervous Breakdown?". *Technology Innovation Management Review*, 9(6): 14-24.

[13] The Web Foundation. (2015): "Is the web really empowering women?" Available at http://webfoundation.org/docs/2015/10/WROinfographic.png (23.08.2021.)

[14] Cooper, Joel. (2006): "The digital divide: The special case of gender". *Journal of Computer Assisted Learning,* 22, 320– 334.

Correa, Teresa. (2010): "The participation divide among "online experts": Experience, skills and psychological factors as predictors of college students' web content creation". *Journal of computer-mediated communication*, 16(1), 71-92.

Fallows, David. (2005): "How women and men use the Internet". *Pew Internet & American Life Project*, *28*, 1-45.

Livingstone, Sonia, Helsper, Ellen. (2007): "Gradations in digital inclusion: Children, young people and the digital divide". *New media & society*, 9(4), 671-696.

Losh, Susan. (2004): "Gender, educational, and occupational digital gaps 1983-2002". *Social Science Computer Review,* 22(2), 152-166.

Pinkard, Nichole. (2005): "How the perceived masculinity and/or femininity of software applications influences students' software preferences". *Journal of Educational Computing Research*, *32*(1), 57-78.

Wilson, Kenneth, Wallin, Jennifer, Reiser, Christa. (2003): "Social stratification and the digital divide". *Social Science Computer Review*, 21(2), 133-143.

[15] Dixon, Laura, Correa, Teresa, Straubhaar, Joseph, Covarrubias, Laura, Graber, Dean, Spence, Jeremiah, & Rojas, Viviana. (2013): "Gendered space: The digital divide between male and female users in internet public access sites". *Journal of Computer-Mediated Communication*, 19(4), 991-1009.

Casillas M. S. et al. (2017) conducted the research on students and revealed that there were gender differences in terms of ICT knowledge - male students were more knowledgeable and skilled in the use of ICT than women. The reason for these digital competences gender gap can be a result of many different reasons. Quoted by UNICEF (2021)[16] some causes are listed with explanation:

- "lesser access of devices, data and networks (Low levels of infrastructure, network quality and coverage disproportionally affect access. Their choice of network is often restricted by various factors (basic handsets17, fewer choices of SIM, cost of the data18). The Alliance for Affordable Internet (A4AI) reports that costs tend to be higher in areas with lower connectivity due to lack of market competition19 and found that women and girls tend to be more price-sensitive than men. Women often have lower levels of income (women often earn 30–50% less than men) and are often less financially independent20. Women and girls with less disposable income to spend on mobile or internet services21 go online less frequently. Women and girls who live in remote areas were particularly affected, due to significant gaps in infrastructure and network coverage in rural areas22);
- social norms (for example India);
- lower education and less practice in creating digital content;
- online safety (52% of young women globally have experienced some digital harm, there is also a lack of formalized policies to prevent digital harm and protect users)";

For women entrepreneurs, ICT offers plenty opportunities for business and e-business. Even though, in Serbia there is a gap in increasing computer usage between women and men. According to the Report of the Statistical Office of the Republic of Serbia (2020)[23], in the last three months 78.7% male and 67.9% female used the computer. By the same Report, in the last three months the usage of internet was 81.8% of male and 76% of female.

16 UNICEF. (2021), 9, 10, 15.

17 GSMA. (2020): "The mobile gender gap report 2020". Available at https://www.gsma.com/ mobilefordevelopment/wpcontent/uploads/2020/02/ GSMA-The-Mobile-Gender-GapReport-2020.pdf (24.08.2021.)

18 Alliance for Affordable Internet. (2019): "Affordability report 2019". Available at https://a4ai.org/affordability-report/ (24.08.2021.)

19 Ibid, 16

20 Alliance for Affordable Internet. (2015): "Affordability report 2015-16". Available at https://a4ai.org/affordability-report/report/2015/ (24.08.2021.)

21 The Web Foundation. (2015): "Women's rights online". Available at http://webfoundation.org/ docs/2015/10/womens-rightsonline_Report.pdf (24.08.2021.)

22 Ibid, 15

23 Statistical Office of the Republic of Serbia. (2020): "Use of information and communication technology in the Republic of Serbia-Households/individuals/Companies". 18,23.

Measuring the level of digital skills in Serbia, Bradić-Martinović i Banović (2018) found that women have lower level of digital skills compared to men. [24]

All these conclusions should give signal for paying more attention to female digital competences development and their performance.

3. Methodology

The main aim of this paper is to give an overview of the female entrepreneurs 'digital competence performance, in other words, to show the percentage of respondents who gave correct answers on real-life scenario questions. The real-life scenario questions were based on the first two areas of the Digital Competence Framework (DigComp)[25] and incorporated segments:

1. **Information and data literacy**
   - Browsing, searching, and filtering data, information and digital content
   - Evaluating data, information and digital content
   - Managing data, information and digital content)
2. **Communication and collaboration**
   - Interacting through digital technologies
   - Sharing through digital technologies
   - Engaging in citizenship through digital technologies
   - Collaborating through digital technologies
   - Netiquette
   - Managing digital identity

The method used to collect data about female entrepreneurs was an online survey - Google form. It consisted of a total of 75 questions (four general and seventy-one mixed questions i.e., fifty self-assessment and twenty-one real-life scenario questions). The main basis for creating this survey was the EU project "Digital Competences Development System (DCDS)"[26]. The survey lasted from the 5th of February until the 5th of March.

In Table 1 the survey questions structure is shown.

[24] Bradić-Martinović, Aleksandra i Banović, Jelena (2018). Assessment of Digital Skills in Serbia with Focus on Gender Gap. *Journal of Women's Entrepreneurship and Education,* (1-2), 54-67.

[25] Kluzer, Stefano, Pujol-Priego, Laia. (2018): "Digcomp into action: Get inspired, make it happen - A user guide to the european digital competence framework". Joint Research Centre.

[26] Ibid, 11

Table 1: *The structure of the survey questions*

		Number of the questions in the first area* (Information anddata literacy)	**Number of the questions in the second area**** (Communication and collaboration)						
		Segment No.							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
The total number of questions by question type	**Self-assessment questions**	8	4	4	9	4	8	3	6	4
	Real - life scenario questions	5	2	1	4	2	2	1	2	2
Total		**13**	**6**	**5**	**13**	**6**	**10**	**4**	**8**	**6**

* The first area includes the following segments: 1. Browsing, searching, and filtering data, information and digital content; 2. Evaluating data, information and digital content; 3. Managing data, information and digital content

** The second area includes the following segments: 4. Interacting through digital technologies; 5. Sharing through digital technologies; 6. Engaging in citizenship through digital technologies; 7. Collaborating through digital technologies; 8. Netiquette; 9. Managing digital identity

Source: Authors' calculation

As seen from Table 1, the highest total number in both areas belonged to the first segment questions (Browsing, searching, and filtering data, information and digital content with thirteen questions in the first area; Interacting through digital technologies with also thirteen questions in the second area). The authors assumed that reason for conducting the highest number of the questions in the first segments is due to the fact that they are wider than other segments and they can be defined as 'start point' for other segments.

The data of the respondents were collected with the support of the Chamber of Commerce of Serbia and "Biznis na štiklama" associations. The random sample for further analysis was 114. The Saleh and Bista[27] noted that one reason for low response is the fact that below 12% of the participants are not willing to complete the survey if the survey is not of their interest.

[27] Saleh, Amany & Bista, Krishna. (2017): "Examining Factors Impacting Online Survey Response Rates in Educational Research: Perceptions of Graduate Students". *Journal of MultiDisciplinary Evaluation*. 13/2017. 63-74.

4. Results

The descriptive statistics (general data of the respondents) is given in the Table 2.

Table 2. *General sample data (%) ordered ↓*

Education level	Location of residence	Age	Business type
Bachelor *(36.8%)*	Novi Sad *(28.9%)*	18-24 *(44.7%)*	Other *(36.9%)*
High school *(31.6%)*	Kragujevac *(28.9%)*	35-44 *(21.1%)*	Other service activities *(28.9%)*
Master *(28.9%)*	Belgrade *(21.1%)*	45-54 *(18.4%)*	Art, entertainment and recreation *(13.2%)*
PhD *(2.6%)*	Subotica *(10.5%)*	25-34 *(13.2%)*	Education *(10.5%)*
	Užice *(2.6%)*	55-64 *(2.6%)*	Accommodation and catering services *(10.5%)*

Source: Authors' calculation

Most of the respondents (female entrepreneurs) finished bachelor studies (36.8%), were located in Novi Sad and Kragujevac (28.9%), were 18-24 years (44.7%) and had other business types than in mentioned options (36.95).

The first survey question (here presented as example) and answers will be shown in Figure 1. Other questions and their answers will be presented in Table 3.

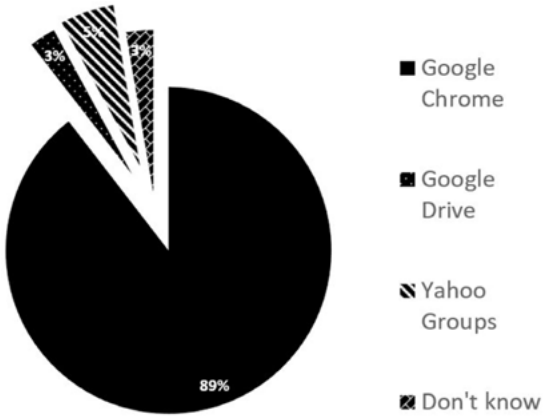

Figure 1: *You are looking for information about the quality of the railway service in your country. In order to find it you use:*

Source: Authors' calculation

89.5% of the respondents answered correctly on this question. Other 10.5% did not answer correctly or answered that they do not know the answer to the question.

Table 3. *The survey questions and the respondents' answers presented in %*

Questions	**% of respondents who answered correctly**	**% of respondents who did not answer correctly or answered with don't know**
You want to refresh the web page you are visiting. You click	97.4	2.6
Click on this link https://ien.bg.ac.rs, navigate into the website and answer the following question: how do you find most information about the IES researchers?	42.1	57.9
Look at the website. The "About us" link is an element of	92.1	7.9
What does it mean to download a file from the internet onto your local device? Before answering the question, please click on this link and download the file	97.4	2.6
Please, click on the two links given and then answer: which one is the official website of Ryanair?	92.1	7.9
Look at the images below, showing the results of a Google search for "solar panels": which of the highlighted items is advertised content?	10.5	89.5
You have to store the digital photos that you took in 2016, 2017, 2018 and you want to group them on a monthly basis for quicker retrieval. Which of the following folder organization solutions do you choose?	60.5	39.5
You are creating a contact on your smartphone about a friend of yours. Which of the following sets of information would you include in the contact in order to communicate effectively with your friend?	92.1	7.9
You have received an email with a file attached from a colleague of yours. You want to send the file to your boss with some changes in the message's text. Which of the following steps do you choose?	73.7	26.3
You want to send a short message to a friend of yours, you send it	100	0
Look at the image below then answer to the following question: in order to create an account on Facebook, you need to	73.7	26.3

[28] Ibid, 3.

What kind of file is it possible to share as an attachment to an e-mail?	94.7	5.3
Can you share a photo by posting it on a website that you are visiting?	36.9	63.1
What is an authentication request?	63.2	36.8
You just moved to Bologna and you would like to use the municipal civic digital network Iperbole. Look at the picture below of the service's online access page: what do you have to do in order to access the service?	57.9	42.1
You received an invitation to a party through an e-mail which was sent to you and three other friends of yours. Unfortunately, you will not be able to go and you want to inform everybody about it. Which of the following e-mail commands would you use to send quickly your regrets message?	81.6	18.4
You have just joined an online professional community and you want to introduce yourself in the general forum. Select the most appropriate way to do so among the three choices below	86.8	13.2
Look at the images below. Which one shows inappropriate online behavior/communication?	86.8	13.2
Which of the following actions can damage your reputation?	86.8	13.2
Look at the pictures below. Which one would you use as a profile picture in a professional social network?	94.7	5.3

Note: The questions with the correct answer>90% are colored grey

Source: Ibid, 3 and authors' calculation

From table 3 it can be seen that all respondents answered correctly on just one question: *You want to send a short message to a friend of yours, you send it*. On the other side, the question *Look at the images below, showing the results of a Google search for "solar panels": which of the highlighted items is advertised content?* was with the lowest percentage of correct answered (10.5%). The authors cannot compare these results exactly because there is no research done on the same basis, but with the similar will be compared to.

As the most commonly used communication device (mobile phone)[29], the result of 100% correct answers on the question mentioned above is approved. In

[29] Papa, Joey. (2017): "Common communication devices". Available at https://itstillworks.com/13661530/common-communication-devices (23.08.2021.)

other words, mobile usage is rapidly growing[30] bringing the need for the mobile competences. Hence, the people are going in line with mobile competence demands for using.

On the other side, the question with the lowest correct answered percentage can be commented as no certain need for digital marketing competences for the participants or a gap of female entrepreneurs' competences in marketing sphere.

6. Conclusion

In the analysis done on random sample of 114 female entrepreneurs' authors found the following: firstly female entrepreneurs were not so willing to participate in the survey (114 participants from more than 1000 sent emails); secondly their knowledge about first two DigComp areas is different - higher performance in the first area "Information and data literacy", especially in browsing the web, above 90% on a scale 0-100% of correct answers comparing to the second area "Communication and collaboration"; thirdly their knowledge about more comprehensive digital competences do not exist – there were none correct answer in segments "Engaging in citizenship through digital technologies", "Collaborating through digital technologies" and "Netiquette".

The authors can conclude that more attention should be paid to motivating women to boost their digital competences through some education programmes, training, workshops and seminars, considering that these competences are essential for living and working in digitized world.

Limitations of the research

Due to insufficient interest in filling out the survey by female entrepreneurs, in the future it is necessary to do the same research on representative sample so that conclusions have much more value.

Acknowledgements

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[30] Statista. (2021): Number of smartphone users from 2016-2021. Available at https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/ (23.08.2021.)

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PERFORMANSE DIGITALNIH KOMPETENCIJA PREDUZETNICA U SRBIJI

Sažetak: *Ovaj rad ima za cilj da ispita performanse preduzetnica u Republici Srbiji usmerene na digitalnim kompetencijama merene na osnovu pitanja iz stvarnog života. Istraživanje je sprovedeno na uzorku od 114 preduzetnica. Metoda koja se koristila za prikupljanje podataka bila je onlajn anketa (Google obrazac). Anketna pitanja su bila zasnovana na Okviru digitalnih kompetencija (DigComp) sa fokusom na prve dve oblasti, "Informisanje i pismenost podataka" i "Komunikacija i saradnja". Rezultati su pokazali da su preduzetnice u Srbiji ostvarile bolje performanse (tj. tačno odgovorile na pitanja) u oblasti "Informisanje i pismenost podataka", posebno u segmentu "Pregledavanje, pretraživanje i filtriranje podataka, informacija i digitalnih sadržaja". S druge strane, slabije performanse srpskih preduzetnica postignute su u oblasti „Komunikacija i saradnja", gde na devet pitanja od trinaest nije odgovoreno tačno. Segmenti „Uključivanje u državljanstvo putem digitalnih tehnologija", „Saradnja putem digitalnih tehnologija" i „Netiketa" identifikovani su kao najproblematičniji jer nisu imali nijedan tačan odgovor.*

Autori mogu zaključiti da veštine ugrađene u segmente druge oblasti treba poboljšati i pojačati kako bi bile u skladu sa zahtevima tržišta.

Ključne reči: *Digitalne kompetencije, učinak, žene preduzetnice, DigComp, Srbija*