REGIONAL APPROACH FOR IMPROVING DIGITAL SKILLS IN WB6 ECONOMIES

CID BALKANS DEVELOPMENT

Report

December 2018

Regional Approach for Improving Digital Skills in WB6 Economies

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This report only addresses those projects and stakeholders encountered by the authors during their research in the six economies and do not intent to provide an exhaustive list of all actors and initiative undertaken directly or indirectly in the area of digital skills. This is without prejudice to other actors/stakeholders as well as projects and initiatives undertaken in a specific economy on the development and promotion of digital skills. The execution amplitude of the different initiatives provided in this report is true and complete to the best of the author's knowledge and available information.

Table Of Contents

1 * This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

List of Figures

List of Charts

1. ACKNOWLEDGEMENTS

This report is the result of collaboration between the NGO Center for Information and Development and the Regional Cooperation Council. The team comprised Enkeleda Kuka (Author- Senior E-gov Expert, CID), Anisa Gjika (Author-Senior Legal Expert, CID), Milena Harito (Author-Senior Digital Transformation Expert).

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The team is also grateful to the Regional Cooperation Council for its financial support and overall guidance in preparing this report.

2. EXECUTIVE SUMMARY

The report provides an analysis of digital skills in the six Western Balkan economies Albania, Bosnia and Herzegovina, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro and Serbia and addresses the findings for three target groups: (i) citizens; (ii) labor force; (iii) ICT professionals. The recommendation for further development of digital skills at the regional level are formulated and is important to mention that the topic of digital skills in the pre-university education system deserves a specific focus and it is out of the scope of this report.

The document begins with the description of the methodology followed; it provides the background of the ever growing need for digital skills in life, in society and for the economy; the definition of digital skills; the related factors of development of digital skills in the WB6 context. The general context of the Western Balkans region, the regional initiatives for the digital agenda in the framework of MAP REA and the relevant data for the digital economy are followed by a detailed analysis for each economy based on the methodology presented at the beginning of this report. For each economy are analyzed the current policies and strategies that affect or are otherwise interlinked with digital skills, the main stakeholders and the survey data and, to the extent possible, the initiatives, activities and programs in the field of digital skills. After the assessment of the WB6 economies, an analysis of the relevant framework to address the issues is presented based in the EU approach and instruments. The report is wrapped up with findings and regional recommendations.

Digital technologies are considerably impacting the economies now days, spreading through all sectors and changing the way economic value is created, the jobs people do, how they do them and the skills they need for those jobs. In particular, it is increasing the need for digital skills in the workplace.

The lack of digital skills is a global trend in EU member states and in the WB6. While the trend of individuals who have the basic digitals skills seems the same, around 43% of EU population had an insufficient level of basic digital skills; the citizens of WB6 who have above basic overall digital skills are almost half of EU average. The lack of intermediate and advanced digital skills impacts the quality of general workforce. Even a majority of young people who are often considered 'Digital natives' do not possess job-relevant digital skills demanded by employers to fill existing job vacancies. The EU is facing advanced ICT skills shortages that result to a skills gap of approximately one million unfilled jobs in the IT sector.

The ever-changing technology and technology-rich environment are challenging the citizens, workforce and ICT professionals to get higher digital skills and competences constantly. The challenges are finance-related, i.e. the need to pay for training for improving skills and the ability to keep the pace of skills acquisition. As such the right considerations and policies on this issue are of a great importance. The digital agenda for the WB6 aims to support the transition of the region into a digital economy and bring benefits of the digital transformation to its citizens, such as faster economic growth, more jobs, and better services The Digital Agenda inter alia aims at fostering digital skills of the WB6 citizens.

The reports of the international partners for the region offer valuable data on general development indicators, employment, skills and information society in each of the WB6 economies, According to OECD, since 2016 the WB6 economies has taken positive steps towards digital empowerment but still there is a lot to be done. Based on our research, survey and findings on digital skills in the WB6, the following recommendations are proposed to the economies level and to the regional one. **Economy level:** A National Strategy and action plan on digital skills, as part of the National Digital Agenda, should be prepared by each WB6 economy to support economic development. Creating National Digital Skills and Jobs Coalitions and repositories, as part of the Regional DSJC and EU DSJC will enable a better coordination among all actors and will help to achieve faster results for the economy. The use of the EU Digicomp framework for Citizens will serve as a reference framework to support and improve citizens' digital competence. Accurate data on the digital society should be gathered regularly and periodically in the WB6 economies which can be used to plan better policies on the information society in general and specifically for the digital skills.

Regional Level: Launch regional discussions aimed at agreeing on common standards related to digital skills, with particular attention to the digital skills definition, certification and evaluation, as a basis for digital skills policies and programs. Raise regional awareness on the economic and social inclusion of women through the improvement of digital skills. Analyze specialization potentials in the digital economy for the WB6 and existing or potential value chains between the economies. Promote the establishment of the Regional Digital skills and Jobs Coalition in WB6 mirroring the experience of EU DSJC. Establish a regional platform in the WB6 languages for Massive Open Online Courses (MOOCs) focused on the basic and intermediate levels of digital skills.

The analysis and the findings of the report provide a solid basis for building discussions and help to pave the way to the future creation of national digital skills strategies for WB6 economies, as a necessary step to enhance further development of digital skills in the region. Also it supports to bring forward the issues of digital skills development for economic impact in the region and create the ecosystem to make the region competitive for the 4th Industrial revolution.

3. METHODOLOGY

In the context of this report, the CID team has worked closely with the responsible government institutions of six Western Balkan economies and other stakeholders in the region.

The key elements in our approach and overall methodology followed are presented below - in relation to the problem expected to be addressed.

Desk review which is focused on review of existing strategic documents available in WB6 related with the development of skills in general and specifically digital skills. It involved a careful review of various documents produced in the last years for the WB6 economies relevant to digital skills: a detailed review of the legal, regulatory documents, progress reports, as well as the review of previous researches and publications from EU Institutions, World Bank group, ETF, OCDE and other International organization relevant to Western Balkan economies.

The online Regional Approach for Improving Digital Skills in WB6 Economies survey was launched in September 2018 and the questionnaire presented in Annex 2 was submitted to more than 600 institutions in WB6 economies. It was addressed to the government institutions, municipalities, public and private universities, private companies, civil society organizations, business associations and chambers of commerce as well as the World Bank, GIZ, British Council, and other International Development Organizations present in the region. The Survey was lunched in English for all participants in WB6 economies. It gave the contributors an opportunity to provide information and comments on digital skills.

The questionnaire is composed of five main sections. Section 1 addressed questions related to the actors and stakeholders involved in the digital skills; Section 2 addressed questions related to policies and programs in the digital skills in the national and institutional level; Section 3 addressed questions related to the implementation of the digital skills policy and programs in the national and institutional level; Section 4 was designed to map the recent projects in the area of digital skills; Section 5 tackled questions related to monitoring & evaluations of the digital skills agenda in the economy level.

Focus Groups were organized in each economy (except Bosnia and Herzegovina) with the purpose of a better in-depth understanding of the perspective of various groups of interest on the questions of how enabling the environment is, what are the barriers faced and how they could be addressed, in-depth interviews and focus group discussions were designed and conducted with key informant. The focus groups meetings were interactive sessions, as well as structured discussions plans and guides, as well as open questions tailored to the specific role of the stakeholder. The findings of the survey results were shared.

4. INTRODUCTION

This Chapter provides the background of the ever growing need for digital skills in life, in society and for the economy, as well as the related factors of development put in the WB6 context of the Digital Agenda. Then the recent definitions of digital skills are framed for the WB6 context.

4.1. BACKGROUND

The concept of Digital economy can be broadly defined as the economy that its transactions and process are extensively based on digital computing technologies. Every day the governments are working to transform the economies toward an advanced digital one aiming to increase the efficiency and productivity. Digital technologies are considerably impacting the current economies, spreading through all sectors and changing the way economic value is created, the jobs people do, how they do them and the skills they need for those jobs. In particular, it is increasing the need for digital skills in the workplace. While digital technologies are replacing some “routine” tasks, they are also creating new jobs which require new technological skills and not only for skilled ICT professionals. Many jobs have a digital element, and it is foreseen that within 20 years 90% of all jobs will require some element of digital skills [1]. Digital skills are only a component of a Digital economy and a necessity for the development of the digital economy and society. The importance of digital skills is seen not only as an economic benefit but also as a social value of digital inclusion [2]. According to the literature the digital inclusion is comprised of four main components which are Access ⟶ Use ⟶ Skills ⟶ Motivation and are presented in the figure one [3].

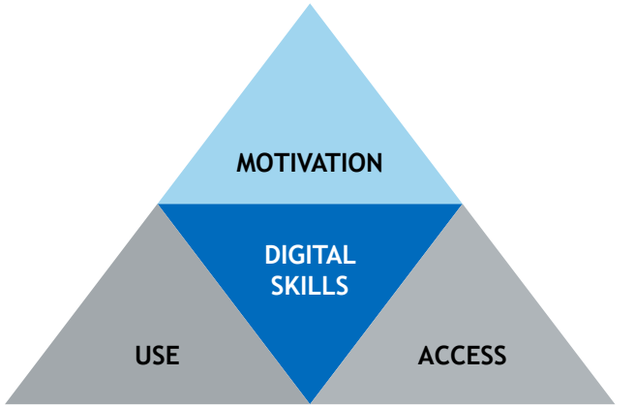

Figure 1. Digital Inclusion Pyramid

For the purpose of this report, the focus is on digital skills only and the other very important components of a Digital Economy such as the access are not tackled.

Digital skills from basic to advance ones are required in all types of jobs and professions. While most jobs require basic digital skills, intermediate and advance skills are required for more qualified jobs and professions.

Digital skills have become a must not only for work, but also for learning and for life. In everyday life, people with the relevant digital skills can access news and information, can benefit from different online forms of entertainment, e-services and e-commerce, and can make use of digital platforms for payments, while also communicating with friends and family through different digital platforms. For this reasons, digital literacy is today a core skill alongside English and math and digital skills should be learned pervasively at all stages of education and training to be prepared for the next digital transformation of the world expected in the next years.

A common digital agenda for the six Western Balkans Economies was announced in the EU-Western Balkans summit of 17 May 2018 in Sofia. The leaders of the European Union and the Western Balkan partners committed to boosting the digital connectivity in the region [4] "The Western Balkans partners have pledged their commitment to the Digital Agenda: lowering the cost of roaming charges in the region, faster deployment of broadband, investing in digital skills; investing in digital trust and security…".

The Digital Agenda for the WB6 aims to support the transition of the region towards a digital economy and to bring benefits of the digital transformation to its citizens, such as faster economic growth, more jobs, and better services. It commits the participating economies to invest more in broadband connectivity; increase cyber security, trust and digitization of industry; strengthen the digital economy and society; and boost research and innovation. The Digital Agenda inter alia will help fostering of digital skills of the WB6 citizens [5]. This will be done by supporting the involvement and representation of the Western Balkans in EU initiatives and events and enabling regional startups to connect and network with major European hubs. The EU Digital Opportunity Traineeship is already open to students and young people from the Western Balkans to acquire first-hand training in digital areas and the EU Code Week is open for all Western Balkan partners, bringing coding skills and digital literacy to the region [6].

4.2. FRAMING DIGITAL SKILLS CONCEPT IN WB6 CONTEXT

The digital economy and the digital society are expanding quickly since 2000, requiring continuously a larger and larger spectrum of digital skills for work and everyday life. While digital knowledge 'I know how' concerns acquiring information by means of learning on the basis of facts, rules, theory and practice in regard to digital technologies, digital skills is related to the ability of applying that knowledge 'I know how and I can do it', in order to cope with a task or solve a problem by using the technology. Anything from the use of social media to coding a website counts as a digital skill.

In the last 15 years, the definitions used for digital skills have evolved and are conceptualized to address the different needs of people for the everyday life, employment and to create value in the digital world. The changes in definitions are driven by the advance technological change and its use in all areas.

Currently, almost in every job, the workforce is required to be able to communicate via email or social media, to create and edit digital documents, to search for information in sector related subjects, or to protect personal information online.

A large number of jobs need some other digital skills including editing different types of documents, manipulating images, digital graphic design, desktop publishing, digital marketing etc. These skills are evolving fast with the changes of technology.

For the ICT professionals, the digital skills include a wide range of aspects from basic programming and coding to networks management and security, software and hardware design. The information technology in the last years includes artificial intelligence, block chain, cyber security, the Internet of things, mobile app development and many others.

Those three big categories of digital skills are generally referred to as basic, intermediate and advanced skills. While there are no set in stone boundaries for these three categories, they could be considered as a continuum of digital skills constantly being updated.

Digital skills cannot be considered as a stand- alone product; they are related to other general skills. According to the 2015 World Economic Forum report "New Vision for education" [7], digital skills are nowadays part of the foundational literacies as the general literacy and numeracy, culture and financial.

Digital literacy according to Digital Cornell University defines digital literacy as 'the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet' [8]. By this definition, digital skills are any skills related to being digitally literate and similar definitions of digital skills are used by the UK Government [9]. In this report we will refer to these 3 categories according to:

1. Basic digital skills (Empowering individuals): skills needed by every citizen to become 'digitally literate'. These are the skills needed to carry out basic functions such as using digital applications to communicate and carry out basic internet searches.
2. Digital skills for the general workforce (Upskilling for the Digital Economy): all of category 1, plus skills needed in a workplace and generally linked to the use of applications developed by IT specialists. While the digital skills needed by the workforce are likely to differ across sectors, there will be some minimum requirements linked to processing information that will be applicable across all sectors.

3. Digital skills for ICT professionals (Digitally innovative and creative individuals, organizations and businesses): all of categories 1 and 2, plus skills needed to work across the diverse IT sector. They include digital skills linked to the development of new digital technologies, and new products and services.

The figure below visualizes the inclusion concept according to the three categories above, where basic skills are needed to foster them to intermediate and advanced levels.

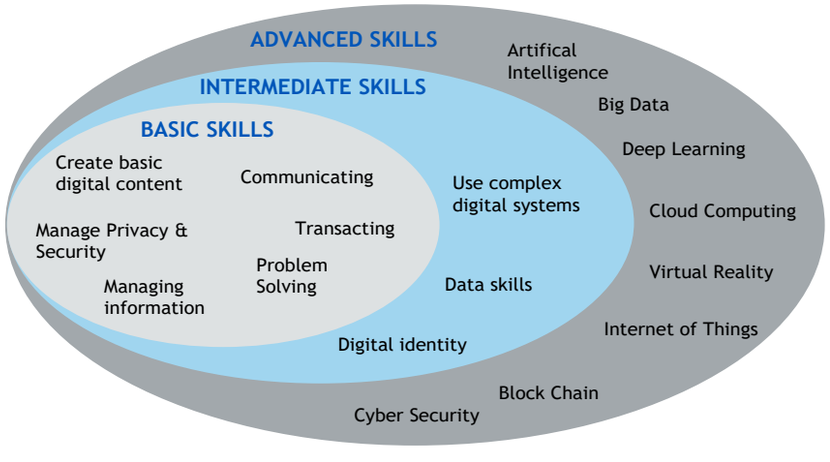

Figure 2. Categories of digital skills

The 3rd category often includes other skills, such as: entrepreneurship and management skills. The definitions over the last years have converged on these 3 categories of digital skills; basic digital skills, intermediate digital skills and advanced digital skills for ICT professionals. The above definition will be used in this report as the three categories are also relevant to the WB6 economies.

5. DIGITAL SKILLS IN WB6 ECONOMIES

This chapter provides the general context of digital skills in the Western Balkans region, the regional initiatives and the relevant data for the digital economy, followed by a detailed analysis for each economy based on the methodology presented at the beginning of this report. For each economy are analyzed the current policies and strategies that affect or are otherwise interlinked with digital skills , the main stakeholders and the survey data and, to the extent possible, the activities and programs in the field of digital skills.

5.1. REGIONAL CONTEXT

The governments of the six Western Balkan (WB6) economies are seeking to increase competitiveness and employment levels of their national economies, while preparing for eventual integration with the European Union. The Information Society is part of the regional agenda with the SEE 2020 Strategy, boosted recently with the digital pillar of MAP REA in 2017 and the Digital Agenda for the Western Balkans in 2018. The South East Europe 2020 Strategy addresses the agenda and how to expedite progress by enhancing National efforts of the South East economies through a shared approach [10]. The Information Society is part of the pillar of Smart Growth of the SEE Strategy, including infrastructure, cross-border e-services and digital skills. One of the key strategic actions in the dimension of Digital Society is defined as follow: ICT training for both public administration and citizens; ICT for e-Inclusion of marginalized groups (women, persons with disabilities, rural poor, Roma, etc.); Provide access to IT training as acquiring digital skills expand employment opportunities [10]. Aiming the regional approach the SEE Strategy puts the general objectives for skills development: An Open South East Europe; Increased employment through effective labor market policies; Competitive knowledge and skills base - quality education accessible to all; Innovative research and development.

Digital skills development objectives and detailed actions for WB6 are included in the digital pillar of MAP REA for the period 2018-2019[2] :

- “Initiate regional cooperation on certified re/qualification digital skills programs;
- Pilot a regional intervention aimed at enhancing basic digital skills for citizens to engage online ;
- Pilot a regional intervention aimed at enhancing skills for IT specialists, that would be closely linked to the demand from and coordinated with digital businesses in WB6 and EU;
- Set up and implement regional training and employability enhancement programme aiming to mobilize and upskill un/underemployed population (women) to seek revenue generation

2 https://www.rcc.int/docs/383/multi-annual-action-plan-for-a-regional-economic-area-in-the-western-balkans-six

opportunities through online work platforms; with particular emphasis on youth, women, and people with disabilities."

Each economy is aligning the actions and focusing in achieving its objectives. Looking at the WB6 Economies for 2018 the Western Balkans growth is projected to increase, reaching 3.5 percent for the current year. Kosovo* and Albania growth is foreseen to reach 4%, Bosnia and Herzegovina will continue to be at a steady 3.2 percent while The Former Yugoslav Republic of Macedonia is expected to reach 2.5%. Montenegro will mark a 3.8 % slightly lower that 2017 and Serbia the largest economy in the region will be at 3.5%.[3]

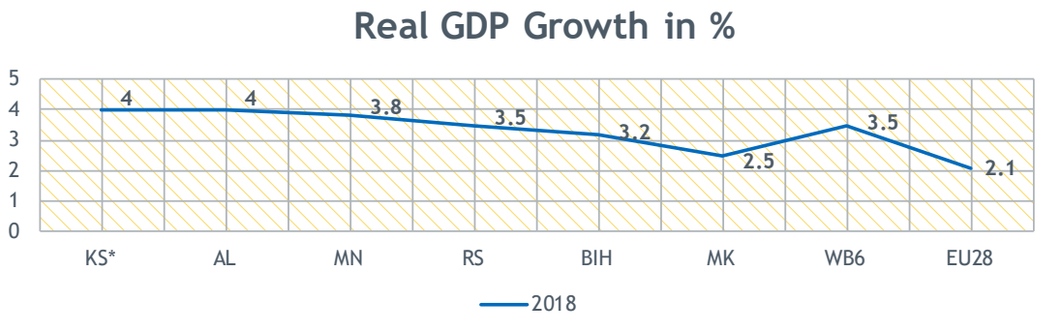

Chart 1. GDP growth in WB6 economies

Based on the Western Balkans Regular Economic Report [4], in the first half of the year, 91,400 new jobs were created in the Western Balkans, compared to 214,000 a year ago. It is estimated that employment growth slowed in all economies except Albania, which gained from higher female participation in the labor market.

In most Western Balkan economies, unemployment marked a decrease with a total of 9,000 unemployed young people founding jobs. By mid-2018 youth unemployment in the region had also declined to what it is considered a historic low, 35.9 percent. It was lowest in Albania at 22.6 percent, followed by Montenegro at 23.9 percent. Elsewhere in the Western Balkans, youth unemployment ranged from 27 percent in Serbia to 55 percent in Kosovo*. Youth unemployment actually rose, in Kosovo* and The Former Yugoslav Republic of Macedonia.

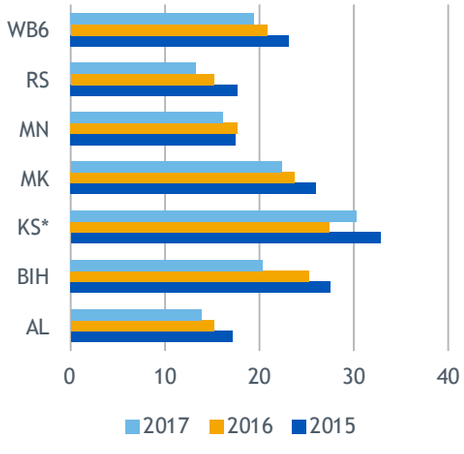

Chart 2. Unemployment rate WB6 economies

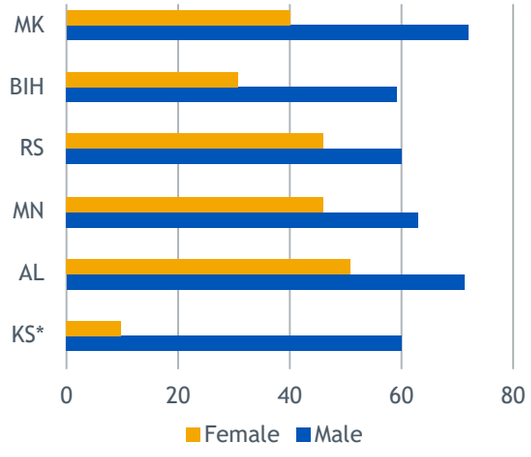

Chart 3. Labor force participation according to gender

3 World Bank Group Western Balkans Regular Economic Report fall 2018 , "Higher but fragile Growth"
4 World Bank Group Western Balkans Regular Economic Report fall 2018 , "Higher but fragile Growth"

Female labor participation in 2018 was about 25% lower than the figure for the male population. Despite some improvement, labor force participation of women continues to be low across the region. In Albania, the participation of women in the labor force shot up to 51.4 percent in June 2018. Serbia and Montenegro also have female participation rates above the regional median of 46 percent. In Bosnia and Herzegovina, however, by mid-year 2018 female labor force participation had fallen to 31.4 %.

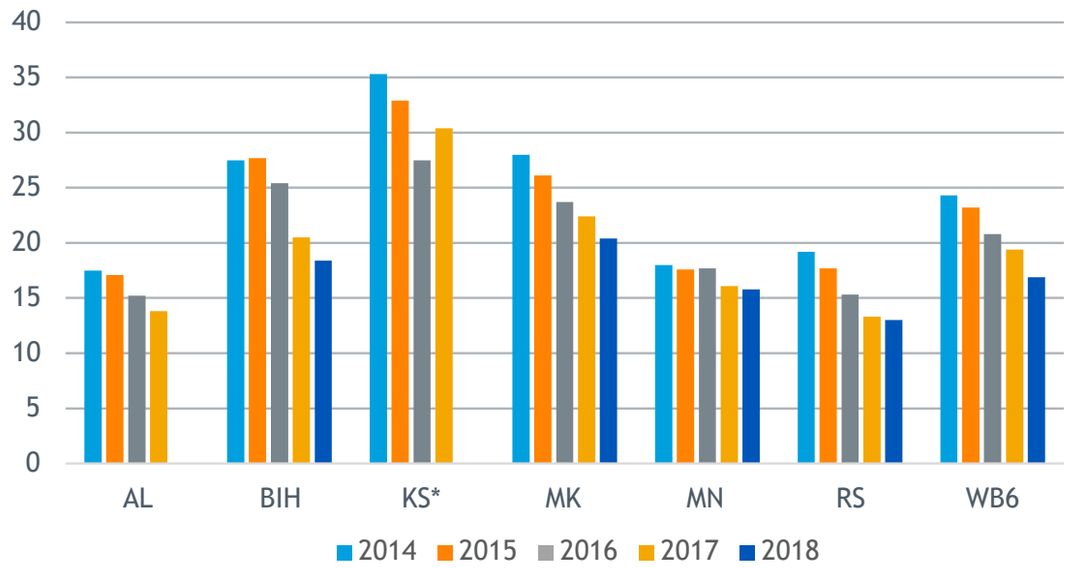

Chart 4. Trend of Unemployment in WB6 economies

According to RCC "MAP Stocktaking and Needs assessment report" the WB6 economies have included provisions of digital skills policy in their digital or education strategies, but they do not address a specific policy document in this area, and it is not considered a priority yet [11].

Comparing the figures between the economies, in the RCC Balkan Public Barometer[5], the public opinion survey demonstrated **that more than 90 % of citizens have not received any kind of training in digital skills during the last 12 months.**

The detailed answers are respectively "Yes" or "No" for the following five type of trainings (A,B,C,D,E): A - Free online training or self-study; B - Training paid by yourself; C - Free training provided by public programs or organizations (other than your employer); D - Training paid or provided by your employer; E - On-the-job training (by e.g. co-workers, supervisors, etc.) It seems that neither companies nor citizens give importance and priority to the continuum process of increasing the digital literacy and knowledge.

5 https://www.rcc.int/pubs/66/balkan-barometer-2018-public-opinion-survey

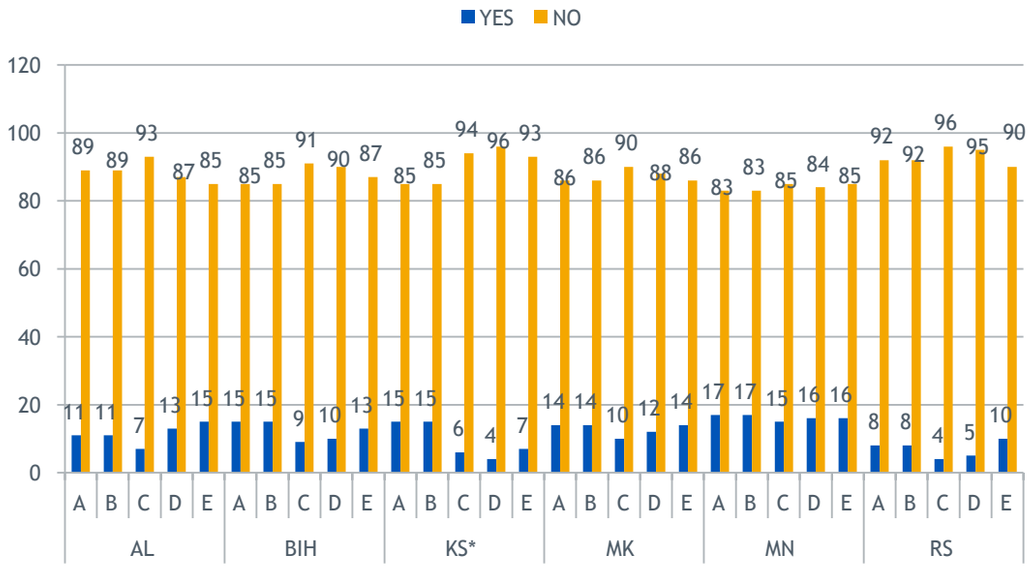

Chart 5. Aggregated data digital skills trainings in %

As service industries gain prominence in the region, education and research must adapt to provide the skills necessary for all workers to fare well in the labor market. But still, today, according to World Bank[6] there is no good measurement of the skills available in each economy or the demand for skills by companies.

With reference to RCC Balkan Public Barometer 2018, the following chart gives the fields in which respondents carried out trainings in the last 12 months in each Wb6 economies.

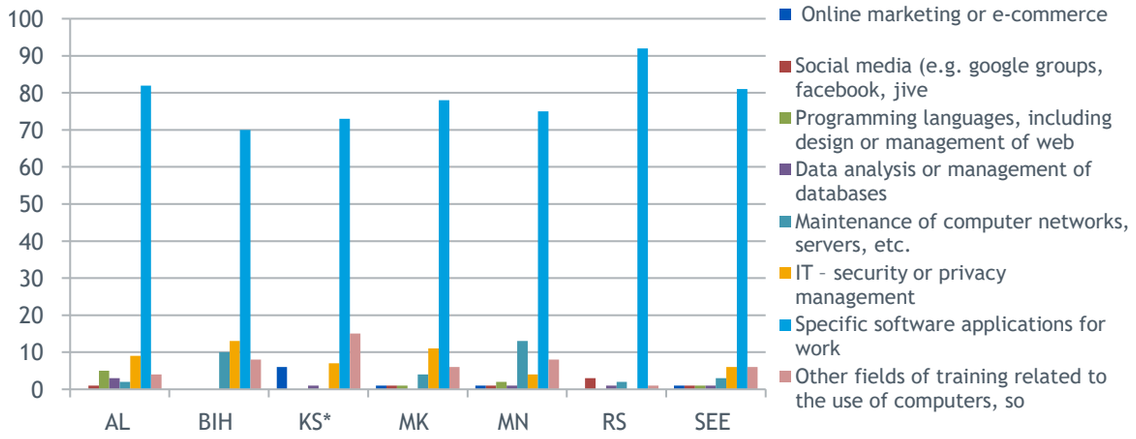

Chart 6. Data on digital trainings

6 WESTERN BALKANS: Regional Economic Integration Issues Notes, World Bank, 2017

Composition of Western Balkan services export and the share of each service category to GDP are presented in the chart below[7].

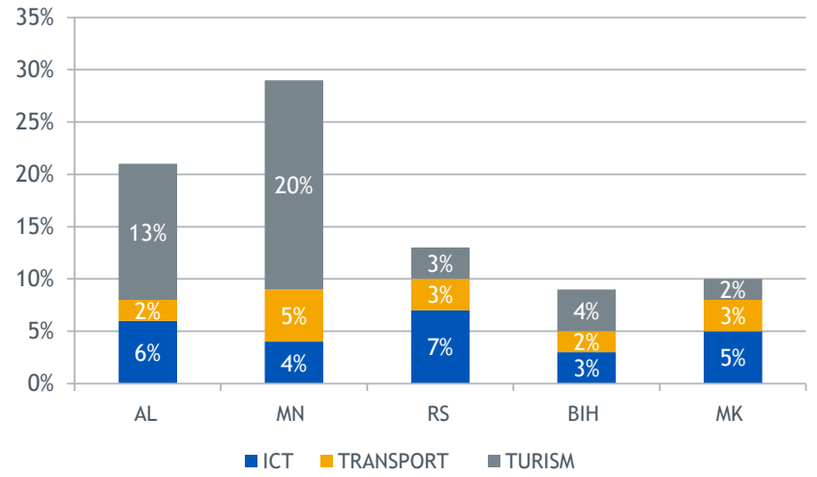

Chart 7. Share of each service category to GDP[8]

According to OECD, since 2016 the WB6 economies have taken positive steps towards Digital empowerment but still a lot remains to be done. Two policy indicators measured in the SEE economies are the e-skills strategy indicator rated just above 2 out of 5, and the e-inclusion strategy indicator with the lowest average score on the (below 1.5 out of 5). This score indicates that although none of the six governments have a dedicated e-skills strategy, they have however included relevant provisions in their digital or education strategies [12]. While Skills gaps are being tackled, it is important not to let vulnerable groups behind. All of
the Western Balkan economies could consider preparing e-inclusion strategies, identifying all groups at risk of being excluded from the digital economy.

Digital skills development in WB6 is supported for each economy at a certain level by international donor's funds, while there are some regional initiatives and support. In the framework of the Berlin Process and MAP REA, in July 2018, the UK Government committed itself on the development of digital skills. While the agenda is moving forward, each economy has its own challenges to address and overcome in the next few years.

Box 1. UK commitment in digital skills in WB6 economies

The UK government committed £10 million to help build digital skills and employment prospects for young people in the Western Balkans. The £10 million project will run over three years. It expands the British Council 21st Century Schools pilot, enabling primary school age children to develop critical thinking, problem-solving and digital literacy skills. It will run in each of the six Western Balkan economies - Albania, Bosnia and Herzegovina, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro and Serbia - reaching 4,500 primary schools and up to one million children. It will help foster the next generation of digital innovators and entrepreneurs by providing computer programming and coding training [13].

7 World Bank Group Western Balkans Regular Economic Report fall 2018 , "Higher but fragile Growth.
8 Data on Kosovo* were not available on this topic

USAID has implemented the regional REG project, including Strengthening Value Chains for Information Technology. REG's IT component helped increase awareness and built capacities for service providers to support the IT sector in the SEE in achieving international standards and certifications for quality products, increase linkages of firms in the region with potential customers in the EU, Middle East, Turkey, and other key markets, increase awareness and build capacity of IT service providers to participate in EU funded programs (including identification of activities and partners, development of bid, capacity building of local organizations/personnel) and increase awareness and build capacity of firms in targeted sectors on the potential benefits of IT tools and services. In order to achieve those goals, REG supports advanced/later stage companies to compete in export markets, and early stage companies/ start-ups by strengthening business service providers in this sector[9].

It is worth pointing out that the ICT export strategy of The Former Yugoslav Republic of Macedonia developed with the support of GTZ since 2010 has contributed to the development of the software industry in the economy, benefiting from the growing trend among Western European and American companies to outsource software related tasks and activities to lower-cost destinations. This kind of ICT sector development policy has already been successfully implemented in some EU countries, such as Poland or later in Moldova, where farms of IT developers, were developed and hired by the international IT companies. After a cycle of IT development of some years, the local IT specialists earned other skills then evolving toward ICT startups, with an upgrade in the value chain. Those good examples could be integrated in a regional approach for WB6. The importance of software exports is highlighted for the development and growth of the software industry and globally for the WB6 digital economies because of the limited domestic market.
The next great transformation expected from Artificial Intelligence and automatization of work will affect non-collar as well as white collar jobs. It seems probable that one of the consequences of the very high level of productivity reached will be that even under optimistic hypothesis of growth that will be not enough jobs. A lot of research is done on the economic policies and social impact and as presented at Stiglitz [14], but education and training are yet mentioned as policies that works and are economically feasible as well as place-based policies – move jobs where people are which is especially sensitive in the economies with high emigration rates as the WB6. According to Stiglitz, "Robotization and other large potentially welfare-increasing changes may actually lead to lower societal well-being in the absence of appropriate government policies.

DATA FROM WB6 ONLINE SURVEY

Valuable insights and feedback has been also provided by the online survey conducted between September and November 2018 for the purpose of this study in all WB economies on the situation of digital skills in each economy.

The respond rate of the survey in all economies was of 50 replies where the majority of respondents are in Albania, Kosovo* and Montenegro. It results from the analysis that 40% of all replies are respondents representing civil society organizations or associations and independents research institutions and the another40% of replies are of respondents representing government institutions, 8% universities, 6% private companies and the remaining 6% international organizations.

9 http://www.regproject.net/competitiveness-it/

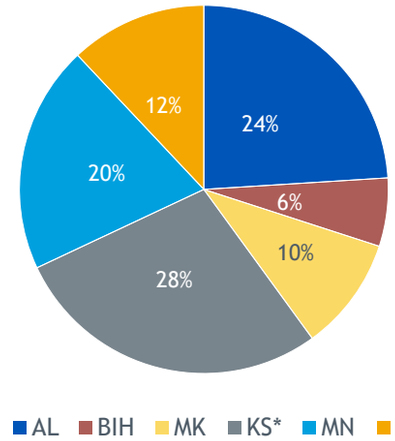

Chart 8 Participation per economy

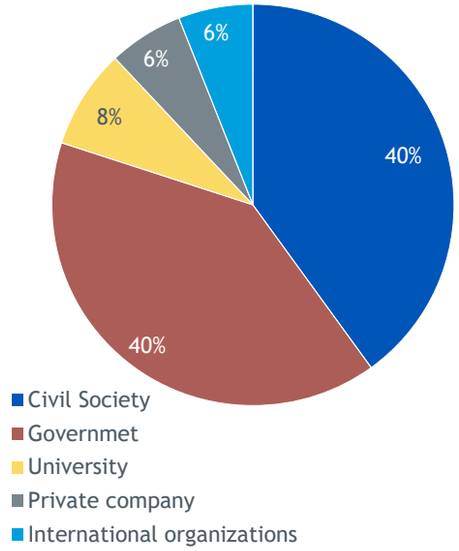

Chart 9 Category of participants

When asked about the existence of a general skills development policy in their respective economy, the majority of the respondents, 50%, replied positively while 29% of them declared not being aware of the existence of such policy.
To the question concerning the existence of a specific action plan on digital skills in the economy, 53% of the participants stated not being aware of an action plan on digital skills being approved while 30% of the participants replied positively. The majority of the participants, 50% of them, replied positively to the question on the existence of a general skills development policy in their economy, while 29% of the participants stated not being aware of the existence of such policy.

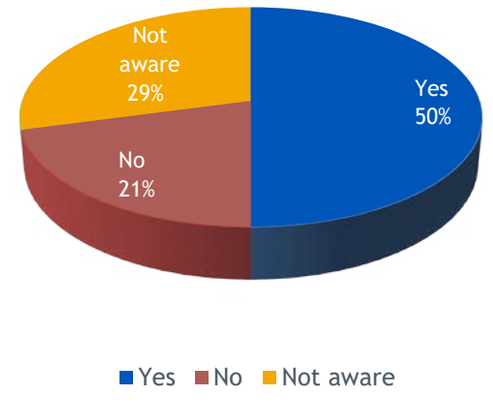

Chart 10. Existence of a skills development policy

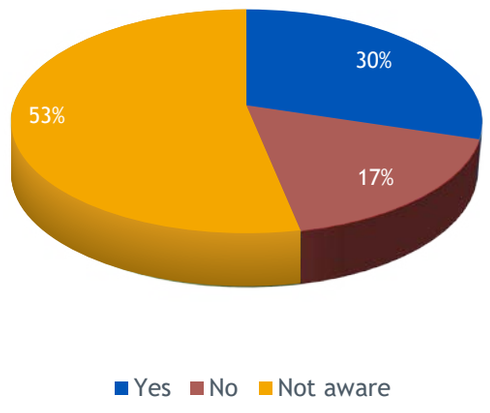

Chart 11. Existence an action plan on digital skills policy

The focus groups on "Regional approach for improving digital skills in six Western Balkan Economies" were conducted in Pristina (October 11, 2018), Tirana (October 29, 2018), Podgorica (November 13, 2018), Belgrade (October 30, 2018) and Skopje (December 12, 2018). The main stakeholders of each economy were present during the discussions and their feedback and suggestions have been incorporated in the findings and recommendations of this study.

5.2. WB6 ECONOMIES ANALYSES

We have followed a common approach for the analysis of the digital skills development in the six economies of the Western Balkans. An analysis by economy is undertaken to identify the government stakeholders, the existing policy documents, as well as the other actors and the implemented projects and programs. The reports of the international partners for the region also offer valuable data on general development indicators, employment, skills and information society. For each of the WB6 economies, the following pillars of the development of the digital skills were considered:

- Reports of International Organizations provide important data on the economic development, digitalization, employment, ICT sector, direct or indirect findings on digital skills;
- Current policies and strategies implemented in each economy that affect or are interlinked with digital skills. Two types of public policies are supporting digital skills at each economy level: first, cross-cutting policies aimed at creating an enabling environment for the development of the economy; second, sectoral policies focusing on education, labor market, and information society influencing directly digital skills;
- Survey data and focus group information on the economy;
- Main actors in the field of digital skills include ministries and government agencies, municipalities, universities and other education institutions, international organizations, civil society and chambers of commerce;
- Ongoing activities and programs in the field of digital skills include programs and projects run by different actors aiming to improve one or more categories of digital skills;
- Digital skills key findings on the economy.

5.3. ALBANIA

General information

The Government of Albania has defined the vision of promoting an inclusive and sustainable economic growth, and considers the EU integration as very important. One of the priorities in accomplishing its vision, which very much depends on the digital skills, is to enhance the Economy competitiveness. According to the OECD Network Readiness Index, the Albanian economy is ranked 84 out of 139 economies, scoring 3.9 and leaving behind only Bosnia and Herzegovina in the region, [12].

According to official data, Albania's labor force comprises some 1.1 million people. The employment by gender counts for 57.1% of workforce male and 42.9% female. According to World Bank, unemployment will remain persistently high should the government fail to address mismatch of skills between workers and business needs and labor market institutional arrangements[10].

Policies related to digital skills

From the review of the existing strategic documents[11], it can be deduced that the issue of digital skills is not addressed specifically for the development of the economy. Policies currently at implementation stage address indirectly the issue of digital skills, although they put the main emphasis on ICT infrastructure. The National Strategy for Development and Integration for the period 2015-2020 addresses the objectives and outcomes foreseen for six governmental priorities and the one directly relevant to digital skills is the Pillar 3 - Investing in human capital and social cohesion, which defines the objectives in education, employment, social inclusion etc. at a macro level. Some specific goals related to digital skills include the modernization of ICT in public institutions, and the development of e-governance and online public services. Improving the skills in the labor market and strengthening the social inclusions are presented in the Economic Reform Program 2018-2020 (ERP) through reforms to improve the quality and coverage of Vocational Education Training while ensuring linkages with labor market, increase employment of women, youth and vulnerable people, drafting and implementing a competence based curricula and training of teachers, etc. [15].

Albania's Digital Agenda Strategy for 2015-2020 is part of the strategic framework designed by the Government of Albania in the area of ICT and aims at addressing the policies for the development of the ICT and electronic communication infrastructure in all the sectors. Its action plan has defined a set of indicators related to digital skills. One important initiative of the government in the area of digital skills is the Innovation week organized every year during the period 2015-2017. This initiative fell in the context of the International Day of Information Society and its objective was to promote innovation and digital skills in all sectors of society.

The National Strategy for Science, Research, Technology and Innovation for 2017-2022 aims at providing support to scientific research, as an incentive for innovation and technology development in the business community, to raise awareness among key players, such as: the business community, media, and public and to support the fine-tuning of legal, institutional, financial serving to science, innovation and technology.

The sectoral policies focusing on the labor market such as: the Employment and Skills Strategy Program for 2014-2020 converge in the combination of employment and education in accordance with the actual situation and capacities of the Albanian job market [16]. Several factors have influenced in a lower labor market activity, such as higher participation of young people in education, young people and women being increasingly discouraged jobseekers etc.

The Strategic priorities for employment and skills development (2014-2020) are defined as follows [17]:
- Foster decent job opportunities through effective labor market policies
- Offer quality vocational education and training to youth and adults
- Promote social inclusion and territorial cohesion
- Strengthen the governance of the labor market and qualification systems

These broader policies will be accompanied by a number of reforms aimed at:
- ensuring the effectiveness of labor market policies;
- offering quality skills development opportunities;
- promoting equality and social inclusion;
- Strengthening the education, training and labor market governance framework.

With this consideration, the Government of Albania has claimed in its governmental program for 2013-2017 the implementation of a new model for growth for the next 15 to 20 years based in policies that are better structured and addressed, to ensure sustainability of its components, increase the domestic product and export rates, and create the conditions for massive new jobs in strategic economic sectors. Knowledge and skills are at the heart of such economic growth model and the

10 Vulnerabilities Slow Growth, western Balkans regular economic report, World Bank, 2018.
11 Policies and strategies related to Albanian economy prepared by the Albanian Government.

design of proper employment and vocational education and training public policies are crucial to achieve it. Digital technology had a significant effect on the nature of work of current and future jobs [18].

The World Bank Partnership Report emphasizes the following policy priorities for the economy relevant to digital skills: Increasing the quality and inclusiveness of labor market engagement; Improving quality, access and relevance of education and training systems; Improving efficiency, access and quality of public services delivery[12].

According to Skills Needs Assessment Report for Albania, at the level of occupations required computer skills are difficult to find for 55.9 percent of ICT expert job positions. Inadequate salary in a company is a barrier for 40.8 percent of job positions for scientists, geologists and agronomists and 38.6 percent for the positions of directors or senior managers. Also the importance of Computer skills when recruiting a new employee seems to be even more important for professions such as senior Specialists & Administrators having completed higher education, Technicians and specialists, Sales and services employees, while for the Craftsmen, while for the professions such as handcraft men and relevant professions, maintenance & machinery workers and elementary jobs such skills are less important [19]. By way of concluding, we believe that this is either due to lack of awareness from the business community regarding the digital skills concept and competences of workforce or non-rich technology environment within the business premises. Also interesting findings is that 68.8% Information and communication Technology companies participating in the survey foresee recruitment of new staff in the coming 12 months.

Female employees comprise 40.7 percent of the total number of employees in Albania. However, a man has double the chances that a woman has to get a job in all regions of the economy outside of the Tirana-Durres area. Youth employment is estimated to be 30.5 percent of employment in the economy [19].

Data from online survey

Based on the responses to the online survey "Improving Digital Skills in WB6 Economies", participants from Albania constitute 24% of the overall participants. It results from the replies that 33% of respondents represent government institutions, 40% Civil Society Organizations and independent research institutions, 8% private companies, 10% Academia.

In response to the question related to the existence of a general skills development policy, 70% of the participants confirm having one. While when sked for the existence of a specific action plan on digital skills 50% of the participant replied not being t aware of the approval of an action plan in this area.

With regard to the questions related to the existence of a national coordination unit for the digital skills development, 40% of the participants confirmed the existence of a national coordination unit; most of them identified such unit with the National Agency of Information Society (NAIS).

In regard to the government incentives for actors implementing projects in the digital skills area, 33% of the participants referred to tax reduction as being an important incentive, while 35% of the participants made reference to the direct financing of the government for such projects as an incentive.

12 Partnership Framework for Albania 2015 – 2019, World Bank, www.worldbank.org.al

Actors and projects in digital skills development

A variety of actors from government, Civil Society Organizations (CSOs), universities and private companies are engaged directly or indirectly in this topic. Concerning the questions related to the existence of a national coordination unit for the digital skills development, 40% of the participants confirmed the establishment of a national coordination unit, most of them identified such unit with the National Agency of Information Society (NAIS).

The Ministry of Infrastructure and Energy (MoIE), in addition to other important tasks, acts as the government body in charge of the policies in the area of telecommunications/ICT field, policy development of digital infrastructure such as broadband development; drafting of legislation and, other regulations, standards and measures in the area of ICT, digital skills do not fall under the portfolio/or direct responsibility of this Ministry. MoIE is acting as a focal point for the digital pillar under MAP-REA, but its responsibility is to prepare and coordinate the efforts in this area as an important step and pre-requisite for supporting the development of the ICT sector.

Since 2017, the Ministry of Finance and Economy (MoFE) is the institution responsible for developing policies, setting priorities for Vocational Education Training (VET) and employment, while also being in charge for monitoring and coordination in regard to those two areas.

The Ministry of Education, Sports and Youth (MoES) is in charge of the University education and shares responsibilities with MoFE over VET. Also the MoES is responsible for the involvement of innovative technologies and curricula for developing digital skills for the students of different levels. Specific training courses have been delivered to teachers who are engaged in teaching information technology subjects. The Ministry of Education and Sports has been supporting and collaborating with different national and international actors in the field of digital skills for several projects on ICT area, mostly for the curricula and for the provided technology for Albanian students. Basic digital skills are needed for most jobs today which have been integrated in all Albanian frame curricula for VET. Such competences should be assured and digital skills should be applied in all fields of study at secondary level (cross-cutting) under the guidance of MoES with the view of enhancing the advanced digital skills and competences of ICT high skilled workforce, there is a need for ICT investment in the universities that have the burden to prepare most of the ICT specialists.

The National Agency on Information Society (NAIS) coordinates and implements all government activities in the field of Information and Communication Technologies. NAIS is also involved in the implementation of policies and strategies for the development of the information society sector, and in particular information and communication technology (ICT, and to the promotion of new technologies in the field of Information, to contribute in education and promotion of ICT use by the public. Accessing public and government information and e-government portals are topics that need to be addressed and can be considered as basic digital skills for citizens. NAIS also provides the public on line services via government portal E-Albania.gov.al, which offers Albanian citizens and government institutions a very convenient way to receive administrative services. One of the concerns considering the use of the E-Albania portal is related to the basic digital skills of citizens, which is noticed by the quantity of calls and level of questions address to portal help desk.

National Employment Service (NES) is an independent agency under MoFE responsible for the implementation of employment policies and vocational training. It functions through the Regional and Local Employment Offices as well as the Regional Directorates of Vocational Training.

INSTAT is an independent institution under the authority of the Council of Ministers. It is one of the major sources of statistical information considered transparent and neutral that help users assess the economy's developments. Recently INSTAT has started to measure a set of Indicators related to basic digital skills for citizens, but the result are not produced yet.

Universities efforts and initiatives in the area of digital skills and innovation are good examples and add more value to the tertiary education. During academic year 2017-2018, 33,283 students out of 129,394 were enrolled at STEM fields of study. For the same academic year ICT enrollment accounted for 6.3% of the total universities enrollment[13].

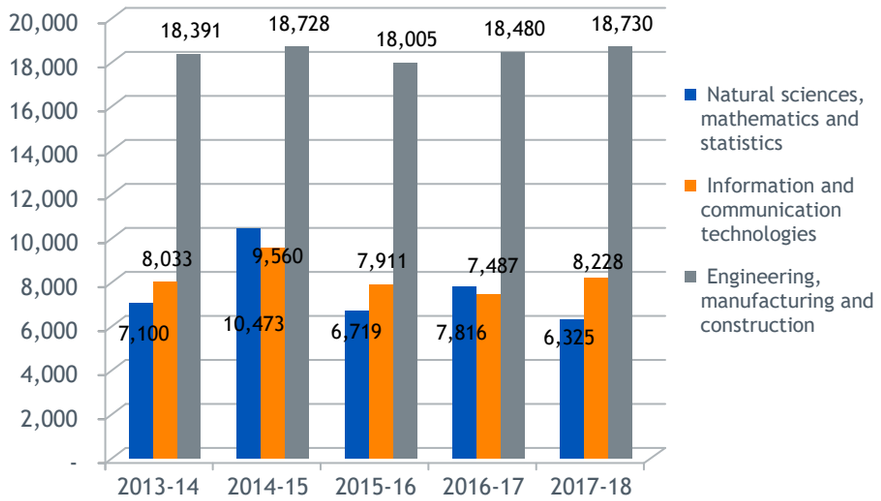

Chart 12. Student enrolled by field of study, Albania

Besides regular curricula, many Faculties engage in other ICT scientific events. The Faculty of Economy has organized for eight consecutive years conferences in the area of Information Systems and Technology Innovations, with the goal of bringing together researchers and practitioners from industry and academia, to give an overview of the state of play, to present new research results and to exchange ideas and experiences in the field of Information and Communication technology, their innovations and applicative aspects in Economy[14]. Also, the Faculty of Natural Sciences has organized the conferences covering the Trends and Applications in Computer Science and Information Technology, aiming at promoting the research and innovation in the area[15].

International partners, such as: EU, UNDP, GIZ, Swiss Cooperation, ETF, are financing the area of digital skills in Albania, either through supporting the preparation of policies or program implementation. International actors have played a crucial role, starting from awareness in the topic to strategic guidance contributions, and concrete projects and activities. The financial support of International donors has been crucial for the support of digital skills area, which is not a priority of the government. Through their programs and intervention in VET area they try to address basic digital skills or intermediate digital skills for youth workforce.

The project Risi Albania is funded by the Swiss Agency for Development and Cooperation (SDC) and implemented by a consortium consisting of HELVETAS Swiss Intercooperation and Partners Albania. The overall goal of this project is to contribute to an increased employment of young women and men (age 15-29) in Albania. In ICT, RisiAlbania facilitates: introduction of cybersecurity law, (increasing capacities of NAECCS) which requires that companies with critical infrastructures invest in IT security and employ IT security specialists.IT solutions, enabling the sector to promote its services for businesses active in tourism, agro-processing etc. This will lead to an increase of digital skills in SMEs in the Albanian economy. The development of a) innovative, b) attractive and c) market-driven training offers in ICT through contemporary learning methodologies (e. g online training platform.)

GIZ ProSEED programme (Sustainable and Regional Development, Employment Promotion, Vocational education and training in Albania) is funded by the German government and the digital skills are also at the focus of the project. One of the recent interventions is the funding of the trainings in ICT to increase the participant's employability, by providing them basic digital skills for jobs in the creative industry, trainings provided by Protik.

Private companies have made a considerable contribution in regard to digitals skills development in the economy. They provide a wide range of ICT trainings from the basic to advanced level. Some good examples include: the ICT Education offers advance ICT trainings and curricula's providing the participants intermediate and advanced digital skills; ikubINFO Academy is another good example of Albanian private company with the goal to prepare students, young professionals or converting-to-IT individuals for the labor market in Albania and beyond and building a bridge between young individuals and investors in order to further enhance innovation and entrepreneurship initiatives in Albania.

Private companies operating in the area of ICT have great concerns when it comes to shortages and the competences of workforce with advance digital skills, which affect their growth and performance. Some private software companies report working for the international markets but their capacity of development is limited by the recruitment of ICT professionals, even with massive investment on HR recruitment processes. Also, according to SNA report, the data of anticipated recruitment over the next 12 months demonstrate that ICT experts are in the top 20 occupations in all size groups of businesses, reflecting that ICT is becoming very important for businesses regardless of size and sector.

Civil Society Organizations in Albania have recently been engaged in activities and projects related to digital skills.

The establishment of a creative technology center Protik[16], stems as an initiative in AADF's education strategy[17]. The main idea behind this initiative is to promote and create a place for Albanian teenagers to explore an innovative path and diversify their future digital skills. Beneficiaries will be able to create their own personalized learning plans utilizing a virtual technology environment designed to facilitate a multi-faceted ICT curriculum.

The Albanian ICT Association[18] represents an initiative of Albanian enterprises working to address the needs of the IT sector; as well as to transform the association into the most important representative body of the Albanian IT domain.

Partners Albania[19] is an independent Albanian CSO working to support civil society and facilitate inter-sector cooperation, in order to strengthen democratic institutions and advance economic

13 http://www.instat.gov.al/al/temat/tregu-i-pun%C3%ABs-dhe-arsimi/arsimi/#tab2
14 http://www.conference.ijsint.org/
15 http://rtacsit.fshn.edu.al/

16 http://www.protik.org/
17 http://www.aadf.org/project/enhancing-digital-literacy-in-albania/
18 http://aita-al.org/
19 http://partnersalbania.org

development also engaged in different activities related to improvement of digital skills mostly for citizens and students.

Oficina[20] is a CSO with the mission to invest in, incubate, and help develop a new-technology industry in Albania. It aims to accelerate the learning in the area of ICT, introduce young generation to mentor programs and help to connect other entrepreneurs.
CID is another CSO supporting economic development through innovation aiming regional partnerships [20]. CID has implemented several regional projects in collaboration with ICK Kosovo* to supports the ecosystem of start-ups in ICT. One important activity is the contest "Digital Girl of the year" between Albania-Kosovo*-The Former Yugoslav Republic of Macedonia[21].

E-mma Balkans was launched in Albania in November 2018. E-mma is an association which promotes diversity in Technology and encourages women to get into fields they have been separated by their education and culture[22].

The Albanian ICT Academy offers innovative methods of education in the field of Information Technology targeting young people and ICT for children. They provide the category of "Ready to Work" training, which includes courses according to the requirements of companies in the field of ICT, thus orienting the trainees more towards the labor market[23].

In regard to the government incentives for actors implementing projects in the digital skills area 33% of the participants invoked tax reduction as an important incentive while 35% made reference to the direct financing of the government for such projects as an incentive.

Key findings

- The need for addressing a policy in the area of digital skills that covers the three levels of competences: basic digital skills for citizens; intermediate digitals skills for a qualified work force; and advanced digital skills for a highly skilled workforce; is important and could benefit the economy. As of today, the government of Albania has not initiated any particular initiative in digital skills. It can be stressed that the reports find important the need to prepare a cross-cutting policy on digital skills in the economy level.
- The digital skills policies should be accompanied by a concrete plan and budget allocation among all actors.
- Considering the initiatives and projects under implementation of all actors it is crucial the government to lead the process of coordination of the efforts. The initiatives and activities happing today in government level are not visible and not coordinated under the digital skills umbrella. The coordination unit could put in place an horizontal organization between government institutions working and being involved ii this topic
- Better harmonization is needed among all actors and stakeholders. The digital skills are in the focus and interest of many actors and synergy is needed between international organizations, CSOs, private companies, etc.
- Low awareness on the importance of the digital skills.
- Low intention of women inclusion in the digital skills initiatives.

20 http://www.oficina.al
21 https://balkansdevelopment.org/
22 http://www.e-mma.org/
23 https://albanianictacademy.com/

5.4 BOSNIA AND HERZEGOVINA

General information

Bosnia and Herzegovina is ranked 89 among 190 economies in terms of "ease of doing business", according to the latest World Bank annual ratings. The ranking of Bosnia and Herzegovina deteriorated to 89 in 2018 from 86 in 2017.

Bosnia and Herzegovina ranks 97/139 at Network Readiness Index (NRI) 2016,[24] the last between WB6 economies as well as for the NRI Skills sub-pillar (135/139 and 92/139 for the quality of math & science education). Concerning the percentage of online sales to the total sales according to the RCC Balkans barometer Bosnia and Herzegovina is at the 2nd place in the WB6 with 22%.
Nevertheless, the ICT sector is considered as one of the fastest developing sectors in this economy. According to the Foreign Investment Promotion Agency (FIPA), the ICT industry is developing and spreading within the economy and becoming one of the drivers of the economic growth [21]. It is estimated that there are between 2.500-3.500 programmers in Bosnia and Herzegovina, and that the sector contributes with around 75 million EUR to the total GDP. Based on the data produced by the association of software industry companies in Bosnia and Herzegovina, BIT Alliance, the revenue of software companies in the economy has increased in the past few years ranging from 200% to as high as 1.400% and in terms of new employees almost 600% [22].

90 % of the companies experience issues in the hiring process, 75% of them have declared facing difficulties in finding employees with relevant work experience and skills, which shows a clear gap between the demand and supply of the job market[25].

Policies related to digital skills

The policies and regulations adopted are influenced by the complex governance structure of this economy. The policy and regulation environment is segmented structurally across state, entity, cantonal and local levels, with no effective coordination across different authorities.

Based on the European Commission Report of 2018 for Bosnia and Herzegovina, the digitalization is still at a very low level [23]. When it comes to the quality of education and update of school curricula to match the market demand, numbers remain still unsatisfactory. The report observed that the education system is very complex and highly fragmented. This results in a lack of common standards for various levels of education, as well as in teacher training and performance evaluation. Teaching curricula are outdated and not aligned with the economy's needs.

The economy efforts are on the other hand strongly focused in the vocational education and training programs. In fact three quarters of upper secondary students in Bosnia and Herzegovina were enrolled in vocational training programs. This is one of the highest rates in Europe and numbers remained relatively stable over the past years [24].

The development of entrepreneurial and digital skills needs strengthening especially for young people, to improve their employability and competitiveness on the labor market. There is no economy-wide measure included on education and skills [25].

Based on the data published by ETF in the Bosnia and Herzegovina Strategy Paper 2017-2020 the

24 http://reports.weforum.org/global-information-technology-report-2016/
25 MarketMakers " Gender Equality in IT sector in Bosnia and Herzegovina" Sarajevo 2016, http://marketmakers.ba/bundles/websitenews/gallery/files/15/1485873826Gender_equality_in_IT_sector_in_BiH_(ENG).pdf

economy workforce is rather low skilled, with only a quarter holding a tertiary qualification. While progress have been made still 16% of adults aged 30- 34 has attained tertiary level of education in 2013, an increase of since 2011 [26].

The low skilled workforce combined with a high unemployment rate is considered to be two of the major factors slowing the growth and progress of the economy.

The growing ICT sector has shown dynamic production and export growth, but continues to be held back by factors including the lack of skilled workers and low business research, development and innovation (RDI) uptake. Competition in the ICT sector needs to be enhanced to further reduce costs and improve quality.[26]

The government of Bosnia and Herzegovina approved the Economic Reform Program 2017-2019 (ERP) in January 2017. ERP inter alia contains a comprehensive program of structural reform aiming at boosting growth and competitiveness of the economy. The ERP determines the reform priorities in 9 sectors, three of them being education and skills, employment and labor market and social inclusion, poverty reduction and equal opportunities.
The priority sector of education and skills document observes that: “Bosnia and Herzegovina” has a high unemployment rate, especially when it comes to youth, women and persons with disabilities. The unemployment rate for men is 22.55 and for women it is 30%. The majority of unemployed in the Bosnia and Herzegovina have completed secondary education, followed by those who have completed primary education and those with lower education. The lowest unemployment rate is recorded among persons with university diplomas.”

The key reform measure foreseen in this regard is improving the links between education and the labor market. In Bosnia and Herzegovina, the Council of Ministers actions will be directed towards the development of new policies in terms of building and enhancing, skills, competence and knowledge. The government of the Federation of Bosnia and Herzegovina on the other hand will establish Student and Education Staff Mobility Funds, will prepare career guidance model in cooperation with cantons, focusing education on the labor market and connecting learning and education outcomes with demands of the labor market as well as amend curricula in accordance with the needs of employers and enhance quality of education so that students will have the required knowledge fund, skills and competences for the job market.

The inclusion of digital skills is not seen as part of a specific intervention. While the document foresees for an improved correlation between skills acquired in education and labor market needs by launching different concrete activities, there are formulated as generalized skills without specific focus on digital skills.

In a sectorial approach that of the information and communication technology, the public sector recognizes it has a role in the ecosystem, but law adoption and the implementation of recommendations are both slow at the state level[27].

With the recent developments of the ICT sector the government followed up by adopting the Bosnia and Herzegovina Policy for Development of information Society for 2017-2021 in the first half of 2017.

The policy is considered as an extremely important document that provides the concept and vision for the development of information and communication society in Bosnia and Herzegovina, with special emphasis in the area of sustainable growth and promotion of more competitive economic society based on knowledge and innovations.[28]

The policy is aligned with the Digital Agenda for Europe as well as the Strategy “Europe 2020” and is considered as a milestone in defining a coherent vision for the ICT ecosystem.

This Policy is based on seven pillars, such as the development of a national software industry, the establishment of a fast and ultra-fast internet access, the establishment of a unique digital market which will include the online services and digital contents as well as a pillar dedicated to strengthening digital literacy, knowledge and E-inclusion.

While the adoption of such documents paved the way to a better framework of development of the sector, the government still needs to prepare and adopt the two-year entity-level action plan. The Ministry of Communications and Transport, on the basis of this policy is currently working on developing an Information Society Development Strategy, which will elaborate the activities in the pillars of the Policy in detail and represent a key strategic document for further directions in the ICT development in Bosnia and Herzegovina.

Another important policy adopted in 2017 was that of the electronic communication sector in Bosnia and Herzegovina for 2017-2021 and its action plan. Through this document the government opens the possibility for the electronic communication operators in Bosnia and Herzegovina to introduce 4G network.

The Policy also sets the electronic communications development goals in Bosnia and Herzegovina, as well as the measures and the activities that will lead to their implementation, as well as set the objective to further develop infrastructure, focusing on the infrastructure that enables broadband services, particularly in less inhabited and underdeveloped area, the development of electronic communications for the purpose of public services.

Data from the online survey

Based on the responses from the online survey participants from Bosnia and Herzegovina constitutes 6 % of the participants. 33.3% are from Municipality level, 33.3% represent Civil Society Organizations and 33.3% of them from International organizations.

To the question pertaining to the existence of a skills development policy, only 40% of them affirm having one, while none of the participants confirmed the existence of an approved action plan on the digital skills policy.

Concerning the questions related to the existence of a nationwide coordination unit for the digital skills development and the existence of government incentive for the actors implementing projects in the digital skills none of the respondents were aware neither for the existence of a nationwide coordination unit nor of governmental incentives in this field.

Actors and projects related to digital skills development

The Ministry of Communications and Transport is leading the Digital Agenda. This Ministry is in charge inter alia with the preparation and development of strategic and planning documents in

26 http://data.consilium.europa.eu/doc/document/ST-8443-2017-INIT/en/pdf
27 https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf
28 http://www.mkt.gov.ba/saopstenja/default.aspx?id=5714&langTag=en-US

the field of information technologies. The Ministry of Civil Affairs is another actor involved in the coordination of policies concerning science and education, as well as labor and employment.

In the government entity level, the Ministry of Development, Entrepreneurship and Crafts and the Federal Ministry of Education and Science are also important stakeholders in the field of skills and innovation.

In terms of CSOs and private networks, Bosnia and Herzegovina have technology parks and innovation centers, such as the INTERA Technology Park, Technology Park Zenica and ICBL Banja Luka or development organizations, such as NERDA Tuzla or Bit Alliance. The latter being the leading association of software industry companies in Bosnia and Herzegovina aiming to initiate the adoption of institutional strategic solutions for the key weaknesses, challenges and problems in the development of the software industry in Bosnia and Herzegovina.[29]

The Business Innovation and Technology (BIT) Center in Tuzla is an incubator providing hard and soft infrastructure for ICT-based start-ups and SMEs. BIT center Tuzla is regarded as representing good practice. Since 2005, it has hosted over 53 companies, employed more than 500 highly skilled individuals and has enabled more than 6,000 people to improve technical and entrepreneurial skills through workshops and training programs.

Several initiatives have been observed in this economy focused on the improvement of digital skills and emphasizing the need to further develop digital capacities among different target groups.

The "Development of Software Industry in Bosnia and Herzegovina"- In 2018 was organized for the second time by Bit Alliance in collaboration with the Ministry of Communications and Transport in Bosnia and Herzegovina, the conference on the Development of Software Industry in B&H. The conference presented trends in the development of the software industry in Bosnia and Herzegovina, as well as on other economies of the region and the world, the challenges it face and the potential of employing a large number of young professionals in this sector of the economy. It was estimated that the conference was attended by 450 participants.

International organizations are important players in the creation of a more adequate environment for the development and promotion of ICT competencies among the young.

The "Partnership for Innovation" project - From 2011-2016, USAID implemented the USD 4.7 million 'Partnership for Innovation' project to help young market entrants improve their skills and work readiness to prepare for jobs in the ICT sector. The project consisted of 24 internship programs, work-readiness courses, and fifteen advanced software programming trainings for 2,000 young people.

The ICT Boot Camp - In May 2015 EBRD in collaboration with BIT Alliance lunched the ICT Boot Camp a six-month, intensive education program for crucial ICT skills, with practical training from experienced IT practitioners. The Boot Camp was conceived as an intensive course where the students learned about a wide range of topics, from programming languages like Java, to software development methodologies and software architecture.

ICT research lab HERD - Another interesting project implemented in this economy is the partnering with the Faculty of Electrical Engineering in Tuzla and BIT Center establishing an ICT research lab HERD project focused on collaboration partnership for innovation. This collaboration is continuing as ERASMUS PLUS project BENEFIT, in which BIT Center fosters soft infrastructure in the local innovation ecosystem and acts as a bridge between academia and industry.

CoderDojo project - The CoderDojo project implemented by Bit Alliance during 2017 had in scope to provide primary and secondary school students, the opportunity for learning programming and other IT skills, by organizing CoderDojo free programming school at 16 locations in 11 cities of Bosnia and Herzegovina. It is estimated that until now, more than 700 elementary and high school students attended this free coding program.

The project for the Digital Inclusion of Marginalized Women - This project implemented by Amica Educa organization, was a three-year project, launched in 2014 aiming the empowerment of women of different ages and levels of education through training on digital literacy. The trainings on digital literacy enabled the participants to independently use applications such as Word, Internet and Skype, as basic tools for many jobs. It is estimated that from the total number of participants 91% of them successfully completed them, 19% of the participants were employed in different companies and organizations after the competition of the training while 24% of the participants began to generate income using their own resources[30].

Key findings

- The system of governance of Bosnia and Herzegovina is characterized by the division of responsibilities and duties among the State, Entities, Cantons and Municipalities makes the coordination and implementation of policies and processes rather difficult and should be considered while recommending specific interventions related to digital skills activities. In consequence the economy does not have a specific nationwide coordination unit for the digital skills development, making the applied measures on this specific area incoherent with each other and heterogenic in the chosen approach. In fact none of the respondents of the online survey was aware neither for the existence of a nationwide coordination unit nor of governmental incentives in this field.
- Bosnia and Herzegovina has a recent Policy for Development of Information Society for 2017-2021, which includes a pillar dedicated to strengthening digital literacy, knowledge and E-inclusion, nevertheless a specific Strategy and an action plan is still not approved to detail the actions in the Digital skill area.
- The economy work force is low skilled in digital skills while the ICT sector is one of the fastest developing sectors in this economy, affordable and flexible measures such as courses and trainings should be taken into consideration to meet in a timely manner the highly increasing demand of the private sector.
- Different initiatives supporting the ICT sector, start-ups and employment exist and they are generally funded by the donors.

5.4. THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

General information

The Former Yugoslav Republic of Macedonia is ranked 11th among 190 countries in Doing Business and is the 1st between WB6 for the Network Readiness Index.

75% of households have Internet access and more than 50% of users report to search information about products and services or health-related issues, but only 24% report using online services for

29 http://bit-alliance.ba/initiative/

30 http://www.amicaeduca.com/the-end-of-three-years-project-named-digital-inclusion-of-marginalized-women.html

purposes of leisure and travelling, only 12% use online banking and only 6.4% attend online courses. Based on these data from 2018 PwC study - ICT Sector Study for Albania Kosovo* and The Former Yugoslav Republic of Macedonia, the usages of online services in the everyday life can be largely improved.

According to the Balkans barometer, companies in The Former Yugoslav Republic of Macedonia report to realize in average 27% of their total sales online, the higher in WB6, which still lives place for improvement on the offer and on the demand side.

According to the State Statistics Office which measures the utilization of information and communication technology for households, individuals and enterprises[31] around 9,000 students were enrolled in ICT programs in 2016, while the number of employees in computer programming, consultancy and related activities has doubled between 2013 and 2016. There is no annual assessment on ICT conducted by the State Examination Center, so no data are available on the achievements of ICT students.

The total ICT market value in The Former Yugoslav Republic of Macedonia was an estimated USD 500 million in 2016. Hardware is the largest segment (55%) of the ICT market in The Former Yugoslav Republic of Macedonia. ICT services are the second largest segment (30%), and software comprises 15 percent of the ICT market[32].

Policies related to digital skills

The European Commission Report underlines that the digitalization of the economy is progressing fast concerning the households with internet access and mobile broadband penetration, but fixed broadband penetration is comparatively low and not improving, impacting negatively on business competitiveness [27]. “As regards the information society, a long-term digital agenda and a separate digital skills strategy have not yet been developed. The new Education Strategy includes digital literacy among its priorities. A national cybersecurity strategy has not been yet developed and application of electronic signature is limited to a few institutions providing services to businesses. The interoperability system is used by only four institutions, despite the equipment and software having been provided. E-government is at an early stage of preparation and the focus has been on digitalization of services for businesses more than for the public. Very few services are provided to the public through the e-government portal. Equal access to public services is not in place”.

The gap between the skills of graduates and the needs of private companies narrows only slowly. The required move from traditional facts-based learning to the acquisition of general, transversal skills necessitates wider inclusion of the business sector in profiling and implementing programs.

Digital skills are specifically tackled in the draft ERP 2019-2012 in The Former Yugoslav Republic of Macedonia[33]: “Developing digital society depend on availability of skilled ICT workforce on the side of service providers, as well as service users. Analysis of the ICT staff across all public institutions is currently being conducted, focusing on the retention of ICT workforce and ICT skills demand. Activities are planned to inform and educate the citizens for the use of e-Services (National Portal for e-Services) and public awareness raising activities in the field of cyber security (National Cyber Security Strategy). In addition, under the EU Code week initiative, students and lecturers were stimulated to engage with programming and innovation activities, as an extracurricular activity. A significant number of projects within the umbrella of EU code week will continue as long-term projects, which will in turn fuel innovation, creativity and entrepreneurship at an early age. Also, all 10-14-year olds in the public school system will be engaged within the “21st century schools programme in Western Balkans” for building their digital skills and employment prospects. The programme will allow them to learn in a fun and innovative way by having access to free micro: bit pocket-sized, codeable computers in ICT classes and other subjects, helping them build their skills and confidence in computer literacy and coding.”

The digital agenda in The Former Yugoslav Republic of Macedonia is covered in three main aspects by three national strategies. The National Strategy for Development of Electronic Communications focused on the development of the communication services and the National Strategy for the development of Next Generation Broadband aiming to develop the broadband networks that support the digital transformation of industries, production and operations. The National Strategy for Information Society Development supports the development and application of ICT in all walks of life and especially in terms of services for the citizens and the businesses. The new Strategy of Information Society which is under preparation for the period 2019-2024 will also include the development of digital skills for several target groups.

The National Cyber Security Strategy 2018-2022 and Action Plan 2018-2022 have both been adopted in July 2018 and December 2018 respectively. Awareness raising activities and educational activities are widely represented in the strategic documents, starting from January 2019[34].

The Former Yugoslav Republic of Macedonia National IT export strategy has been realized since 2010 with the support of GIZ and gave a real boost to the ICT sector increasing the demand for professionals with high-level ICT skills.

The policies concerning skills and employment and vocational education to match skill supply to labor market demands. The Employment Strategy of the Ministry of Labor and Social Policy for 2016-2020 aims to increase employment, job quality and productivity, with an emphasis on vulnerable groups traditionally on the margins such as women and young people. The Former Yugoslav Republic of Macedonia is putting emphasis to vocational training in terms of digital skills through the Ministry of Education and Science and the Centre for Vocational Education and Training (VET Centre)[35]. The VET Strategy 2013–2020 Action Plan ‘Better skills for better tomorrow’ highlights the value of ICT in teaching and learning for developing digital skills among VET students. [28].

A specific digital skills strategy has not yet been developed, but it is important to emphasize that the **new Education Strategy 2018-2025** has encompassed digital literacy among the other priorities of the Strategy. VET students who wish to continue to higher education can opt for ICT as an elective subject in the national high School examination. A new Law has been adopted on Mathematics and Informatics gymnasium.

Digital literacy is also mentioned in the Public Administration Reform observing that the problem of using ICT in the administration is still ongoing, especially related to full time employees who will require more investments in making them ICT literate. Even more, taking into account the speed of technological advancement and lack of IT staff in the region, steps must be taken for continuous education and motivation of IT staff and solving the problem on systematic level [29]. The Ministry has two relevant initiatives for public administration e-learning education and training: micro learning, and a Learning Management System a web based solution for public administration workforce across all public institutions (information for both is only available in The Former Yugoslav republic of Macedonia).

31 http://www.stat.gov.mk/OblastOpsto_en.aspx?id=27
32 Data taken from ICT_Export_Strategy
33 https://www.finance.gov.mk/files/Economic%20Reform%20Program%202019%20EN%20Nov%202018.pdf
34 http://mioa.gov.mk/?q=mk/node/1813
35 The ETF factsheet of January 2018 on the Digital Skills and online learning in The Former Yugoslav Republic of Macedonia, European Training Foundation, 2018

On the other hand, the Innovation Strategy of The Former Yugoslav Republic of Macedonia for 2012-2020 includes specific measures to strengthen human resources for innovation, one of them being the adaption of education policies to the development of the skills needed for innovation, but digital skills are not treated in a specific manner even though the skill gap is a clear observation of the Strategy.

A State owned fund for Innovation and technological development finances start-ups in the different phases of development: start-ups, spin-offs, accelerators, technology transfer, commercialization.

Data from the online survey

Based on the replies of the online survey participants from The Former Yugoslav Republic of Macedonia constitutes 10% of the participants. 40% of the participants represent Government Institutions, 40% represent Civil Society Organizations and 20% of them are Academia representatives.

To the question pertaining to the existence of a skills development policy all participants confirmed having one in force. To the question of the existence of action plan on the digital skills implementation 75% of the participant confirmed the existence of an approved action plan on the digital skills policy while 25% were not aware of an action plan in this field.

To the question if there were any government incentives defined in the policy for actors implementing projects in the digital skills area, 40% of the participants considered direct financing as government incentives in the policy.

Concerning the questions related to the existence of a nationwide coordination unit for the digital skills development only 20% of the responses confirm that the government has set up a nationwide coordination unit.

Actors and projects related to digital skills development

Several ministries are involved in the policy making in related domains with digital skills in The Former Yugoslav Republic of Macedonia. The Ministry of Information Society and Administration is leading the Digital Agenda since 2008 which highlights the continuity and sustainability of the government's organization. The other main stakeholders in the government are the Ministry of Labor and Social Policies and the Ministry of Education are together with the deputy- prime minister in charge of the economic development. As well as the VET Center mentioned before.

Several programs and projects of different sizes have a contribution in the development of digital skills.

The government project "A computer for every child", 2008-2015 part of the 'Education and training for everyone' initiative opened the way for digital and online learning in primary and secondary schools.

In order to enrich the digital skills of teachers, the Bureau for the Development of Education implemented a Learning Management System, which will provide online courses for the successful application of ICT in teaching.

World Bank funded the Education Modernization project, aimed at developing an accreditation system to ensure that all providers of CPD including digital skills for teaching met the appropriate training quality standards.

The USAID E-school initiative (www.digitalschool.mk) aims to help vocational teachers to make use of digital instructional tools in their teaching through a Moodle platform set up in 2016. Teachers from three schools were trained in the development of digital materials, which then trained and mentored other teachers in their own schools. In 2017 the scheme was extended to seven other schools and to different vocational training entities. In December 2017, the Moodle platform counted 2,897 active users, 5,119 registered, 702 courses, 13,205 assignments and 10,564 quiz questions.

MASIT, ICT Chamber of Commerce, launched in 2017 a project for retraining personnel which includes employees and unemployed persons, where interested candidates have the opportunity to retrain in order to acquire certain other skills, knowledge and practical experience and the IT profiles that are needed for ICT companies.

A bilateral program, "Aided Project of e-Education" with the support of the Chinese government created smart classrooms in 23 secondary schools in Skopje region and 1 remote center of learning at the Bureau for the development of education. Some universities have also created the smart classrooms.

Other "smart classrooms" were launched in some schools in The Former Yugoslav Republic of Macedonia, as in Albania, with the support of Samsung foundation.

Some CSOs and private businesses are engaged also in initiatives, hubs, co-working spaces as CEED hub[36] or Skopje Hub[37].

The Technology Park in Skopje is a new project of a hub for research and development, stimulating innovation and to boost the IT start-up community, cooperating with relevant public institutions, academic community, business sector and chambers of commerce. A feasibility study is conducted, actually pending for adoption by the Government. One of the objectives of the project is for large companies to provide aid for start-ups through the Technology Park support scheme. Start-ups in the IT industry or startups developing innovative technology-based solutions in different industries will be eligible to apply.
Amidst the events and conferences which promote the ICT sector as a whole and the ICT skills for professionals can be mentioned the association for information and communication technologies ICT-ACT, ICT innovations.org, organizing conferences and workshops to promote scientific research in the field of informatics and applications of ICT to build the information society.

EU code week 2018 initiative has been supported by the Ministry of Education and the Ministry of Information Society and Administration, ensuring massive participation of schools, reaching a number of more than 130 events across primary and secondary schools in The Former Yugoslav Republic of Macedonia. 24 of them were supported by 300-euro grants provided by Metamorphosis foundation.[38]

A special place was taken by the first WB6 Digital Summit organized in the framework of MAP REA, with the support of RCC in Skopje in April 2018.

Key findings

- It is to be noticed the stability in the institutional organization in The Former Yugoslav Republic

36 https://ceedhub.mk/
37 https://www.globalshapers.org/hubs/skopje-hub
38 http://metamorphosis.org.mk/en/

of Macedonia where the digital agenda is led by the Ministry of Information Society and Administration since 2008 which highlights the engagement of the governments for the sector.

- A specific digital skills policy with national targets and measures has not yet been developed but it is important to emphasize that the new Education Strategy 2018-2025 has encompassed digital literacy among the other priorities of the Strategy and the digital skills will be included in the new Strategy of Information Society 2019-2024.

- The export strategy for ICT that exists in The Former Yugoslav Republic of Macedonia since 2010 can be considered a good practice that could be extended for the region.

- Education programs for digital skills began as early as 2008 in The Former Yugoslav Republic of Macedonia.

- The EC report suggests stimulating growth-enhancing investments, in particular in research and development and digitalization and the development of a more systematic approach and cooperation among the stakeholders on media and digital literacy is needed.

- Different initiatives exist but a better coordination seems to be needed, factually based on national indicators who could be a common evaluation basis for the national strategy and for all the projects implemented by the public and private actors.

- Also, it is worth pointing out that according to the WB data, the participation on women in the labor force is the highest in the WB6. In these conditions it seems easier to engage women in specific programs on intermediate digital skills programs for better employment.

5.5. KOSOVO*

General Information

NRI is not available for Kosovo*. Based on the Kosovo* Association of Information and Communication Technology (STIKK) report, it is estimated that 76.6% of Kosovo* population are Internet users, mainly for entertainment purposes.

In Kosovo* schools there is one computer per 46 pupils much lower compared to the EU average where 3-7 pupils use a computer, on the other hand only half of the teaching staff has ECDL (European Computer Driving License) trainings.

According to the Balkans barometer 2018, 20% of the total sales of enterprises are generated online, 3rd place between WB6.

Based on the data of the Association of Information and Communication Technology (STIKK) IT Barometer of 2017, to the question addressed to IT companies “do you perceive a deficit of competences/skills in this sector, 80% of the interviewed companies replied positively [30].

It is estimated that the output of the universities is insufficient in terms of quality and quantity. IT companies have to invest substantially into university graduates because their skills profile does not match market requirements. Obviously there is a mismatch between curricula and the requirements of companies. Kosovo* has the youngest population in Europe which gives to this economy a great potential for development.

Kosovo* is among the top 10 economies worldwide with the most notable improvement in doing business reforms, says the Doing Business 2018 report issued by the World Bank Group. This year Kosovo* ranks 40th out of 190 economies in ease of doing business, compared to 60th place last year.
The European Commission Report 2018 for Kosovo* observed that digitalization of the economy has not progressed much over the past year. Kosovo* is gradually aligning legislation with the Acquis, but implementation is lagging behind. An increased number of businesses are conducting e-commerce. However, exact data is yet to be published.
The number of employees and the share of gross value added (GVA) of the ICT industry have gradually increased since 2008 but still remain low despite ample potential for stronger development.

High inactivity and low employment remain among key challenges. The unemployment rate is very high at 31% in 2017. It continues to be higher for women (37%) than for men (29%). The overall employment rate is 30%, but only 13% of women are in formal employment, compared to 47% of men. Only 29% of the employed have permanent work contracts, whereas 71% work on short-term contracts. Unemployment is most prevalent among young people (15-24 years), with 51% unemployed. The rates of unemployment are even higher in the Roma and Ashkali communities.

EBRD Strategy for Kosovo* observed that there is a substantial mismatch between the skills of the young job seekers and the requirements of the labor market, specifically at vocational level. The unemployment rate for those who have no school education stands at 64.6 per cent, compared with those who completed secondary school (41.2%) and those who completed tertiary education (18.9%). According to the ILO Key Indicators of Labor Markets (KILM), 24 per cent of young people are under-educated and unable to offer the qualifications required in the labor market. Almost a quarter of businesses report an inadequately skilled workforce to be an obstacle for their business[39].

While the ETF SKILLS 2020 for Kosovo* pointed to the fact that one of the key issues and changes for skill supply and skills demand was a digital skills remained at a poor level in Kosovo* and required a greater focus on improving school curricula starting from earlier grades.

Policies related to digital skills

The National Development Strategy 2016-2021 (NDS) was approved by the government of Kosovo* in January 2016. The main purpose of this document is to establish a clear agenda towards the European Integration of Kosovo* in all areas. The NDS is composed of four main pillars of intervention covering Employment, Law, Business and Infrastructure. In the first pillar detailing the intervention for employment, the government reiterates that: “Kosovo* today is the ranked towards the bottom in the region in terms of skilled labor. At a time of rampant unemployment, the paradox is that many enterprises actually run into difficulties recruiting skilled labor.”

The government does also observe that another concern is “the mismatch of acquired skills with labor market demands, and there is also the lack of interconnection between the schools, businesses and the communities. In this sense, we are yet to also adequate capitalize on the skills of diaspora members. The lack of qualified labor discourages investment and is an obstacle to our enterprises for increase of their productivity and competitiveness and develops products of higher added value”.

Nevertheless, the inclusion of digital skills is not seen as part of a specific intervention in the Strat-

39 EBRD Strategy for Kosovo*

egy. While the strategy does foresee an improved correlation between skills acquired in education and labor market needs, by launching different concrete activities that are formulated as generalized skills without specific focus on digital skills.

The Kosovo* Economic Reform Program 2017-2019 is composed of 9 structural reform priority areas among which education and skills, employment and labor markets, social inclusion, reduction of poverty and equal opportunities. The reform measures foreseen to address the issues in the reform area of education and skill are the harmonization of supply and demand by drafting occupational standards and reviewing curricula as well as applying and improving the teacher's career system. Digital skills are not a specific part of this document but taken into account presumably in the general definition of "skills".

The Kosovo* IT Strategy 2016-2020 is a core document, composed by 9 strategic pillars this Strategy was conceived at the same time as a strategic guideline and roadmap.

Pillar 5 of this Strategy is dedicated to IT education with the goal of improving IT education and promoting HR excellence in Kosovo*. This strategic pillar is directed in promoting education and human resources by continuously improving IT education in Kosovo* on the primary, secondary and particularly on the tertiary level. The pillar foresees also "Special emphasis needs to be placed on aligning IT curricula with the specific needs of the private sector and with fostering close cooperation between the universities and the IT industry." Eight different activities are foreseen in this component, several of which directly focusing on the improvement of digital skills such as: the elaboration of recommendation on IT education curricula in Kosovo* for Universities and Schools, development and integration of applied courses and lectures by IT professionals (practitioners) into curricula, incorporation of established certification programs into the curricula.

The Electronic Communications Sector Policy 2013-2020 ("Digital Agenda") on the other hand is an important instrument which identified and addresses three problematic areas: ICT infrastructure development, development of the electronic content and services and promotion of the use thereof and enhancement of the Kosovo* residents' ability to use the ICTs.
The Digital Agenda of Kosovo* recognizes that some target groups of the Kosovo* population do not use a computer or the internet or use them scarcely and that as ever more daily tasks are carried out online, all residents of Kosovo* need enhanced digital skills to participate fully in society.

For the first time in the government strategic documents, the digital skills of disabled persons were taken into consideration. The document acknowledged that disabled persons face particular difficulties in benefiting fully from new electronic content and services and clearly focused at three target groups: rural population, low-income residents and the elderly as low percentage of older people over 65 use computers and the Internet, compared with the percentage of those who use computers and the Internet within the age group 16-24 years.

According to the Digital Agenda of Kosovo* 90% of jobs in the near future will require ICT skills of some level. Shortages of adequate skills in some sectors or occupations already co-exist with unemployment. Number of young people studying and choosing careers in ICT is decreasing also in Europe and is not keeping up with growing demand. In that context of overall lack of the ICT sector employees, Digital Agenda is stressing that women are underrepresented at all levels in the ICT sector. In order to realize full equal opportunities and to empower them to participate fully in the information society, higher participation of young women and women returners in the ICT workforce should be promoted.

The third component of the Digital Agenda of Kosovo* "Enhancement of the Kosovo* residents' ability to use the ICTs" the strategy objective was to encourage the citizens to gain knowledge and skills required for successful use of the ICTs and to become involved in the information society, to improve their quality of life and to reduce social exclusion.

The actions foreseen in the achievement of the policy objectives address the public employees and the citizens that don't use internet. The first action is to create a teaching and learning portal and to prepare teaching program for the public servants enabling to gain skills in online public administration functions and the second action to enable the target groups of the Kosovo* population that have not yet used computers and internet to gain the required knowledge and apply it in various areas of activity.

In increasing the use of ICT in Kosovo* efforts are directed towards ensuring coordination of the sector, adoption of ITC standards and support of IT businesses without directly tackling the importance of improvement of digital skills.

Data from the online survey

Based on the replies of the online survey participants from Kosovo* constitutes 28 % of the participants. 28% of the respondents represent government institutions, 50 % are from Civil Society Organizations, 15% of them from International organizations and 7% are private companies.

To the question pertaining to the existence of a skills development policy, only 21% of them affirm having one while only 14% confirm having an approved action plan on the digital skills the rest declaring not being aware of the existence of an action plan in this area.

Concerning the questions related to the existence of a nationwide coordination unit for the digital skills development only 7% of the respondents declared that the government had a nationwide coordination unit for digital skills.

To the question if there were any government incentives defined in the policy for actors implementing projects in the digital skills area, 29% of the participants invoked as incentives Tax reduction and 22% direct financing by the government.

Actors and projects in digital skills

From the governmental structure, during the years, three ministries have been in charge of promoting and developing ICT. The Ministry of Education, Science and Technology (MEST) and the Ministry of Trade and Industry (MTI) were the main institutions responsible for creating a policy framework and environment conducive to innovation, while the Ministry of Economic Development gradually increasing its role in the innovation system.

The Ministry of Innovation and entrepreneurship was established in 2017. The main objective of this Ministry was based on the Governmental Program of the Republic of Kosovo* for 2017-2021, for developing entrepreneurship and private initiative through innovation and focusing on the development of manufacturing and service SMEs as a prerequisite for increasing employment, increasing competitiveness and hence increasing private sector growth (especially of young people and women).

The Ministry is also in charge for the implementation of the WB6 Digital Agenda in line with the Sofia Summit Declaration 2018 including in the area of digital skills.

Besides the public sector, the CSOs and private sector in Kosovo* seem particularly active in the digital skills topics, as concerns the target groups of interest for this study. In fact in a relevantly very short time, Kosovo* ICT sector was able to organize itself and to establish a focal point for developing public-private dialogue within the economy.

CSOs and associations play a major role in the ICT ecosystem of Kosovo*. STIKK established in 2008, has played an active role in the ICT sector communications and development.

The Innovation Center Kosovo* is another actor actively involved in the support of entrepreneurship, innovation and commercial based business development with a focus on information and communication technology. It was created in 2012 and is funded by the Embassy of Sweden in Pristina and Royal Norwegian Embassy in Pristina. It has supported more than 165 startups and created more than 720 jobs.

The Internet Project Kosovo* Foundation IPKO is an important actor actively involved in supporting the development of the next generation with a digital vision. These entities provide training services to improve the digital skills of general workforce, including Incubator tenants, business people, ICT professionals, public administration and civil society.

Kosovo* Digital Economy (KODE) - World Bank Loan of 25 mill$ The Digital Economy Project (KODE) for Kosovo* main objective is to improve access to better quality and high-speed broadband services and to online knowledge sources, services and labor markets among citizens, and public and academic institutions. One of the three components of KODE focuses particularly on the improvement of digital skills, digital work and empowerment. It will support the youth online and upward (YOU) program and increased access to knowledge, information, and online services. Additionally, the project will facilitate more access among citizens to knowledge, information, and services through support to the development of a National Research and Education Network (NREN) and a Digital Awareness Program[40].

The Women in Online Work (Wow) project - Another interesting project implemented in Kosovo* targeting women is the one year WoW project launched in 2016 which is a training program of the Ministry of Economic Development through which trainees benefit in acquiring digital skills in order to find work in the online freelancing market. The project was funded by the World Bank and Korea Green Growth Trust Fund and implemented in five municipalities in Kosovo* through the Green Growth in Rural Areas of Kosovo* Technical Assistance program. The WoW pilot trained hundreds of unemployed and underemployed young women in different streams of online freelancing.

The KODE will replicate the WoW pilot by establishing the Youth Online and Upward (YOU) Program, which aims to train 2,000 young men and women in front-end web development, graphic design, and search engine optimization.

European Computer Driving License (ECDL) developing teacher's digital skills in Kosovo* - As per 2018, 140 public schools in the Republic of Kosovo* have received a grant from the World Bank to improve the digital competences of public-school teachers in using technology in the classroom. ECDL Kosovo*, the local ECDL National Operator has been selected to offer ECDL training and certification to a number of these schools.

Kosovo* Association of Information and Communication Technology (STIKK) Education - STIKK Education are training programs combined with internship in private technology companies. This program has been designed to specifically address the obstacles concerning skill-development and training. The vision of this program is to increase the local capabilities in the sector of ICT through professional and competent trainings, specifically designed to meet the needs of the local industry. KOS-ICT is an annual conference, existing since 2011 gathering the ICT industry on the trends and challenges and creating networking opportunities.

40 http://projects.worldbank.org/P164188?lang=en

Key findings

Some data related to the digital economy and society in Kosovo* are missing in the international reports as for example the Network readiness Index.

- Kosovo* has two important policy documents treating the question of digital skills respectively the Electronic Communications Sector Policy and the digital Agenda with some specific actions and measures, while monitoring mechanisms and measurement of achievements in the improvement of the digital skills could not be found.

- While the issue of digital skills is tackled in different policy document, usually is treated as a "countering" of ICT infrastructure on some cases or part of improved school curricula in others. It would be highly advisable to envisage cohesive and aligned approach in regard to the improvement of digital skills with a specific document on the issue.

- The strategic documents tackle the e-inclusion specifically for disabled people, rural population, low-income residents and the elderly.

- Different stakeholders have contributed and been part of the effort to support the ICT sector and to enhance employment. Active start-ups, good organization of the sector and success stories exist and have been promoted. Coordination in the public sector can be improved.

- The project implemented in Kosovo* on employment of women in the field of ICT is a good initiative, nevertheless a concrete and coherent government driven approach to achieve the objective on women inclusion has not been observed.

5.6. MONTENEGRO

General Information

Montenegro ranks 51/139 at Network Readiness Index 2018 and is the second in the region, following The Former Yugoslav Republic of Macedonia. The Statistical office of Montenegro - MONSTAT has been conducting the survey on the ICT usage in Montenegro since 2011, using Eurostat methodology. This survey refers to the use of ICT by households and individuals as well as in enterprises and provides valuable data for this report. In 2018 71.5% of the persons used Internet in the last 3 months, slightly increasing from 2017.

Percentage of respondents who bought or ordered goods or services is 27.0%, mostly clothes and sports goods (68.2%), travelling, accommodation (20.1%), entertainment, films etc. (12.8%), medicine (6.7%).

According to the Balkans barometer 2018, 20% of the total sales of enterprises are generated online, the economy holds the 3rd place between WB6 and Kosovo*.

The Doing Business 2018, World Bank data, Montenegro is ranked 42 over 190[41].

41 http://documents.worldbank.org/curated/en/734781510047916994/pdf/120981-WP-PUBLIC-DB18-MNE.pdf

The European Commission Report 2018 on Montenegro[42] concludes that "A new multi-annual strategy, based on the Digital agenda for Europe and the Digital single market strategy, was adopted. It addresses issues such as accessibility of broadband services, cyber security, digital business, e-Health and e-education".

The general skills mismatch between education and the labor market is also highlighted by the EC report 2018 'The mismatch between the education system and labor market needs remains an issue of concern' as it was by ETF 2014 document "Skills 2020 Montenegro" which proposed a monitoring framework. As we will see later, for the digital skills, national target indicators are defined.

Policies related to digital skills

The Economic Reform Programme of Montenegro for the period between 2018-2020 [31] considers the development of broadband services and the building of an adequate infrastructure for fast and safe internet, as an obstacle for the development of many economy sectors and of society as a whole. It considers that a relatively small number of enterprises activities are based on innovation, knowledge and modern technology.

On the research priorities defined by the Ministry of Science in 2015 and the Council for Scientific Research Activity, one of the areas of research is ICT [32] with a particular importance for the short-term development of Montenegro, together with energy, medicine and health, new materials, products and services, sustainable development and tourism; agriculture and food.

Box 2. The priorities of Information and Communication Technologies

Research leading to the development of health-care system, extending the life/ working life of the population and improving the living/working conditions of persons with disabilities. Research that contributes to increasing the competitiveness of our business environment in terms of faster adaptability, better integration and economic sustainability. Development of technological solutions that imply safer means of transport. Research in the field of ICT, services and infrastructure of the future that presents the innovation basis for development of the technology sector in Montenegro. Scientific projects related to the resolution of problems related to the performance of electronic communications infrastructure, information protection, control of content for sensitive groups of the population, and the development of services adapted to the needs and requirements of users. Developing new skills of the population using the cultural resources, which should be made widely available and efficient through ICT".

The Strategy of Information Society Development in Republic of Montenegro until 2020 [33] "Digital Montenegro" identifies strategic priorities with Key Performance Indicators (KPI) to achieve:

- Digital infrastructure
  1. Basic broadband access => 100% of the population by 2018 ;
  2. Fast broadband access (30 Mbit/s or more) => 100% of the population by 2020;
  3. Improvement of structure and capacities of the national CIRT for protection, prevention and combat against Internet incidents with the total number of the team experts to increase to20 by 2020.

- Digital business:
  1. The share of the ICT in GDP should reach 6%, which will be reflected in economic growth and job creation in other sectors of the economy. The share of e-commerce in total commerce should reach 1.5%.

42 https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/20180417-montenegro-report.pdf

- e-education: The percentage of the teachers trained to work on computers should be 30% of the total teaching staff, whilst the percentage of the teachers skilled in the field of cyber security should be 20% of the total number of the teaching staff
- E-health, the percentage of e-prescriptions and e-referrals issued, out of the total number of the prescriptions issued, should reach 60%, while online appointments should surpass the traditional appointments, and reach 70% of the total number of appointments.
- E-government services: the percentage of the citizens, who choose to communicate electronically with the public administration, should be 50% by 2020, and the percentage of legal entities using e-services should be 30%.

The Information Society Development Strategy 2016–2020 recognizes the relevance of digital skills and the use of digital and online learning in adult education in Montenegro especially on the growth of the basic and advanced digital skills:

- Encouraging greater use of Internet by all structures of society.
- Acquisition of digital competencies.
- Creating a greater number of ICT experts.
- Eliminating the digital gap between generations.
- Encouraging women towards the education and career ion ICT.

The associated strategic indicators on the digital skills are clearly defined as follow:
- the percentage of the ICT experts in relation to the total number of employees in enterprises: from 2% in 2018 to 4% in 2020;
- the percentage of the ICT graduates in a total number of the graduates at all universities from 9% in 2018 to 10% in 2020;
- the number of ECDL certificates issued from 10.000 in 2018 to 15.000 in 2020.

Also, annual action plans have been defined for the implementation of the strategy, and a coordination body for the monitoring and evaluation of KPI.

The Strategy for youth 2021 [34] in Montenegro includes also the ICT skills in the action plan. Improved youth information is associated with a new national indicator "Share of young people and adults with ICT skills, broken down by type of skill" linked with the international UNICEF draft indicators:
- % of young people aged 15-19 with ICT skills by type of skill and SDG 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship. Add national disaggregation by region, gender and vulnerability.

Education and curricula are not in the focus of this report but we can mention that Montenegro's national strategy on teachers' education 2017–2025 emphasizes the need for the CPD of teachers and training to focus on digital skills and the IPA 2015-2017 Sectoral operational programme for Montenegro on Employment, Education and Social policies in 2015 highlights the need to reduce curricula, creating space for the acquisition of functional skills, analytical skills, ICT skills, language and creative skills.

The Strategy for Vocational Education and Training 2015–2020 includes digital and online learning and platforms to provide teachers and trainers with formal and non-formal options to improve their digital skills as part of continuing professional development (CPD). The adult education system is regulated by several laws and licensed adult education providers offer training for occupations, programmes for key competence improvement, including digital skills and competences. Yet dig-

ital skills remain under-developed, most VET providers report a lack of up-to-date infrastructure which is a major obstacle to digital and online learning according to report 'Digital skills in Montenegro' [35].

Data from the online survey

Based on the replies of the online survey participants from Montenegro constitutes 20% of the participants. 50% of the respondents represent government institutions, 30% are from Civil Society Organizations, 10% of them from Academia and 10% are private companies.

To the question pertaining to the existence of a skills development policy only 30% of them affirm having one while only 10% confirm having an approved action plan on the digital skills.

Concerning the questions related to the existence of a nationwide coordination unit for the digital skills development 10% of the respondents declared that the government had a nationwide coordination unit for digital skills development.

To the question if there were any government incentives defined in the policy for actors implementing projects in the digital skills area, 20% of the participants invoked as incentives Tax reduction and 22% direct financing by the government.

Actors and projects in digital skills

Digital skills topic is covered by more than one institution in Montenegro. The main work on the Digital Agenda Montenegro is under the responsibility of both the Ministry of Public Administration and the Ministry of Economy in charge of information society (State secretary on Information Society and Telecommunications). The Ministry of Science has defined ICT as a priority research area, Other governmental actors are also involved such as the Ministry of Education in charge for all levels of education and VET as well as the Ministry of Labor in charge of all questions related to the employment.

Yet the topic is cross-cutting and in our survey to the questions related to the existence of a nationwide coordination unit for the digital skills development 10% of the respondents declared that the government had a nationwide coordination unit for digital skills Development.

Some of the projects and programs implemented in Montenegro on the digital skills are mentioned here, without being exhaustive:
UNICEF in collaboration with the Ministry of Education and Telenor Montenegro implemented a three-year pilot project in 2017 aiming to assist primary school children acquiring basic digital literacy. The pilot project of introducing digital pedagogy in Montenegrin schools started by opening digital lab in Primary School in Podgorica. These digital labs allow teachers to use digital media in classroom in order to teach children, through video content and interactive activities, in more creative way. Also, that means increasing of pupil digital literacy. The Digital lab is equipped with computers, video cameras, microphones, interactive projectors, project canvas and other multimedia devices. The initiative of introduction of a digital pedagogy was created as an answer to UNICEF research from 2016, which showed that every fifth parent and every tenth child in Montenegro don't use internet, and every second parent thinks that school needs to support children in digital literacy.

Another project implemented with the support of EU was the introduction of the European Computer Driving License (ECDL) in Montenegro which also established the ECDL standard level as a reference for basic digital skills and competences for all teachers and the ECDL advanced level as a reference for ICT teachers.

In 2014, an EU IPA project on the introduction of competence-based curricula required the development of cross-subject learning units in VET tourism and agriculture programmes, involving 13 initial VET schools. A learning management system called Chamilo (https://chamilo.org/) was introduced to facilitate the sharing of experience and learning materials among VET teachers, thus offering them non-formal opportunities to develop their digital skills and competences. Unfortunately, despite a strong initial engagement and commitment of teachers and institutions, the use of the platform was not maintained at the end of the project.

The Business Start-Up Centre Bar (created in spring 2007) supports students, young graduates and young potential entrepreneurs (up to the age of 35) in starting their own small and medium enterprises (SMEs) in Montenegro. The project financed by the Ministry of Foreign Affairs of the Netherlands, and co-owned by local stakeholders contributes between other topics to the capacity building of Project Partners by the implementation of new ICT Systems and training of staff[43].
The PAMARK training center helps its students develop digital skills alongside other skills such as entrepreneurship using specifically designed software, through the concept of virtual enterprises[44].

The Montenegrin IT Cluster (ITCMNE), is a non-profit organization comprised of IT companies whose main business activities are the development of e-Gov applications and cross industry services[45].

Digitalizuj.me[46] is a CSO implementing several projects on ICT related fields as Digital cities or hakaton.me. Its mission is to connect and develop the startup community of Montenegro. They help startups understand and exploit the new chances for social change and businesses in the digital environment using social media and innovative business models. Digitalizuj.me organizes events, ranging from meetups to startup weekends and events with international partners. Montenegro's ecosystem is developing and there are only a few small hubs and co-working spaces owned by private companies, municipalities and individuals. Digitalizuj.me is working to fill this gap in Montenegro, posing as a link between the startup community and seed and VC funds that exist in the region.

Internet Society Montenegro runs events, programs and activities that all work to support educating members or the general public about Internet-related issues such as security, child safety or a program on learning coding in primary school 7th grade. Learning how to code starting in elementary school helps pupils acquire skills that will be relevant in tomorrow's labor market and get the highest-paying entry level jobs as they become college graduates[47].

In the high skills for ICT professionals, the Montenegrin Association for New Technologies, MANT is CSO established in January 2012 by scientists and engineers with global mission to foster technological innovation and excellence[48].

INFOFEST, as a large regional event in the ICT area has a long standing tradition since 1994 and is one of the important links for the ICT sector in the region. It helps ICT companies in their development in the regional markets.
KEY FINDINGS

- While skills mismatch between labor market and education still exists, the digital skills are part of the "Digital Agenda" of Montenegro.
- In Montenegro target national goals and indicators are defined for the digital skills.
- The specific vulnerable target groups are defined and encouraging women towards the education and career ion ICT is part of the national strategy.
- ICT is also defined between the priority areas of research from the government.
- There is no formal framework and monitoring system to measure students' progress in acquiring

43 http://www.bscbar.org/en
44 http://pamark.me/
45 http://www.itcluster.me/
46 http://www.Digitalizuj.me
47 http://isoc.me/
48 http://mant.me/en

digital skills and competences in line with the relevant national strategy and policies.

5.7. SERBIA

General Information

Serbia aims at becoming "knowledge-based economy according to the Economic Reform Programme for the period 2018-2020. Measuring how Serbian economy use the opportunities offered by ICT for increased competitiveness, Serbia ranks 75 out of 139 economies, scoring 4.0 and leaving behind in the region Albania, Bosnia and Hercegovina, and Kosovo*, according to OECD [12]. Examining some key data on the Serbian Digital economy, presents that 68.0% of households possess a computer in 2017. The last surveys of the Statistical office of Serbia, regarding to e-skills, measured the Internet users said having transferred files between computers or other devices, and 38.5% used them to install software applications [36].

According to European Commission, Serbia, as all WB6 economies, is facing negative demographic trends where about of population is rapidly declining and aging. In the report of 2018 it is stated that 'Almost a quarter of all unemployed completed tertiary education, which points to a considerable gap between acquired skills and labor market. Unemployment will remain persistently high if the government does not address both the skills mismatch between workers and business needs and labor market institutional arrangements, especially the relatively high minimum wage. Both employers and graduates believe that the education institutions do not equip students with key soft skills, such as problem solving and decision-making' [37].

In the Economic Reform Program 2018-2020 is stated that "For Serbia's full integration into the international economic system, it is necessary, to define measures aimed at modernizing technological processes and introducing technical regulations and standards, which will facilitate a shift towards a higher share of high-tech products in total exports". [38]. Also the structural Reform 16 of ERP addresses actions for the 'qualifications oriented to the labor market requirements'. The Serbian Strategy for Industrial Development (2011-2020), gives priority to five economic sectors: Agro-food, Auto-transport, Information and Communication Technologies, Metal industry and Pharmaceutical industry. As such the Serbian economy, increasingly dependent on knowledge and skills, higher investment in education is a prerequisite for further human capital development, while ICT economic sector specifically will demand a workforce with advanced digital skills. Some issues relevant to digital skills which needs special focus are: A stronger link between the business and academic communities is needed; A key challenge is reversing the emigration of highly educated population ("brain drain") and attracting domestic and international talents; Matching the labor force qualifications with the labor market needs; The introduction of the dual education model will facilitate greater application of the attained knowledge and skills matched with the business needs; Special efforts will be directed towards regulating the system of qualifications attained through education; and dedicated Government programs will increase the capacities in terms of IT skills.

Policies related to digital skills

The strategy for 'Development of Information Society 2020' aims at providing high broadband connection and high-quality Internet access for all pupils, students, teachers, researchers by 2020, which are absolutely important towards a digital skills workforce and society. Aiming at development of human resources the important objectives set are:

- In order to facilitate the faster development of sophisticated and other ICT companies, it is necessary to significantly increase the number of ICT educators and reduce the number of ICT experts leaving Serbia;
- It is necessary to form an e-skills forum that will bring together the economy, educational institutions and state authorities, as well as those that are produced, used and regulated by highly skilled experts;
- It is also necessary to support the development of the areas in which over a long period exhibits good expertise of local professionals, and where there is the economic justification for further development, such as the development and production of ICT equipment and components.

The information society implementation in Education sector considers as a progress the adequate level of knowledge and skills related to use of ICT, both with experts from various professions, and with all citizens. ICT-related skills are crucial for the competitiveness of national economies and an increased opportunity for new jobs and employment. To achieve that it is necessary:

- Integration of the ICT in all aspects of the educational process, with a view to the effective and efficient education.
- The development of digital educational content;
- Training teachers to use ICT;
- Achieving the level of knowledge and skills for using ICT in the broadest population;
- Introduction of the modern concept of e-learning and open-source distance learning;
- The inclusion of social groups with special educational needs, including the lofty knowledge and skills in the field of ICT adults who did not have a chance to get them.

Strategy of scientific and technological development of the Republic of Serbia for the period 2016 to 2020 - research for innovation emphasizes the importance of research for the nation. Serbian Government Statistical Office in 2013 recorded that the Republic of Serbia has a total of 21,044 employees in research and development, accounting for 2.8 employees per thousand inhabitants. This is well below the European average, where the number is greater than 5% (Eurostat). Analyzing the implementation of the Strategy of Scientific and Technological Development of Republic of Serbia for the period from 2010 to 2015 the following findings are significant in the area of digital skills:

- The excellence of scientific research and its relevance to the economic and social development economy and society at large are not sufficiently supported system of research funding;
- There are no adequate financial instruments, nor the institutional framework for connecting science with industry and the public sector;
- There is a lack of adequate human resources in research organizations, businesses, the public sector, and there are no long-term measures to address this problem;

The strategy addresses the way to overcome the above findings and also stressed the need to promote the international cooperation in the field of science and innovation; Increase of investment in research and development through public funding and encouraging business sector investment in research and development.

Strategy for Education Development in Serbia addressed various aspects of the development of the education system, training and lifelong learning systems in the Republic of Serbia for the period 2013-2020. It focuses on defining a national system of education to meet the development needs of its citizens, outlining a set of strategic policies, actions and measures aiming at providing the basic foundation of life and the development of each individual, state and society based on knowledge. Still about 10% of the population do not complete primary school (or do not enroll in or drop-out during the elementary school). The high school is registered between 90-95% of those who complete primary school (about 80% of the generation), and about 15% of the entries is finished secondary (about 35% of the generation). Only 13% have completed college or university education, and the level that is lower than the EU average (19% with a tertiary degree compared to the EU average of about 30%. In Serbia, ICT education is taught in 40 Higher Education institutions across 21 cities, a level of access that helps recruit a wide base of ICT students. From the digital skills point of view, the strategy does not define particular objectives or action plan. The objectives of digital skills in Education are covered in the 'Information society 2020' document.

The National Employment Strategy for the period 2011–2020 addresses the issues of employment

in a national scale. The sectoral structure of employment in Serbia shows that employment in agriculture is very high, and employment in the industry is too low compared with economies with similar levels of economic activity. Regarding the level of education, the decline in employment was the highest in the lowest educational level (10.3% - incomplete primary and primary school), while the employees with higher education and faculty came up to employment growth of 11.2% in 2009 compared to 2005. Comparative analysis of rural and urban population shows that there are major differences between these two populations [39].

Serbia is faced with all types of migration: external and internal, forced and voluntary, legal and illegal, migration of highly skilled and unskilled workers, immigration and emigration. Industrial employment will increase by nearly 170,000 people during the projected period, i.e. by almost a quarter, and the share of industrial employment in total employment will increase from 24.2% in 2010 to 26.4% in 2020.

Some important quotes from the document directly linked to digital skills:

“Mismatch between supply and demand, and a lack of skilled workforce to match the requirements of employers, i.e. deficit competencies and job skills, characteristics of the labor force not only in Serbia but also in most EU countries. It is hard to expect that the current educational system will be able to realign in the short term in accordance with the changed structure of demand for labor, qualifications and skills. The problem is the lack of a national qualifications framework which includes the established qualifications, describes levels of qualifications, relations, but also the totality of subjects and processes related to their establishment, methods of acquiring, comparing, recognition, quality assurance and standards, which is aligned with the European Qualifications Framework”.

One of the objectives of the World Bank Partnership Framework will be to assist Serbian government in closing medium and long term skill gaps ‘The planned Skills project will help address both short and long term skills gaps, focusing on vocational training, but in particular on enhancing access to Early Childhood Education, which is a critical constraint to long term skills development, especially among vulnerable and disadvantaged groups’[49].

Vocational education and training have to respond to employers’ demands and the development of skills in Serbia should include improvement of digital literacy in order to increase employability of students and unemployed persons. All the institutions and organizations underlined their commitment to promoting the Skills Vision and the possibility to encourage business sector to take part in the areas of their interest[50]. What can be noticed referring to policy and strategic reports is that the digital skills are not addressed specifically, but rather tackled indirectly.

Data from the online survey

Based on the replies of the online survey ‘Improving Digital Skills in WB6 Economies’ regarding the participants from Serbia constitutes 12 % of the participants. 67% of the respondents represent government institutions, 16 % are from Civil Society Organizations and 16% of them from Academia.

To the question pertaining to the existence of a skills development policy 67% of them affirm having an approved action plan on the digital skills, and 50% of them confirm having an approved action plan on the digital skills policy implementation. This confirms the lack of awareness among actors on the existing policies

Concerning the questions of the online survey, related to the existence of a nationwide coordination unit for the digital skills development 33% of the respondents declared that the government had a nationwide coordination unit for digital skills Development.

To the question if there were any government incentives defined in the policy for actors implementing projects in the digital skills area, 17% of the participants invoked as incentives Tax reduction and 33% direct financing by the government.

Actors and projects in digital skills

A variety of actors from government, CSOs, Universities and the private companies are engaged in the topic of digital skills. Ministry of Trade, Tourism and Telecommunication is in charge of the policy and strategy of development of information society; preparation of laws, other regulations, standards and measures in the area of information society and ICT; development and functioning of information and communications infrastructure; development and promotion of academic, i.e. educational and scientific research computer network; creating conditions for the realization of projects financed by EU pre-accession funds, donations and other forms of development help in the areas if ICT. The Ministry of Trade, Tourism and Telecommunications has launched a training project for women looking to acquire and develop digital skills and digital literacy – as well as learning programming and re-training in the field of IT. Nine projects were approved at a public competition for funds targeted at further initiatives providing specialized skills and retraining for women in the field of ICT.

The Ministry of Education, Science and Technological Development of the Republic of Serbia is the ministry in charge of education, science and technological development in the Republic of Serbia. It covers all level of education: elementary education, secondary and university education. The Serbian ICT sector these days absorbs the vast majority of ICT graduates although this has not always been the case – for years Serbia faced a massive ‘brain drain’ of ICT graduates and professionals. Given today’s increasing demand for ICT products and services, Serbian educational institutions will need to attract higher numbers of students and will need to make more experts available to the market. Domestic universities have implemented substantial reforms in line with international standards to further enhance the quality of teaching provided.

The tasks of the Ministry of Labor relevant to the area of digital skills are: the system in the field of labor relations and labor rights in all forms of work except in state bodies and bodies of local self-government units and autonomous regions, public agencies and public services; cooperation with international organizations in the field of labor and employment; international conventions in the field of work, safety and health at work; anti-discrimination policy.

International partners such as EU, UNDP GIZ, Swiss Cooperation, ETF, are supporting digital skills policies and initiatives in Serbia.

Youth Employment Promotion Programme of GIZ for Sustainable Growth and Employment in Serbia objective is to enable young people in disadvantaged regions of Serbia to establish themselves on the labor market.

E2E program started in 2015 and will end in 2019 with a total budget of EUR 13 million. The Swiss Government contributed with EUR 5.8 million, while Serbian Government contributed with additional EUR 6 million. The project aim at improving the youth job prospects in Serbian labor market through policy adaption and development of skills and knowledge employers are looking for, including here digital skills.[51]

Many local CSOs are currently active and implementing projects related to digital skills in national or regional level in Serbia. The ECDL [40] Foundation was established and its branch is fully operational in Serbia. SEE ICT [41] organizes advanced educational content with the emphasis on

49 Partnership Framework 2016-2020, Republic of Serbia, World Bank, 2016,
50 digital skills and online learning in Serbia, European Training Foundation, 2017

51 https://znanjemdoposla.rs/en/about-e2e/#mission

practical knowledge in tech and digital sector. Digital Serbia Initiative [42] aims to create a business environment that serves digital innovation by strengthening the education system, supporting entrepreneurial companies in the initial and growth phases, etc. Vojvodina ICT Cluster[52] has its own academy ad its focus is on ICT professionals. There are many other CSOs which focus is on the digital skills for citizens, students, and general workforce and ICT professionals.

The Adult Education Society organization works mainly in the field of adult learning and education, covering a range of activities from promotion and improvement of quality of adults' education, to contribution to the formulation of public policies in the field of adult learning and education[53].

According to ITU, the following measures would be a major boost for digital ecosystems: aligning the education system to respond to the needs of the IT industry; modernizing curricula and increasing enrolment quotas for IT studies [43]. According to the EBRD strategy for Serbia for 2018-2022, when it comes to competitiveness one of the obstacles is the 'Skills mismatches contributing to high youth unemployment and new training requirements' and one of the main government reform priorities should be to strengthen innovation and digitalization, including through innovation parks and the Innovation Fund.

Formulation of digital skills for Development Strategy: The Ministry of Trade, Tourism, and Telecommunications has initiated the establishment of the working group aiming to prepare the digital skills policy with the participation of representatives from the Ministry of Trade, Tourism, and Telecommunications; Ministry of Education, Science, and Technological Development; Ministry of Public Administration and Local Self-Government; Serbian Academy of Science and Arts; Faculty of Electrical Engineering; Faculty of Philology of the University of Belgrade; Mathematical Grammar School of Belgrade; and Petnica Research Station.

Key findings

- A cross-institutional working Group is settled for the creation of the digital skills Development Strategy. Serbian government has also highlighted the need to form an e-skills forum that will bring together the economy, educational institutions and state authorities, as well as those that are produced, used and regulated by highly skilled experts. Specific government support is provided for projects improving digital skills for women.

- The need for addressing a policy in the area of digital skills that covers the three levels of competences: basic digital skills for citizens; intermediate digitals skills for a qualified work force; and advanced digital skills for a highly skilled workforce; is considered important by the government and will benefit the economy. It can be stressed that the report finds important the need to prepare a cross-cutting policy on digital skills in the economy level. The digital skills policies should be accompanied by a concrete plan among all actors and allocation of financial resources.

- Definition of digital competences for citizens is important and the alignment of such competences with the digital Competences framework defined for education system (secondary schools) is needed.

- Better harmonization is needed among all actors and stakeholders. The digital skills are in the focus and interest of many actors and synergy is needed between international organizations, CSOs, private companies, etc.

- The awareness of the importance of digital skills is essential and proper plans of promotion could help to understand its role.

52 https://vojvodinaictcluster.org
53 http://www.aes.rs/en/

6. GAPS AND INSTRUMENTS FOR THE DEVELOPMENT OF DIGITAL SKILLS IN THE EU CONTEXT

After the assessment of the WB6 economies, this Chapter focuses on an analysis of the relevant framework to address the issues. The developments of digital skills remain a concern in most of the economies given the fast-changing technology environment. Some examples are given from the EU countries to highlight the dynamic of this issue. As the WB6 economies are in the process of EU accession, their target is to close the gap with the EU economies, this is why the focus is put in the EU framework, approach and instruments.

6.1. DIGITAL SKILLS REQUIREMENTS, NEEDS AND GAPS – COMPERATIVE FINDIGS IN EU AND WB6

Two main characteristics of current lives and economy putting pressure to every human are the ever-changing technology and technology-rich environment. Those are challenging the citizens, workforce and ICT professionals to get higher digital skills and competences constantly.

The example of the agriculture sector, which is one of the main economic sectors of each WB6 economy, might be considered a priority, as a sector where the persons employed do not require digital skills acquisition. But to perform efficiently the farmer's job in the 'near future' many digital skills will be a must, as illustrated in the box below.

Box 3. Today's Digital technology in Agriculture

IoT and Sensors in the Field: Sensors placed strategically around fields along with image recognition technologies are allowing farmers to view their crops from anywhere.
IoT and Sensors in Equipment: Much like the technology within the field, sensors are being placed on agricultural equipment to track the health of the machine and more
Drones and Crop Monitoring: Drones are being used for crop monitoring widely across the U.S. as a means to combat drought and other harmful environmental factors.
Farming and Robotics: Robotics is being used for the spraying, weeding, fruit-picking, etc.
All of the above are currently being use in agriculture sector in US[54]

54 https://www.forbes.com/sites/danielnewman/2018/05/14/top-six-digital-transformation-trends-in-agriculture/#6467479aed2e

During the last decade it has become clear with the trend of technology development, that the skills we teach today in our schools and universities might become obsolete pretty quick.

Currently and in the future, the EU will be faced with a major issue related to the gap in skills with approximately one million unfilled jobs in the IT sector. According to the data from Eurostat 2017, there is an important difference between the Member States when it comes to citizens digital skills in the EU. While the trend of individuals who have the basic overall digitals skills seems the same, the difference lays in the individuals who have above basic digitals skills. Iceland, Luxembourg, Netherland and Norway top the list of EU countries with the highest percentage of citizens mastering basic and above digital skills, while the citizens of Bulgaria, Romania and Croatia lack those skills. From an overall perspective in 2017, 43% of EU population had an insufficient level of digital skills, 17% had none at all as they did not use the internet or used it randomly. According to statistics, 56% of adults of OECD nations have no digital or ICT skills or have only the skills to fulfil the simplest set of tasks in technology-rich environments. Majority of young people in EU, who are often considered 'Digital natives' do not possess job-relevant digital skills demanded by employers to fill existing job vacancies.

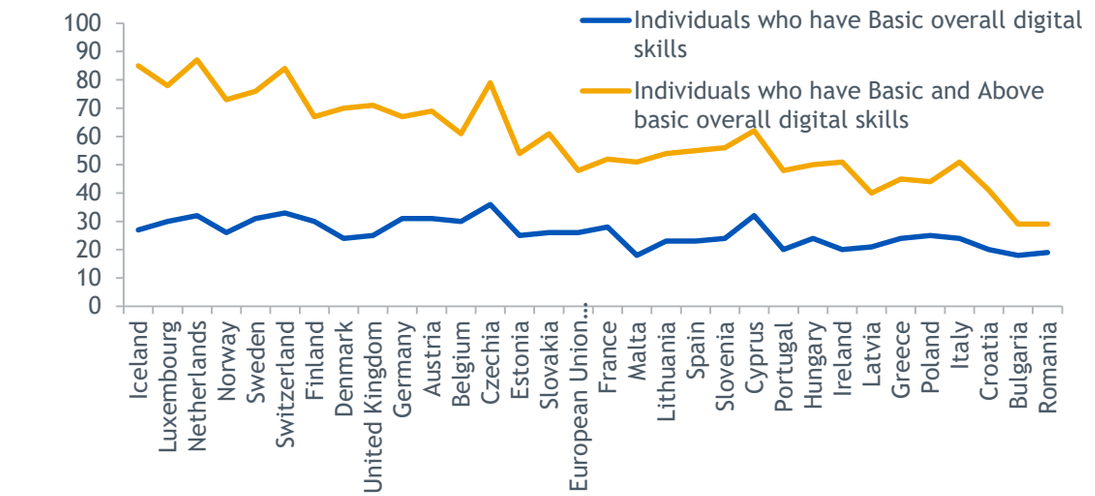

Chart 13. Skills trend in EU

The Digital Economy and Society Index for 2018 provides important insights on digital skills also from a gender perspective, observing in this regard that there are more men than women with at least basic digital skills, respectively 60% to 55% [44]. Digital exclusion risk is particularly high for marginalized groups, people with low educational attainment or low income, as well as the elderly. In fact, only 31% of people with low education levels or no education have at least basic digital skills. This figure is also significantly lower among those living in rural areas (49%) compared with those living in cities (63%).

When it comes to the preparation of the labor force on digital skills based on data provided by Eurostat, only 10% of the EU labor force had no digital skills, while 35% did not have at least basic digital skills which are now required in social life and most of the jobs.

While the data concerning digital skills and the respective gaps are slowly improving every year, in the EU Member States this is still not enough to cover the demand for information and communications technology knowledge. In the future, 9 out of 10 jobs will require digital skills. At the same time, 169 million Europeans between the age group of 16 and 74 years old, - 43%, lack basic digital skills [45].

Employment of ICT specialists in the EU grew by 500,000 between 2015 and 2016 to reach 8.2 million workers. Based on DESI Report 2018 – Human Capital 8.2 million persons were employed as Information and Communication Technologies (ICT) specialists in the EU in 2016. This amounts to about 3.7 % of total employment.

The economies employing the most ICT specialist were UK, Germany and France. In 2016, 1 in 5 enterprises in the EU employed ICT specialists. However, 41 % of enterprises which recruited or tried to recruit them had difficulties in filling vacancies. Nevertheless, as previously stated the gap between demand and supply of ICT specialists in the EU is expected to widen further and the employment potential of specialized ICT skills remains an issue.

Approximately 40% of companies report having major issues in finding adequate skilled ICT professionals and this is not only a European problem but a global one. A new survey prepared by Capgemini and LinkedIn found that over 50 percent of businesses are now feeling the pressure from the digital skills gap. As reported 54% of 1,200 global organizations said they've been affected by the skills shortage. This has resulted in them having to revise their digital transformation plans [46]. In the EU today there are at least **350,000 open vacancies for ICT specialists** and this figure is expected to increase.

The challenges are finance-related, i.e. the need to pay for training for improving skills and the ability to keep the pace of skills acquisition. The figure below illustrates the gaps faced by labor force to be fully equipped with digital skills.

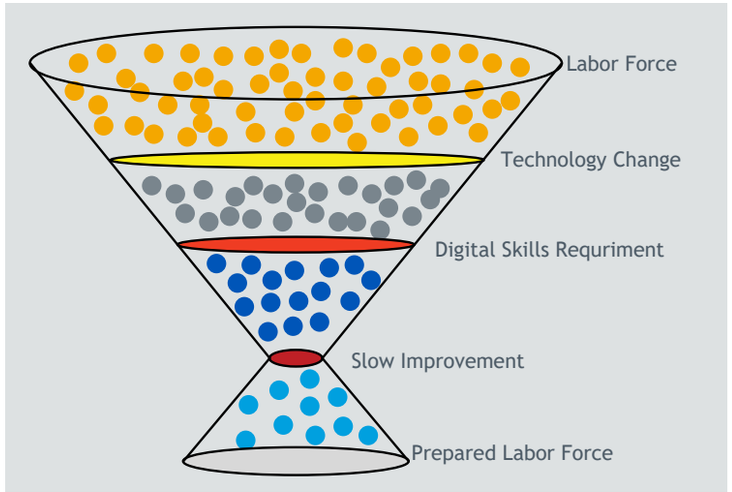

Figure 3. Bottleneck, skilled labor Force

Some interesting facts can be concluded looking at the Eurostat data in regard to the trends of individuals for Serbia, Montenegro and The Former Yugoslav Republic of Macedonia[55]. While the trend is similar to European countries for individuals who have basic digital skills, the citizens who have above basic overall digital skills are almost half of the trend of EU average.

55 Data for Albania, Bosnia and Herzegovina, and Kosovo* are not available.

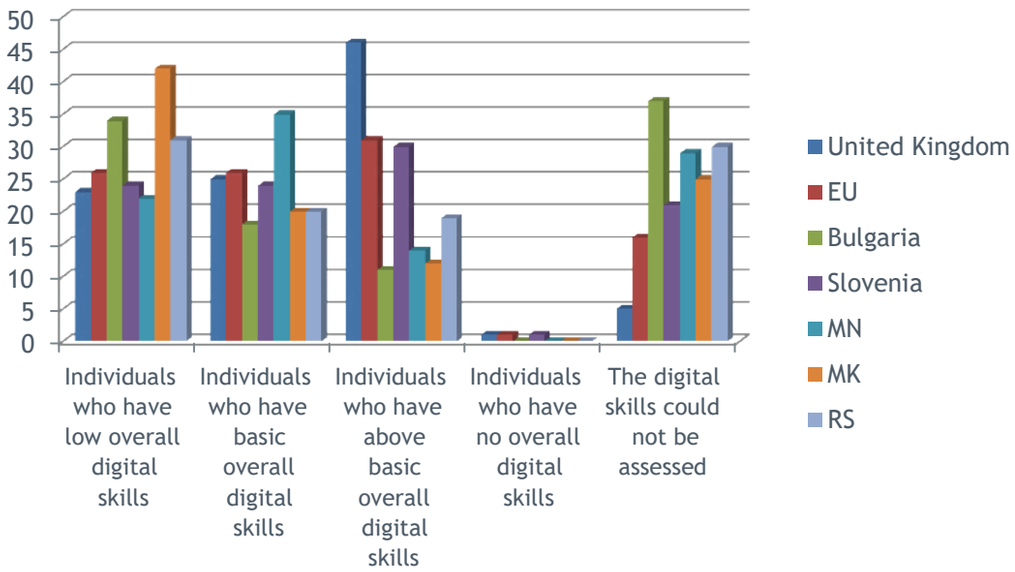

Chart 14. Level of digital skills in Serbia, Montenegro, The Former Yugoslav Republic of Macedonia

The gaps in digital skills require quick responses by the governments. In the EU statement [47] for member states it is emphasized that "Policies need to be put in place to ensure that people at all ages have access to the appropriate digital skills".

6.2. DIGITAL SKILLS DEVELOPMENT FRAMEWORK

The EU shared concept [48] for National digital skills strategies was prepared to give EU member states a common framework to develop comprehensive national digital skills by mid-2017. It identifies the main challenges for four target groups for the acquisition of digital skills and gives some solutions for the identified challenges together with a very large list of good practices for each identified solution.

- Challenges in education: Providing adequate ICT infrastructure in schools and training institutions; Modernizing and up-to-dating teaching content and pedagogies; Up-grading trainers and teachers' skills; Strengthening cooperation between education and industry; Teaching students how to search information online, fact-check and develop critical thinking towards the online world;

- Challenges for citizens: Developing a common definition and understanding of digital skills and competences; Overcoming the obstacles and/or limitations some people face to obtaining digital skills - including lack of interest, awareness, resources and/or knowledge, as well as fear of technology and importantly disability; Providing relevant digital skills training opportunities for all;

- Challenges for the labor force: Improving the understanding and definition of digital skills needs; Upgrading the digital skills of the labor force with a focus on professional-related digital skills; Creating new opportunities and challenges; Strengthening collaboration across relevant stakeholders; Improving managers' digital skills or so-called "e-Leadership" skills;

- Challenges for ICT professionals: Making the ICT profession more attractive as a career choice, encouraging more women; increasing the number of young people trained for ICT professions; ensuring certification and standardization; upskilling of ICT professionals in a life-long-learning perspective.

In accordance to the steps taken by most of the member states and the European Union, three aspects of the digital skills in each economy level are important: **The digital skills strategy for the economy, the Digital Competence Framework; and measuring the indicators;**

❖ Putting in place the digital skills Strategy for the Economy

Preparing the national Strategy and implementation plan is important for the government as it will define the concrete goals and actions to address the digital skills. The **ITU Toolkit 2018** provides a useful guidance for governments and other stakeholders to develop a digital skills strategy [49]. In addition to the digital skills definition, inventory of best practices, it highlights the importance of stakeholder engagement through national coalitions and /or councils and the various forms of trainings worldwide. The figures below provides the roadmap and steps to prepare a national strategy and its implementation.

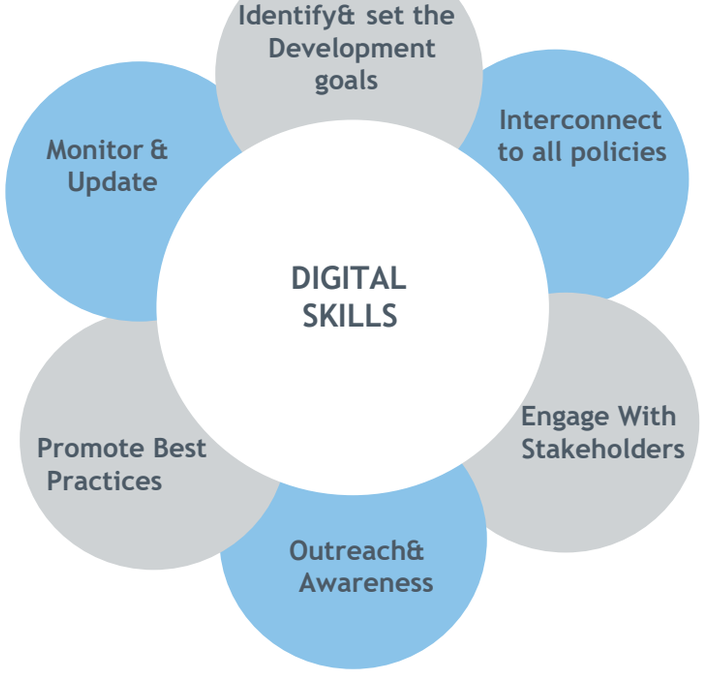

Figure 4. The digital skills Strategy Development Cycle

❖ The EU Digital Competence Framework for policymakers and citizens

The European Digital Competence Framework, also known as DigComp offers a tool to improve citizen's digital competence. The EU Digital Competence Framework can help to monitor citizen's digital skills and to support curricula development. For policymakers it can be beneficial to know where citizens stand for digital competence at the economy level. The DigComp framework can be used to plan and design education and training offers.
The EU DIGCOMP 2.0 identifies the key components of digital competence of citizens in 5 areas: Information and data literacy; Communication and collaboration; Digital content creation; Safety; Problem Solving. Each of them is divided into a set of competences. The Digital Competence Framework can help with self-evaluation, setting learning goals, identifying training opportunities and facilitating job search [50].

❖ Measuring the indicators of digital skills

Using data to measure digital skills and capabilities of the target groups is important to track the progress and improve what need to be done. The European Commission monitors Member States' digital progress and the six areas of the Digital economy and Society Index (DESI)[56] are:

- Connectivity;
- Human capital / digital skills;
- Use of Internet by citizens;
- Integration of digital technology by businesses;
- Digital Public Services;
- Research and development in ICT.

Measuring the digital skills according to new methodology of the Eurostat that includes a many composite indicators, means that the WB6 economies have to start measure periodically the composite indicators presented in the Annex 3.

The six Western Balkans economies are engaged in the process of European Union accession. In this regard the European Union framework on digital skills should be the common framework the WB6 economies can easily use including the Shared Concept for National digital skills strategies, the ITU Toolkit, Digicomp and DESI besides the other initiatives as the Digital Skills and Jobs Coalition, EU Code Week etc.

56 https://ec.europa.eu/digital-single-market/en/desi

7. LESSONS LEARNED, FINDINGS AND RECOMMENDATIONS

7.1. FINDINGS

A full analysis of the six economies presented common issues related to digital skills in various aspects such as lack of specific policies, data quality, lack of indicators and standards and e-inclusion issues with women and marginalized groups.

Digital skills

- Basic digital skills - the usages of e-commerce and e-services are still low in WB6. At the same time the basic digital skills for the citizens become a barrier in the usage of the online services. The increase number of online services from the WB6 companies might increase the demand for skilled people with intermediate and high level skills in the job market;
- Intermediate and advanced digital skills trends in WB6 are similar to European countries for individuals who have basic digital skills, but the citizens who have intermediate and advanced digital skills are almost half of the trend of EU average. It slows down the economic development and competitiveness of the companies.
- The majority of companies in the WB6 face difficulties to hire ICT professionals with high level of ICT skills.
- Marginalized groups and especially women are left behind in the acquisition of digital skills and while gender inclusion is taken into account in some of the reviewed policy documents the women inclusion remains low in all targeted economies.
- According to the findings of this report, in most of the WB6 economies there is a general skills mismatch between education and the job market. It creates a misbalance in employment and job opportunities, with an adverse impact on the economic development.

Policy issues

- All WB6 economies have in place a National Digital Agenda, and digital skills are made reference to in policy documents, but specific national strategies and action plans on digital skills are in preliminary preparation phases. The EC Digital Agenda for the Western Balkans of June 2018 refers to the need for formulating national strategies in the WB6 for the digital skills development.

- None of the WB6 economies have a dedicated policy document yet focused on digital skills which would allow defining national targets, to put in place a national coordination of the projects and initiatives and orient funding and budgets (Serbia is in the process of preparing such a policy).
- National targets and indicators on digital skills are generally not defined except in Montenegro Digital agenda. Measuring of the national targets doesn't exist, or is not systematic.
- According to OECD, e-inclusion strategy indicator has the lowest average score in WB6. Even in EU countries digital exclusion risk is particularly high for marginalized groups, people with low education levels, low incomes, elderly and people living in rural areas.
- A national action plan to increase the engagement and employment of women through the digital skills improvement is missing, but projects aiming the inclusion of women in the digital job market have been implemented. The employment of women is lower than men in most WB6 economies. To be noticed that in all economies pilots and short term projects have been implemented to increase women participation in ICT and improve their digital skills (WoW project in Kosovo*, Inclusion of Marginalized Women Project in Bosnia and Herzegovina, Digital Girls in Kosovo*-Albania-The Former Yugoslav Republic of Macedonia), but this attempts are sporadic attempts and a specific policy or awareness to raise digital skills of women is not observed in the targeted economies.
- Policy implementation: Fragmented initiatives and projects on digital skills exist throughout the WB6 economies mostly driven by international donors and without a clear frame and definition of national targets. Information on the initiatives neither is easily found nor systematically shared between the actors.

Regional Cooperation

- WB6 economies have launched important steps for developing inter-governmental cooperation in digital matters and integration within the European Digital Single Market with the 2017 Trieste declaration on MAP REA for a regional approach.
- Concerning the digital skills, the RCC MAP Stock Tacking recommendations refer to the need for regional cooperation on certified digital skills and regional interventions, aimed at enhancing basic digital skills for citizens, skills for IT specialists, and employability enhancement programs for underemployed population, youth, women, and persons with disabilities.
- In addition, there are some cross-economies initiatives, and exchanges, such as: "Get in the Ring" Albania-Kosovo* but they are not systematic. There are also regional events, like INFOFEST in Montenegro or the Digital Summit in Skopje 2018.
- Introduction of ECDL (European Computer Driving License) is observed in almost all the targeted economies mainly through EU funds and projects. Nevertheless the amplitude, result and impact of these trainings are difficult to assess and a coherent approach and follow up of its implementation has not been observed.

Incomplete data on Information Society

The national statistics agencies in the WB6 don't collect systematically disaggregated data on information society generally, and on digital skills more specifically. Nevertheless several indicators as the Skills sub-pillar of NRI indicator or OECD Competitiveness, as well as data on usages of online services from the citizens and of the online sales for the companies are used, giving indirect information the digital skills.

ICT industry

Success stories on ICT exist throughout the WB6 economies from important achievements such as the Microsoft site of one of its five global development centers in Serbia which is stimulating the startup scene or startups going in the global market such as: Girafa in Kosovo*, SoftMogul in Albania and others.

The new fast developing domains of technology as Artificial Intelligence and Internet of Things even when are mentioned, are not tackled as digital transformation agents that can have very important economic impacts. It is observed:

- The lack of skilled ICT professionals
- The software industry will need growing capacities in the next years regarding the ICT professionals, standard certifications for ICT professionals.
- Some regional cooperation initiatives as the REG project from USAID have been developed but they are not included in the government strategies.

7.2. RECOMMENDATIONS AT THE ECONOMY LEVEL

Taking actions in the area of digital skills will benefit the economy, regional cooperation and integration of Western Balkan economies and for more the EU integration. Based on our survey and findings on digital skills in the WB6, concerning the general life digital skills for citizens, the intermediate digital skills for employment and the high level digital skills for ICT professionals, we propose the following recommendations to be considered at economy level. For some of the recommendation actions to be considered by WB6 economies are put forward.

1st Recommendation

A National Strategy and action plan on digital skills, as part of the National Digital Agenda, should be prepared for each WB6 economy to support economic development. The ITU Toolkit and EU Shared concept are the good generic tools to build these strategies.

ACTION 1. National Strategy and action plan on digital skills to be drafted and prepared with consultation with all national stakeholders public, private, CSOs, universities, and international partners should be the basis for a coordinated intervention in the implemented projects to address shortages in the areas of strategic importance for the near future, including cyber security, Artificial Intelligence and big data, the Internet of Things.

ACTION 2. National targets and indicators should be defined for each target group. The e-inclusion should be tackled in the strategies, in order to reduce the digital divide and limit the risk of marginalization in society for those categories which does not possess digital skills WB6 must take into account diversity target groups and avoid one size fits all approach on a future strategy on digital skills.

ACTION 3. Appropriate programs should be implemented for women to engage them in the future jobs market.

2nd Recommendation

Creating National digital skills and Jobs Coalitions and repositories, as part of the Regional DSJC and EU DSJC will enable a better coordination among all actors and will help to achieve faster results for the economy. Representing all target groups will enable to:

- The available data indicating a big gap with EU countries for the intermediate digital skills of workforce, it is very important to define a good framework to improve those skills which are important for the economy modernization and competitiveness.

3rd Recommendation
Use of the EU Digicomp framework for Citizens which is reference framework to support and improve citizens' digital competence. Government agencies such as the employment agencies, or high-schools can be engaged to gather through it self-reported information on digital skills. Test based tools like PIAAC – Programme for the International Assessment of Adult Competencies – OECD that 'aims to measure the set of literacy, numeracy and technology based solving skills' can also be used. Usage of the automatically generated data on the use of digital platforms and services for the national mapping of digital skills can also be employed

4th Recommendation
Accurate data on the digital society should be gathered in the WB6 economies and they should become part of the DESI indicator as stated also in the EU Digital Agenda for the Balkans in July 2018, including WB6 in the DESI indicator will be the first step for better policies on the information society in general and specifically for the digital skills.

ACTION 1. The national statistics agencies in the WB6 should be supported, to collect disaggregated digital skills data. National targets and indicators should be regularly monitored for each economy in accordance to what is it presented in annex 3.

Note: Some of these recommendations can also be addressed either at a national context or a regional one.

7.3. RECOMMENDATIONS AT THE REGIONAL LEVEL

According to our research, survey and findings on digital skills in the WB6, concerning the general life digital skills for citizens, the intermediate digital skills for employment and the high level digital skills for ICT professionals, we recommend to put in place at the regional level the following policies and initiatives: :

MAP REA OBJECTIVES	MAP REA ACTIONS	TYPE OF RECCOMENDATION	RECOMMENDATION AT THE REGIONAL LEVEL	DESCRIPTION	PROPOSED ACTION
Develop and strengthen supply of digital skills	Initiate regional cooperation on certified re/qualification digital skills programmes	POLICY	Launch regional discussions aimed at agreeing on common standards related to digital skills, with particular attention to the digital skills definition, certification and evaluation, as a basis for digital skills policies and programs.	Several initiatives are implemented in the WB6 on the development of digital skills from international partners, governments, CSOs, training institutions, etc. WB6 market is still fragmented and benefits from economy of scale are limited. Agreeing on common regional standards on digital skills (i.e. definition, certification and evaluation) may allow having common basis of work and regional understanding on digital skills that would stimulate better coordination of the initiatives and better evaluation of digital skills policies and programs. Preparing a regional skills training system incorporating the establishment of digital skills standards and certification as well as specific activities for women and marginalized groups. Agreed and measurable standards will contribute to a better coordinated support and funding of the various initiatives	Creation of the experts working group representing stakeholders of each economy
					A cohesive guideline document standardizing the digital skills definition, certification and evaluations.
					Through certification and standardization increasing mobility at the regional level, making the ICT profession more attractive as a career choice in the region.

CID BALKANS DEVELOPMENT

	Pilot a regional intervention aimed at enhancing basic digital skills for citizens to engage online	INITIATIVE	Based on the standards of the 1st policy recommendation, establish a regional platform in the WB6 languages for Massive Open Online Courses (MOOCs) focused on the basic and intermediate levels of digital skills.	According to available data the biggest gap in digital skills between WB6 economies and EU countries is in intermediate and high level skills. MOOCs largely exist in English and other languages. They are a fast, cheap and flexible way of learning digital skills which are evolving very fast. For the high level digital skills for ICT professionals MOOCs can be used in English because they should address the global market.For basic and intermediate digital skills which address local economy issues as the access on local public services or the local employment market MOOCs should be available in the WB6 economies languages. Several paying initiatives exist in the WB6 economies but they have small scale impact. According to RCC 2018 barometer, 90 % of the WB6 citizens have not updated their digital skills during the last year. It would be valuable for WB6 to become part at the regional level of a world-class MOOC platform. The rights could be acquired at the regional level and translated in the WB6 economies languages.	Creation of the experts working group representing stakeholders of each economy
	Pilot a regional intervention aimed at enhancing skills for IT specialists, that would be closely linked to the demand from and coordinated with digital businesses in WB6 and EU	POLICY	Analyze specialization potentials in the digital economy for the WB6 and existing or potential value chains between the economies.	Given the level of development of the region in the IT industry, the strong international competition but also the growing opportunities of the digital industry there is a need to act fast. The region is small and need to have a common vision to be relevant in the international markets. Serbia being clearly ahead of the region in the export of services, followed by The Former Yugoslav Republic of Macedonia supported by an specific strategy of export for the software industry. There is an opportunity to build a regional value chain on one specific domain of the digital economy as IoT, Artificial Intelligence, block chain, virtual reality, healthcare applications etc.,	Assessment of the potential of specialization and possible guide the activity of the start-ups of the region toward a specific field of the digital economy through dedicated financial support. Create and promote a regional brand for the specific field of the digital economy in the WB6. Mapping and financial support to regional Hubs. By mapping and assessing the specialization of the Hubs in the region a cross-specialization could be identified and put in place through targeted financial support. Such mapping would also promote further cooperation between the regional Hubs.
		INITIATIVE	Promote the establishment of the Regional Digital Skills and Jobs Coalition in WB6 mirroring the experience of EU DSJC.	For basic and intermediate digital skills which address local economy issues as the access on local public services or the local employment market MOOCs should be available in the WB6 economies languages. Several paying initiatives exist in the WB6 economies but they have small scale impact. According to RCC 2018 barometer, 90 % of the WB6 citizens have not updated their digital skills during the last year.	The Regional DSJC would allow integrating the initiatives through formal registration, to promote and share them and to establish a regional network of the actors.
	Set up and implement regional training and employability enhancement programme aiming to mobilize and upskill un/under-employed population (women) to seek revenue generation opportunities through online work platforms; with particular emphasis on youth, women, and people with disabilities	INITIATIVE	Regional awareness on the economic and social inclusion of women through the improvement of digital skills.	WB6 economies share a common historical and cultural context concerning the place of women in society and in the workplace. Engaging women of the WB6 to develop digital skills for the everyday life and for employment will have important impact in the socio-economic development. It can boost place-based policies and move jobs where people are as for e-commerce of local products and development of agro tourism which are especially sensitive in economies with high emigration rates as the WB6.	Regionally promoting the role of basic and intermediate digital skills in empowering women in skills for life and all sectors of the economy. Regionally promoting the role of women in ICT and increasing awareness on the importance of digital skills and opportunities for girls and women. Developing a regional career awareness program for high schools girls on the region.

CID BALKANS DEVELOPMENT

ANNEX 1. LIST OF ABBREVIATIONS

Acronym	Description
BPR	Business Process Re-engineering
CID	Center for Information and Communication
CSO	Civil Society Organization
DESI	Digital Economy and Society Index
DIGICOMP	Digital Competence
DOL	Digital Online Learning
DSC	Digital Skills and Competences
DSJC	Digital Skills and jobs Coalition
DSM	Digital Single Market
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECDL	European Computer Driving License
e-Gov	Electronic Government
ERP	Economic Reform Program
ETF	European Training Foundation
EU	European Union
FDI	Foreign Direct Investment
FIPA	Foreign Investment Promotion Agency
GDP	Gross Domestic Product
GIZ	German Society for International Cooperation
ICJ	International Court of Justice
ICT	Information and Communication Technology
ILO	International Labor Organization
IoT	Internet of Things
IT	Information Technology
ITU	International telecommunications Union
KILM	Key indicators of Labor Market
KPI	Key performance Indicators
MAP REA	Multiannual Action Plan for the Regional Economic Area
MOOC	Massive Open Online Courses
NRI	Networked Readiness Index
OECD	Organization for Economic Co-operation and Development
RCC	Regional Cooperation Council
SEE	South Eastern Europe
SME	Small and Medium Enterprises
UNSCR	United Nations Security Council Resolutions
USAID	United States Agency for International Development
VET	Vocational Education and Training
WB	World Bank
WB6	Western Balkan Economies (Albania, Bosnia and Herzegovina, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia)
STEM	Science, Technology, Engineering, and Mathematics
NES	Albanian National Employment Service
MoFEE	Albanian Ministry of Finance, Economy and Employment
VE	Vocational Education
MoES	Albanian Ministry of Education, Sports and Youth
AL	Albania
BIH	Bosnia and Herzegovina
MN	Montenegro
MK	The Former Yugoslav Republic of Macedonia
RS	Republic of Serbia
KS*	Kosovo*

ANNEX 2. THE QUESTIONNAIRE OF ONLINE-SURVEY

REGIONAL APPROACH FOR IMPROVING DIGITAL SKILLS IN WB6 ECONOMIES'

1. ORGANIZATION & STAKEHOLDERS

1.1. **Economy** *(scroll list of 6 economy/economies)*
1.2. **Name of the Institution / Organization** (_____)
1.3. **Contact Email address** (_____)
1.4. **Website of the organization** (_____)

1.5. **Is your institution:** one choice
- □ Part of the government
- □ Municipality
- □ University
- □ Civil Society Organization
- □ Training institution
- □ Independent research institution
- □ Associations, chambers of commerce
- □ Private company
- □ Other, *please specify:* (_____)

1.6. **What is the role of your institution/organization on digital skills policies: (You can select more than one option):** multiple
- □ Policymaker
- □ Implementation
- □ Evaluation
- □ Monitoring
- □ Other, *please specify:* (_____)

2. POLICY

2.1. **Does the economy have a skills development policy? (If yes, please specify in 2.2)** one choice
- □ Yes
- □ No
- □ Not aware

2.2. **Does the economy have a digital skills development policy?** one choice
- □ Part of Skills development Policy
- □ Specific Policy document
- □ Other, *please specify:* (_____)

2.3. **Does the policy of digital skills represent the following target groups in general?** multiple
- □ Life digital skills for all citizens
- □ Employment general skills
- □ ICT professional high technical skills
- □ Other, *please specify:* (_____)

2.4. **Is the concept of digital skills defined, respectively for the following target groups?**
- o Total Demand for digital skills (Yes/No)
- o Digital skills required by target group (Yes/No)
- o Digital skills demand gaps (Yes/No)
- o Future digital skills requirements (Yes/No)

2.5. **Please add more details for the questions 2.3 and 2.4 related to the selected options.**

2.6. **Does the government have an approved action plan on the digital skills policy implementation?** one choice
- □ Yes
- □ No
- □ Not aware

2.6 a. **If Yes, please Specify the timeline below**

2.7. **Does the government have a nationwide coordination unit for the digital skills devel opment?** one choice
- □ Yes
- □ No
- □ Not aware

2.7 a. **If Yes, please Specify the timeline below**

2.8. **Are there any government incentives defined in the policy for actors implementing projects in the digital skills area?** multiple
- □ Tax reduction
- □ Direct Financing
- □ Other

2.9. **Is the digital skills policy related or connected with other national policies?** multiple
- □ Education policy
- □ Employment policy
- □ Information society
- □ ICT policy
- □ Not aware of
- □ Other, *please specify:* (_____)

2.10. **Is your institution/organization directly involved in the digital skills agenda development at?** multiple
- □ Economy level
- □ Region level
- □ International level
- □ Other

2.11. **In a scale from 1-5 what is the level of priority for the digital skills agenda, for your institution?**
1 2 3 4 5 (Low-High)

2.12. **Does your institution have a specific policy/program of digital skills for the following target groups?** multiple
- □ Citizens
- □ Labor force
- □ Education
- □ ICT professionals
- □ Not aware
- □ Other, *please specify:* (_____)

2.13. **Does your institution have a specific policy/program of digital skills for 'life digital skills for citizens'?** multiple
- □ Elderly people
- □ Woman and girls
- □ Disabled people
- □ Ethnic or minority group
- □ Not aware
- □ Other, *please specify:* (_____)

2.14. **Does your institution have a specific policy/program of digital skills for 'Employment general skills'?** multiple
- □ Unemployed
- □ Public employees
- □ Vocational training
- □ Not aware
- □ Other, *please specify:* (_____)

2.15. **Does your institution have a specific policy/program of digital skills for 'ICT profes sionals with high technical skills'?** multiple
- □ University education
- □ ICT Professionals in ICT sector
- □ ICT Professionals in non ICT sector
- □ Not aware
- □ Other, *please specify:* (_____)

3. IMPLEMENTATION

IMPLEMENTATION OF POLICY & PROGRAM IN NATIONAL & INSTITUTIONAL LEVEL If you are supporting or implementing activities, projects, programs or training for the development of digital skills, please fill in the section 3 and 4.

3.1. **What are the activities you are implementing in Education and Training for digital skills?** multiple
- □ Professional trainings delivery
- □ University education delivery
- □ Networking and competition activities
- □ Promotion and Public awareness
- □ Digital hub managing
- □ Coding bootcamps
- □ Special digital courses
- □ Research
- □ Not aware
- □ Other, *please specify:* (_____)

3.2. **Are the activities implemented by your institution / organization mapped to a policy?** multiple
- □ Mapped to digital skills policy
- □ Mapped to institution strategy
- □ Mapped to another national policy
- □ None of the above
- □ Other, *please specify:* (_____)

3.3. **What are the digital skills your institution/organization is focused on training for 'Citizens - basic life skills'?** multiple
- □ Hardware -using a keyboard and operating touch-screen technology
- □ Software word processing
- □ Managing files on laptops
- □ Managing privacy settings on mobile phones
- □ Basic online operations -email, search
- □ Completing an online form
- □ Other, *please specify:* (_____)

3.4 What are the digital skills your institution/organization is focused on training for 'Employment - intermediate digital skills'? multiple
- □ Desktop publishing
- □ Digital graphic design
- □ Web design
- □ Digital marketing
- □ Data analysis - produce, analyze, interpret, and visualize
- □ Other, *please specify:* (_____)

3.5 **What are the digital skills your institution/organization is focused on training for 'ICT Professionals - high level technical skills'?** multiple
- □ Computer programming
- □ Networks (check box)
- □ Digital entrepreneurship
- □ Mobile and cloud solutions
- □ Artificial intelligence
- □ Big data
- □ Coding
- □ Cybersecurity
- □ Internet of Things
- □ Mobile app development
- □ Block- Chain
- □ Other, *please specify:* (_____)

3.6 **Which are your target groups in Education and Training for digital skills? Life digital skills for;** multiple
- □ Elderly people
- □ Woman and girls

- □ Disabled people
- □ Ethnic or minority group
- □ Other, *please specify:* (_____)

3.7. **Which are your target groups in Education and Training for digital skills? Employment general skills for;** multiple
- □ Unemployed
- □ Public employees
- □ Vocational training
- □ Other, *please specify:* (_____)

3.8 **Which are your target groups in Education and Training for digital skills? ICT professionals with high technical skills?**
- □ University education
- □ ICT Professionals in ICT sector
- □ ICT Professionals in non ICT sector
- □ Not Applicable (check box)
- □ Other, *please specify:* (_____)

3.9. **At which level are you operating for the implementation of your project on digital skills?** multiple
- □ At the local level (one municipality)
- □ In several municipalities
- □ At economy level
- □ In several economies
- □ Other, *please specify:* (_____)

3.10. **Is your institution/organization implementing the projects/training related to digital skills?** multiple
- □ On your own
- □ In collaboration with CSOs
- □ In collaboration with academic actors
- □ In collaboration with government institutions
- □ In collaboration with international Development Organizations
- □ Other, *please specify:* (_____)

3.11. **Is your institution/organization financed by?** multiple
- □ Totally by the Government
- □ Partially by the Government
- □ International partners grants
- □ Private financing
- □ Other, *please specify:* (_____)

3.12. **Are there any government incentives for actors implementing projects in the digital skills area?** multiple
- □ Tax reduction
- □ Direct financing
- □ None of above
- □ Other, *please specify:* (_____)

4. PROJECTS IN DIGITAL SKILLS IN THE LAST 5 YEARS

4.1 **Please, provide a list of different projects or training activities implemented by your organization in the area of digital skills in the last 5 years.**

Project/ Training Title	Budget (€ /$)	Year of Beginning	Duration in Months	Target Group	No. of Beneficiaries

4.2 **Can you provide more details related to the implementation of the projects?**

5. MONITORING & EVALUATION OF DIGITAL SKILLS

5.1. **Do you measure the impact of your policies/programs?** one choice
- □ Yes
- □ No
- □ Other, *please specify:* (_____)

5.2 **Which authority is in charge of the digital skills policy impact evaluation?** multiple
- □ Competent Government authority
- □ Independent research institution (outside government)
- □ Not aware
- □ Other, *please specify:* (_____)

5.3 **Does the impact assessment touches upon?** multiple
- □ Economic and social inclusion goals
- □ Enhancing digital literacy in the early steps of the education system
- □ Enhancing employment
- □ Enhancing the development of the ICT sector
- □ Not aware
- □ Other, *please specify:* (_____)

5.4 What are the indicators your organization is using to evaluate the policy /program? multiple
- □ Number of beneficiaries
- □ Number of Activities
- □ Financing resources
- □ Other, *please specify:* (_____)

5.5 **Is the process of impact evaluation including;** one choice
- □ Key stakeholders
- □ Policy goals

- □ Target groups
- □ Other, *please specify*: (_____)

5.6 **Is Impact assessment carried out periodically?** one choice

- □ Yearly
- □ Every 2 years
- □ Every 5 years
- □ Not aware
- □ Other, *please specify*: (_____)

5.7 **Are the following listed indicators of digital skills evaluated periodically? If yes, please select the period.**

	No	Every Year	Every Two Years	Other
Basic digital skills one choice				
ICT Specialist one choice				
Science, Technology, Engineering and Mathematics Graduates one choice				
Digital Public Services one choice				
SMEs selling online one choice				
e-Commerce Turnover one choice				
eHealth Services one choice				

5.8. **Which of the following topics are assessed in national level?**

- o Total demand for digital skills (Yes/No)
- o Digital skills required by employers (Yes/No)
- o Digital skills Demand gaps (Yes/No)
- o Future digital skills requirements (Yes/No)

5.8.1 **For each of options above (checked yes) please provide detailed information?**

5.9. **Please feel free to provide feedback you would like to share. This could include any other feedback on the digital skills policy, implementation, and evaluation or on the questionnaire itself.**

5.10. **Date of the Survey** (_____)

ANNEX 3. DIGITAL SKILLS INDICATORS

The table below presents the digital skills indicator in accordance with the digital competence framework [51].

Competence area:	Indicator	Scale
Information	• Finding information about goods and services • Obtaining information from public authority websites • Reading or downloading online news/ newspapers/news magazines • Copying or moving a file or folder	**None** **Basic** (only one item) **Above basic** (at least two items)
Communication	• Sending/receiving emails • Telephoning over the internet/video calls (via webcam) over the internet • Posting messages to chat sites • Uploading self-created content to any website to be shared	**None** **Basic** (only one item) **Above basic** (at least two items)
Content creation	• Using copy and paste tools to duplicate or move information within a document [Basic] • Using basic arithmetic formulae to add, subtract, multiply or divide figures in a spread sheet [Basic] • Creating electronic presentations with presentation software (e.g. slides), including e.g. images, sound, video or charts [Above basic] • Creating websites or blogs [Above basic] • Writing a computer program using a specialized programming language [Above basic]	**None** **Basic** (if one or more “basic” items but none of the “above basic” items) **Above basic** (if at least one of the “above basic” items)
Problem solving	• Solving technical problems sub-dimension • Connecting and installing new devices • Installing a new or replacing an old operating system • Modifying or verifying the configuration parameters of software applications • Identifying needs and technological responses sub-dimension • Internet banking • Buying or ordering goods or services for private use (last 12 months) over the internet, • Selling online • Making an appointment with a practitioner via a website	**None** **Basic** (only items from one of the two sub-dimensions) **Above basic** (at least one item from each sub-dimension)

ANNEX 4. BIBLIOGRAPHY

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