

# Digital Transformation and Current Challenges of Higher Education

Bogdan Fleaca, Elena Fleaca, Sanda Maiduc

*University Politehnica of Bucharest, Splaiul Independentei 313, 060042, Bucharest, Romania*

**Abstract** – Higher education institutions are facing increasing challenges in adapting to changing capabilities brought on by technology improvements, increasing technological interconnection, worldwide market expansion, mobility and migration, and workplace diversity.

The paper deciphers significant initiatives at the European Union level with regard to digital readiness as well as summarizes the state of play for Romania's higher education sector in the context of current challenges posed by the development of digital skills.

The results fill in the knowledge gap by systematically analysing the country's performance indicators that chart the progress toward green and digital transition.

**Keywords** – digital transformation, higher education improvement, quality education, digital skills.

## 1. Introduction

The ubiquity of digital transformation is reshaping the world of labour, economies and actual societies. Technological advancements, job automation, digitalization, and artificial intelligence all have an impact on what individuals do at work, as well as how and where they work.

---

DOI: 10.18421/TEM113-32

<https://doi.org/10.18421/TEM113-32>

**Corresponding author:** Bogdan Fleaca,  
*University Politehnica of Bucharest, Splaiul Independentei 313, 060042, Bucharest, Romania*

**Email:** [bogdan.fleaca@upb.ro](mailto:bogdan.fleaca@upb.ro)

*Received:* 16 June 2022.

*Revised:* 29 July 2022.

*Accepted:* 04 August 2022.

*Published:* 29 August 2022.

 © 2022 Bogdan Fleaca, Elena Fleaca & Sanda Maiduc; published by UIKTEN. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 License.

The article is published with Open Access at <https://www.temjournal.com/>

As acknowledged by OECD 2019, digital transformation changes occupations having implications for skills demand and supply by the transformation of occupations due to automation of routine tasks and creation of new technology-rich occupations where advanced digital skills are necessary. According to the studies, 43 percent of employees said their technology has changed in the last five years, putting some people's jobs at risk of automation, while 47 percent said their working techniques or practices have changed [1], [2]. Also, before the pandemic crisis, the researchers predicted that over the next 15 to 20 years, about 15% of present employment will be automated, while another 32% would demand significantly new skills and tasks [3].

To make the most of digital transformation, individuals require a wide range of cognitive abilities in addition to digital capabilities that stand for creativity, problem-solving, and socio-emotional skills. Since a substantial portion of our life is spent in educational environments acquiring skills and preparing for a career path, societal changes, skills development, and learning are becoming increasingly linked.

Furthermore, while the digital revolution may improve happiness, it also introduces new risks, such as overconsumption, cyberbullying, lower efficiency, and high levels of social anxiety. Worryingly, intensive use of technology and persistent access to digital networks, particularly in work-related contexts, may increase stress and emotional exhaustion [4]. According to the researchers, highly skilled individuals are more likely to be aware of the risks associated with extensive use of technology, as evidenced by data showing that 45% of students who excelled in reading, mathematics, and science reported feeling bad when they didn't have access to the Internet, compared to 62 % of low performers [1].

It is also worth noting that evidence is accumulating suggesting technology use has an impact on memory and cognitive development, as people appear to outsource not only their memory and information storage but also their thinking to digital devices [5]. Critical thinking and the ability

to participate positively and competently in the digital environment have thus become more important than ever for positive digital transitions.

There is a growing emphasis on higher education institutions' needs to adapt to changing skills induced by technological advances, increasing technology interconnection, global market expansion, mobility and migration, and workplace diversity.

As acknowledged by the "Council Resolution for European Cooperation in Education and Training", the education system has a vital role in equipping individuals with appropriate knowledge, skills, competencies, and attitudes to deal with societal, economic, and labour market changes in the future [6].

In these ever-increasing changes, education and skills formation demonstrated their critical role not only in the recovery processes but also in setting a path to a prosperous future for societies embracing the green and digital transition.

These realities highlight the importance of exploring and structuring important initiatives in the European Union area, with particular concern for higher education graduates' digital readiness as future employees. The analysis is further conducted considering the Romania context and several indicators were used to appreciate the quality of the education system in comparison with other EU member states. The boundary of the study is limited to the conceptual analysis of strategic references from the European Commission in the education and training area, as well as deciphering several performance indicators from the huge array of available data, in coherence with challenges induced by digital transformation.

## 2. Education and Framing Policy Context

In the attempt to address the structural challenges induced by digital transition and technological advances accelerated by the pandemic crisis, the European Union (EU) political factors and strategic decision-makers put forward meaningful framing initiatives and policies to share a common sense of urgency in the construction of a more sustainable, resilient, and equitable Europe for future generations. In this context, the field of education and learning, and fostering all-inclusive, innovative education and training remain a critical concern which is addressed by the series of strategic reference documents, interlinked with other policy initiatives that assist the lifelong learning approach.

In this regard, Table 1 depicts the main structural initiatives at the EU level which coherently support up- and re-skilling of talent, set up a culture of lifelong learning in Europe, support a demand-driven approach to increasing industry cooperation, and improve citizens' employability [7].

Table 1. Synoptic view of framing policy context at the EU level

Framework	Aims & Description
<b>"The European Education Area"</b>	Strategic framework for collaboration in the areas of: <ul style="list-style-type: none"> <li>▪ policy cooperation;</li> <li>▪ synergies with other relevant initiatives such as Bologna Process;</li> <li>▪ targets and indicators to monitor progress towards achieving the EEA;</li> <li>▪ integration of education and training into the European Semester process.</li> </ul>
<b>"Digital Education Action Plan 2021-2027"</b>	Policy initiative to assist the sustainable and beneficial adaptation of the education and training systems to the digital age through: <ul style="list-style-type: none"> <li>▪ promoting the growth of a high-performing digital education ecosystem;</li> <li>▪ improving digital skills and competencies for the digital transformation.</li> </ul>
<b>"European Pillar of Social Rights"</b>	Action plan to achieve three EU headline targets in the areas of: <ul style="list-style-type: none"> <li>▪ employment;</li> <li>▪ skills;</li> <li>▪ social protection.</li> </ul>
<b>"European Skills Agenda"</b>	Individuals and organizations can learn more and better abilities with the help of a strategic plan with 12 actions focused on: <ul style="list-style-type: none"> <li>▪ sustainable competitiveness;</li> <li>▪ social fairness;</li> <li>▪ resilience.</li> </ul>
<b>"2030 Digital Compass"</b>	Framework policy that underpins 4 pillars to increase the degree of digitalization of economy or society: <ul style="list-style-type: none"> <li>▪ skills;</li> <li>▪ infrastructures;</li> <li>▪ transformation of business;</li> <li>▪ public services.</li> </ul>

To ensure the achievements of the European Education Area (EEA), there were established seven EU-targets to reach by 2025 or 2030, which the following are relevant for higher education and training sectors [6]:

- Tertiary level attainment: "at least 45% of 25-34 year-olds have a higher education qualification, by 2030";
- Adult learning participation: "by 2025, at least 47 percent of adults aged 25 to 64 will have participated in learning in the previous 12 months".

The search for ways to support and scale up the meaningful use of digital and creative educational methods for digital transformation is also addressed by the digital education action plan [8]. It recognizes the need to improve teaching and learning by taking advantage of digital opportunities and scaling up innovative practices, concepts, methods, processes, tools, systemic thinking, and design thinking to provide the right mix of transversal/soft skills and robust digital skills. Three concrete actions were envisaged as effective solutions to the challenges of education in the context of digital transformation such as:

- refined teaching and learning with the aid of the use of digital technology;
- digital competencies and skills for the digital transformation;
- education betterment based on improved data analysis and foresight.

These actions are bundled into two main priority areas targeting the education system and the competencies needed to be developed.

Digital competencies refer to the confident and critical use of digital technology in five areas: information and data literacy, communication and collaboration, digital content and creation, safety and well-being, and problem-solving.

Despite the fact that the terms digital technology and digital tools are frequently used interchangeably, the DigComp 2.2. defines digital technology as any product that can be used to create, distribute, store, modify, retrieve, view, receive and transmit information electronically in a digital form, whereas digital tools are about the use of digital technology to perform a specific function such as information processing, communication, content creation, safety, or problem-solving [9].

However, a thoroughly comprehending of digital competence needs to be connected to the holistic perspective provided by LifeComp which underpins the interdependence between personal, social, and learning-to-learn areas of individuals in their pursuit to manage challenges posed by digital transformation and rapidly changing societies. The framing reference deciphers the complex interrelations among key dimensions [10]:

- Personal growth, which includes the ability to deal with ambiguity, stress, and complexity, as well as the ability to work independently and manage a professional career;
- Social competence refers to knowing codes of conduct and rules of communication in our contexts, as well as the ability to interact constructively, collaborate, negotiate, comprehend different views, gain confidence, and develop empathy;

- Learning to learn competence that pertains to critical curiosity, cognitive intelligence, creativity, and resilience, as well as the ability to pursue and persist in learning, and effective time management and information processing, both individually and in groups.

All these components gain particular importance, especially in the digital transformation and technology-rich environments where having a good level of cognitive and behavioural skills (i.e. personal, social, and learning to learn skills) increases the likelihood of a more diversified and complex use of digital tools and technologies for learning and working purposes. In a variety of sectors of life, technology is becoming increasingly vital and there is a growing demand to update both types of skills throughout their lives. The multidimensional nature of technological advances and digital transformation are requiring education and training systems to reinforce teaching and learning practices. The higher education providers need to consider both digital skills and transversal skills which apply to all aspects of life, preparing students and future graduates to cope with complexity as successful individuals, reflective lifelong learners, and responsible social agents. In this light, Table 2 shows the high-level components of each type of skill.

Looking at the concerted efforts to build a strong social Europe with a long-term impact, the "European Pillar of Social Rights" action plan proposed three targets to be achieved by 2030: "a minimum 78% of the population between the ages of 20 and 64 should be working; minimum 60% of all adults should participate in training, yearly; there should be a reduction of at least 15 million persons at risk of poverty or social exclusion" [11]. Hence, the foundations for employability and involvement in society are being laid by education and training systems and higher education institutions need to ensure a future workforce with proper skills for green and digital transition. In a digitally transformed Europe, the goal of inclusion and engagement in the job market and society is also addressed by the following objective of at least 80% of people aged 16 to 74 possessing essential digital skills [11].

The concern for a highly skilled workforce is also addressed by the New European Skills Agenda that put forward four strategic objectives to be achieved by 2025: "50% of adults aged 25 to 64 participated in learning in the last 12 months; 30% of low-qualified adults aged 25 to 64 participated in learning in the last 12 months; 20% of unemployed adults aged 25 to 64 have recent learning experience; 70% of adults aged 16 to 74 have at least basic digital skills". In this attempt, the initiative defined a specific action for improving green and digital skills,

which included generating green products, services, and business models, as well as developing new solutions that reduced the environmental impact of operations [12].

Table 2. The framework of digital skills and life competencies [10], [11]

Areas of digital skills & key factors	Areas of life competence & key factors
"Information and data literacy": use and manage digital data, information and content; determine the source's and its content's relevancy.	<p><b>Personal development:</b> self-regulation, flexibility, well-being.</p> <p><b>Social competence:</b> empathy, communication, collaboration.</p> <p><b>Learning to learn competencies:</b> growth mindset, critical thinking, managing &amp; learning.</p>
"Communication and collaboration": interact, collaborate and communicate using digital technology; manage digital presence, identity, and reputation.	
"Digital content creation": improvement and information and content integration into the existing body of knowledge; creating and editing digital content in accordance with copyrights and license rules.	
"Safety": protecting digital tools, content and personal data; being aware of the use of digital technology for social inclusion, social well-being, and environmental impact.	
"Problem-solving": resolving problems and issues in digital settings, keeping updated with digital evolution.	

The recent years have shown that digitalization may bring people together regardless of where they are physically located, due to major difficulties posed by pandemic crises and the rapid pace of digitization of communities and businesses. Digital technologies become a critical enabler, enabling individuals to reach out beyond specific territories, social positions, or community sides, as well as opening new possibilities to interact, work, and learn. These lessons learned call for a coherent response to capitalize on the potential of the digital transformation, and build a healthier and greener society. In this light, the framing policy 2030 Digital Compass proposes four cardinal points translated into concrete targets to better support the development of Europe in line with the pace of a digital transformation, as well as the implementation of digital principles [13]:

- Population with a high level of digital literacy and highly qualified digital professionals that are fulfilled by a well-performing digital education ecosystem, as well as advanced digital

- skills and specialists for cyber security and data analysis;
- Secure and sustainable digital infrastructures through better connectivity, microelectronics, and the ability to process vast data to support the industry's competitive edge;
- Digital transformation of businesses that is addressed by the usage of business digital technologies including 5G, robotics, the internet of things, augmented reality, and artificial intelligence that enables a more intensive and efficient resource use;
- Digitalization of public services by which online public services shall be fully accessible for everyone providing easy-to-use, efficient and personalized services and tools with high security and privacy standards.

In summing up, the pervasive concern throughout the framing policy and documents of the European Union is pertaining to digital skills development coupled with high levels of cognitive and behavioural components, as strategic means for addressing the challenges and vulnerability of digital space. These argue for certain adjustments and improvements in teaching and learning, as well as coordinated and integrated measures and steps to better adapt education and training systems to the digital transformation, which cannot be stopped but must be managed positively.

As a result, education and skills are prominently featured in these programs, paving the path for recovery, quality of life, resilience, and competitiveness.

### 3. Higher Education Challenges – Romania Context

The state of play of the challenges of higher education induced by digital transformation is addressed by plenty of performance indicators that may support decisional factors to analyze structural factors at the EU and country level from different points of view.

Albeit the increasing challenges to teaching and learning at the European level are complex and interlinked, the analysis goes further by exploring the particular vulnerabilities of Romania's tertiary education context, attempting to draw up desirable improvement solutions.

In this light, having a broader perspective on the role of tertiary education in skills formation is addressed by selecting several indicators provided by reliable international sources of information as presented in Table 3.

Table 3. Performance indicators for analysis of the challenges of education in Romania country

Source of data	Indicator
"Digital Economy and Society Index" - DESI	<ul style="list-style-type: none"> <li>▪ Human capital with dimensions:</li> <li>▪ Internet user skills;</li> <li>▪ Advanced skills and development (ICT graduates and ICT specialists).</li> </ul>
"Education and Training Monitor 2021"	<ul style="list-style-type: none"> <li>▪ Total expenditure on education and training;</li> <li>▪ The expense of public and private institutions per student;</li> <li>▪ Tertiary attainment.</li> </ul>
"Eurostat database"	<ul style="list-style-type: none"> <li>▪ The employment rate of recent graduates.</li> </ul>
"Skills panorama", Cedefop	<ul style="list-style-type: none"> <li>▪ Employment growth in the high-tech economy;</li> <li>▪ Digital skills usage.</li> </ul>

The concern for the state of the digital economy and society and digital progress is measured by the composite indicator "The Digital Economy and Society Index" (DESI) which identifies areas for priority action in coherence with four cardinal points introduced by the framing policy 2030 Digital Compass [14]:

- "The human capital dimension" assesses both internet user skills of citizens and advanced skills of specialists;
- "Connectivity dimension" with both fixed and mobile broadband which are ascertained with indicators measuring the offer and the demand side as well as retail prices;
- "Integration of digital technology dimension" assesses digital intensity, take-up of selected technologies by enterprises and e-commerce;
- "The digital public services dimension" assesses the requirement and offer of e-government as well as open data policies.

Considering the previous year, Romania is ranked 27th place among EU countries, being scored below average on most of the indicators. As for the human capital dimension, Finland seems to lead the hierarchy, followed by Sweden, the Netherlands, and Denmark, whereas the lowest-ranked countries were Italy, Romania and Bulgaria.

According to the most recent data on internet user capabilities, Romania is ranked 26th, with only 31% of persons aged 16 to 74 having at least basic digital skills compared to 56% in the EU, and only 35% having at least basic software skills compared to the EU average of 58 percent. As for advanced skills and

development, Romania encountered a slight increase in the percentage of ICT specialists but they are below than in the EU as a whole (2.4% against an EU average of 4.3%). Romania performed very well for ICT graduates with 6.3% vs 3.9% of graduates in the EU [14].

Given the quality education as a prerequisite for digital progress and improvement of the teaching and learning processes, the share of spending in education is one of the main critical factors that shape the commitment to the sector, making available to teachers and students the resources needed to strengthen the link between the quality of teachers and students achievements. Romania seems to be on the way to reducing the gap with the EU average as the share of public expenditure on education and training increased to 3.7% of GDP (Gross Domestic Product) in 2020, but significantly below the EU average of 5.0% of GDP. Notably, Sweden – 7.2%, Belgium – 6.6%, and Denmark – 6.4% still maintain their high-level spending in education as a % of GDP, being above the EU average. Worthy to mention, the annual expenditure on higher education institutions per student displays an increasing value of 3469 euros/student in 2019 versus 2510 euro/student in 2015 but lagging behind the EU average of 10318 euros/students in 2019 [15].

Another intake in the pursuit of analysis is referring to tertiary education attainment which becomes a relevant predictor for the challenges of education posed by digital transformation. In 2020, this indicator was 26.4 percent, well below the EU average of 41 percent and the EU-wide goal of 45 percent by 2030. Interestingly, when it comes to technological advances, the percentage of Romanian graduates in science, technology, engineering, and mathematics is one of the highest in the EU (30%), but the availability of professionals is poor due to the low number of graduates [15].

As for the employment rate of recent graduates, Romania performs well with an increased share of employed tertiary education graduates of 88.4% in 2021 compared with 85% in 2015, being above the EU average of 85% in 2021 [16].

Current jobs are becoming more driven by digital technology and the labour market is seeking graduates with digital readiness to properly use digital technologies. As the data show, the employment growth in high-tech occupations (e.g. science and engineering, information and communication technology professionals) in the economy sector in Romania has an estimated mean of 10.5% while the maximum is 43.9 for ICT services. Another useful indicator is digital skills use which pertains to the ability of individuals related to information, communication, problem-solving, and using software in the context of the digital environment. The available data point that digital skills use average in 2021 is estimated at 34.5% whereas the minimum is 11% for Bulgaria and

Romania, while the maximum is 59% for the Netherlands [17].

In summing up, the state of play of Romanian higher education seems to be characterized by structural vulnerabilities in terms of low public expenditure, unsatisfactory level of digital skills for both students and the workforce, a small number of ICT specialists in industries framed by digital transformation and a small number of tertiary-educated professionals, whose skills are not well aligned with labour market demands. These shortcomings hinder the capacity of alignment with top performers in the EU, slowing down the process of charting the progress toward quality in education and training. Thus, there is considerable room for improvement in the process of implementation of educational policies at the country level.

In the pursuit to counteract the existing vulnerabilities, particular attention might be paid to improvement measures such as:

- Enhancing the learning practices through innovative educational techniques centred on collaborative, genuine, project-based learning to develop key components of digital competence, such as problem-solving, creativity, and critical awareness and assessment of data, information, and digital material;
- Assisting and training teachers in the integration of digital competence into the disciplinary curriculum;
- Engaging educators in active and collaborative online learning experiences to develop digital competence (e.g. content creation, safety management, problem-solving capabilities, collaboration and communication) using non-traditional pedagogical approaches like flipped education, project-based learning, mentoring and peer-learning, etc.

#### 4. Conclusion

Given the challenges of workplace digitization and the integration of new technologies like cloud computing, artificial intelligence, and robotics into current market practices, digital skills are increasingly becoming a transversal requirement in all sectors.

Growing digitalization and the need for skilled digital technology uses have the potential to radically change teaching and learning by equipping people to work and be creative citizens and by improving the access to learning. As a result, education and training sectors are responsible for ensuring that students and future graduates are prepared to take advantage of possibilities and overcome the difficulties of a fast-paced, globalized, and interlinked society.

In this light, the challenges of higher education in the context of digital transformation, especially for Romania country, might be addressed by coherent measures at strategic and operational levels to make higher education more relevant to the labour market and facilitate digitalization, keeping pace with the education targets depicted by framing policies at European level.

#### References

- [1]. Organisation for Economic Co-operation and Development. (2019). *OECD skills outlook 2019: Thriving in a digital world*. Paris, France: OECD. doi.org/10.1787/df80bc12-en.
- [2]. Cedefop, E. (2018). Skills forecast: trends and challenges to 2030. *Luxembourg: Publications Office. Cedefop reference series*, (108). Retrieved from: <https://data.europa.eu/doi/10.2801/626296> [accessed: 25 May 2022].
- [3]. Nedelkoska, L., & Quintini, G. (2018). Automation, skills use and training. Retrieved from: <https://www.oecd-ilibrary.org/docserver/2e2f4eea-en.pdf?expires=1659353526&id=id&accname=guest&checksum=FBD42FA8E2152EDAF96C3173BB37AEC8> [accessed: 25 May 2022].
- [4]. Becker, M. W., Alzahabi, R., & Hopwood, C. J. (2013). Media multitasking is associated with symptoms of depression and social anxiety. *Cyberpsychology, behavior, and social networking*, 16(2), 132-135.
- [5]. Barr, N., Pennycook, G., Stolz, J. A., & Fugelsang, J. A. (2015). The brain in your pocket: Evidence that Smartphones are used to supplant thinking. *Computers in Human Behavior*, 48, 473-480.
- [6]. European Council. (2021). Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021–2030). Retrieved from: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=uriserv:OJ.C\\_.2021.066.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=uriserv:OJ.C_.2021.066.01.0001.01.ENG) [accessed: 28 May 2022].
- [7]. European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. (2019). *The European Green Deal*. COM(2019) 640 final. Retrieved from: [https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF) [accessed: 01 June 2022].
- [8]. European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. (2018). *The Digital Education Action Plan*. COM(2018) 22 final. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0022&from=EN> [accessed: 01 June 2022].

- [9]. Vuorikari Rina, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens-With new examples of knowledge, skills and attitudes* (No. JRC128415). Joint Research Centre (Seville site). doi:10.2760/115376 , JRC128415
- [10]. Sala, A., Punie, Y., Garkov, V., & Cabrera, M. (2020). *LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence* (No. JRC120911). Joint Research Centre (Seville site). doi:10.2760/302967, JRC120911
- [11]. European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. (2021). *The European Pillar of Social Rights Action Plan*. COM(2021) 102 final. Retrieved from: [https://eur-lex.europa.eu/resource.html?uri=cellar:b7c08d86-7cd5-11eb-9ac9-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:b7c08d86-7cd5-11eb-9ac9-01aa75ed71a1.0001.02/DOC_1&format=PDF) [accessed: 20 May 2022].
- [12]. European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. *European Skills Agenda for sustainable competitiveness, social fairness and resilience*. COM(2020) 274 final. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0274&form=EN> [accessed: 25 May 2022].
- [13]. European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. (2021). *2030 Digital Compass: the European way for the Digital Decade*. COM(2021) 118 final. Retrieved from: [https://eur-lex.europa.eu/resource.html?uri=cellar:12e835e2-81af-11eb-9ac9-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:12e835e2-81af-11eb-9ac9-01aa75ed71a1.0001.02/DOC_1&format=PDF) [accessed: 28 May 2022].
- [14]. DESI. (2021). Digital Economy and Society Index Romania. Retrieved from: <https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2021> [accessed: 01 June 2022].
- [15]. European Commission. DG for Education, Youth, Sport and Culture. (2021). *Education and Training Monitor 2021 – Romania*. Luxembourg: Publication Office of the European Union. Retrieved from: <https://data.europa.eu/doi/10.2766/532994> [accessed: 28 May 2022].
- [16]. Eurostat. (2022). Labor Force Survey. Retrieved from: [https://ec.europa.eu/eurostat/databrowser/view/LFSI\\_EDUC\\_A\\_custom\\_2862443/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/LFSI_EDUC_A_custom_2862443/default/table?lang=en) [accessed: 28 May 2022].
- [17]. Cedefop (2020). Skills forecast 2020: Romania. Cedefop skills forecast. Retrieved from: [https://www.cedefop.europa.eu/files/skills\\_forecast\\_2020\\_romania.pdf](https://www.cedefop.europa.eu/files/skills_forecast_2020_romania.pdf) [accessed: 28 May 2022].