Studying of The Employment of Information and Communication Technologies Specialists in Bulgaria [1]

Bulgaristan'da Bilgi ve İletişim Teknolojileri Uzmanlarının İstihdamının İncelenmesi

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Abstract

This article is intended to study the overall development of ICT employment in the EU and in Bulgaria by level of education, age and gender. Also, the intent is to study the changes in employment under labour agreement and the employed by statistical regions in Bulgaria for the "Creation and dissemination of information and creative products; Telecommunications" economic activity.

This article shows the part of ICT specialists in the total workforce in EU and, also, the percentage of ICT specialists in Bulgaria. A comparison is made of ICT skill level and age-group distribution in EU and in Bulgaria, as well as the share of female specialists.

This article presents data about the "Creation and dissemination of information and creative products; Telecommunications" economic activity in Bulgaria such as employees under labour agreement in the 2008 - 2018 period, and during the first quarter of 2019.

The distribution of the employed persons in the 2010 - 2017 period in this economic activity by statistical regions in the country is presented.

The analysis of employment in the ICT field shows a constant upward trend of employment under labour agreement and an increase of employment by statistical region in Bulgaria.

Keywords: ICT sector; ICT specialists; employment of ICT specialists

Öz

Bu makale, AB ve Bulgaristan'da BİT istihdamının genel gelişimini eğitim seviyesi, yaş ve cinsiyete göre incelemeyi amaçlamaktadır. Ayrıca, iş sözleşmesi kapsamındaki istihdamda ve Bulgaristan'daki istatistiki bölgeler tarafından istihdam edilen "Bilgi ve yaratıcı ürünlerin yaratılması ve dağıtılması; Telekomünikasyon" ekonomik faaliyetin değişimini incelemeyi amaçlamıştır.

Bu makale, BİT uzmanlarının AB'deki toplam işgücü içindeki miktarını ve ayrıca Bulgaristan'daki BİT uzmanlarının yüzdesini göstermektedir. AB ve Bulgaristan'da BİT beceri düzeyi ve yaş grubu dağılımı ile kadın uzmanların payı karşılaştırılmıştır.

Bu makale "Bilgi ve yaratıcı ürünlerin oluşturulması ve yayılması; Telekomünikasyon" un Bulgaristan'daki 2008-2018 döneminde ve 2019'un ilk çeyreğinde iş sözleşmesi altındaki çalışanları gibi ekonomik faaliyetlerini incelemektedir.

2010-2017 döneminde bu ekonomik faaliyette istihdam edilenlerin ülkedeki istatistiki bölgelere göre dağılımı sunulmaktadır.

BİT alanındaki istihdam analizi, iş sözleşmesi kapsamında sürekli bir artış eğilimi ve Bulgaristan'daki istatistik bölgelerinin istihdamının arttığını göstermektedir.

Anahtar Kelimeler: BİT sektörü; BİT uzmanları; BİT uzmanlarının istihdamı

[1]This article is an extended version of the study titled "Employment of Specialists in Economic Activities in The Information and Communication Technologies Sector in Bulgaria" presented orally in the 4. International Entrepreneurship, Employment and Career Congress held in Muğla between 17-20 October 2019

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1. INTRODUCTION

Information and communication technologies (ICT) underlie today's economy, aid in communication and in the exchange of information and data. Almost all economic activities are dependent on the development and use of computer and telecommunication technologies and services. Information and communications technology is being introduced into the activities of all sectors. There is almost no business today without a computer network, specialized software, mobile applications, on-line services, etc. The intensive use of ICT and the new procedures for access to and use of the Internet have created a demand for qualified ICT specialists. The main role of these ICT specialists is in the information and communication technology. They are qualified to develop, operate and maintain ICT systems and, at the same time, they are involved in a broad range of tasks related to corporate ICT systems. Some ICT specialists are adequately qualified to specify, evaluate or perform work related to innovation or scientific research. Almost all sectors of the economy employ ICT specialists (Stefanova, 2017).

The Information and Communication Technology (ICT) Sector is one of the main growing contributors to the increase in Bulgaria's gross added value dynamics. The ICT sector has been showing a positive trend during the recent years and is among the fastest growing sectors in Bulgaria. According to Eurostat, the gross added value of the ICT sector amounts to 1.43 billion Euro and is increasing by 25%. Bulgaria is one of the EU member states with a comparatively higher participation of the ICT sector in the gross added value, ranking 5th in the EU (Ministry of Economy [ME], 2019).

In 2018, the total turnover of ICT developing, supplying and integrating companies in Bulgaria exceeded BGN 5.5 billion (Over BGN 5.5 billion, 2019). The revenue from IT activities alone, including outsourced IT services, exceeded BGN 3 billion, showing an increase of 45% as related to 2017. Software and application development for Bulgarian and foreign customers has generated the highest revenue for yet another year. The ICT service turnover index in 2019 reached 154% relative to the baseline year of 2015, and the turnover in enterprises has risen by 16% relative to the same quarter of the previous year (ME, 2019).

All those facts explain the demand for ICT specialists and the increase in their employment during the recent years.

This article is intended to study the overall development of ICT employment in the EU and in Bulgaria by level of education, age and gender. Also, the intent is to study the changes in employment under labour agreement and the employed by statistical regions in Bulgaria for the "Creation and dissemination of information and creative products; Telecommunications" economic activity.

Statistical data from Eurostat and from the Bulgarian National Statistical Institute (NSI) have been used for this study.

This paper presents data about EU member states (EU-28), about some non-EU member states in Europe, and about some EU candidate countries. The comments present data only about some countries with marginal (highest or lowest) parameters under consideration.

2. RELATIVE SHARE OF ICT SPECIALISTS AS PART OF THE OVERALL EMPLOYMENT IN THE EU

The number of employed ICT specialists in the EU has increased by 41.4% during the 2008 and 2018 period. This substantial increase is higher by a factor of more than 12 than the relative increase (3.4%) in overall employment. Figure 1 shows the index of ICT employees and the overall employment in EU-28 for the 2008-2018 period. The data about ICT specialists extend to persons employed throughout all economic fields.

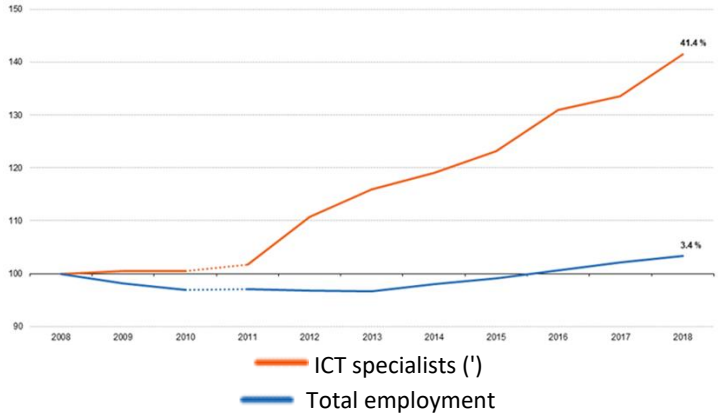

Figure 1: Index of the number of persons employed as ICT specialists and total employment, EU-28, 2008-2018 - (2008 = 100)
Source: Eurostat, 30 July 2019 (*ICT specialists in employment*, 2019)

In 2018 ICT specialists accounted for 3.9% of the overall workforce in EU-28. Figure 2 presents the share of ICT specialists in individual EU countries, in some of non-EU member states in Europe, and also in some EU candidate countries.

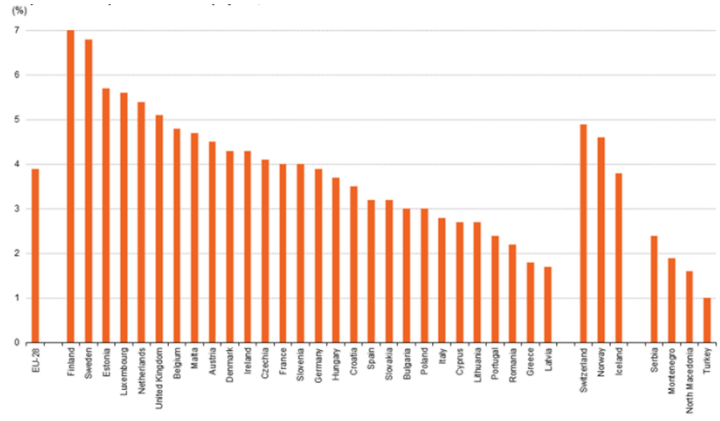

Figure 2: Proportion of ICT specialists in total employment, 2018, (%)
Source: Eurostat, 30 July 2019 (*ICT specialists in employment*, 2019)

Finland and Sweden show the highest relative share of ICT specialists at 7.2% and 6.8%, respectively. High shares of ICT specialists, above 5%, have also been registered in Estonia (5.7%), Luxembourg (5.6%), the Netherlands (5.4%) and the United Kingdom (5.1%). The least share of ICT specialist is that in Greece (1.8%) and in Latvia (1.7%). In Bulgaria, ICT specialists account for 3% of the overall workforce.

3. ICT SPECIALISTS BY LEVEL OF EDUCATION, AGE AND GENDER

Here are present data about ICT specialists in some EU countries by education level, age and gender for the 2008 – 2018 period. A comparison is made of their averages in the EU and in Bulgaria.

The changes in level of education, age, and gender of the ICT specialists were assessed by calculating the difference in percentage of specialists registered in 2008 and in 2018. Only data about some countries with marginal (highest or lowest) parameters are commented.

3.1. ICT specialists by level of education

Table 1 shows the EU and Bulgarian averages for the number of ICT specialists by level of education, and the marginal levels of education in some countries. Table 1 contains only partial EU data and the full table can be seen in (ICT specialists in employment, 2019).

Table 1: ICT specialists in some EU countries by level of education (as a % of the overall employment of specialists in ICT)

	Tertiary education, %			Non- tertiary education, %		
	2008	2018	Change in 2018 relative to 2008	2008	2018	Change in 2018 relative to 2008
EU	54.9	**63.1**	8.2	44.8	36.8	-8
Bulgaria	64.2	**68.7**	4.5	35.8	31.3	-4.5
Cyprus	85.0	**84.7**	-0.3	15.0	15.3	0.3
Ireland	82.9	**83.7**	0.8	15.4	14.6	-0.8
Spain	78.9	**82.4**	3.5	21.1	17.6	-3.5
Lithuania	62.4	**82.0**	19.6	37.6	18.0	-19.6
Italy	28.1	**33.5**	5.4	71.9	66.5	-5.4

Source: Eurostat, 30 July 2019, (*ICT specialists in employment*, 2019)

EU's average for university graduate ICT specialists is above 50%, this share being 63.1% in 2018 and showing a growth rate of 8.2% over the ten-year period The non-university graduate ICT specialists in the EU are 36.8%. The highest percentages of tertiary education ICT specialists in the EU, exceeding 80%, have been registered in Cyprus (84.7%), Ireland (83.7%), Spain (82.4%) and Lithuania (82%). The exception in the EU is Italy with the lowest share of tertiary education level ICT specialists of 33.5%.

In Bulgaria, the predominant share of ICT specialists is held by tertiary education graduates, whose numbers have increased by 4.5% since 2008 and up to 2018, to reach 68.7%. During this period, the non-tertiary education level ICT specialists have decreased by the same percentage (4.5%) down to 31.3% in 2018.

A comparison with a previously researched period, between 2005 and 2014, shows that the higher education ICT specialists in Bulgaria have increased by 9% (Stefanova & Petrov, 2016). The higher trend for employment of higher-education ICT specialists continued in 2014, with more than 70% of highly qualified specialists being employed in the sector (Stefanova, 2017).

3.2. ICT specialists by age group

The distribution by age of ICT specialists was evaluated by two age groups: 15 to 34 years of age and above 35. The upper age limit is, according to the employment data, 74 years.

Table 2 shows the number of ICT specialists by age group - EU and Bulgaria averages, and also for some countries where this indicator has marginal levels. Table 2 contains only partial EU data and the full table can be seen in (ICT specialists in employment, 2019).

Table 2: ICT specialists by age group in some EU countries and in some of EU candidate countries (as a % of the overall employment of specialists in ICT)

	15 - 34 years, %			35 - 74 years, %		
	2008	2018	Change in 2018 relative to 2008	2008	2018	Change in 2018 relative to 2008
EU	43.2	36.4	-6.8	56.8	**63.6**	6.8
Bulgaria	53.6	**52.1**	-1.5	46.4	47.9	1.5
Italy	36.9	23.5	-13.4	63.1	**76.5**	13.4
Sweden	32.9	30.6	-2.3	67.1	**69.4**	2.3
Hungary	49.7	31.6	-18.1	50.3	**68.4**	18.1
Finland	44.5	31.9	-12.6	55.5	**68.1**	12.6
Malta	62.0	**56.9**	-5.1	38.0	43.1	5.1
Estonia	45.6	**54.9**	9.3	54.4	45.1	-9.3
Latvia	65.4	**54.6**	-10.8	34.6	45.4	10.8
Lithuania	45.1	**54.5**	9.4	54.9	45.5	-9.4
Turkey	73.0	**62.2**	-10.8	27.0	37.8	10.8
North Macedonia	51.8	**60.5**	8.7	48.2	39.5	-8.7

Source: Eurostat, 30 July 2019, (*ICT specialists in employment*, 2019)

More than half (56.8%) ICT employees in the EU were older than 35 years in 2008. Then years later this age group is still predominant, having increased by 6.8% to reach 63.6% of the EU ICT employees in 2018.

The highest share of ICT professionals over 35 years in the EU in 2018 is in Italy (76.5%), Sweden (69.4%), Hungary (68.4%) and Finland (68.1%). Malta (56.9%), the Baltic Member States (Estonia, Latvia, Lithuania) and Bulgaria have the highest proportion of young ICT professionals in the EU aged 15-34 years. There are also non-EU member countries employing mostly ICT professionals aged 15-34 – these are Turkey (62.2%) and North Macedonia (60.5%).

In the years since 2008 and up to 2018 in Bulgaria the employees from the younger age group (from 15 to 34 years) prevail, which despite the slight decrease of 1.5%, in 2018 it is 52.1%, and the specialists over 35 are 47.9 %.

The number of employed youths has been increasing in almost all economic activities in Bulgaria during the past two years. One

curious change in 2018, as related to 2008, is that the ICT sector has prevailed over the Government Management as the leading employer of young people in Bulgaria. In 2008 the persons below 35 years of age employed in the government were nearly twice as much as the ICT sector employees. Their numbers became equal in 2017, and in 2018, the ICT sector employed nearly 12 thousand more young specialists (Alexiev, 2019).

3.3. ICT specialists by gender

Table 3 shows the number of ICT specialists distributed by gender - EU and Bulgaria averages, and also for some countries where this indicator has marginal levels. Table 3 contains only partial EU data and the full table can be seen in (ICT specialists in employment, 2019).

Table 3: ICT specialists in some EU countries by gender (as a % of the overall employment of specialists in ICT)

	Men, %			Women, %		
	2008	**2018**	**Change in 2018 relative to 2008**	**2008**	**2018**	**Change in 2018 relative to 2008**
EC	77.8	**83.4**	5.6	22.2	16.6	-5.6
Bulgaria	65.8	71.7	5.9	34.2	**28.3**	-5.9
Hungary	66.0	**91.5**	25.5	34.0	8.5	-25.5
Czech Republic	71.7	**90.1**	18.4	28.3	9.9	-18.4

Source: Eurostat, 30 July 2019, (*ICT specialists in employment*, 2019)

Most of the ICT employees in the EU-28 are men. The number of men employed as ICT specialists has been growing every year in all EU member states. The share of employed male ICT specialists in 2018 was 83.4%, which is higher than the 2008 share by 5.6%. The highest shares of male ICT specialists are those present in Hungary (91.5%) and in the Czech Republic (90.1%).

The number of male ICT specialists in Bulgaria is also higher, having increased by 5.9% between 2008 and 2018 up to 71.7% in 2018. The number of female ICT employees in Bulgaria during the period under consideration has been declining and was 28.3% in 2018. However, this is the highest share among the EU member-states.

The employment profile of women in the ICT sector in Bulgaria has been changing dynamically. More and more women occupy major positions in this sector. The female leadership and the increase in female professional involvement in the digital industry, science, and entrepreneurship are an important factor in today's management in many technological companies.

The successful women in the ICT sector contribute highly for the changes in the operation and evolution of this industry (Tsaneva, 2017).

4. PERSONS EMPLOYED IN BULGARIA UNDER LABOUR AGREEMENTS IN THE INFORMATION AND COMMUNICATION; TELECOMMUNICATIONS SECTOR IN 2008 - 2019

In Bulgaria, the economic activity of "Creation and dissemination of information and creative products; Telecommunications" includes telecommunications and information technologies and services, among others. According to the Classification of Economic Activities in Bulgaria (CEA-2008), this activity there are 6 ICT sector related sub-activities. These are: Telecommunications; Computer Programming, Consultancy and Related Activities; Information Service Activities; Programming and Broadcasting Activities; Motion Picture, Video and Television Programme Production Activities; and Publishing Activities.

Table 4 shows the number of persons employed under labour agreements in the "Creation and dissemination of information and creative products; Telecommunications" sector in Bulgaria between 2008 and 2019.

Table 4: Persons employed under labour agreements in the "Creation and dissemination of information and creative products; Telecommunications" sector in the 2008 - 2018 period* and for the first quarter of 2019**

(Listed numbers as at the end of the relevant year's last quarter, and for the first quarter of 2019)

Year	**Total for Creation and dissemination of information and creative products; Telecommunications economic activity**	Telecommunications	Computer Programming, Consultancy and Related Activities	Information Service Activities	Programming and Broadcasting Activities	Motion Picture, Video and Television Programme Production Activities	Publishing Activities
2008	**54201**	18526	18884	3766	4535	1515	6975
2009	**58003**	20170	21212	4558	3624	2191	6248
2010	**63419**	20853	25284	5090	3677	2290	6225
2011	**63856**	21531	25952	5160	3245	2034	5934
2012	**66246**	21543	27406	5858	3168	2319	5952
2013	**69268**	20700	31377	6292	2999	2154	5746
2014	**73583**	20743	34738	7557	2991	2167	5387
2015	**79488**	20693	39950	8505	2982	2404	4954
2016	**86113**	21114	45361	9859	2550	2453	4776
2017	**82016**	20185	41534	10549	2430	2212	5106
2018	**86465**	18924	47163	11243	2365	1955	4815
2019	**90343**	19423	50298	11121	2656	2027	4818

Source: NSI: *Preliminary data (3 June 2019), (*Employees under labour contract*, 2019)

**Preliminary data for the first quarter of 2019, 3 June 2019, NSI

The change in persons employed under labour agreements in this economic activity was assessed by calculating the difference in number of employees registered by the end of 2018 and 2008. Table 5 presents the changes in numbers (and percent) of persons employed under labour contracts in 2018 relative to 2008 in the economic activity "Creation and dissemination of information and creative products; Telecommunications".

In total during the 2008-2018 period, the number of persons employed under labour agreement in the "Creation and dissemination of information and creative products; Telecommunications" economic activity has increased by 59.53%.

The highest increase in employees in this economic activity is that in "Information Services" where the ICT employees have increased by 198.54% between 2008 and 2018. A substantial increase in employment is noted also in "Computer Programming,

Consultancy and Related Activities" - 149.75%. Employee growth during this period is also noted in the "Motion Picture, Video and Television Production Activities" at 29.04%, with a slight increase of 2.15% in the "Telecommunications" field.

Table 5: Changes in employed persons under labour agreements in 2018 relative to 2008 for the economic activity of "Creation and dissemination of information and creative products; Telecommunications"

Creation and dissemination of information and creative products; Telecommunications	2008	2018	Change in 2018 relative to 2008, Quantity	Change in 2018 relative to 2008, percentage
Total for this economic activity	**54201**	**86465**	**32264**	**59.53**
Telecommunications	18526	18924	398	2.15
Computer Programming, Consultancy and Related Activities	18884	47163	28279	149.75
Information Service Activities	3766	11243	7477	198.54
Programming and Broadcasting Activities	4535	2365	-2170	-47.85
Motion Picture, Video and Television Programme Production Activities	1515	1955	440	29.04
Publishing Activities	6975	4815	-2160	-30.97

The substantial increase in the shares of "Information Services" and 'Computer Programming, Consultancy and Related Activities' and the increasing numbers of their employees during the recent years is due to the fact that most companies involved in these activities work for the foreign markets which are far larger than the local markets. Unlike the sub-activities mentioned in Table 4 above, telecommunication services are aimed at the domestic market which is disparately smaller, despite the constant increase in revenue and demand (Popov, 2017).

Large dips in employment in this economic activity are noted alongside the high increase during this period. The percentage drop in employment is the highest in the "Programming and Broadcasting Activities" at 47.85% and "Publishing Activities" at 30.97%.

In total, the upward trend in employment in this economic activity has been on the increase also in 2019, with the overall growth for the first quarter of 2019 relative to 2018 being 4.5%.

5. EMPLOYED BY STATISTICAL REGION IN BULGARIA IN THE INFORMATION AND COMMUNICATION TELECOMMUNICATIONS SECTOR IN 2010 - 2017

Table 6 shows data about the main economic parameters for the "Creation and dissemination of information and creative products; Telecommunications" sector of employees by statistical regions between 2010 and 2017. The last two rows in this table present the numerical (and percent) changes in employment in this activity 2017 relative to 2010.

Table 6: Persons employed by statistical region in "Creation and dissemination of information and creative products; Telecommunications" sector in the 2010 - 2017 period *

Employees	Total	Statistical Regions					
		North-West	North central	North-East	South-East	South-West	South-Central
2010 r.	67 735	1 253	2 187	3 195	2 591	55 039	3 470
2011 r.	69 920	1 184	2 175	3 199	2 605	57 084	3 673
2012 r.	73 564	1 214	2 127	3 389	2 482	60 410	3 942
2013 r.	77 337	1 233	2 293	3 906	2 509	63 147	4 249
2014 r.	79 414	1 278	2 327	4 211	2 619	64 421	4 558
2015 r.	86 207	1 384	2 486	4 510	2 671	69 869	5 287
2016 r.	94 756	1 346	2 617	4 757	2 926	77 270	5 840
2017 r.	100 950	1 399	3 011	5 010	2 873	82 554	6 103
Change in 2017 relative to 2010, Quantity	33 215	146	824	1815	282	27515	2633
Change in 2017 relative to 2010, percentage	49.04	11.65	37.68	56.80	10.88	49.99	75.88

* The annual data, shown by statistical region, were calculated using local units and following the methodology of structural business statistics.
Source: NSI: Preliminary data (30 November 2018), (*Number of persons employed by economic activity*, 2018)

The persons employed in the "Creation and dissemination of information and creative products; Telecommunications" sector are irregularly distributed among Bulgaria's statistical regions. The highest number of employees in 2017, which is 81.77%, was present in the South-western region. The South-West Region covers South-Western Bulgaria and part of Northern Bulgaria (Stefanova, 2017). This region comprises five administrative districts: Blagoevgrad, Kyustendil, Pernik, Sofia area and Sofia District (Capital City). This is the region of Bulgaria's capital city. The economic activities in the Sofia Municipality concentrate around ICT, business services, and tourism. The financial services, development, and research are activities with the highest profit-margin potential (The IT sector, business services and tourism, 2019). The IT business is concentrated in Sofia, having increased 8 times over the 2010-2015 period, with highly qualified and internationally competitive workforce (for outsourcing destinations). There are 3,500 IT companies in the Sofia Municipality, accounting for 10% of all effectively working companies. There had been 47,849 employees in the "Creation and dissemination of information and creative products; Telecommunications" economic activity in the non-financial enterprises in Sofia in 2008, while in 2017 their number is 84,324, which is a 76.2% increase (Economic and Investment Profile of Sofia, 2018)

The next highest numbers of employees in the remaining regions of Bulgaria are present in the South Central region (6.05%) and in the North-East region (4.96%).

The South-Central region occupies Bulgaria's central part. This region includes the Kardjali, Pazardjik, Plovdiv, Smolyan, and Haskovo districts. This district's smart specialisation capacity is focused in several activities, leading among whom are the thematic fields of "Information Science and Information and Communication Technology" (Stefanova, 2017).

The North-East region occupies Bulgaria's north-eastern part. It includes the following administrative areas: Varna, Dobrich, Targovishte, and Shumen. There is a diverse scientific potential for innovation present in this region, with a focus on information technologies.

These regions are followed by the North-Central and the South-East regions with almost 3% of the overall number of employees.

The North-central region comprises the central part of Northern Bulgaria. It includes 5 administrative areas: Veliko Tarnovo, Gabrovo, Razgrad, Targovishte, and Yambol. The "Information and ICT" theme is a focus for specialists in the Veliko Tarnovo, Gabrovo, and Russe districts.

The South-East region occupies Bulgaria's south-eastern part. It includes 4 administrative areas: Burgas, Sliven, Stara Zagora, and Yambol. Information Technologies, Eco and Energy Saving Technologies, as well as Economic Analyses and Evaluations are priority employment areas in the Burgas district. The Information and Computer Technology sector in the Sliven district has been developed in aid of machine building sector.

The lowest number of employees, 1.38%, in this economic activity is present in the North-West region of Bulgaria.

The North-West region occupies Bulgaria's north-western part. This region includes the administrative districts of Vidin, Vratsa, Lovetch, Montana, and Pleven.

The last two rows of Table 6 present the changes in numbers (and percent) of employees in 2017 relative to 2010 in the economic activity "Creation and dissemination of information and creative products; Telecommunications".

A growth in employment in this economic activity is noted for 2010-2017 in all of Bulgaria's statistical regions, with the overall rate being 49.04%. The highest increase during this period was present in the South Central region (75.88%). A substantial increase in ICT employees is observed also in the North-East region (56.80%), in the South-West region (almost 50%), and in the North-Central region (37.68%). The growth in the North-West and the South-East regions exhibit almost equal growth rates at 11.65% and 10.88%, respectively.

According to a study of the number of jobs in the ICT industry in Bulgaria between 2014 and 2016 by the independent agency of CBN Pannoff, Stoytcheff & Co, there are ICT business in 197 urban areas in Bulgaria (CBN: The growth of jobs in the ICT sector, 2017). A substantial difference between Sofia and the remaining towns and whole districts was shown by the study. The ICT companies with main offices in Sofia provide 14 jobs more than the district next in the numbers of jobs and 500 times more than the areas with the least ICT jobs. In the period between 2014 and 2016, the new jobs in the ICT business in the Plovidv district (South-central region) increased almost twice as fast than those in the Varna district (North-eastern region). The local ICT business in both areas provides more than 5,000 jobs each. The least number of ICT jobs exists in the Vidin area (North-eastern region).

According to the annual study "ICT industry in Bulgaria 2019 - annual observer by CBN Pannoff, Stoytcheff", based on an analysis of the results from more than 15 thousand ICT companies in 432 urban areas in Bulgaria, the annual increase in revenue for the ICT industry in Bulgaria has exceeded BGN 1.3 bln., and the jobs have increased by more than 5 thousand (ICT sector revenue, 2019). Beside the increase in new jobs in the Plovdiv (South-central region) and Varna (North-eastern region) districts, which are almost equal, ICT jobs have incresed even in the less developed areas of Bulgaria, such as Vidin and Vratsa in the North-western region, and in areas where the industry is less present such as in the Kardjali and Smolyan areas in the South-central region.

6. CONCLUSION

Employment in the EU in the ICT sector has, during the recent years, been growing as yet another confirmation of the increasing importance of ICT for the global economy. Information and communication technologies have definitively emerged as the most intensively and successfully evolving sector, both in throughput rates and in labour conditions. The ICT sector has become increasingly important for Bulgaria's economy in general.

The study of ICT employment has produced the relative share of ICT specialists in the total workforce in the EU and in Bulgaria, the qualification and age distribution of ICT specialists in Bulgaria and, also, the share of women among them.

The share of ICT specialists in 2018 in Bulgaria's total workforce was 0.9% lower than the EU average. During that same year, the ICT university graduates were by 5.6% more than the EU average. In 2018, most of Bulgaria's ICT specialists were between 15 and 34 years of age, or 15.7% more than the EU average for the same age group. The share of female ICT specialists in Bulgaria in 2018 was the highest in the EU, with 11.7% more than the EU average.

In 2018, the ICT industry in Bulgaria has reached impressive levels both as operating revenue and number of jobs, and as pay rates. The study shows that increase in employees under labour contracts in the 'Creation and dissemination of information and creative products; Telecommunications' during the 2008 - 2018 period is nearly 60%. The ICT specialists employed in the "Information Services" sector during this period has increased by a factor of almost 3, while the increase in employment in the "Computer Programming, Consultancy and Related Activities" is almost 2.5.

The substantial increase in ICT jobs is a very clear answer to the question about the orientation of young people in Bulgaria. The ICT sector is the only sector with more than 50% of employees below 35 years of age. Two visible reasons for the prevalence of young specialists are the growing popularity of IT positions among

school students and undergraduates, and the education alternatives for employees. Different schools and centres for education in IT skills have appeared during the recent years. The shortages of specialists given the rapid growth has forced the companies to offer increasingly jobs to undergraduates and to commit to provide them with on-the-job training.

All good ICT industry results in Bulgaria are due to the high skill levels of the specialists employed in the ICT sector. More than 2/3 of the ICT specialists employed in various sectors of the economy are higher-education graduates. Almost all graduates in subjects within the ICT sphere find relevant employment with incomes far above the average. Generally, unemployment among young people with ICT skills is exceedingly low, at around 2%.

With regard to the distribution by gender, around 2/3 of the employees are male and 1/3 are female, with the share of women employed in Bulgaria's ICT sector being the highest in the European Union.

Also, this study showed the regional distribution of those employed in the "Creation and dissemination of information and creative products; Telecommunications" sector in Bulgaria. The overall increase in employment in this economic activity during the 2010-2017 period in all Bulgarian statistical regions was nearly 50%. This is, also, the growth rate of employees in the South-West region, where more than 80% of the country's ICT employees are concentrated.

Unlike most other industries scattered throughout the country, the broad ICT sector is highly concentrated in Sofia. The three mobile operators and most companies involved in software and network maintenance are registered in Sofia. Sofia is Bulgaria's undoubted ICT centre. A substantial growth in employment is present, with the total number of employees in the ICT sector having increased by more than 50% between 2011 and 2015. One in every 20 employees in Sofia is in a profession related to information technology.

Given the optimistic data about ICT employment in Sofia and in the South-western region, it should be noted that the negative demographic development of a significant number of Bulgarian municipalities impacts seriously their abilities to increase the number of employees in their territories. This impact may be mitigated or worsened by the state of the local economy. One other potential positive effect for higher ICT employment in some areas is the human capital. It is an indisputable fact that the areas with universities in Bulgaria provide substantially higher numbers of ICT related jobs.

The analysis of employment in the ICT field shows a constant upward trend of employment under labour agreement and an increase of employment by statistical region in Bulgaria. IT related initiatives are encouraged in Bulgaria, with efforts being made to shape an image of a country with competitive advantages in the future technological world.

ICT is a systematically relevant industry with ever increasing importance as a stand-alone sector and as a key factor in the development and growth of other sectors. The information and communication technologies have given rise to significant changes in the methods of production and in the models of employment. ICT specialists influence the development, introduction and servicing of ICT in Bulgaria's individual economic sectors. This is why monitoring the development of employment of ICT specialists in individual countries and in the EU is highly significant.

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