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# USAID COOPERATION FOR GROWTH PROJECT (CFG)

## FINAL REPORT ON THE DIGITAL SKILLS STUDY IN SERBIA

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## I. Executive Summary

The main goal of the project „Research on digital competences in Serbia“ is to determine the need for digital competences in Serbia. The research team approached this goal comprehensively, examining available theory first, and then the needs of the economy, employees and consumers through adequate methodologies.

By examining the theoretical units of available knowledge and experience, an attempt was made to answer the question of the impact of the Fourth Industrial Revolution (4IR) on the development of digital competencies. Some of the main findings of this part of the research, among other things, stated that work and employability in 4IR will not depend solely on ICT skills but also on creative, critical and informed use of technologies. Also, the 2019 OECD Skills Report notes that formal education is not sufficient for career advancement as a large number of required competencies are not included in formal education programs. In addition to this, one of the major challenges is automation, which a great deal of research believes will have a significant impact on the redistribution of goods / wealth, and therefore on the labor market. Lastly, developments in 4IR require the workforce, regardless of profession, to adapt and build their skills to keep pace with advances in digitalization.

In order to examine the specific needs for digital competencies in the labor market, two studies have been conducted. First, an online survey was conducted on the experience of HR departments with digital skills within their respective companies. This survey included 109 companies that provided detailed answers and insights regarding the need for digital skills. In this way, the research provided significant support for the development of a future digital skills development strategy, as well as for tailoring education policies and training planning for labor market actors. Following the online survey, a focus group was conducted to deepen the knowledge gained in the original analysis.

The another quantitative research was a quantitative survey of the expressed need for digital skills in job advertisements. The data set included 107,000 job listings, published on the Infostud portal in the past 6 years. The analysis was done by automatically processing natural language and using machine learning to identify the demand for digital competencies, expressed in ad text in different ways.

Two case studies on digital consumer competences, in the e-commerce sector and in the crowdfunding sector, have provided support for research comprehensiveness and basic insights on the digital competency needs of consumers.

**Based on a cross-analysis of all the qualitative and quantitative researches mentioned above, this study has reached several major conclusions:**

- Formal education is not sufficient for career advancement because a large number of required competencies are not included in formal education programs;
- There is significant importance of interpersonal, higher-order cognitive skills and systems skills. Interpersonal skills relate to teaching, social perceptiveness and coordination, as well as related knowledge, such as psychology and anthropology;

- Organizations rate their digitalization level relatively high: 2.47 on a scale of 1 to 3. Individuals who are employed by mid-sized companies will be expected to have higher-level digital competencies, as well as having a broader range of competencies;
- Digital companies are the most prepared companies operating in the field of information technology (IT);
- There is significant difference between currently employed individuals and those actively seeking work in the job market is found only in two competencies - solving technical problems and recognizing the impact of digital technologies on the environment;
- It is essential for modern organizations to develop their tools to test the level of digital competence of their current and potential employees. In addition to developing testing tools, it would also be desirable to develop training programs focusing on the necessary digital competencies;
- No competence is irrelevant or superfluous, regardless of field of work or level of job complexity. It is only a matter of possessing an appropriate level of competence, with a relatively rapid upward trend in these requirements in the years to come;
- During the last 6 years, the number of advertisements has been steadily and rapidly increasing, while the number of competitions does not follow that growth, which indicates an increased supply of jobs in relation to demand;
- All levels of digital competence are constantly and proportionally increasing;
- Higher levels of job complexity also more often imply higher levels of digital skills;
- E-commerce market is in the initial stages of development, with high annual growth rates;
- The primary element in the development of the crowdfunding field in Serbia is to raise awareness of its existence, its functioning and the benefits it can provide over other funding tools. After that, very similar to the findings in the field of e-commerce, it is necessary to work to educate and create confidence in the payment mechanisms on which crowdfunding rests.

## **II. Project Background**

“Research on digital competences in Serbia” aims to support the creation of the Strategy for development of digital skills in Serbia, which is led by the Ministry of trade, telecommunications and tourism. Its goal is to provide relevant research and actionable insights to the creators of the Strategy especially within the area of digital skills development in accordance with the needs of the labor market.

The digitalization process has already covered all areas of society and the economy, and digital

skills are required for almost all jobs. Most jobs require knowledge of basic digital skills, but it can be expected that the need for these skills will grow. In the field of work, digital skills qualify not only in conventional areas of the job market but also open the door to participation in new sectors, as well as opportunities for starting one's own business. People who have mastered more advanced digital skills can also take advantage of the much wider range of opportunities created by the continued advancement of digital technologies and devices. Digital skills are particularly important in view of the changing nature of the work environment, including the rapid increase in the number of people working in informal forms of work in this area, as well as broader structural changes that will greatly affect job design in the future. Therefore, especially when looking at the labor market, certain skills need to be not only possessed but also constantly improved in order to keep up with new technologies and developments in the field.

### **III. Evaluation methodology**

#### **I. Scope and Coverage**

##### **I.1. HR quantitative survey**

This research report depicts the need for digital competencies of employees in Serbia. The market needs for specific digital competencies in the respect of explicit working areas within an organization, as well as a level of digital competency for a specific job category, is presented. Also, the gap that exists between market needs and the supply of appropriate competencies is mapped, emphasizing the difference of a competencies supply in terms of the level of competencies that hold current employees and those who apply for the job.

The idea was to cover as wide a range of industries and areas of work as possible to develop better and more precise skills development strategies that would suit the specifics of particular area of work. Consequently, different industries (fields of work), areas of work, organization sizes (micro, small, medium, and large) and job categories are covered with the organizations signifying each of the groups representing Serbian market.

##### **I.2. HR qualitative survey (focus groups)**

This part of the research aimed to deepen the findings from the quantitative survey, and it included representatives of the companies that took part in the preceding research. Scope and coverage are the same as above.

##### **I.3. Demand study for digital skills in the labor market based on job ad analysis**

This part of the research aimed to cover the entire labor market represented in ads posted on Infostud portal in the previous six years, which amount to over 100,000 ads in total. Although this total number of ads is very high, the research team was aware that it cannot fully represent the entire labor market. Attempts were made to obtain data from National Employment Office, unfortunately without success. This would certainly enrich the findings of the research, but on the other hand conclusions that could be drawn from data available from Infostud proved to be extremely relevant and valuable.

## **1.4. Case studies in e-commerce and crowdfunding sector**

These studies focused on the consumer side within these sectors, covering the competencies that consumers need in order to participate adequately on the market. By doing so, it is assumed that they contribute to further market development.

## **2. Sample Design**

### **2.1. HR quantitative survey**

For the purpose of the research, the questionnaire was sent out to 453 company addresses, diverse by size, activity, and region. The aim was to cover as wide range of working field and work areas as possible to get as representative depiction of the situation. About 24% companies send the response back. So, the sample frame consists of 109 companies. In the absence of data on the entire population, an intentional (non-probabilistic) sample was used in this study.

The research team, with its expert knowledge in this field, has put together a available sampling frame, diversified according to the size of the company, business activity, havinh HR sector, and region. Therefore, these findings cannot be tested according to the principles of pattern theory, but may provide a strong assumption about conclusions, which can be more accurately tested in future research.

Sampling was purposive, targeting Serbian organizations based on their presence on Serbian labor market with the idea to cover all sectors and work areas of different sized organizations as precisely as possible. However, the expectation behind purposive sampling approach was to gain insight from the more (digitally) advanced part of the Serbian economy. Companies that are more advanced in the process of digital transformation are more likely to have relevant experiences with digital competencies and thus could provide valuable information on future directions for the rest of the economy.

### **2.2. HR qualitative survey (focus groups)**

Six HR directors, managers and experts from various sectors and industries were present at the focus group and provided their views on the current situation, needs and requests for digital competencies on the labor market.

### **2.3. Demand study for digital skills in the labor market based on job ad analysis**

107,000 job ads in total from Infostud portal in the last six years. These ads cover entire Serbia geographically, as well as all work areas and levels of job complexity and seniority.

### **2.4. Case studies in e-commerce and crowdfunding sector**

For the e-commerce case study, the sample was comprised of ten interviewees from sectors that are leading e-commerce development in Serbia currently. These include online marketplace, media, retail (home/furniture, fashion, sports, food) and banking.

For the crowdfunding case study, the sample was comprised of companies that could potentially have an interest in taking part in the crowdfunding process. These included four corporate entities and four startups.

### **3. Data Collection Process**

#### **3.1. HR quantitative survey**

The research was conducted online. The questionnaire was prepared and disseminated using Google forms tool.

Data base of 453 targeted Serbian organizations was made for questionnaire distribution as well as procedure for dissemination. Invitation for participation in the research was made and questionnaire was released via email with the help of Ministry of Trade, Tourism and Telecommunications and CFG USAID team. Also, direct contacts of HR community members via LinkedIn were used to foster filling the questionnaire.

Dissemination was implanted in 2 iterations. First in a period 10th till 20th of June 2019, after this a cross-section was made; in order to identify a missing representative from a specific industry. Bearing this in mind, second iteration in a period from 20 till 30th June 2019. was conducted where data collection was prolonged to target specific companies, by personal contact, in order to ensure as most as possible representative sample.

#### **3.2. HR qualitative survey (focus groups)**

Data was collected during the focus group which was organized at the Faculty of political sciences in Belgrade on September 27th 2019.

#### **3.3. Demand study for digital skills in the labor market based on job ad analysis**

The research team received the raw database, 107,000 job ads were sent to the research team by Infostud company at the beginning of the project.

#### **3.4. Case studies in e-commerce and crowdfunding sector**

Structured interviews were organized with relevant interviewees during July and August for the e-commerce study, and in September for the crowdfunding study. The duration of all the interviews was between 45-90 minutes, depending on the approach and openness of the interviewee. In general, all the interviewees had positive feedback and attitude for the interviews.

### **4. Data Collection Tools**

For all the surveys within the project appropriate questionnaires were created. More details on them can be found within each of the separate reports (Please see annex list). One general guideline that all of the questionnaires followed were EU Digital Competences Frameworks, which are standard and most common guidelines for digital competences in Europe.

## **IV. Findings**

### **I. The Impact of the IV Industrial Revolution on the Development of Digital Skills**

This report seeks, based on a review of the relevant literature, to identify the digital competencies needed in the field of work and employment and thus enable decision makers in Serbia to respond to the new demands of the labor market. The competency gap in 4IR can lead to lower levels of productivity, increased labor costs and slow adoption of new technologies (Curtarelli et al., 2016). It is already known that the concept of education of previous generations is unsustainable for both employers and workers. As a country facing three industrial revolutions at the same time, Serbia is motivated to harness the potential that technology development brings with it and transform its labor market and overall economy. It should therefore come as no surprise that the development of competence in the labor market has been recognized as one of the strategic goals in the Draft Digital Competence Strategy in the Republic of Serbia. This objective presupposes the creation of trainings and workshops for improving employability, especially for vulnerable groups, as well as for conducting business in the digital economy.

One of the most important documents in this area is the Digital Competence Framework for Citizens (DigiComp), developed by the European Commission in 2016. The Framework recognizes that work and employability in 4IR will not depend solely on ICT skills but also on creative, critical and informed use of technology. Also, the 2019 OECD Skills Report notes that formal education is not sufficient for career advancement because a large number of required competencies are not included in formal education programs.

Developments in 4IR require the workforce, regardless of profession, to adapt and build their skills to keep pace with advances in digitalization. While some argue that the development of digital technologies will lead to a greater demand for highly skilled workers with cognitive skills and technical knowledge (Curtarelli et al., 2016), others suggest that future demand will be oriented toward arts and creativity skills (Snow 2019).

Individual authors (Bakhshi et al., 2017) emphasize the importance of interpersonal, higher-order cognitive skills and systems skills. Interpersonal skills relate to teaching, social perceptiveness and coordination, as well as related knowledge, such as psychology and anthropology. Higher order cognitive skills are about originality, ideology and active learning. Systems thinking skills are decision making, system analysis and system evaluation. Broad knowledge such as knowledge of English, history, administration and project management are, according to these authors, linked to the professions whose growth is predicted in the future (ibid.).

### **2. Online survey of HR service experiences related to digital skills**

Researchers have sought to highlight the digital competencies required in different areas of work and at different levels of job complexity. The research findings provide significant support for the development of a future digital skills development strategy, as well as for the adaptation of education policies and training planning for labor market actors.

In order to adequately answer the main research questions, a comprehensive questionnaire was

created which, as the primary target group, i.e. respondents, had experts in the field of human resources, as well as domain experts in the sample of companies in the territory of the Republic of Serbia. Correctly completed questionnaires and answers were received from 109 organizations. Of the total number of organizations in the sample, 87% are from the private sector and 13% are from the public sector. Also, when looking at the sample structure by size, 46% of the companies surveyed are large, 25% are medium-sized, 18% are small while 11% are micro-enterprises.

The survey provided insight into the current state of digital readiness of companies, as well as an understanding and awareness of respondents about the need for digital skills. The results showed that organizations rate their digitalization level relatively high - self-assessment is 2.47 on a scale of 1 to 3. The level of their digital readiness is rated most by medium-sized organizations - 2.62. One possible conclusion that can be drawn from this indicator is that individuals who are employed by mid-sized companies will be expected to have higher-level digital competencies, as well as having a broader range of competencies.

Also, the expected result is that digital companies are the most prepared companies operating in the field of information technology (IT).

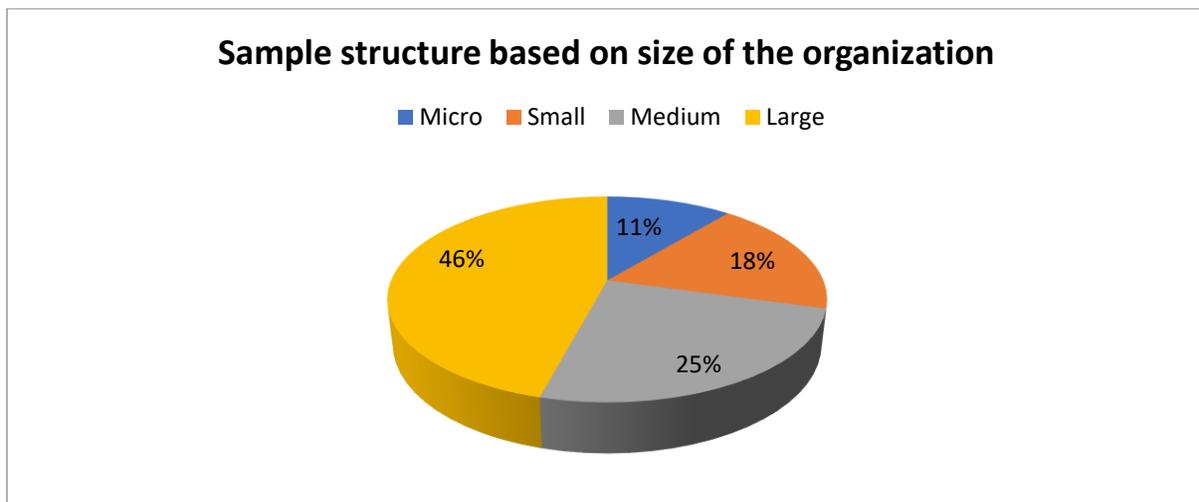


Figure 2: sample structure based on size of the organization<sup>1</sup>

Competencies required at an advanced or expert level in any field of work are those related to the use of Internet technologies for communication (email, Skype, WhatsApp, Viber, intranet ...) and search of information, as well as the use of digital content in a lawful and ethical way the way.

The analysis of digital competences from the aspect of job complexity indicates that the level of excellence for each competency grows from operational posts through administrative to professional and expert, with a greater gap between operational and administrative levels than the gap between administrative and expert levels. Although there are differences between these levels, in the modern business world, having a basic level of competencies is considered necessary regardless of the complexity of the job.

The study also pointed to the fact that a significant difference between currently employed

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<sup>1</sup> There is significant share of medium and large companies, as the result of intention to collect data from HR services.

individuals and those actively seeking work in the job market is found only in two competencies - solving technical problems and recognizing the impact of digital technologies on the environment. The competencies that were spontaneously mentioned during the examination as missing from potential employees, ie those individuals who are actively seeking employment, are those related to Excel's skill in using it.

The results of the research indicate that it is essential for modern organizations to develop their tools to test the level of digital competence of their current and potential employees. In addition to developing testing tools, it would also be desirable to develop training programs focusing on the necessary digital competencies.

Perhaps the main conclusion of this research is that no competence is irrelevant or superfluous, regardless of field of work or level of job complexity. It is only a matter of possessing an appropriate level of competence, with a relatively rapid upward trend in these requirements in the years to come. Such a conclusion recommends that the focus in future measures and activities be placed on a more comprehensive picture that goes beyond the requirements of specific organizations or professions, and point to the educational implications that must be drawn from the analysis, that is, the need to adapt the education system to new realities based on digital technologies.

In the next step, a focus group was also conducted, which aimed to deepen the findings from the quantitative research previously done. The focus group participants were HR directors, managers and experts from six companies, who provided relevant insights into the need and requirements for digital competencies in the job market.

Some of the main conclusions that emerged are the following:

- Digitization in companies is at a high level, which is transforming the way businesses do business;
- Business operations in Belgrade and Novi Sad are highly digitized and the challenge is to reach smaller and more remote environments;
- Digitization, like any change in the organization, brings higher levels of stress among employees (techno-stress);
- Employees should possess a certain level of digital competence in all domains (information and data literacy, communication and collaboration, content creation security and problem solving in the digital environment) depending on the field of work;
- A lower level of digital competence is implied in almost all positions within companies. Often it is not checked directly when selecting candidates, but indirectly through e-recruitment and online testing. Although it is a matter of digitalization, readiness for continuous learning is the most important competence
- The future challenge for employees will be managing a large amount of data. Currently, these jobs are often outsourced;
- In addition, the challenge is to develop employees to use digital technologies in a creative way in the face of rapidly changing needs;
- The state should support the digitization process through the digitization of public administration and education processes at all levels of education.

### 3. Demand study for digital skills in the labor market based on job ad analysis

A quantitative survey of the expressed digital skills needs in job advertisements was conducted. The survey included 107,000 job ads published on the Infostud portal in the past 6 years. The main unit of observation was one published job ad.

Digital competencies are defined in 5 levels<sup>2</sup>: 0 - the ad has no explicit reference to digital competencies, 1 - basic computer work and Internet usage, 2 - working in MS Office and similar packages, and content creation, 3 - using specialized data analysis software , design, resource management (ERP), bookkeeping, etc. and Level 4 - software development and IT qualification.

The analysis was done by automatically processing natural language (basically taking all the words from the ad text and preparing them to be suitable for analysis in order to see which words are more connected with each other) and using machine learning to identify the demand for digital competencies, expressed in the text of an ad in different ways. The data were further cleared of errors and categorized to provide dimensions for analysis.

The basic statistics of ads and the demand for digital competencies are shown in Figure 3. Some of the important insights are:

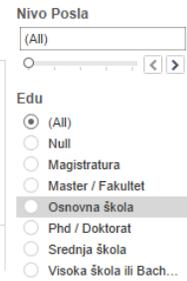
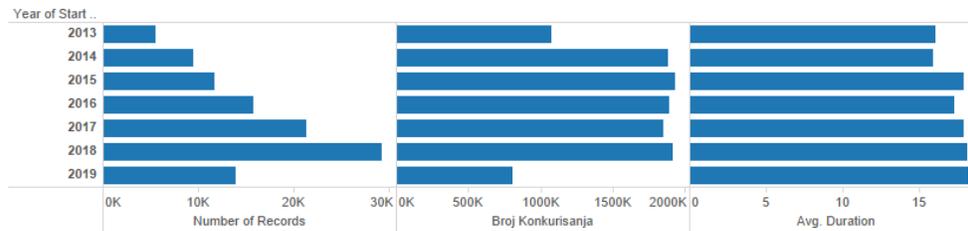
1. During the last 6 years, the number of advertisements has been steadily and rapidly increasing, while the number of competitions does not follow that growth, which indicates an increased supply of jobs in relation to demand (which can be seen from the increased average duration of the advertisement), as well as the possible increased fluctuation workers.
2. Jobs with all levels of digital competency demand are on the rise, as can be seen from the absolute amounts of ads and percentage views by digital competency levels.
3. There is a significant increase in jobs without the required digital competencies (Level-0), especially since the end of 2016, when the inflow of ads for low-skilled jobs (education, level of complexity, etc.) has increased. This also speaks to the increased use of the digital advertising platform (Infostud), even for low-skilled jobs, which implies some digital competence in online job seeking. Finally, there are a number of jobs without the required digital competencies because sometimes those competencies are implicitly implied.

*Figure 3: Basic statistics of ads and measured demand for digital competencies*

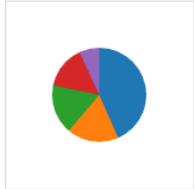
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<sup>2</sup> The research team classified digital competencies based on the available data for analysis

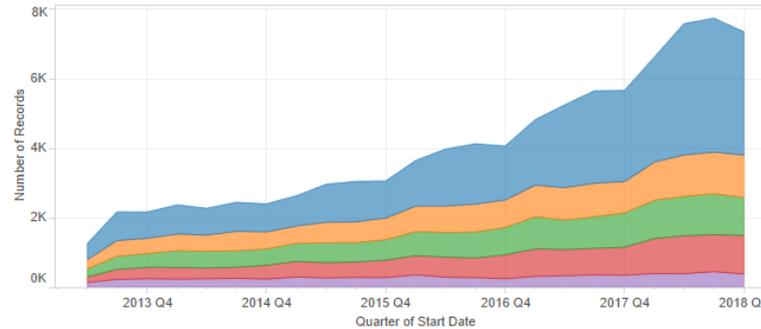
## Ukupne statistike Infostud oglasa



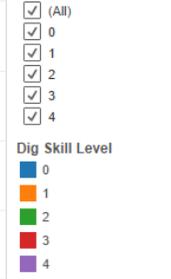
## Digitalne vestine



## Broj oglasa sa razlicitim nivoom digitalnih vestina

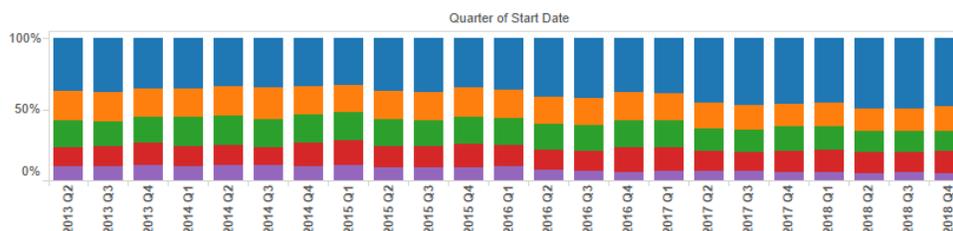


## Dig Skill Level

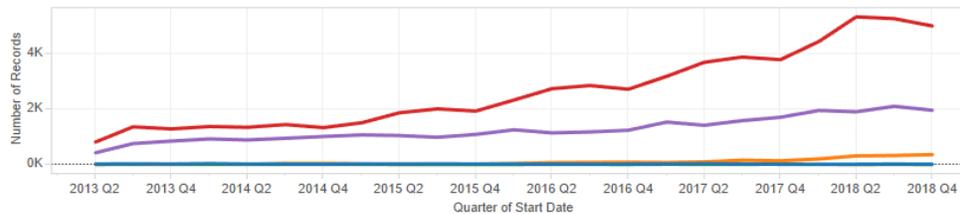


Number of Records: 107,019

## Procenat oglasa sa razlicitim nivoom digitalnih vestina



## edu\_trend



When it comes to jobs with basic and intermediate digital competencies (Levels 1,2,3), it can be seen that:

1. All levels of digital competence are constantly and proportionally increasing (Figure 4), so it cannot be said that development is not only about basic and simple competences, but also those that are critical for the job in the workplace. This is observed at all levels of job complexity and education levels.
2. Although weaker than other levels, the demand for the highest form of digital competency (Level-4) is also on the increase, and since 2013 this demand has tripled (Figure 5). Also, this estimate is probably conservative, and growth is likely to be higher, as IT positions have recently been advertised on other notable specialized platforms (such as the Startit website).

Figure 4: Demand for basic and medium digital competencies in ads

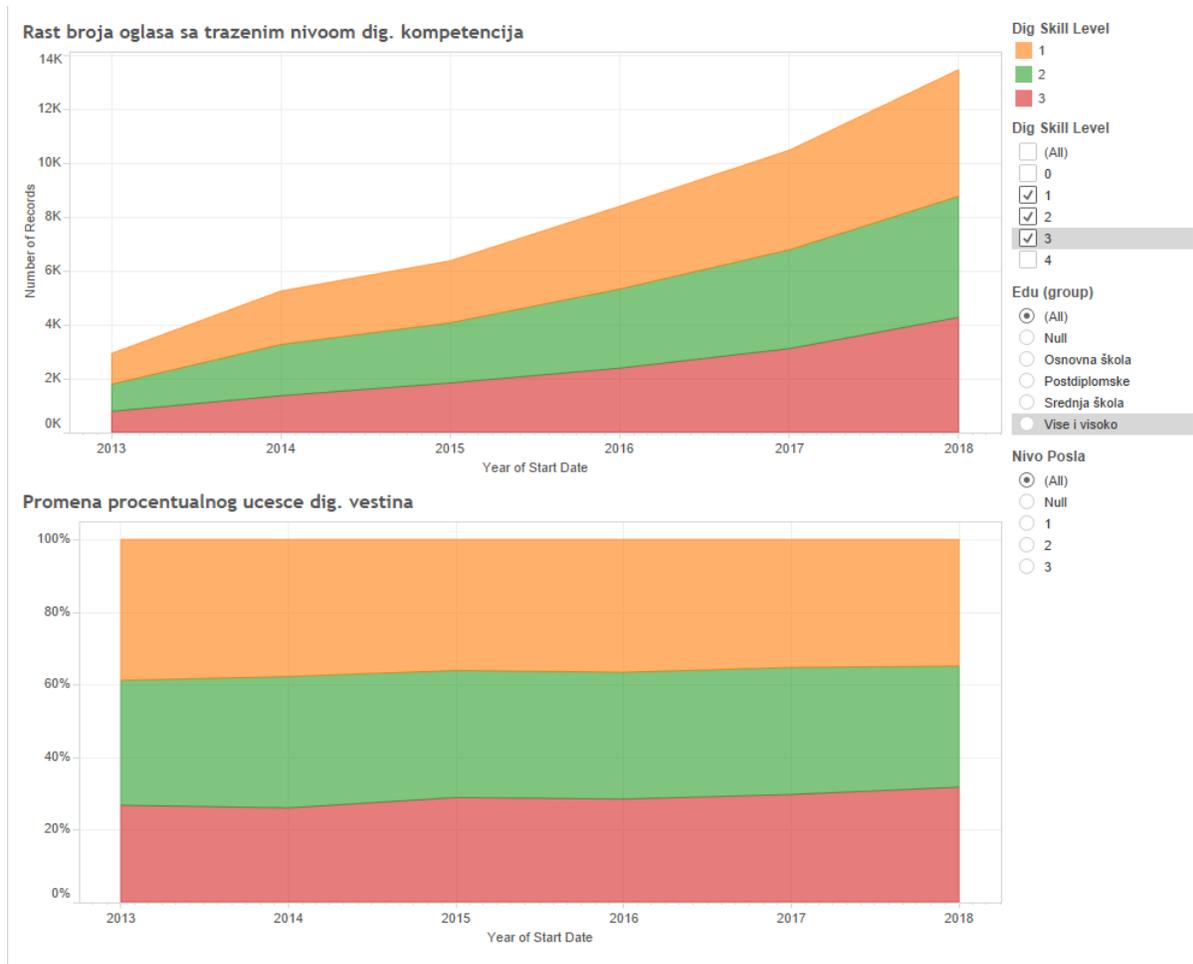
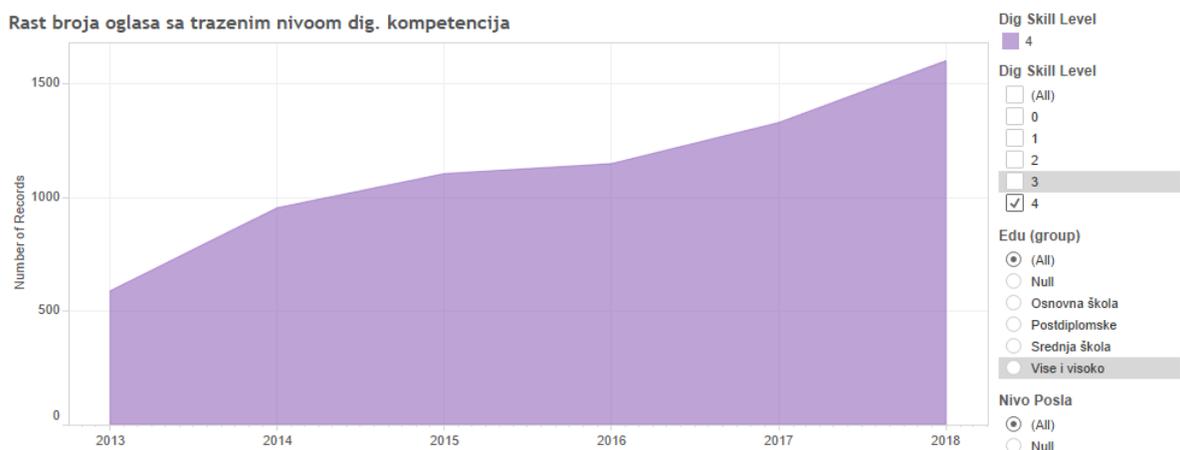


Figure 5: Demand for highest level of digital competencies in ads



The additional analysis compared other parameters related to the digital competencies required, and it can be noted that:

1. The level of digital competencies required is largely related to the level of education required for the workplace, so higher levels of digital competence are more sought after for higher levels of education (Figure 6).
2. Also, jobs with a required higher level of digital competence also imply higher knowledge of foreign languages, so these two skills certainly imply a correlation in job advertisements (Figure 6).
3. Higher levels of job complexity also more often imply higher levels of digital skills (Figure 7). For the highest level of job complexity (Level 3 - managerial and expert positions), there is also a significant increase in the level of digital competence 3 related to the use of specialized resources management and workplace software.
4. Finally, there are differences between industries, such as "transport" or "hospitality" have no developed demand for digital competencies, while industries such as "accounting, bookkeeping", "law" and "commerce, sales" have significantly higher demand for such jobs. (Figure 7).

Figure 6: Relation between level of digital competencies, level of education and knowledge of foreign languages

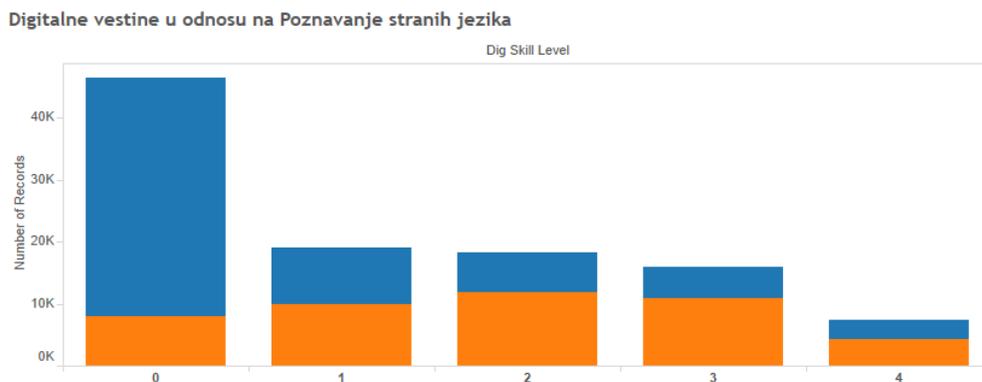
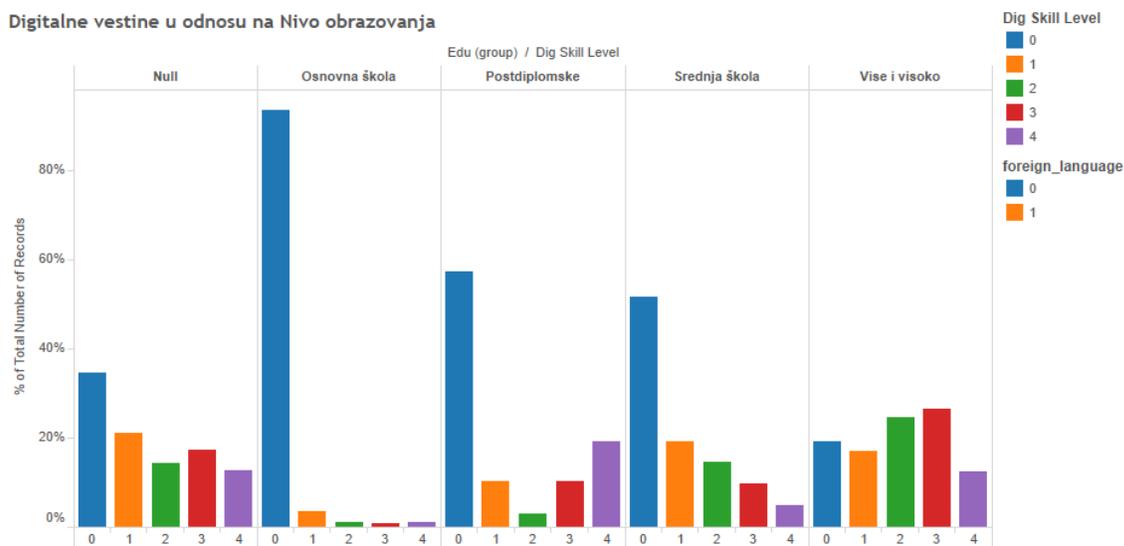
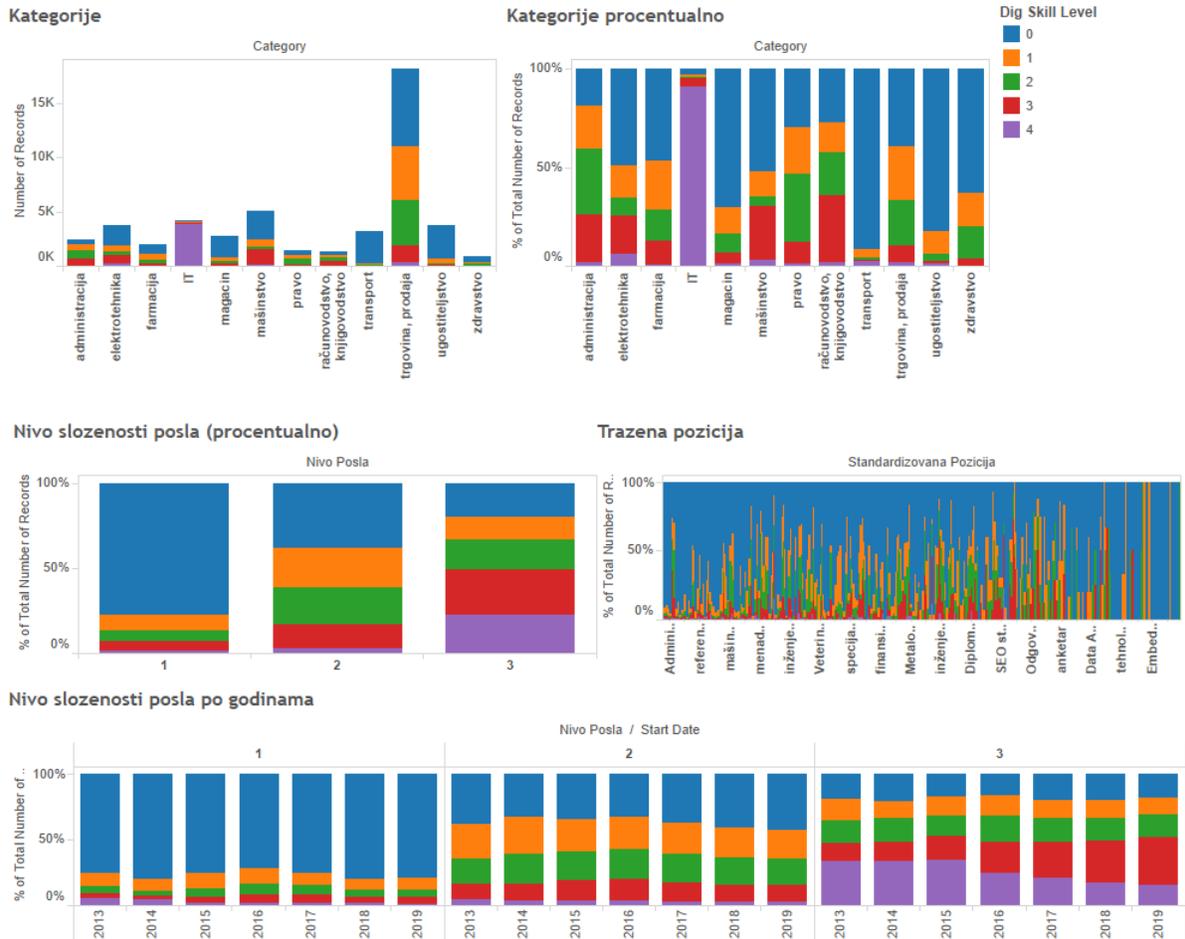


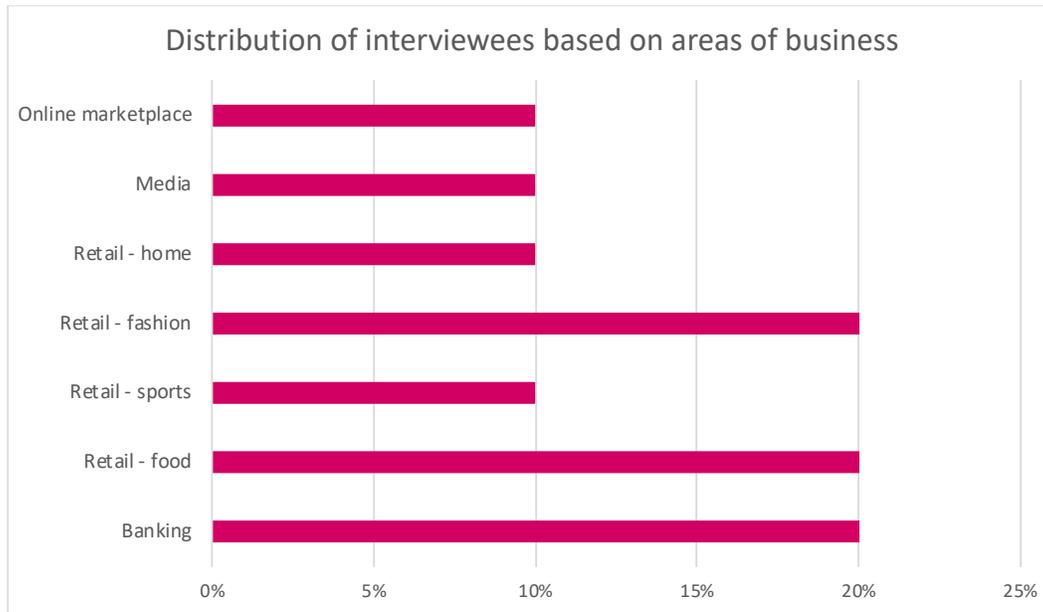
Figure 7: Relation of expected levels of digital competencies with industries and level of work complexity



#### 4. Research of demand for digital skills of the consumers – e-commerce and crowdfunding

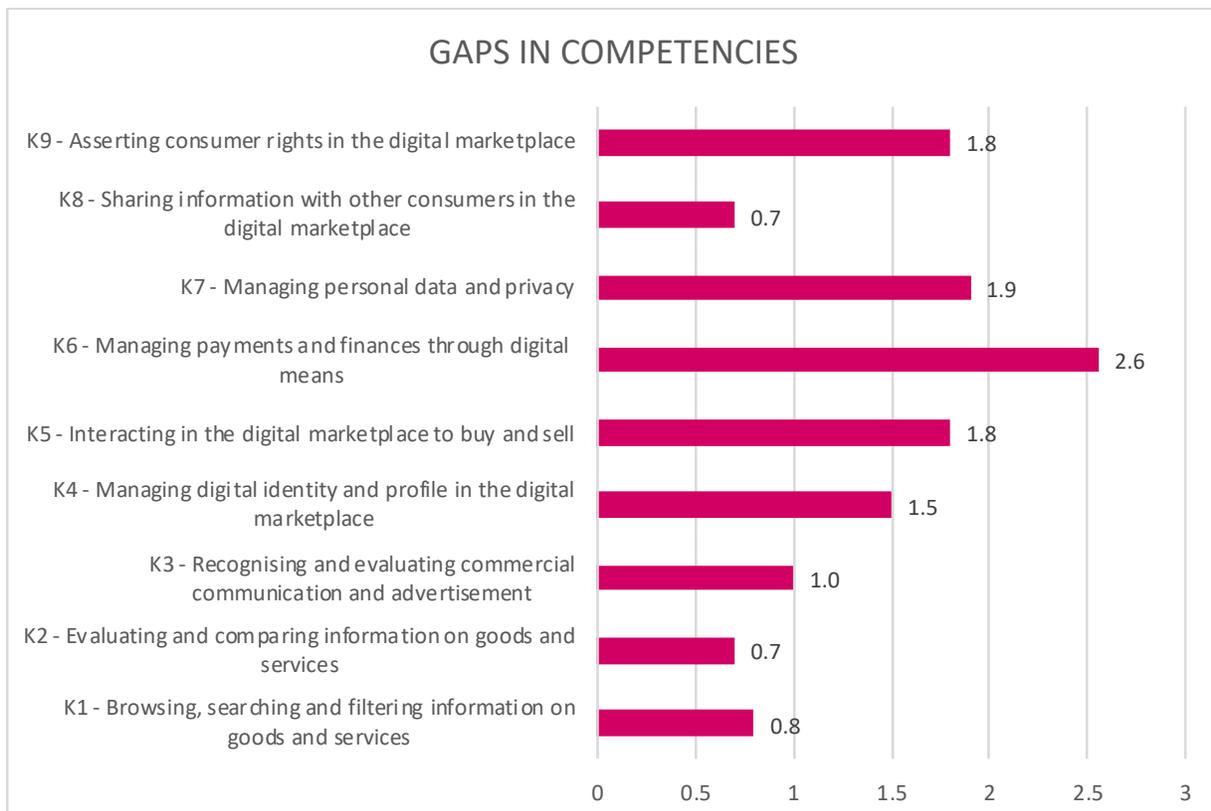
The aim of this research was to determine what digital consumer competencies are important for the development of the e-commerce sector in Serbia. The case study technique was used through structured interviews with companies with significantly developed e-commerce business, and interview questionnaires were based on and guided by the EU framework for consumer digital competences.

The interviewees were relevant representatives of the business community who have significantly developed e-commerce business. Also, it was important to have representatives from a number of different industries to reach the widest possible range of consumers they serve. Finally, 10 relevant interviewees were interviewed.



When the results are cross-examined, very interesting and indicative conclusions can be made. The greatest gap exists in the following competencies:

1. Managing payments and finances;
2. Managing personal data and privacy;
3. Determining consumer rights in the digital market;



The main conclusions are as follows:

- In sum, the current level of consumer digital competences is at a moderate level.
- The e-commerce market is in the initial stages of development, with high annual growth rates.
- Future activities, programs and measures aimed at market development, from the point of view of raising consumer capacity, should focus on the following areas:
  - Managing payments and finances through digital means
  - Personal Data and Privacy Management (with Digital Identity Management)
  - Determining consumer rights in the digital market (after purchase)
- Trust, that is, fear, is the main obstacle that needs to be overcome in order to improve the areas crucial for the further development of the e-commerce market.

As far as crowdfunding is concerned, the level of its development in Serbia is still in its early stages and so are digital consumer competences. With consumers, and with companies that could potentially be involved in the crowdfunding process, there is insufficient knowledge of the basic concepts of crowdfunding and how the process works. Knowledge generally comes down to donor crowdfunding or reward-based crowdfunding, while crowd-investing and crowdlending are virtually unknown as financing tools.

For this reason, the primary element in the development of the crowdfunding field in Serbia is to raise awareness of its existence, its functioning and the benefits it can provide over other funding tools. After that, very similar to the findings in the field of e-commerce, it is necessary to work to educate and create confidence in the payment mechanisms on which crowdfunding rests.

## **V. List of Annexes**

1. ANNEX 1: Database of all mapped existing studies, policies, plans, and programs that support the development of digital skills (SRB);
2. ANNEX 2: Report “Assessment of trends and future demand – Impact of the Fourth Industrial Revolution on the development of digital competences” (SRB);
3. ANNEX 3: Database of all regulatory and strategic documents that support the development of digital skills, and Report with analysis of impact of regulatory and strategic documents that support the development of digital skills (SRB);
4. ANNEX 4: Report on focus group conducted with a broad range of stakeholders for activities envisaged under the Digital Skills Strategy (SRB);
5. ANNEX 5: Report on mapped initiatives for the development of digital competences, in line with the matrix of the EU document “A common European response to shared goals - "shared concept" for a digital skills strategy” (SRB);
6. ANNEX 6: Report on quantitative research of current demand for digital competences by employers conducted through data mining analysis of text of job offerings for the period of the past 6 years (approximately 100.000 job offerings) (SRB);
7. ANNEX 7: Report on two case studies analysis in relation to the demand for consumer digital competences: 1. in e-commerce sector; 2. in crowdfunding sector (SRB);

8. ANNEX 8: Report on research into comparable experiences involving a broad range of stakeholders in strategy implementation (four Western Balkan/EU countries) (ENG);
9. ANNEX 9: Report on on-line survey of experiences of HR services with digital competences gained by conducting an on-line survey of HR experts employed in various companies and experienced in selecting candidates (approximately 100 HRs) (ENG);
10. ANNEX 10: Report on the state of digital competences in Serbia (SRB);
11. ANNEX 11: Report on the need for digital competences in Serbia (SRB);
12. ANNEX 12: Report on qualitative research of demand for digital competences conducted through the focus group of selected HR experts (SRB);
13. ANNEX 13: Report on interest from stakeholders to take part in implementation (SRB);
14. ANNEX 14: Presentation: Analysis for the digital skills demand in Serbia (SRB);