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ASSESSMENT OF HUMAN COMPETENCE QUALITY FOR SOCIETY 5.0 READINESS: THE ROLE OF DIGITAL AND MEDIA LITERACY

Abstract: *The development of the Society 5.0 concept opens new questions and research fields regarding understanding the relationship between technology, humans, and society. We are facing the changes and a shift in focus from technologies that are no longer a goal by themselves, but rather a means for improving the quality of life and solving social challenges. While there are numerous studies dealing with technological and organizational aspects of digital transformation, there are also many open questions related to the readiness of individuals and their competencies for active participation in the society that is emerging before us, which can be described as Society 5.0.*

The aim of this paper is to identify the most important competencies required for the building Society 5.0 concept. Furthermore, it is necessary to propose a model for assessing individual readiness through the Society 5.0 Readiness Index. To conduct this research, based on the analysis of relevant literature, 15 key competencies were defined and then evaluated by 30 university professors from different scientific fields. The competencies were grouped into three main dimensions: digital-technological, cognitive-developmental, and social-ethical competencies.

The research further analyzes two particularly important competencies – digital and media literacy, as well as social and emotional intelligence and empathy – on a sample of 300 respondents from Serbia. The results show that the ability to use and critically understand digital technologies, as well as the development of empathy and social responsibility, represent key factors for the successful inclusion of individuals in the building Society 5.0 concept. The proposed approach represents a basis for further development of a model for assessing human readiness for digital and social transformation within the framework of the Quality 4.0 and Society 4.0 concepts.

Keywords: *Society 5.0, human competencies, readiness index, digital literacy, media literacy, socio-emotional intelligence*

1. Introduction

We are witnessing huge changes caused by the concept of Industry 4.0 so called the digital transformation of industry. The

application of new technologies, starting from artificial intelligence, big databases, and the Internet of Things, has contributed to changes in the way industry functions (Adattil et al., 2024). As with all changes throughout

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history, the key factors are actually the changes in technology, processes, or people. Among other changes brought by Industry 4.0, the most significant ones are those the field of human resources, knowledge, and skills.

The ongoing change will primarily focus on human resources and improved approaches to process management. In the analyzed manuscripts, there is a noticeable positive correlation among the topics of Quality 5.0, Society 5.0, and Quality of Life (Stefanovic et al., 2024). On the other hand, there is a need to analyze Society 5.0. Society 5.0 should be one that, “through the high degree of merging between cyberspace and physical space, will be able to balance economic advancement with the resolution of social problems by providing goods and services that granularly address manifold latent needs regardless of locale, age, sex, or language” (Deguchi et al., 2020). In other words, it is necessary to redefine and focus on the connections between technology and society, as well as the technology-supported relationship between individuals and society. Industry 4.0 and 5.0 can be considered as the industrial component of Society 5.0. Within the research of the Society 5.0 concept, numerous questions arise that are focused on the relationship between digital technologies, human competencies, quality of life, and sustainable development, because the essence is the idea of creating a human-centered society in which technology is a means and not a goal for achieving a higher quality of life for every individual.

Despite being a relatively new concept, there are numerous studies. Some studies are focused on the necessary technologies that essentially enable this concept, some of them are dealing with the analysis of the necessary competencies of individuals, while the third group of studies is focused on the required characteristics of organizational and management systems. Within this paper, the focus will be on the individual competencies of people necessary for timely, purposeful, and humane inclusion in the Society 5.0 concept. Within the paper, the necessary

competencies that are of essential importance for Society 5.0 will be defined, along with the Society 5.0 Readiness Index. Finally, two of the most important competencies that greatly contribute to the readiness of individuals for inclusion and realization of the Society 5.0 concept will be analyzed: digital literacy and social and emotional intelligence and empathy.

2. Literature review

Society 5.0 was proposed by the Japan Cabinet to balance economic advancement with the resolution of social problems in Japanese society. Generally, the revolutions of industry and society have profoundly interacted with each other since the First Industrial Revolution (Huang et al., 2022).

The new Era, Era 5.0, which places human beings at the center of innovation and technological transformation, can and must contribute to improving the quality of life, solving social problems, and human well-being, with the support of technology (Mourtzis et al. 2022). Society 5.0 is a true revolution of society and humanity focused on quality of life, human, social, environmental, and economic well-being. Society 5.0 aims to build a completely new society that incorporates advanced technologies such as Big Data, Artificial Intelligence (AI), and the Internet of Things (IoT) into people's daily lives to improve well-being and address social issues. Its foundation is the idea of “human-centric innovation,” which places people at the center of technological development with the aim of creating a better society for everyone (Tyagi et al. 2023).

Being as such, this concept initiated numerous and relatively diversified directions and paths of research, starting from digital transformation of society (Rohayati & Abdillah, 2024; Ydyrysbayev et al., 2022), human capital and competencies (Ikenga & van der Sijde, 2024; Shafie et al., 2025), technology and quality of life (Maljugić et al.,

2024; Mahajan et al., 2025), sustainability (Kasinathan et al., 2022; Ramírez-Márquez et al., 2024), Industry 5.0 and Society 5.0 (Kasinathan et al., 2022), public administration and smart cities (Mishra et al., 2022; Mishra & Singh, 2023), issues of ethics and digital inclusion (Tarumingi et al., 2025), as well as measurement, evaluation, and development of appropriate models (Carayannis & Morawska-Jancelewicz, 2022).

Within this paper, the focus will be on the role of human capital and competencies in the Society 5.0 concept and partially on the proposal of a model for evaluating the readiness of individuals for participation in the digital transformation of society.

Since the entire concept of Society 5.0 is based on human resources and human well-being, it is logical that this research question is one of the more significant and present topics among numerous authors (Azhar, 2022; Lubis & Lubis, 2024). Some authors state that Human resource competency requires hard skills that are adapted to the Society 5.0 era (Lubis & Lubis, 2024), others focus on strengthening AI and digital competencies (Shafie et al., 2025), while some focus on management skills (Atay et al., 2025). What is clear is that there is no general or sufficiently complex model that would include competencies from different areas, as well as no model or index that would indicate the potential readiness of an individual, group, or society to participate and take part in the development of Society 5.0. There are studies on digital readiness (Valaskova et al., 2025) or technological readiness (Magliocca et al., 2024). In this paper, the focus will be on human resources and individual competencies, as well as on the analysis of the most important competencies that should contribute to the digital transformation of society and achieving the final goal, higher quality of life and a more humane society.

3. Skills required for the development of Society 5.0

It is clearly evident that the further development of Industry 4.0 and its transformation into Industry 5.0 will have an impact on social transformation, which will ultimately lead to what we call Society 5.0 (Mourtzis et al., 2022).

Society 5.0 seems to be related more to the human sphere, while Industry 5.0 seems to be more industrial-centered (Dautaj & Rossi, 2021). One of the main aims of green and digital transitions included in Industry 5.0 and Society 5.0 is to ensure that people still lead purpose-driven and creative lives (Carayannis & Morawska-Jancelewicz, 2022), which is why this concept is so significant.

If we base our analysis on the fact that Society 5.0 largely depends on the characteristics and skills of human beings themselves in different social and sociological roles, starting from students, workers, and social beings, it is necessary to define the required characteristics, knowledge, and skills that an individual must and should possess in order to prepare the entire society for evolutionary or revolutionary transformation into the Society 5.0 concept.

If we analyze the essence of Society 5.0, it is clear that there is a set of skills necessary for achieving this concept (Shalender, K. 2023). Based on experience and literature analysis (Dautaj et al., 2025; Ismail et al., 2023; Shalender, K. 2023), we defined 15 necessary skills that are presented in Table 1. In the next step, the assessment of the importance of individual skills for the building Society 5.0 concept was provided by 30 university professors from universities in Serbia according to the following structure: 10 professors from the field of technical and technological sciences, 10 professors from the humanities field, and 10 professors from the field of social sciences.

An important conclusion is that the distribution of assessments was uniform, i.e. there were no statistically significant deviations between the evaluations of

academic staff from all three fields. It goes without saying, for the purposes of similar research, it is possible to survey a differently profiled group of experts depending on the

target group to which the evaluation of skills refers. However, for the first studies in this area, this represents a fully satisfactory sample of experts.

Table 1. Skills Influencing the Realization of the Society 5.0 Concept

No	Skill Area	Specific Skills Required for Society 5.0	Grade
1	Digital Literacy	Use of digital technologies, understanding digital platforms, working with data, and safe use of the internet and digital services	4.9
2	Information and Media Literacy	Finding, evaluating, analyzing, and critically assessing information; recognizing misinformation, manipulation, and fake content	4.8
3	AI Literacy	Understanding the capabilities and limitations of artificial intelligence, proper use of AI tools, and interpretation of AI system outputs	4.5
4	Data Literacy	Understanding data collection, processing, analysis, and interpretation; making decisions based on data-driven insights	4.3
5	Cybersecurity	Protection of personal data, safe behavior in digital environments, and understanding cybersecurity risks	4.1
6	Human–Machine Collaboration	Ability to work with automated systems, robots, and intelligent tools	3.7
7	Critical Thinking	Assessing information reliability, logical reasoning, solving complex problems, and making informed decisions	4.9
8	Creativity and Innovation	Generating new ideas, designing new solutions, and adapting to changes driven by technological development	4.2
9	Digital Adaptability	Ability to continuously learn and adapt to new technologies and changes in the labor market	4.7
10	Communication Skills	Effective communication in digital environments, virtual collaboration, and management of digital identity	3.9
11	Social and Emotional Intelligence and Empathy	Empathy, human–technology collaboration, and understanding the social consequences of technological changes	4.9
12	Ethical and Civic Responsibility	Understanding privacy, data protection, algorithmic bias, digital rights, and responsible use of technology	4.4
13	Systems Thinking	Understanding the interconnections between technology, economy, ecology, and social systems	4.0
14	Lifelong Learning	Continuous development of knowledge and competencies throughout life	4.6
15	Problem-Solving Skills	A fundamental universal skill, partially covered through critical thinking, creativity, and systems thinking	3.6

The analysis of Table 1 indicates interesting facts. In addition to some skills that have already been highly positioned in previous analyses of human resource quality, such as lifelong learning, communication skills, problem-solving, creativity and innovativeness, and systems thinking, new

characteristics and skills also appear, such as emotional intelligence and empathy, digital adaptability and cooperation with machines, as well as, of course, different aspects of the concept of digital and AI literacy.

Table 2. Grouped Model for Society 5.0

Dimension	Included Skills	Total Score	Dimension Weight
Digital-Technological Competencies	Digital literacy, information and media literacy, AI literacy, data literacy, cybersecurity, human-machine collaboration, digital adaptability	31.0	46.6%
Cognitive and Developmental Competencies	Critical thinking, creativity and innovation, systems thinking, self-directed learning, problem-solving skills	21.3	32.0%
Social and Ethical Competencies	Communication skills, social and emotional intelligence, ethical and civic responsibility	13.2	19.8%
TOTAL		66.5	100%

The next logical step was the grouping of the presented competencies and skills into appropriate groups, namely: Digital-Technological Competencies, Cognitive and Developmental Competencies, and Social-Ethical Competencies (Table 2). For each of the mentioned groups, the sum of scores was calculated, and based on these values, the weighting dimension was determined. This served as the basis for defining the Society 5.0 Readiness Index, which is:

$$\text{Society 5.0 Readiness Index} = 0.466(\text{DT}) + 0.320(\text{KR}) + 0.198(\text{SE})$$

DT – Digital-Technological Competencies
 KR – Cognitive and Developmental Competencies
 SE – Social-Ethical Competencies

Different authors are intensively dealing with the assessment of the readiness of society or systems for transformation toward the Society 5.0 concept (Magliocca, et al., 2024; Suparno et al., 2023), but in this paper, the Society 5.0 Readiness Index was developed, which shows the assessment of competencies and skills of individuals or groups for achieving the Society 5.0 concept. This approach has significant advantages because other authors are mainly focused on the readiness of governments and organizational systems, as well as technical readiness. This is one of the first indices that indicates the readiness of human resources.

On the other hand, a new question arises: how to evaluate and what influences some of these defined skills. For the purposes of this paper, two of the most influential skills were analyzed: digital literacy and social and emotional intelligence and empathy. The assumption is that by influencing the development of certain skills, we can influence the improvement of the Society 5.0 Readiness Index, which would be of undeniable and significant importance for further development and new steps in the ongoing industrial and social evolution.

4. Digital and media literacy and empathy as important factors in the realization of the society 5.0 concept

4.1. Digital and media literacy

Digital and media literacy combines the skills needed to find, understand, evaluate, and create information using digital technologies. It consists of accessing tools, analyzing credibility, creating content, acting responsibly, and reflecting on behavior (Iordache et al., 2017; Meyers et al., 2013; Koltay, 2011). The development of the concept of media, and later digital media literacy, is based on the contributions of numerous authors who viewed this field from different perspectives – educational, social, technological, and ethical. Among the most significant are Hobbs (2010), Hobbs (2017), Jenkins (2006), Livingstone (2004), Marin

and Castaneda (2023) and Buckingham (2015).

Hobbs (2010) emphasizes that media literacy does not only mean the ability to use technology, but also the ability to analyze, evaluate, and create media content. Special importance is given to understanding information sources, recognizing manipulation, and developing responsible behavior in the digital environment (Hobbs, 2010).

Critical thinking represents one of the basic components of digital media literacy (Scheibe & Rogow, 2011). Art (2018) and López-González et al. (2023) emphasize the importance of the individual's ability to analyze, interpret, and evaluate media messages, while critical analysis of sources, recognition of bias, and distinguishing facts from opinions are considered key skills of the modern citizen. A critical approach to media enables individuals to recognize hidden interests, manipulative techniques, and potential misinformation (Chadwick & Stanyer, 2022).

The problem of misinformation and information manipulation has become particularly significant with the development of digital platforms. Numerous researchers have investigated the ways of spreading fake news, the role of social networks and algorithms in the formation of the information environment (Dumbre, 2025; Mwangi, 2023). Their research indicates the need to develop skills for fact-checking, source analysis, and understanding the context in which information is created and distributed (Agunlejika, 2025).

Livingstone (2004) showed that the development of digital competencies depends on the social, cultural, and family context. They especially emphasize the role of educational institutions in developing responsible internet use, privacy protection, and understanding the risks of the digital environment.

Jenkins (2006) through the concept of participatory culture made an important contribution to understanding the changes brought by digital media. In his works, the media user is no longer only a passive receiver of information, but an active participant who creates, shares, and interprets content. Digital media literacy therefore includes not only media consumption, but also the ability for creative creation, cooperation, and responsible participation in digital communities (Jenkins, 2006).

Buckingham (2015) further develops the critical approach to media education and emphasizes the relationship between media, culture, identity, and ideology. Buckingham (2015) emphasizes the need for the integration of media literacy into the education system. According to Buckingham, students should develop the ability to critically understand media content, but also become active participants in its creation (Buckingham, 2015).

A special segment of digital media literacy relates to ethics and responsible behavior in the digital space. Numerous authors point out the importance of moral principles in communication, respect for privacy, copyright, and responsible sharing of information (Kuiler, 2024; Painter, et al., 2025; Zhanbayev et al., 2023). Digital competence is therefore not only technical knowledge, but also includes understanding the consequences of one's own behavior in the virtual space (Villar-Onrubia et al., 2022; Zvereva, 2023).

Based on the contributions of the mentioned authors, it can be concluded that digital media literacy represents a complex competence that combines critical thinking, understanding of media context, the ability to recognize manipulation, creative content creation, ethical behavior, and active citizenship. In the contemporary digital society, it becomes one of the key skills for making informed decisions and responsible participation of individuals in social processes.

4.1.1 Demographic structure of respondents

Within this paper, a study was conducted to investigate the extent to which digital literacy skills and empathy are present in the context of the preparation and implementation of the

Society 5.0 concept. The research was conducted on a group of 300 respondents from the territory of Serbia, where respondents were grouped into corresponding geographic regions (Table 3).

Table 3. Demographic Structure of Respondents

Variable	Category			Frequency (N)	Perc. (%)
Variable Gender	Male			142	47,3
	Female			158	52,7
	Total			300	100,0
Region of Serbia	Central Serbia			87	29,0
	Southern Serbia			59	19,7
	Belgrade			80	26,7
	Vojvodina			74	24,7
	Total			300	100,0
Educational Level	Educational Level	F	Perc. (%)	M	Perc. (%)
	No formal education (no completed schooling)	4	1,4	5	1,8
	Primary school education	18	6,5	16	5,8
	Secondary school education (3 or 4 years)	101	36,5	98	35,6
	Higher vocational education	39	14,1	36	13,1
	University degree (higher education)	92	33,2	94	34,2
	Specialist degree / Master's degree	14	5,1	18	6,5
	Doctoral degree (PhD)	9	3,2	8	2,9
	Total	277	100,0	275	100,0

Source: Mirković (2022), results of primary research

4.1.2 Internet access and use of social networks

The first question considered the way in which people access the Internet and social networks. For accessing social networks at home or elsewhere, respondents most frequently use a mobile phone 35.62 percent, a laptop 19.21 percent, a smart TV 15.52 percent, a desktop computer 11.45 percent, a tablet 9.41 percent, a game console or player is used by 6.62 percent, some other device is used by 1.53 percent, while only 0.38 percent of respondents do not use the Internet (Figure 1).

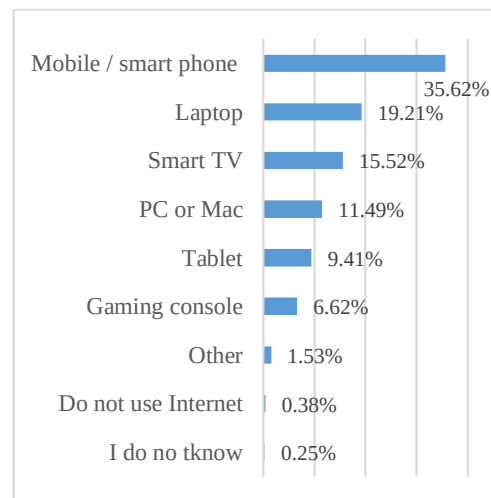


Figure 1. Device Used for Accessing Social Networks

Source: Mirković (2022)

The most frequently used social network by respondents is YouTube, used by 26.62 percent, Instagram by 19.59 percent, Snapchat and TikTok are used by 17.38 percent and 17.10 percent, respectively, Pinterest by 8.13 percent, Facebook by 7.21 percent, Twitter by 3.42 percent, while 0.55 percent of respondents are not on social networks (Figure 2).

Regarding awareness of internet safety and acceptance of safety-related advice, 44.5 percent of respondents fully follow safety recommendations, 25.6 percent follow them sometimes, 2.6 percent do not follow them at all, 25.3 percent think that they are always safe on the Internet, while 1.9 percent do not know anything about internet safety (Table 4).

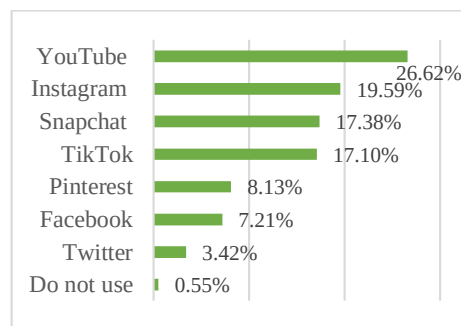


Figure 2. Use of Social Networks

Source: Mirković (2022)

4.1.3 Safe use of the internet and digital services

In the next step, the modalities of safe use of the Internet and digital resources were investigated.

Table 4. Awareness of Internet Safety and Acceptance of Safety-Related Advice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fully follow	137	44,5	44,5	44,5
	Sometimes follow	79	25,6	25,6	70,1
	Do not follow at all	8	2,6	2,6	72,7
	Always safe online	78	25,3	25,3	98,1
	Not informed, know nothing about online safety	6	1,9	1,9	100,0
	Total	308	100,0	100,0	

Source: Mirković (2022)

The Chi-square test of independence did not show a significant relationship between gender and following safety advice on the Internet, $\chi^2(4, n=300)=7.37$, $p=0.118$, Cramer's $V=0.157$.

Since the contingency table gender $\times$ following safety advice = 2×5 (larger than 2×2), the values of Adjusted Residuals are relevant (Table 5).

Values greater than two (2) indicate that the number of cases in the cell is higher than expected, while values lower than -2 indicate that the number of cases in the cell is lower than expected.

The Chi-square test of independence did not show a significant relationship between the region and following safety advice on the Internet, $\chi^2(12, n=300)=12.238$, $p=0.352$,

Cramer's $V=0.121$. For respondents living in the Central Serbia region, the number of cases for the statement "Completely" was significantly higher than expected, while for the statement "I am always safe online" it was significantly lower than expected.

The Kruskal-Wallis Test revealed a statistically significant difference in the assessment of campaigns on safe behavior on social networks among the four regions in which respondents live (Gp1, $n=84$: Central Serbia, Gp2, $n=54$: South Serbia, Gp3, $n=79$: Belgrade, Gp4, $n=73$: Vojvodina), $\chi^2(3, n=257)=12.761$, $p=0.005$. In this case, the variable is on average higher (slightly higher Mean Rank) for respondents from Vojvodina (where the median is 5, meaning that 50 percent of respondents gave a score of six (6)

or seven (7)), while for respondents from Belgrade the median is two (2), meaning that 50 percent of respondents gave a score of two (2) or one (1)) (Table 6).

Table 5. Crosstabulation gender* Following Safety Advice (Mirković, 2022)

			If you know (are informed) how to stay safe online, do you actually follow this advice?					Total
			Fully follow	Sometimes follow	Do not follow at all	Always safe online	Not informed, know nothing about online safety	
Gender	Male	Count	55	39	6	39	3	142
		% within gender	38,7%	27,5%	4,2%	27,5%	2,1%	100,0%
		Adjusted Residual	-2,0	,4	2,1	,9	,6	
	Female	Count	79	40	1	36	2	158
		% within gender	50,0%	25,3%	,6%	22,8%	1,3%	100,0%
		Adjusted Residual	2,0	-,4	-2,1	-,9	-,6	
Total		Count	134	79	7	75	5	300
		% within gender	44,7%	26,3%	2,3%	25,0%	1,7%	100,0%

Table 6. Crosstabulation region* Following Safety Advice (Mirković, 2022)

			If you know (are informed) how to stay safe online, do you actually follow this advice?					Total
			Fully follow	Sometimes follow	Do not follow at all	Always safe online	Not informed, know nothing about online safety	
Part of Serbia (region)	Central Serbia	Count	47	21	3	15	1	87
		% within Part of Serbia, (Region)	54,0%	24,1%	3,4%	17,2%	1,1%	100,0%
		Adjusted Residual	2,1	-,3	,5	-2,1	-,7	
	South Serbia	Count	31	11	2	13	2	59
		% within Part of Serbia, (Region)	52,5%	18,6%	3,4%	22,0%	3,4%	100,0%
		Adjusted Residual	1,4	-1,3	,4	-,7	,9	
	Belgrade	Count	29	23	2	24	2	80
		% within Part of Serbia, (Region)	36,3%	28,8%	2,5%	30,0%	2,5%	100,0%
		Adjusted Residual	-1,8	,8	-,1	1,1	,4	
	Vojvodina	Count	27	21	1	24	1	74
		% within Part of Serbia, (Region)	36,5%	28,4%	1,4%	32,4%	1,4%	100,0%
		Adjusted Residual	-1,6	,7	-,8	1,6	-,5	
Total		Count	134	76	8	76	6	300
		% within Part of Serbia, (Region)	44,7%	25,3%	2,7%	25,3%	2,0%	100,0 %

4.1.4 Data Processing, learning, and digital content creation

Learning – the average score is 3.80, the median is four, meaning that 50 percent of respondents gave a score of four or lower, the typical score is four, the coefficient of variation is 49.47 percent (the variability is moderate), Skewness is 0.128, meaning that the variable shows a small positive asymmetry, Q1 is two, Q3 is five, IQR is three, and there are no outlier data (Figure 3 and Figure 4).

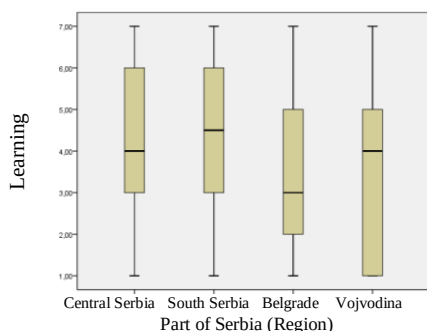


Figure 3. Learning by Region
Source: Mirković (2022)

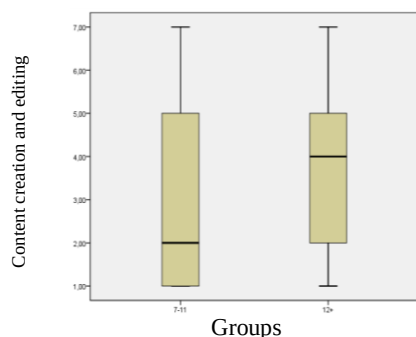


Figure 4. Content Creation and Editing by Age Groups
Source: Mirković (2022)

The Kruskal-Wallis Test revealed a statistically significant difference in the use of social networks for learning among the four regions in which respondents live (Gp1, n=86: Central Serbia, Gp2, n=58: South Serbia, Gp3, n=79: Belgrade, Gp4, n=73: Vojvodina), $\chi^2(3, n=296)=13.253, p=0.004$.

In this case, the variable is on average higher (slightly higher Mean Rank) for respondents from South Serbia and Central Serbia (where Q3 is six, meaning that 75 percent of respondents gave a score of six or lower, while 25 percent gave a score of seven).

The Kruskal-Wallis Test revealed a statistically significant difference in the use of social networks for learning among the four regions in which respondents live (Gp1, n=85: Central Serbia, Gp2, n=56: South Serbia, Gp3, n=80: Belgrade, Gp4, n=73: Vojvodina), $\chi^2(3, n=296)=13.945, p=0.003$. In this case, the variable is on average higher (slightly higher Mean Rank) for respondents from South Serbia and Central Serbia (where Q3 is 6.5 and six, respectively, meaning that 25 percent of respondents gave a score of seven).

Content creation and editing – the average score is 3.63, the median is three, meaning that 50 percent of respondents gave a score of three or lower, the typical score is one, the coefficient of variation is 58.12 percent (the variability is high), Skewness is 0.208, meaning that the variable shows a small positive asymmetry, Q1 is two, Q3 is five, IQR is three, and the variable has no outlier data.

4.2 Empathy as cognitive and emotional competence

Empathy represents the ability to understand the inner world of another person, that is, the temporary perception of reality from their perspective without judgment and imposing one's own values. Paananen et al. (2023) find that empathy involves entering the private perceptual world of another person and understanding their feelings, experiences, and the meanings they assign to their own experiences.

Contemporary psychology distinguishes two basic dimensions of empathy: affective and cognitive empathy. Affective empathy refers to the ability to share the emotional experience of another person, while cognitive empathy represents the ability to understand

other people's perspectives, values, motives, and life circumstances. Although they are connected, these two dimensions have different functions. Affective empathy enables emotional connection, while cognitive empathy enables more precise understanding of the needs of others and making more appropriate decisions.

The special importance of cognitive empathy is reflected in the possibility of overcoming prejudices and better understanding people from different cultural, social, and life contexts. The lack of the ability to understand the perspective of another person has often been associated with social injustice, discrimination, and conflicts. Therefore, empathy represents an important basis for the development of tolerance, cooperation, and responsible social behavior (Waghid, 2024; Giddens & Sutton, 2009).

Contemporary research indicates that empathy is not only an innate characteristic, but also a skill that can be developed throughout life (Bulgarelli & Jones, 2023). However, the development of empathetic abilities also depends on experience, education, and the conscious effort of an individual to understand other people (Ergin 2024; Milovanović, 2026).

Numerous studies show that taking the perspective of another person increases the willingness to help and engage in prosocial behavior. Batson (2023) research confirms that individuals who try to understand the experiences of others show a higher level of empathic concern and greater willingness to provide support (Batson, 2023). Therefore, empathy represents an important component of moral development, social responsibility, and active citizenship.

In the context of the digital age, empathy gains additional importance because it influences the way individuals communicate, evaluate information, and relate to others in the virtual space (Fuchs, 2014; Čekić, 2025). The development of empathy is connected with the ability to understand different perspectives, responsible behavior on the Internet, and higher-quality social interactions.

4.2.1 Analysis of the level of empathy

In this part of the research, we analyzed the level of empathy in the same group in which we analyzed media and digital literacy (Table 7).

Table 7. Level of Agreement with Items/Statements – Empathy

Item / Variable / Statement	Mean	Median	Mode	Std. Deviation	Coefficient of variation (CV)
I sometimes try to better understand my friends by imagining how things look from their perspective.	5,27	6	7	1,76	33,48 %
I quickly notice when someone in a group feels uncomfortable or uneasy.	5,24	6	7	1,72	32,89 %
I try to consider everyone's point of view in a discussion before making a decision.	5,19	6	7	1,89	36,38 %
I easily notice when someone wants to join a conversation.	5,18	6	7	1,82	35,03 %
I quickly understand when someone says one thing but means something else.	5,14	6	7	1,97	38,36 %
My friends often talk to me about their problems because they say I am understanding.	5,01	6	7	2,06	41,19 %
I can easily tell whether what I am saying is interesting or boring to the person I am talking to.	4,96	5	7	1,93	38,86 %

I am happy when I am in a cheerful group and sad when others are feeling down.	4,79	5	7	1,96	41,03 %
I can tell when someone is hiding their true emotions.	4,65	5	7	1,93	41,45 %
Before criticizing someone, I try to imagine how I would feel in their place.	4,60	5	7	2,04	44,35 %
Before doing something, I try to consider how my friends will react to it.	4,58	5	7	1,97	43,01 %
I always try to consider another person's feelings before doing something.	4,51	5	7	1,94	42,95 %
I can easily understand what another person would like to talk about.	4,49	5	7	1,93	42,98 %
The people I spend time with have a strong influence on my mood.	4,39	4	7	2,03	46,15 %
I worry when other people are worried or panicking.	4,38	5	5	1,90	43,40 %
I can sense that I am imposing on someone even when they do not tell me.	4,36	5	7	2,08	47,72 %
I can accurately predict what someone else will do.	4,33	4	4	1,89	43,73 %
I can accurately predict how someone else will feel.	4,31	5	7	2,04	47,38 %
I am strongly affected when one of my friends appears upset.	4,28	5	7	2,01	47,04 %
Other people tell me that I am good at understanding how they feel and what they think.	4,24	4	7	2,11	49,76 %
I often understand other people's perspectives, even when I do not agree with them.	4,22	4	5	1,90	45,12 %
I often become deeply involved in the feelings of a character in a movie, play, or novel.	4,16	4	7	2,18	52,42 %
I become very upset when I see someone crying.	4,15	4	7	2,16	51,90 %
I often become emotionally involved in my friends' problems.	4,05	4	1	2,17	53,51 %
I find it difficult to understand why certain things affect other people so much.	3,79	4	3	2,00	52,73 %
I tend to become nervous when people around me appear nervous.	3,63	3	1	2,23	61,37 %
I sometimes find it difficult to see things from another person's perspective.	3,41	3	1	1,95	57,30 %
I find it easy to put myself in "someone else's shoes."	3,37	3	1	2,00	59,36 %
I usually remain emotionally detached when watching a movie.	3,33	3	1	2,15	64,70 %
I am usually objective when watching a movie or play, and I do not often become deeply absorbed in them.	3,21	3	1	1,91	59,74 %
When someone annoys me, I usually try to put myself in "their shoes" for a while.	3,20	3	1	2,05	64,15 %

Source: Mirković (2022)

The Mann-Whitney U test revealed statistically significant differences in the assessment of statements/items according to gender for all listed statements/items from Table 8 (all Asymp. Sig. (2-tailed) values are

less than 0.05). The effect sizes (r) are also presented in Table 35 (0.1 = small effect, 0.3 = medium effect, 0.5 = large effect). Each of the variables/items has a higher average value (higher Mean Rank) for female respondents.

Table 8. Results of the Mann-Whitney U Test by Items in Relation to Respondents' Gender

Item / Statement	According to gender					
	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	N	Effect size measure (r)
I often become emotionally involved in my friends' problems.	6993,00	17146,00	-5,699	,000	300	0,33
I tend to become nervous when people around me appear nervous.	8037,50	18048,50	-4,144	,000	298	0,24
The people I spend time with have a strong influence on my mood.	9253,50	19264,50	-2,304	,021	296	0,13
I am strongly affected when one of my friends appears upset.	8617,00	18770,00	-3,428	,001	299	0,20
I often become deeply involved in the feelings of a character in a movie, play, or novel.	8822,50	18833,50	-3,144	,002	299	0,18
I become very upset when I see someone crying.	9284,50	19437,50	-2,608	,009	300	0,15
I am happy when I am in a cheerful group and sad when others are feeling down.	8989,00	19142,00	-2,945	,003	299	0,17
I worry when other people are worried or panicking.	9169,00	19322,00	-2,763	,006	300	0,16
I easily notice when someone wants to join a conversation.	8716,00	18869,00	-3,419	,001	300	0,20
I quickly understand when someone says one thing but means something else.	8725,50	18878,50	-3,426	,001	300	0,20
I quickly notice when someone in a group feels uncomfortable or uneasy.	8800,50	18953,50	-3,306	,001	300	0,19
Other people tell me that I am good at understanding how they feel and what they think.	8250,00	18403,00	-3,928	,000	299	0,23
I can easily tell whether what I am saying is interesting or boring to the person I am talking to.	8243,50	18254,50	-3,966	,000	299	0,23
My friends often talk to me about their problems because they say I am understanding.	6482,00	16493,00	-6,434	,000	299	0,37
I can sense that I am imposing on someone even when the other person does not tell me.	8718,50	18871,50	-3,376	,001	300	0,19
I can easily understand what another person would like to talk about.	8907,50	18918,50	-3,029	,002	299	0,18
I can tell when someone is hiding their true emotions.	8077,00	18230,00	-4,248	,000	300	0,25
I often understand other people's perspectives, even when I do not agree with them.	8917,00	18928,00	-3,012	,003	299	0,17

Source: Mirković (2022)

4.2.2 Factor analysis: Empathy

Factor analysis will be used to explain the common variance of the set of statements/items, that is, the variability within the group of statements “Empathy” will be explained. For the purposes of factor analysis, 14 items/statements were selected, thereby meeting the required conditions (more than 150 cases, and the correlation matrix contains a part of correlations greater than 0.3). Considering the sample size (308), the factor loading value is 0.35.

Table 9. KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,855
Bartlett's Test of Sphericity	Approx. Chi-Square	1033,145
	df	91
	Sig.	,000

Source: Mirković (2022)

The value of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.855, and Bartlett's test of sphericity reached statistical significance (Sig = 0.000), which indicates the factorability of the correlation matrix, meaning that factor analysis is justified (Table 9).

Since we are interested only in components with eigenvalues of 1 or higher, we have three components with eigenvalues above 1 (4.165, 1.185, and 1.233), which explain 29.75 percent, 13.26 percent, and 8.80 percent of the variance, respectively. These three components explain a total of 51.82 percent of the variance. On the scree plot (which is the result of the SPSS report), we observed the existence of a clear breaking point between the third and fourth components; see Figure 5. In order to determine the number of factors that should be retained, a parallel analysis will be performed.

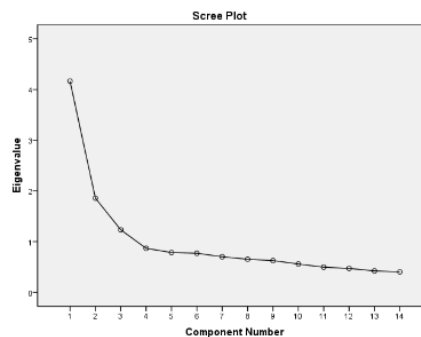


Figure 5. SPSS report

Source: Mirković (2022)

Table 10. SPSS report

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4,165	29,750	29,750	4,165	29,750	29,750	3,901
2	1,856	13,260	43,010	1,856	13,260	43,010	2,617
3	1,233	8,805	51,815	1,233	8,805	51,815	1,267
4	,867	6,192	58,007				
5	,784	5,602	63,610				
6	,770	5,499	69,109				
7	,700	5,002	74,111				
8	,652	4,657	78,768				
9	,625	4,464	83,232				
10	,557	3,981	87,213				
11	,496	3,540	90,754				
12	,470	3,360	94,114				
13	,422	3,012	97,126				
14	,402	2,874	100,000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

The results of the parallel analysis support the conclusion made based on the scree plot that three factors should be retained for further analysis, whose eigenvalues exceed the corresponding threshold value obtained using an equally large matrix of random numbers (14 variables $\times$ 308 respondents).

In the SPSS report, the Pattern Matrix table (Table 10 and Table 11) contains the unrotated factor loadings of each variable for the three components (factors). Factor loadings greater than 0.35 are presented for the three factors, where component one (1) has eight (8) factor loadings greater than 0.35, component two (2) has four (4) factor

loadings greater than 0.35, and component three (3) has only two (2) factor loadings greater than 0.35. Ideally, each component should have three (3) or more factor loadings greater than 0.35, so the two-factor solution would still be more appropriate.

4.2.3 Emotional intelligence

In this part of the research, the focus was on measuring the emotional intelligence of respondents, and all participants in the research used the self-assessment scale to select the level of agreement or disagreement with the listed statements.

Table 11. SPSS report Pattern Matrix^a

	Component		
	1	2	3
I quickly understand when someone says one thing but means something else.	,753		
I can easily understand what another person would like to talk about.	,728		
I can tell when someone is hiding their true emotions.	,722		
I can easily tell whether what I am saying is interesting or boring to the person I am talking to.	,681		
My friends often talk to me about their problems because they say I am understanding.	,656		
Other people tell me that I am good at understanding how they feel and what they think.	,644		
I can sense that I am imposing on someone even when the other person does not tell me.	,560		
I often understand other people's perspectives, even when I do not agree with them.	,553		
I become very upset when I see someone crying.		,831	
I often become deeply involved in the feelings of a character in a movie, play, or novel.		,745	
I am strongly affected when one of my friends appears upset.		,725	
I often become emotionally involved in my friends' problems.		,650	
I am usually objective when watching a movie or play, and I do not often become deeply absorbed in them.			,773
I find it difficult to understand why certain things affect other people so much.			,730
Extraction Method: Principal Component Analysis.			
Rotation Method: Oblimin with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			
Source: Mirković (2022)			

By observing the assessment of respondents' agreement with the 30 statements/items of the "Emotional Intelligence" section (1 – completely inaccurate, 7 – completely accurate) from Table 12, it can be concluded that:

- The statements with the highest average scores (level of agreement of respondents) above 4.50 are: I am satisfied with my childhood, I generally believe that things in my life will turn out well in the end, I can successfully

cooperate with people, I believe that I have many strengths, I feel that I have many good qualities, I am generally able to adapt to new environments, I would describe myself as a person who knows how to negotiate, I usually manage to find a way to control my feelings when I want to, I often think about my feelings, I am a highly motivated person. The first three statements have a median of six (meaning that 50 percent of respondents gave a score of seven), while the others have a median of five. The typical response (mode) for all statements is seven, and for all statements the variability is moderate (coefficients of variation are in the interval from 30 percent to 50 percent).

- The statements with the lowest average scores (below 3.50) are: I often find it difficult to stand up for myself and my

rights, I often find it difficult to see things from another person's perspective, I often have a negative view of things around me, I generally do not think that life is pleasant, I find it difficult to become strongly attached even to those who are close to me, It seems that I have no influence on other people's feelings, I often find it difficult to adapt to circumstances, Close people often complain that I do not treat them properly. Each of the statements has a median of three (50 percent of respondents gave a score of three (3) or lower), the typical response (mode) is one, and there is high variability (coefficients of variation are in the interval from 50 percent to 70 percent), except for the variable Close people often complain that I do not treat them properly, which has very high variability.

Table 12. Level of Agreement with Items/Statements – Emotional Intelligence

Statement	Mean	Median	Mode	Std. Deviation	Coefficient of variation (CV)
I am satisfied with my childhood.	5,53	6	7	1,93	34,83 %
I generally believe that things in my life will turn out well in the end.	5,28	6	7	1,89	35,87 %
I am able to successfully cooperate with other people.	5,18	6	7	1,78	34,30 %
I believe that I have many strengths.	5,03	5	7	1,79	35,60 %
I feel that I have many positive qualities.	4,94	5	7	1,74	35,13 %
I am generally able to adapt to new environments.	4,83	5	7	1,94	40,15 %
I would describe myself as a person who knows how to negotiate.	4,74	5	7	2,10	44,22 %
I am usually able to find ways to control my emotions when I want to.	4,71	5	7	1,94	41,18 %
I often think about my feelings.	4,64	5	7	2,03	43,84 %
I am a highly motivated person.	4,62	5	7	1,98	42,71 %
Sometimes I get involved in things that I later wish I could get out of.	4,39	5	7	2,09	47,62 %
I know how to cope with stress.	4,38	5	7	2,11	48,08 %
I have no difficulty expressing my feelings in words.	4,36	4	7	2,25	51,65 %
I am usually able to influence how other people feel.	4,17	4	3	1,91	45,80 %
I am usually able to put myself in another person's position and experience their feelings.	4,05	4	4	2,02	49,82 %

Table 12. Level of Agreement with Items/Statements – Emotional Intelligence (continued)

Statement	Mean	Median	Mode	Std. Deviation	Coefficient of variation (CV)
I often change my mind.	4,00	4	7	2,03	50,59 %
I usually find it difficult to control my emotions.	3,99	4	1	2,09	52,27 %
I usually find it difficult to maintain my motivation.	3,82	4	1	2,04	53,29 %
I often find it difficult to show love to those who are close to me.	3,75	4	1	2,24	59,79 %
Others admire my calmness.	3,69	4	1	2,07	56,04 %
I often cannot recognize what emotion I am feeling.	3,69	3	1	2,12	57,47 %
I tend to withdraw, even when I know I am right.	3,62	4	1	2,20	60,74 %
I often find it difficult to stand up for myself and my rights.	3,44	3	1	2,13	61,99 %
I often find it difficult to see things from another person's perspective.	3,44	3	1	1,91	55,52 %
I often have a negative view of the things around me.	3,30	3	1	2,05	62,09 %
I generally do not think that life is enjoyable.	3,25	3	1	2,08	63,97 %
I find it difficult to form strong attachments, even with people close to me.	3,23	3	1	2,12	65,64 %
It seems that I have no influence on other people's feelings.	3,04	3	1	1,91	62,69 %
I often find it difficult to adapt to circumstances.	3,00	3	1	1,84	61,30 %
People close to me often complain that I do not treat them properly.	2,46	2	1	1,90	77,31 %

Source: Mirković (2022)

5. Conclusion

The Society 5.0 concept represents a new view of the development of society and industry in which technology (from the Industry 4.0 toolbox) should be in the service of humans, especially for improving quality of life and solving complex social challenges (sustainability, energy issues, and many other development issues). In previous phases of digital transformation, where the dominant focus was on technological innovations, new technologies, and system efficiency, Society 5.0 requires a different approach in which human competencies become one of the key prerequisites for a successful transformation. The results of this research confirm that the

readiness for Society 5.0 cannot be observed exclusively through the level of technological development, but through the ability of individuals to understand, use, and critically evaluate technology as well, while maintaining social responsibility, empathy, and the ability to cooperate in the new digital environment.

Based on the analysis of the relevant literature and the assessment of a multidisciplinary group of experts, 15 competencies were identified that represent the basis of human readiness for Society 5.0. By grouping them, three key dimensions were defined: digital-technological competencies, cognitive-developmental competencies, and social-ethical competencies. Expert assessments

showed that the greatest importance is given to digital literacy, critical thinking, information and media literacy, as well as social and emotional intelligence and empathy. This result indicates that the future society will not require only individuals who know how to use digital technologies, but individuals who can understand their consequences, assess their reliability, and use them in a responsible manner.

Based on the obtained results, the Society 5.0 Readiness Index was proposed as a framework for assessing the readiness of human resources for participation in the process of social transformation. The special value of this approach is reflected in the fact that existing readiness models mainly analyze technological infrastructure, organizational capacities, or institutional readiness, whereas the individual as the main carrier of changes is placed at the very center. Although the proposed index represents an initial conceptual model, its introduction opens the possibility for systematic monitoring of the development of human competencies and identification of areas where additional education and development are needed.

The empirical results of the research on digital and media literacy on a sample of 300 respondents from Serbia further confirm the importance of this competence for Society 5.0. The results presented in this paper indicate that respondents most often access the Internet through mobile devices (35.62%), while social networks represent the dominant channel of communication and access to information. The most represented platforms among respondents were YouTube (26.62%), Instagram and Snapchat (19.59%), and TikTok (17.10%), which indicates changes in the way younger generations are informed and communicate. However, the availability of digital technologies itself does not automatically mean developed digital competence. Although a significant part of respondents stated that they follow recommendations for safe behavior on the Internet (44.55%), it is also clear that there is room for significant improvement of

knowledge about digital security, data protection, and critical evaluation of content, since 25.6% follow instructions sometimes, while 2.6% do not follow them. It was demonstrated that there is no relationship between the region and following safety advice on the Internet, while safety campaigns are more accepted in more developed regions of Serbia. On the other hand, the use of social networks for learning is more present in Central and South Serbia. Digital content creation is evenly distributed across all regions.

These findings indicate that digital transformation does not automatically bring the same level of competencies to all social groups and that educational policies should be directed toward reducing the digital divide.

In addition to digital competencies, the results obtained from the research on empathy and emotional intelligence indicate that social abilities and skills represent an equally important element of future society. The analysis of the level of empathy showed a relatively high level of respondents' ability to understand the perspectives of other people, recognize emotional states, and provide support to people from their environment. The highest values were recorded for statements related to understanding friends, recognizing discomfort in other people, and the ability to perceive different perspectives. It was found that female respondents have a statistically significantly higher level of empathy. At the same time, factor analysis showed the existence of several dimensions of empathy, with cognitive empathy, emotional involvement, and the ability to understand other people's feelings being particularly emphasized. The results of the emotional intelligence analysis further confirm the importance of personal and social competencies in the future digital society. Respondents gave the highest evaluations to the ability to cooperate with other people, adapt to new environments, self-confidence, and the ability to manage their own emotions. These findings are particularly important in the context of Society 5.0 because they show

that technological development will not reduce the importance of human skills, but will increase the need for abilities that machines can hardly replace: understanding, empathy, ethical reasoning, and social responsibility.

However, the research results should be considered with certain limitations. First, the expert assessment of key competencies was based on the opinions of 30 university professors, which represents a relevant but limited group of experts. In future research, it would be useful to include representatives from industry, the education system, the public sector, and different age groups. Second, the empirical part of the research was conducted on a sample of respondents from Serbia, which requires additional verification of the model in other social and cultural contexts. Also, the instruments used were

mostly based on respondents' self-assessment, which may include a certain level of subjectivity.

Future research should be directed toward further validation of the Society 5.0 Readiness Index, the development of a standardized instrument for its measurement, and testing the model at the international level. Special attention should be given to the analysis of the influence of education, generational differences, professional experience, and socio-economic factors on the development of competencies required for Society 5.0. Furthermore, the accelerated development of artificial intelligence creates the need for additional research on AI literacy, ethical responsibility, and the relationship between humans and intelligent systems.

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