

THE EUROPEAN WAVE OF DIGITAL TRANSFORMATION AND THE WORKFORCE MIGRATION

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Abstract

This article presents the current European context regarding the extent of the labour migration phenomenon, along with the evolution of the digitalization process of the Union, using as a reference point the dynamics of the Digital Economy and Society Index in economically developed and emerging European states. It is based on the examination of the specialized academic literature and the official reports of the institutions on the evolution of the European labour market and digitalization. It tries to capture the direction and the way of labour force migration. A strong DESI level is the equivalent of a complete digital infrastructure, of a level of self-sufficient individual digital skills, and a high-performance digital integration of companies. Also, it is equivalent to the loss of obsolete jobs and the birth of new ones, for which a high level of human resources skills and knowledge is necessary. An elevated digital state can no longer be the equivalent of the destination of GIG workers from economic branches characterized by a workforce equipped with only essential digital skills.

Keywords: digitalization, DESI, GIG workers, labour force, migration

JEL: J21, J6, O33

1. Introduction

In the current global context, in the period of sanitary, energy, food and political crisis, the GIG workforce migration question arises: what future will the employees, GIG workers who worked in fields where digital was not needed have? Generally, the question could have three answers: re-conversion to digital, transition to an unemployment state, or changing the destination of migration to less digitized states, in which there are still areas that are not digitized fully or partially, and for which raw or seasonal work is still needed? On the other hand, the GIG economy is also based on digital work platforms, the area where

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the competitiveness and highly qualified labour force are present. A strong DESI is the equivalent of increasing job opportunities for as many highly skilled people as possible, GIG workers or not. A high degree of competitiveness in the labour force means the delivery of performance work results and simultaneously, the increase in the performance of companies that use this employment model.

The fourth technological revolution, called Revolution 4.0 is that of automation, artificial intelligence and digitization. According to the analyzes and results of the European Center for the Development of Vocational Training (CEDEFOP), artificial intelligence and automation represent promoters of jobs transformation and in no case factors with a crisis effect in the labour market, adapting to the new transformations actually representing an element of opportunity, in the context where at least half of jobs will be automated in the future [3].

Conclusions regarding the benefits of going through the digital transformation refer to significant increases in the financial and economic performance of companies, the profitability of the investments carried out, and beyond financial considerations, to the improvement of work relations between employees and employers, or those of business with partners, suppliers and customers, to a positive impact on economic growth, environmental and sustainability indicators, referring, in general, to progress.

The analysis carried out is empirical, statistical data being collected and processed on the basis of the Eurostat archive and official European specialist reports or large global analysis and consulting companies.

2. Digitalization – general approach to the impact on companies and workforce evolution

Digitalization means the transformation of information, documents, objects, sound or image, in digital format [1], and in a broader sense, digital technologies and their use for the general purpose of streamlining activities, domestic, personal, or related to work or production of value [2]. Digitization of processes can be turned into a benefit, given the results in the efficiency of communication, planning activities, archiving, monitoring results, document management or improving time management indicators.

An important characteristic of the current technological transformations is the very high speed of the innovation cycles, with a different pace compared to the evolution of the past years. The creation of new products and the application of digital marketing have become much faster, the workforce has become more flexible, classic forms of work can be easily replaced by contingent or freelancing forms (platformers), and the extension of "digital innovators" in the digital environment participate in the intensification of the competitive process. The increase in demand for products and services in recent years is justified, along with other factors, by the offer diversification, in terms of volume, quality and price, with direct effects in the creation of new jobs.

Current technological development and especially the speed with which these transformations are taking place may lead to even greater discrepancies in income inequalities. The degree of adaptability of workers to environmental changes is predicted to be different, depending on the age groups, for example, so that the new generations will

have the advantage of understanding and getting used to the technological and digital diversification immediately, to the detriment of the older age groups . Consequently, the labour market will be affected by these phenomena, with existing studies and research giving contradictory results as to how the effects will be felt. Both positive effects of adaptability of the working population with new technologies and artificial intelligence are appreciated, as well as negative results.

3. The benefits of digital transformation on companies' evolutions

Business models will be resized and reoriented through digital transformation, operating models, customer relations and the digitized interaction with the customers, marketing processes will also be adapted, depending on the companies` digital integration levels, but also depending on the future requirements and needs of consumers. A study operated by Deloitte [4] expresses results regarding the correlation between the companies` degree of digitalization integration and the evolution of income growth, as well as the increase in the degree of global income reporting. The efficiency of organizational processes is related to the existing level of digitization, so any action in this regard, for example, recalibration and flexibility of the infrastructure through cloud services, will lead to time savings and the efficiency of data center maintenance costs.

According to Delloitte [5], digitization is the basis of the development of processes for collecting information, data and managing databases, so that the actions of customizing products and services and their quality will be optimized according to customer requirements. The results will be seen in increased sales volume or in the critical performance indicators improvement. And speaking about business collaboration, the digitization process results will support and stimulate the development of relations with external partners. Human capital represents another beneficiary of the implementation of the digitization process, in a sense in which, simultaneously with the continuous process of developing digital skills, the knowledge received will bring added value to individual or company results. Relations between workers and employers are stimulated and improved in this regard.

In order for the results to appear in closer form to the optimal version, digitization must be implemented in accordance with development strategies based on this tool, depending on the specifics of the companies, the development objectives, the economic sectors in which they operate, both at the individual level (companies) and at the national level.

4. The Digital Economy and Society Index (DESI)

The digital performance and progress recorded by the EU member states in implementing digitization measures are given by a set of indicators, which together form the Digital Economy and Society Index (DESI) being grouped thematically, in key implementation areas (digital public services, connectivity, integration of digital technology and human capital). DESI reflect the dimension of the European information society, allowing the comparative analysis of digital development at the European level [6].

Thus, according to the results of the *EU DESI 2022* Report [7], during the COVID-19 pandemic (2020-present), positive and increasing results were recorded regarding the

achievement of the general objectives of the process of digital transformation, although a slower advance was reported in terms of development on 5G digital infrastructure components, digitalization in SMEs or digital skills. The purpose of digitalization policies initiated during the pandemic, aimed to intensify the use of digital solutions, and subsequent statistical data confirmed results in this regard, both at individual and business environment level [8]. The strongest emphases were recorded in the areas of workforce mobility, work remote, automation or e-commerce (as a percentage of total retail sales), while digital transformation at the citizen or enterprise level, as mentioned before, did not achieve the expected results [9]. The McKinsey Global Institute study, *The future of work after COVID-19*, was carried out based on the analysis of socio-economic data on a panel of 8 globally developed economies countries, which together form approximately 62% of global GDP and represent over half of the world's population (China, India, Japan, US, UK, Spain, France and Germany).

The results of the *DESI 2022 Report for Europe* confirm the maintenance of the trends from previous years, in the sense of a positive progress registered at a general level, with discrepancies, however, on the key development components. Barriers and gaps are registered in the area of development of digital skills, expansion of infrastructure networks and the transfer of SMEs to cloud or big data services. The repercussions of these sustained delays and blockages on these 3 components will materialize in the digital gap, the risk of digital exclusion, the decrease in the degree of competition and the slowdown of economic growth.

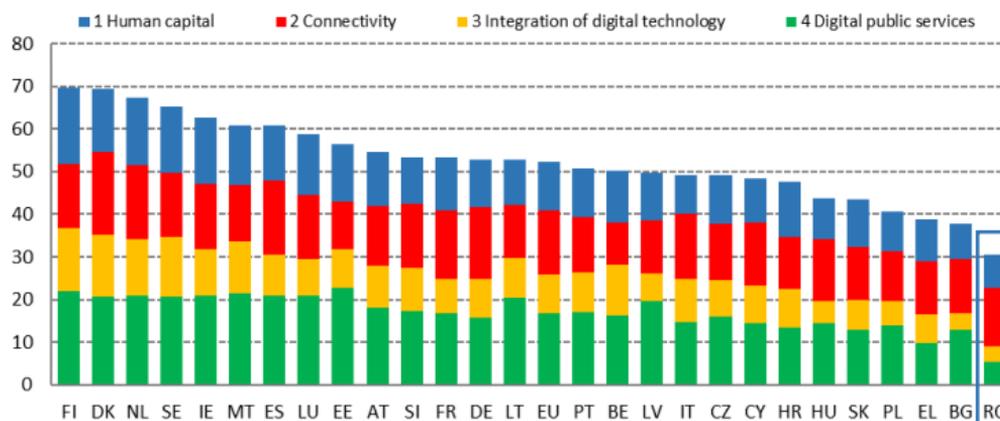


Figure 1. DESI 2022 ranking⁴

The 4 digital key implementation areas, public services, connectivity, integration of digital technology and human capital demonstrate a different evolution in the EU member states (figure 1), DESI placing Finland, Denmark, Holland, Sweden on the first places in the ranking and at the opposite pole, Romania, Bulgaria and Greece.

⁴ source: <https://digital-strategy.ec.europa.eu/en/policies/desi-romania>

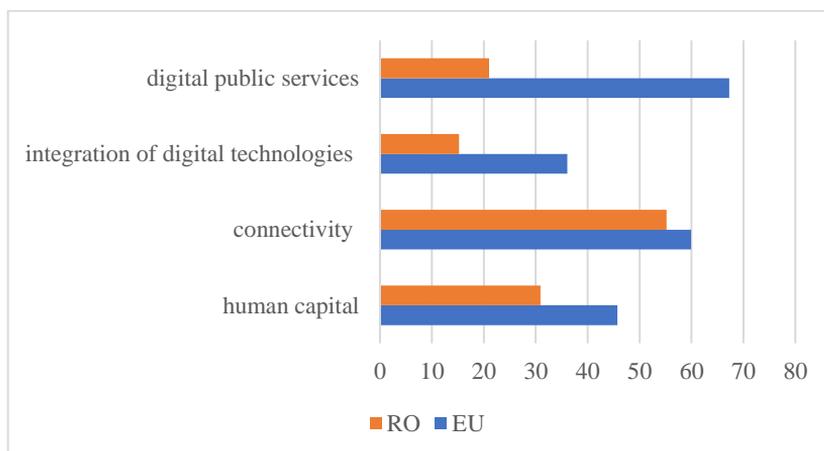


Figure 2. DESI components level for RO and EU, 2022⁵

On DESI` 4 components, Romania records the following results, for 2022: human capital 30.9% compared to EU average 45.7%, connectivity 55.2% compared to EU average 59.9%, the integration of digital technologies 15.2%, compared to EU average of 36.1% and digital public services 21% compared to EU average of 67.3%, according to statistical data (figure 2).

5. The impact of technological change, of digitization and automation on the labour market

The consequences of the worldwide initiation of automation and digitization processes, together with other significant determinants, were not slow to appear and the recovery efforts are significant, whether at the individual, community, society, state or regional level, the vast majority of the workforce being affected, obviously, in different proportions, but negatively, in general.

Technology has also made it easier to create jobs by working online or joining the so-called GIG economy. What is currently being observed is the increasingly rapid development of the skills necessary for the performance of work and the growing demand for new skills and abilities. Starting from the ever-increasing number of new jobs, in new economic areas and implicitly carrying new or rare requirements and skills, the demand for work is transformed in terms of the quality of skills and abilities, or educational level. The workforce, on the other hand, have increasingly easy access to tools for improvement, personal development or, where appropriate, professional reconversion and simultaneously, online, to the offer of available jobs.

A category of the criteria for classifying the effects are those related to the geographical area analyzed and the level of regional economic development, the economic field evaluated and its correlation with the present and future technological expansion. An advanced economy, for example, whose degree of sustainability is high, can cover the

⁵ source: <https://digital-strategy.ec.europa.eu/en/policies/desi-romania>

expenses of these structural transformations, if we refer to the costs of the transition period. On the other hand, states with developing economies will feel the effects of these movements more deeply, with future generated costs much higher than developed states. Extrapolating, a more economically advanced region will adapt more easily to the new wave of change than less favored areas. From the economic sectors point of view, as an image of the future under the effect of these changes, it can be appreciated that technology will bring beneficial changes in any field, but the fields close to the ICT area will register the most fulminant rise, reaching the automation of tasks routine and to the creation of new jobs, different from the present ones. Consequently, the demand for ICT specialists is born in all economic fields and the pressure on the demand for digital skills of an increasingly high level in the fields supplemented with the ICT area (tasks) is accentuated [10].

The skills required for work today will give way in the future to the skills required for the emerging jobs of the future. CEDEFOP statistical data and specialist reports, through the *European Skills and Jobs Survey (ESJS)* [11] indicate a minimum 35% share of current skills that will be gradually replaced, refer to the current fields of study and qualification in education system that they will not find in the same proportion in the future and suggests that 65% of today's students will have jobs that do not exist today. It also indicates 14% of current jobs are being fully automated, with work tasks completely replaced by automated learning models, and around 18 million workers in the European Union at risk of losing their jobs due to this phenomenon. According to the estimates of *Factory 4.0 & Frames* analysts, there is confirmation of the phenomenon of gradual replacement of non-current jobs in the context of a wave of demand for labour in the area of support services in the public or private sector, until the end of this decade [12].

6. The European Employees – Where To?

Regarding the social-economic trends of 2011-2020 period, according to Emergent Research [13] and Intuit [14], there will be increasingly accentuated migratory flows of the labour force, their destination keeping the same directions until now: towards the states with advanced economies and from rural to urban area. With the increase in the scale of the digitalization phenomenon, it is assumed that migration will have relocation tendencies in the digital area, for digitally remodeled workplaces and for the employees' categories with advanced education and skills. At the opposite pole, workers with education up to the tertiary level, will compete for jobs not yet digitized. Other research [15] refer to the agglomeration of job offer in the most popular freelancing fields (e.g. design and technology) as a result of the intensification of the digitization process. Research by the McKinsey Institute refers to the intensification of the relocation of headquarters and economic activities of large companies to emerging markets, until 2030 [16], with an impact on the structure and volume of future workforce migratory flows, the workforce mobility magnitude being predicted on average, 65 million people annually and an increasing trend.

The shock effect on the economy, as a result of job losses due to the pandemic, energy, climate crises, further leads to significant structural changes in the labour market, in terms of, but not limited to, patterns of work engagement. There is a transition from classic forms of work to temporary ones, either due to the loss of the current job, or due to the need for additional income.

Globally, for 2019, the general picture of the volume and structure of the migrant workforce [17] describes two-thirds of the total as being concentrated in the developed states of the world and about 25% localized in Europe, 22% in North America and 14% in Arab states. Another essential feature highlighted is the increase in the volume of flows, from year to year.

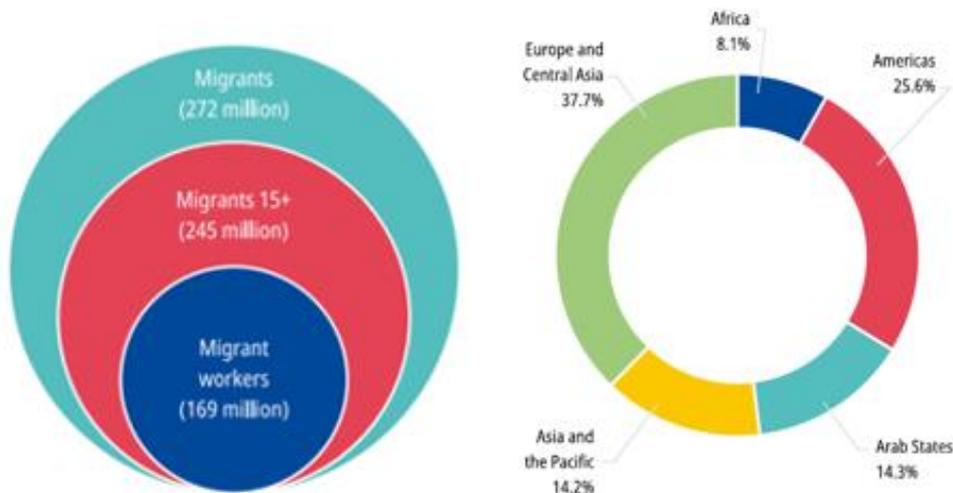


Figure 3. The volume and global migrant workers distribution, by region, 2019⁶

272 million migrants were registered, of which 245 million were over 15 years old and 169 million migrant workers (figure 3). As a concentration, from a regional point of view, (figure 3) statistical data show the highest share (37.7%) in Europe and Central Asia, 25% in the US and Central and South America, 14.8 in the Arab States, 14.2 % in Asia and the Pacific and about 8% in Africa. By gender category, the gender composition shows a share of 58.5% men and 41.5% women.

At European level, the migratory volume has a strong upward trend for the last period and large regional or temporal variations of the migratory phenomenon are highlighted (figure 4). According to ESPON GECT, the last two decades were characterized by a positive global net migratory balance, the number of immigrants (incoming labour force) being higher than that of emigrants (outgoing labour force). It can observe the states and regions that send the labour force outside the borders, and in this sense, Romania, southern Italy, Spain, Portugal, Bulgaria, in general the southern and eastern regions of Europe, states or regions with no developed very good economic conditions can be highlighted. At the opposite pole, the labor-receiving states are generally the countries of northern and central Europe.

⁶ source: [wcms_808935.pdf \(ilo.org\)](#)

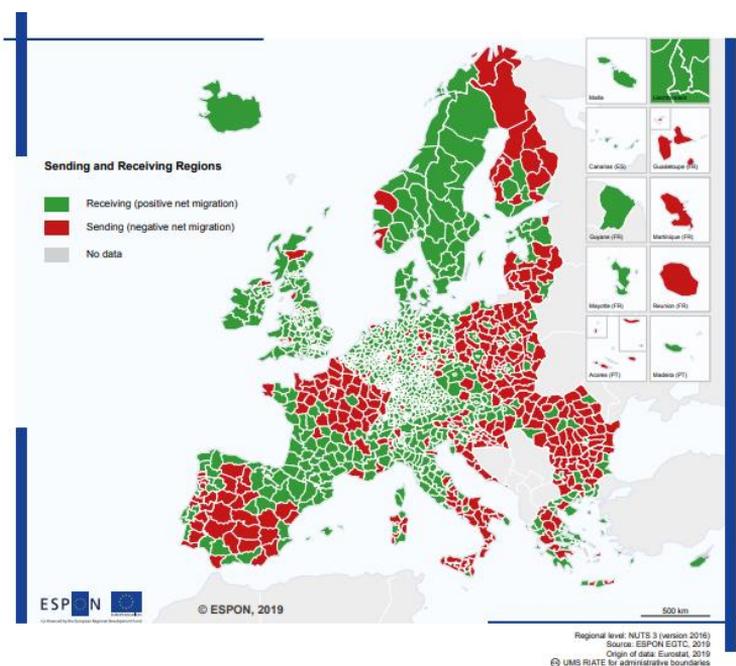


Figure 4. In- and out-migration, 2017⁷

The specialized literature describes a strong relationship between the labour force migratory structure and volume and the level of economic development of the states, respectively GDP/capita or the labour market state. Thus, the movement of migratory flows is directed towards economically developed states, with an intensified status of labour demand [18]. According to the mentioned study, there is a close connection between the workers migration pattern and the knowledge economy status, so the indicators that define it (level of tertiary education, investments in research and development, the intensity of patenting activity, the share of the force of active work in the technological and scientific domains) become essential factors in the dynamics of the migratory flow (figure 5).

The highly educated migrants tend to concentrate in regions where highly educated natives are intensive working [19]. Based on the statistical data provided by Eurostat, we can outline a general framework of the ranking of the EU member states in terms of the employment rate of people with a tertiary level of education (table 1). The European average, for the year 2021 quarter 4 is 85.8%, the countries with a high value of the infector being Malta (92.2%), Hungary (90.8%), Poland (90.4%), Slovenia (90%) and the lowest values, but over 77%, are registered by Greece (77.7%), Italy (80.7%), Spain (81.1%) and France (84.4). Romania has a tertiary employment rate of 88.2%, higher than the EU average.

⁷source: ESPON EGTC,
<https://www.espon.eu/sites/default/files/attachments/ESPON%20Policy%20Brief%2C%20Labour%20migration%20challenges.pdf>

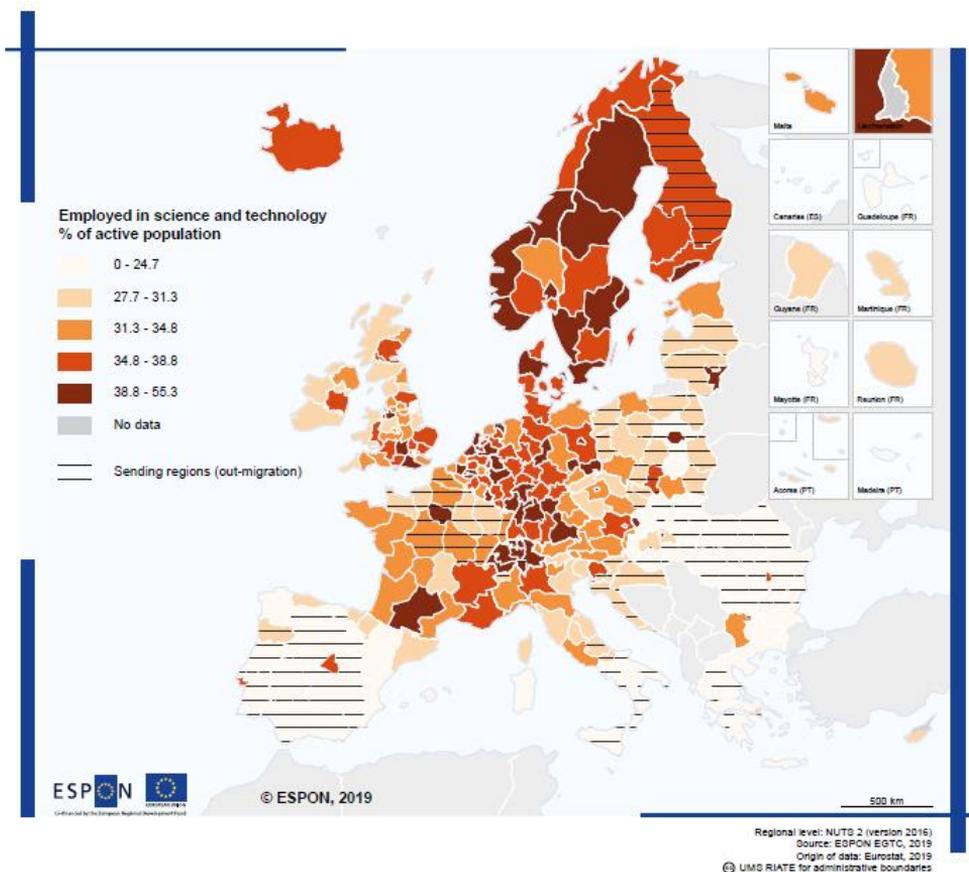


Figure 5. Relationship between knowledge economy and out-migration, 2017⁸

GEO /TIM E	201 9- Q1	201 9- Q2	201 9- Q3	201 9- Q4	202 0- Q1	202 0- Q2	202 0- Q3	202 0- Q4	202 1- Q1	202 1- Q2	202 1- Q3	202 1- Q4
Malt a	88, 6	88, 6	87, 5	88, 5	92, 3	90, 3	86, 9	88, 1	90, 2	89, 7	89, 1	92, 2
Hun gary	85, 5	85, 8	84, 8	84, 9	85, 1	84, 8	85, 4	85, 7	89, 1	89, 7	90, 0	90, 8
Pola nd	87, 6	87, 7	87, 9	88, 4	88, 1	87, 4	88, 2	88, 5	89, 3	90, 1	89, 8	90, 4
Slove nia	89, 4	89, 3	88, 7	90, 6	90, 2	89, 0	89, 2	89, 2	86, 1	88, 8	89, 2	90, 0

⁸ source: ESPON EGTC, <https://www.espon.eu/sites/default/files/attachments/ESPON%20Policy%20Brief%2C%20Labour%20migration%20challenges.pdf>

GEO /TIM E	201 9- Q1	201 9- Q2	201 9- Q3	201 9- Q4	202 0- Q1	202 0- Q2	202 0- Q3	202 0- Q4	202 1- Q1	202 1- Q2	202 1- Q3	202 1- Q4
Lith uani a	91, 2	90, 9	89, 8	91, 4	90, 4	89, 7	88, 4	89, 4	88, 6	89, 2	89, 8	89, 6
Swed en	87, 6	89, 0	88, 7	89, 9	88, 1	88, 0	87, 4	88, 3	86, 4	88, 3	89, 3	89, 6
Bulg aria	87, 6	89, 2	88, 6	88, 7	88, 7	86, 2	87, 1	88, 4	88, 0	88, 3	89, 3	89, 3
NL	88, 6	89, 0	88, 5	88, 6	88, 6	88, 5	88, 0	88, 8	88, 6	88, 2	88, 3	88, 7
Ger man y	88, 6	89, 0	89, 0	89, 2	:	:	:	:	87, 0	87, 5	88, 2	88, 6
Esto nia	86, 3	85, 7	85, 9	87, 8	85, 7	82, 9	84, 0	85, 8	86, 6	85, 6	87, 8	88, 4
Finla nd	85, 8	86, 2	86, 2	86, 7	86, 4	85, 8	86, 2	86, 5	86, 4	87, 2	87, 1	88, 3
Den mark	86, 9	87, 4	87, 1	87, 4	87, 4	87, 4	86, 3	87, 2	86, 0	88, 3	86, 9	88, 2
Rom ania	89, 2	89, 6	88, 9	89, 0	89, 3	88, 7	88, 7	88, 6	87, 5	88, 8	89, 3	88, 2
Latvi a	89, 3	88, 8	88, 8	89, 3	85, 5	86, 1	86, 4	87, 0	85, 6	84, 8	85, 1	87, 5
Irela nd	85, 2	85, 4	84, 6	85, 9	86, 3	82, 7	82, 9	83, 6	82, 9	84, 4	85, 5	87, 2
Port ugal	85, 6	86, 6	84, 5	85, 3	85, 5	84, 3	83, 7	84, 2	84, 4	86, 9	85, 9	86, 3
Slova kia	80, 8	80, 7	80, 3	80, 7	81, 0	80, 1	79, 5	80, 4	84, 9	85, 5	85, 4	85, 9
EU 27	84, 6	85, 1	84, 4	85, 0	84, 4	83, 5	83, 3	84, 1	84, 0	85, 0	84, 9	85, 8
LU	85, 1	85, 7	84, 4	83, 7	82, 7	84, 5	82, 9	82, 8	82, 8	83, 6	84, 1	85, 8
Czec hia	86, 0	85, 0	84, 6	84, 2	84, 5	83, 7	83, 4	84, 0	84, 4	84, 7	84, 7	85, 6

GEO /TIM E	201 9-Q1	201 9-Q2	201 9-Q3	201 9-Q4	202 0-Q1	202 0-Q2	202 0-Q3	202 0-Q4	202 1-Q1	202 1-Q2	202 1-Q3	202 1-Q4
Austria	84,5	85,0	84,7	85,3	84,6	83,9	85,2	85,0	84,1	84,3	85,4	85,6
Croatia	80,1	81,1	83,2	83,1	82,1	83,8	84,0	83,5	83,7	83,8	83,8	85,1
Belgium	84,3	84,2	83,1	83,8	83,9	83,7	83,0	83,6	83,6	84,3	83,6	84,9
Cyprus	83,2	83,6	82,6	83,7	83,9	84,1	81,2	83,3	82,3	83,1	84,7	84,6
France	83,6	83,9	82,5	83,4	83,5	82,7	81,8	82,4	83,6	84,9	84,2	84,4
Spain	79,9	80,8	79,9	80,7	79,8	77,0	77,6	78,4	78,4	79,6	79,6	81,1
Italy	78,7	80,0	77,9	79,0	79,0	78,0	76,3	78,7	78,4	79,8	77,9	80,7
Greece	74,9	76,3	75,0	74,6	74,9	74,5	74,2	74,5	71,2	74,8	76,7	77,7

Table 1. EU, the tertiary education (5-8) employment rate, age 20-64⁹

An EU overview of the employment rate for people with an 0-2 education level (**less than primary, primary and lower secondary education**) is captured by Eurostat statistical data (table 2). A low level of the employment rate for 0-2 level category can be interpreted from the perspective of some highly developed economic sectors, whose labour demand is concentrated at the tertiary level, while the need for the 0-2 level is insignificant, just as, it can also be interpreted as an work market instability or dysfunction of the in the case of economic sectors where the demand is predominant for level 0-2. At the opposite pole, a significant employment rate may mean the existence of economic sectors that predominantly require a labour force with an educational level of 0-2.

Starting from the European average of the indicator (55.7% in 2019, decreasing with the outbreak of the pandemic to 54.8% in 2020 and 54.9% in 2021) and the fact that 20 of the Union states register over 50%, it is observed that the highest values of the low-skilled employment rate are recorded in Portugal (69.3% in 2021 compared to 69.1% in 2020 and 69.8% in 2019), the Netherlands (with an increase important in 2021 (66.7%) compared to 2020 (62.9%), Malta (65.3% in 2021 compared to 64% in 2020 and 64.5% in 2019), Cyprus (64.5% in 2021 compared to 64% in 2020 and 63.2% in 2019), Estonia (62.7% in 2021), Germany (61.9% in 2021) and Denmark (61.2% in 2021). The lowest values are recorded in Slovakia (26.9% in 2021 compared to 34% in 2020 and 36.1% in

⁹ Source: Eurostat, author's processing

2019), Croatia (42.1% in 2021 compared to 38.5% and 39.5% in 2019) and Romania (42.5% in 2021 vs. 55.7% in 2020 and 56.8% in 2019).

GEO/TIME	2019	2020	2021
Portugal	69,8	69,1	69,3
Netherlands	63,2	62,9	66,7
Malta	64,5	64,0	65,3
Cyprus	63,2	64,0	64,5
Estonia	62,8	60,9	62,7
Germany	61,8	61,2	61,9
Denmark	59,5	58,9	61,2
Luxembourg	57,6	56,9	59,6
Hungary	55,7	54,6	57,8
Spain	57,8	55,4	57,2
Sweden	61,2	57,4	56,9
Latvia	59,9	61,3	56,7
Austria	55,7	54,2	55,0
EU 27	55,7	54,8	54,9
Czechia	53,4	54,7	53,7
Finland	52,0	51,5	53,2
Greece	50,2	49,9	52,5
France	51,8	52,5	51,8
Lithuania	47,9	48,2	51,5
Ireland	52,4	51,3	51,3
Italy	52,1	50,9	50,8
Slovenia	50,2	47,4	49,5
Poland	44,6	45,2	46,8
Bulgaria	51,2	48,1	46,3
Belgium	46,3	45,6	44,7
Romania	56,8	55,7	42,5
Croatia	39,5	38,5	42,1

GEO/TIME	2019	2020	2021
Slovakia	36,1	34,0	26,9

Table 2. EU, 0-2 education level employment rate, age 20-64¹⁰

The most important points of acceleration of the indicator values are observed in the case of Romania (a negative trend of the indicator is registered, with a significant decrease for 2021 compared to previous values), the Netherlands (increase in 2021 compared to 2020), Hungary (2021 compared to 2020) and Latvia (with a sharp decrease in 2021 from 2020).

Another aspect must be considered. According to a McKinsey study carried out with the Rework America Alliance, it is highlighted that, with the outbreak of the pandemic and its effects in the labour field, the large global companies have restructured the human resources management model, the poorly qualified or less educated workforce being reconsidered as a potential resource. The approach focuses on the value of the skills of this category of employees, before the academic titles they hold [20].

7. Conclusions

A very high European average of the tertiary employment rate is observed, with values starting from 77.7%. Regarding the employment rate of people with educational level 0-2, the recorded values are in 26.9% - 69.3% range.

There is already a trend of reconsideration and reevaluation of the potential of the poorly qualified labour resource, by the biggest global companies.

The EU member states with the highest DESI values are labour force receivers. Romania registers DESI values that are far from the average European values, in a negative sense: 68.80% lower in digital public services, 57.89% lower in integration of digital technologies, 32.39% lower in human capital, only in terms of connectivity approaching the European average (7.85 lower). The implementation process of the European public digitization policies in Romania must be made more efficient.

The EU member states with significant indicators regarding the intensity of employees number in knowledge economy field have also an high DESI indicators, while countries with negative critical indicators regarding the workforce present in science and technology are labour force senders and poorly DESI level.

For more in-depth future results, it should be considered how the speed of the digitization phenomenon and the degree of efficiency of the implementation of government policies related to digitization and research and development (R&D) public or foreign investments (FDI) act on the labour market and on the migratory flows of the labour force.

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