



FUTURE OF IT REPORT

The ultimate guide for IT buyers,
investors and experts

2023

INSIDE

IT Competitiveness Index

Data-rich country profiles

Insights from experts

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investors and experts**

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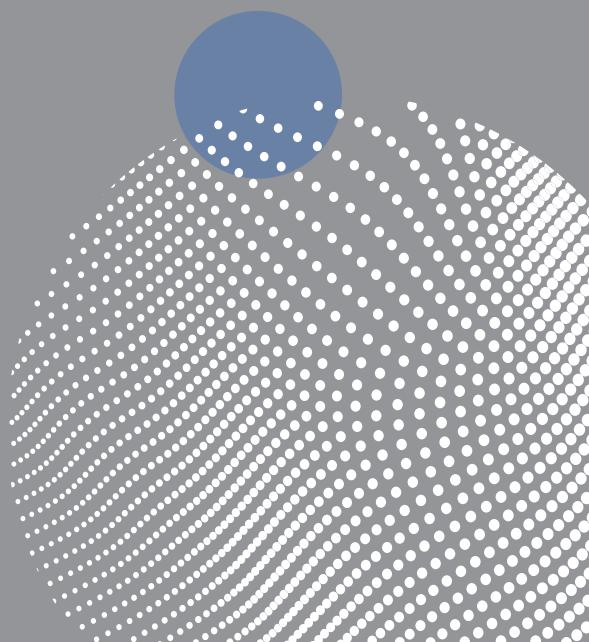
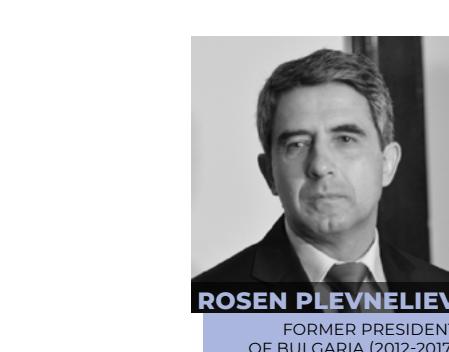




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ROSEN PLEVNELIEV
FORMER PRESIDENT
OF BULGARIA (2012-2017)

Before the Covid-19 pandemic, there was already a lot of discussion regarding the implications of technology for the future of our lives and our work. However, the future arrived far sooner than anticipated, and many of us changed our routines dramatically. Remote virtual meetings are now commonplace and economic activity has increased on a range of digital platforms. We are all now using digital services across an ever-increasing range of domains: finance, health, commerce, to name just a few. None of this would have been possible without the technological advancements and the unprecedented economic growth that we have observed over the

A WORD FROM

Chairman of the Tech Emerging Europe Advocates Advisory Board and Former President of Bulgaria (2012-17)

last few decades, especially in the emerging Europe region.

When most emerging Europe countries were starting their transition from a centrally planned to a market economy, I was graduating from the Technical University of Sofia with a diploma in computer science, specialising in artificial intelligence. I had earlier received an award in a national computer programming competition. But it never occurred to me that my home country of Bulgaria, and the entire region, for decades stuck behind the Iron Curtain, would successfully compete with free-market economies and would deliver highly advanced technology used across the globe and come up with technological solutions to fight a global pandemic.

After serving as a head of state and talking to many world leaders, both political and business, it was obvious to me that the world was moving into a new phase of development and

that the world is becoming a different place. That there is a shift from a global to a regional approach — there is no way to be globally strong unless you are locally strong too.

One result of these global geopolitical changes is that large German companies are bringing at least part of their huge operations back from China to Europe. The same goes for American companies. They are once again looking to be close to their potential customers. This offers an enormous opportunity for emerging Europe.

But for that to be successful, we need to see greater collaboration between our countries and a joint value proposition showing the region's potential. This is why it is essential to show emerging Europe's potential in technology.

The Future of IT in Emerging Europe, co-branded by Tech Emerging Europe Advocates, which is part of the Global Tech Advocates network, is an important step towards doing just that.



ANDREW WROBEL
LEAD, TEEA

Over the last three decades, the emerging Europe region has grown tremendously with a number of countries transitioning from poverty to wealth.

According to the International Monetary Fund, there are 39 (out of 195) economies globally that have been labelled 'advanced'.

Since World War II, fewer than 20 countries have joined this club of countries with a high level of per capita income, a varied export base, and a financial sector that is integrated into the global financial system. Among them are Greece and Portugal, followed by East Asian countries such as South Korea and Taiwan.

A WORD FROM

Emerging Europe's Founding Partner

The last decade has seen the group joined by small nations such as Puerto Rico and San Marino and several from Central and Eastern Europe: Czechia, Slovakia, Lithuania, Latvia, Estonia, and Slovenia. All of these economies share a per capita income above 17,000 US dollars and Hungary, Poland, and Romania are close to meeting that threshold. The secret to development is consistently strong growth.

That growth is now being strengthened by digital transformation, entrepreneurship and innovation. This is no longer a region that robotically carries out repetitive processes at low cost. These processes are now being redesigned in the region.

Large parts of the region can no longer be considered 'low cost' and the region's business partners — both foreign investors and importers

— understand that cost is no longer the primary motive behind their decision to expand or relocate to, or buy from, the region and that access to a wealth of talent is now far more important. As is the high quality of products and services.

In this picture, the IT sector has a special place.

The Future of IT is the third edition of Emerging Europe's deep dive into the IT industry in the entire region using the same methodology to understand how each and every country contributes to the size of the regional market.

The IT Competitiveness Index, divided into four areas — talent, IT infrastructure, economic impact and business environment — shows areas where individual countries can become even more competitive.

A WORD FROM the Tech Emerging Europe Advocates ADVISORY BOARD



RUSS SHAW CBE

FOUNDER, TECH LONDON ADVOCATES & GLOBAL TECH ADVOCATES



MAREK DIETL

CEO, WARSAW STOCK EXCHANGE



OLGA GRYGIER-SIDDONS

A BUSINESS ADVISOR AND MENTOR, FORMER CEO OF PWC CEE



BRUNO BALVANERA

FORMER MANAGING DIRECTOR FOR CENTRAL ASIA AT THE EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT

The emerging Europe region is a very important part of the world for the global technology sector. The area has the talent, the innovation and the entrepreneurs to become a critical IT partner for the UK and other tech hubs right across the globe. In a time where the digital economy is driving growth and employment for countries at a rapidly increasing rate, the ambition to scale of the tech community in emerging Europe is very encouraging. I would advise tech leaders in more established hubs to truly start taking note as the ecosystem there could well represent a

Growing technology companies can be called Covid-winners since 2020. As they develop rapidly, they need external investment which in the current market environment is readily available from the investment community, via the stock exchange. We have seen spectacular growth in sectors such as IT, video gaming and biotechnology. During the pandemic, the performance of Warsaw Stock Exchange (GPW) indices and stock sub-indices reflected this growing interest from both retail and institutional investors. For example, WIG.

Talent, then talent, and again talent. Our countries are not making public the fact that there is so much talent in our countries. We are missing a trick. Investors only know about this wealth of talent from anecdotes, from companies which have already invested in the region. Central and Eastern Europe should stick together. We have something to offer on the global stage.

Covid has significantly accelerated the inevitable digitalisation of all aspects of our lives: familial, social, political, health, trade, financial, cultural, academic. An infinite number of new platforms have been developed and are under constant development all around the world. No country is excluded from this process and all countries have a relatively similar competitive advantage.

key location for IT and other exciting tech verticals in the years to come. At Global Tech Advocates our mission is to connect and forge vibrant networks between tech communities internationally. Creating greater cooperation and trade in global tech is essential for supporting early-stage markets and sharing in the considerable opportunities that innovation offers for society and the economy. This report will serve a vital role in mapping many of these opportunities across the region and signposting what tech in the region has to offer today and moving forwards.

GAMES, which can be seen as a proxy for the 'appetite for investment' in the video gaming sector, increased by almost 54 per cent year-on-year. I believe that the exchanges are innovative thanks to technology implementations. GPW Group's technological development initiatives are a key priority of both mine and our strategy. This ambition is attributed to GPW Tech, our technology subsidiary, which is responsible for the in-house development and subsequent commercialisation of IT products and solutions for the financial sector.

And not only that. According to Eurostat, eight out of 10 ICT specialists across the European Union are men. The proportion of female ICT specialists is significantly higher in emerging Europe. In Bulgaria, over 30 per cent of ICT specialists are women, in Romania, over 26 per cent, followed by Latvia and Lithuania.

We need to identify all ways possible to boast about that internationally.

Winners will be the fastest, most versatile and most creative. With the high levels of internet penetration, the opportunities have no boundaries and countries in Eastern Europe, the Caucasus and Central Asia are well placed to be key players of the world transformation on the back of its young, well-educated and thirsty population!



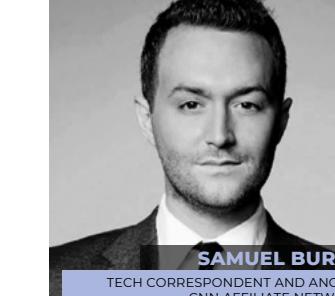
VICTORIA MASSÓ

DIGITAL INNOVATION ECOSYSTEMS EXPERT FOR THE INTERNATIONAL TELECOMMUNICATIONS UNION, HEAD OF TRAINING AND STRATEGY, SCALE&CONNECT



MARTA ARSOVSKÁ TOMOVSKA

DIGITAL INNOVATION EXPERT, ADVISOR TO THE SERBIAN PRIME MINISTER



SAMUEL BURKE

TECH CORRESPONDENT AND ANCHOR, CNN AFFILIATE NETWORKS



URANIQ BEGU

EXECUTIVE DIRECTOR, INNOVATION CENTRE KOSOVO

In a digitalised world, ruled by volatility, uncertainty, complexity, and ambiguity (VUCA), where borders disappear and technological changes are advancing faster than policies, there is a need to have new approaches to navigate this complex landscape.

The history and education of the emerging Europe region, similar to mine in Latin America, has brought up relentless problem solvers that are resilient, adaptable and tech-savvy.

The biggest strength of the emerging Europe region, especially of the Balkan countries — lies in their geopolitical context. Historically, geopolitical turbulence turned people here into the best problem solvers, and the best innovators, as they live in constant 'survival mode'. Additionally, by bridging East and West, countries in the region need to maintain good relations with both. Finally, this part of the world is famous for good math and technical education, which produces solid engineering potential.

In my decade covering technology with CNN, I've seen many countries and regions attempt to become 'the next Silicon Valley'. Start-ups across emerging Europe are proving they have more than just the desire — they're already making it a reality.

The region's deep history of advanced engineering, market access as well as advanced language skills have made them key players in the tech ecosystems.

Fast technological developments are making it very difficult for the existing formal educational system to address market needs in terms of talent. Countries and companies in the emerging Europe region are seeing this as a great opportunity to seize markets and grow companies, while nurturing local talent and providing amazing opportunities for their youth and their respective economies. Most, if not all, of the countries in the region have increased both public

We must bet on these future innovators and have systems globally to support their growth, as they have the skills to solve critical societal issues and excel in today's world.

Why is this important? Take the example of Serbia. The crisis only helped Serbia unlock its full potential. The foundation was set by the dedicated leadership in the past few years, but in 2020, the most difficult year for the world - the country managed to have the highest GDP growth in Europe. Three reasons – agility and excellent problem-solving skills, great relations with both East and West, and finally, excellent tech skills. I have the feeling that emerging Europe is not going to waste this crisis but position itself as the fresh frontrunner.

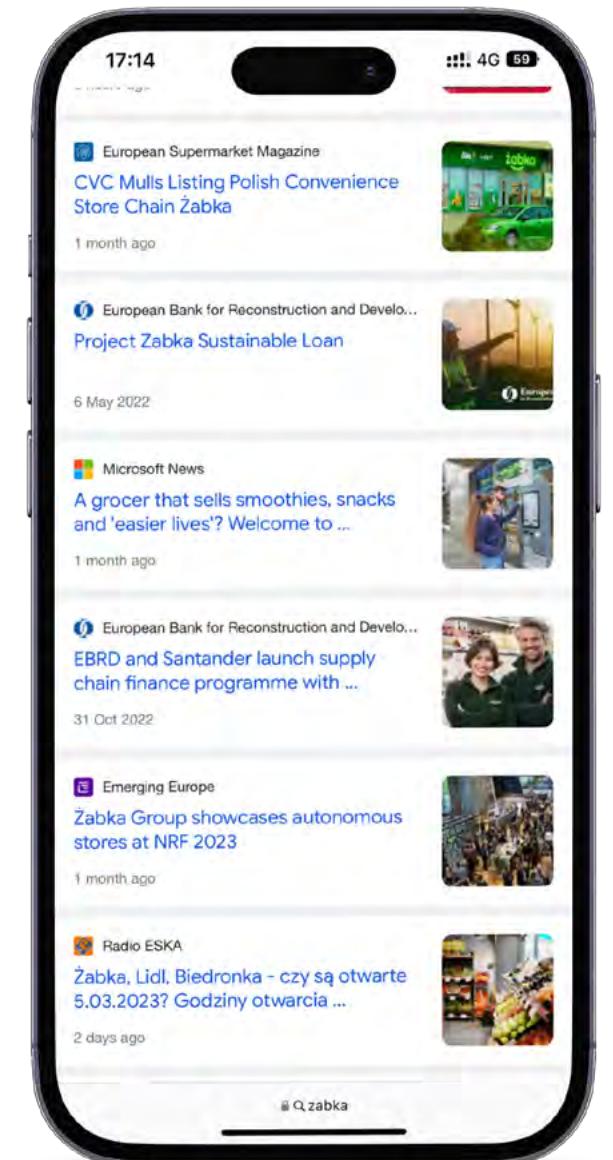
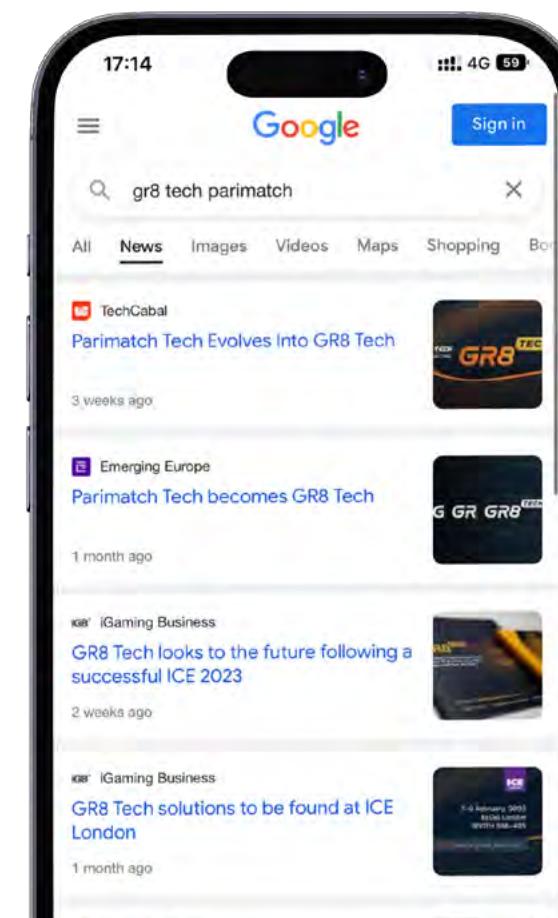
Now, emerging Europe faces an enviable challenge of how it will leverage the partnerships and investments flowing into the region to bolster its flourishing tech sector.

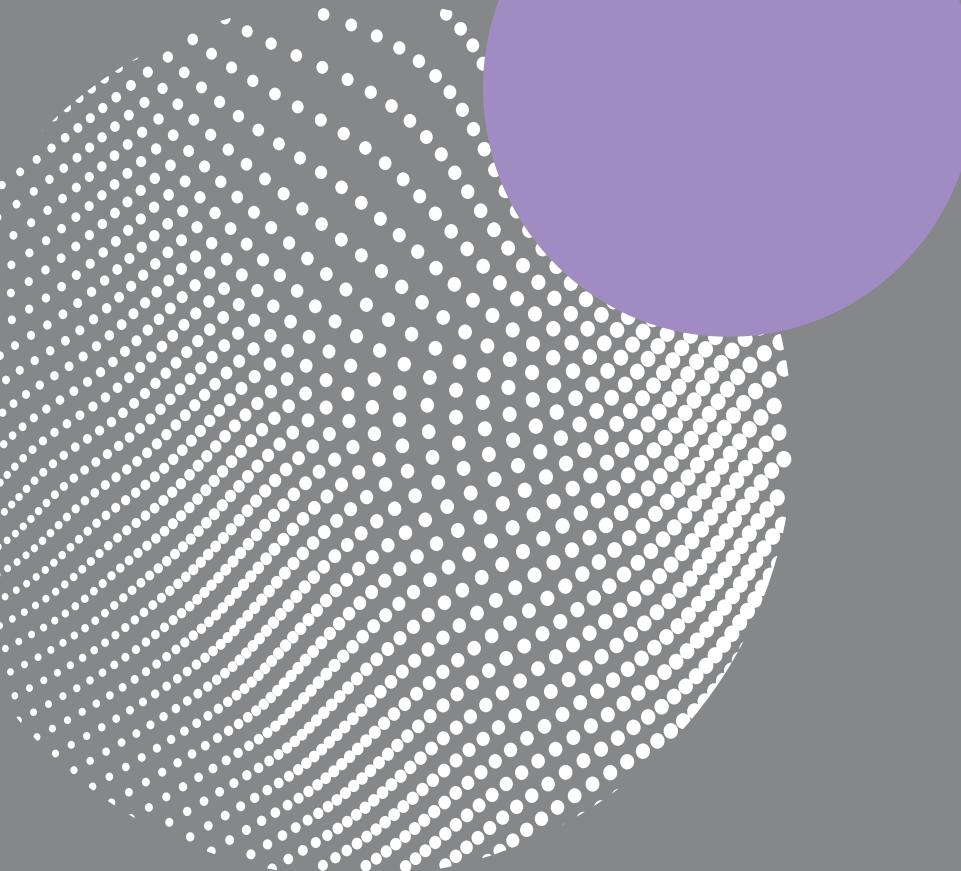
and private funding for training young people for the new world of work. Nevertheless, despite the increasing number of IT professionals in the region, more could be done in order to facilitate not just tech talent, but also nurture entrepreneurship and grow tech companies that in return would create more jobs and opportunities. Entrepreneurs and talent are the solutions for the future.

Global Visibility Programme

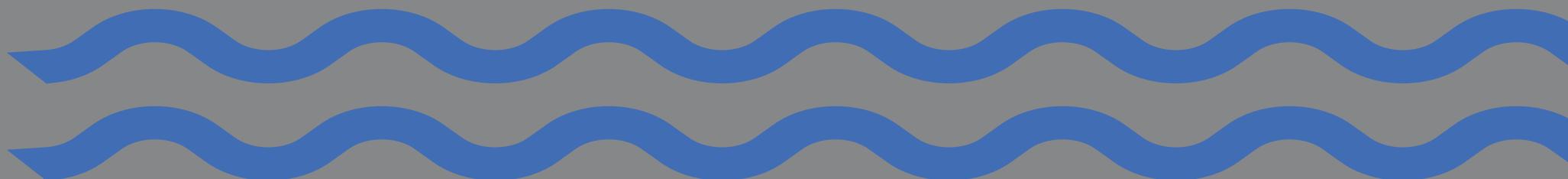
Unlimited news stories about your company, plus thought leadership editorials authored by your experts, published on Emerging Europe.

- Boost awareness about your organisation
- Strengthen your SEO and digital presence
- Build the thought leadership of your experts





REGIONAL ANALYSIS



BUILDING ON THE OPPORTUNITIES THAT THE COVID-19 PANDEMIC AND THE WAR IN UKRAINE HAVE PRESENTED

The global pandemic might be at a transition point, but Covid-19 remains a global health emergency. In the meantime, one day after the previous edition of the Future of IT in emerging Europe was launched, Russia launched a full-scale invasion of Ukraine and added to global volatility, uncertainty, complexity and ambiguity.

With a recession looming, sourcing has become instrumental to the survival of businesses in the developing economic crisis. The outsourcing industry tends to boom when there is any uncertainty or when there's a recession.

"Globally, the industry has grown by leaps and bounds over the past 30 years, reaching 300 billion US dollars," says Rohitashwa Aggarwal, partner at Everest Group. And despite the

"series of unprecedented events and escalations [...] the sheer robustness that the industry has shown reignites the confidence in this model."

After the Covid-19 pandemic alone the industry bounced back at a much higher rate, almost at 10-15 per cent.

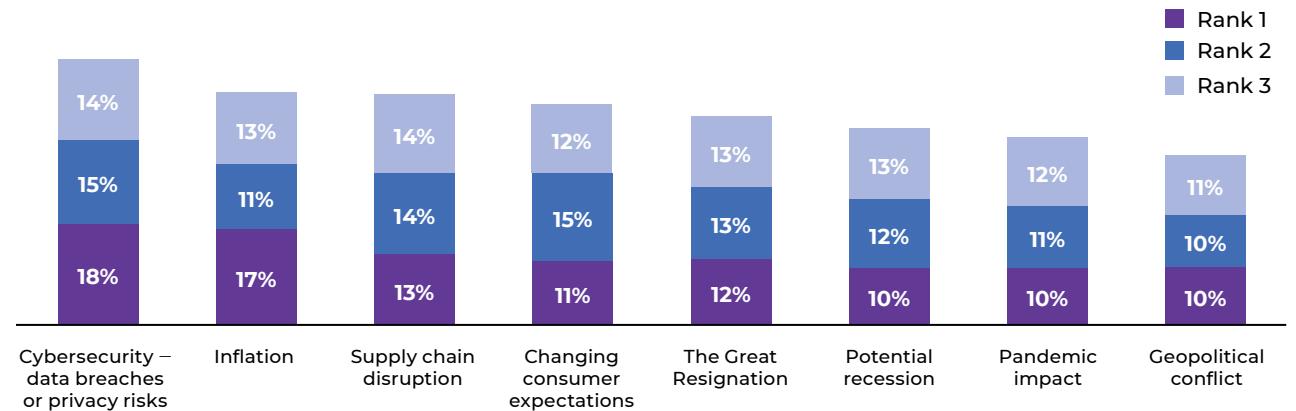
"And even in 2023, with all the macroeconomic challenges, the series of layoffs that we are seeing, there is huge demand for talent, technology, need to outsource more from a customer experience standpoint, from operations. The growth projection looks small compared to the last few years but if compared to the last decade, it stays on point," Aggarwal adds.

In Deloitte's 2022 Global Shared Services and Outsourcing Survey,

organisations reported that competition for talent has reached unprecedented intensity. Executives see talent acquisition as the top internal challenge, despite more than half reporting an increase in their staff over the previous year to support the demand for growth. Meanwhile, 62 per cent of executives say they are ill-prepared to address the causes and impacts of poor employee retention.

In a recent survey carried out by HFS, cybersecurity, inflation and supply chain disruption were picked as the most concerning macroeconomic challenges faced by businesses. Interestingly, the Covid pandemic and the war in Ukraine were the least concerning out of the eight defined.

The macroeconomic factors adversely impacting an organisation's goal



Source HFS Research, March 2023

WAR IN UKRAINE

Soon after Russia's massive invasion of Ukraine there were voices saying that the Ukrainian IT sector "would be dead" soon and that this situation would impact the emerging Europe region.

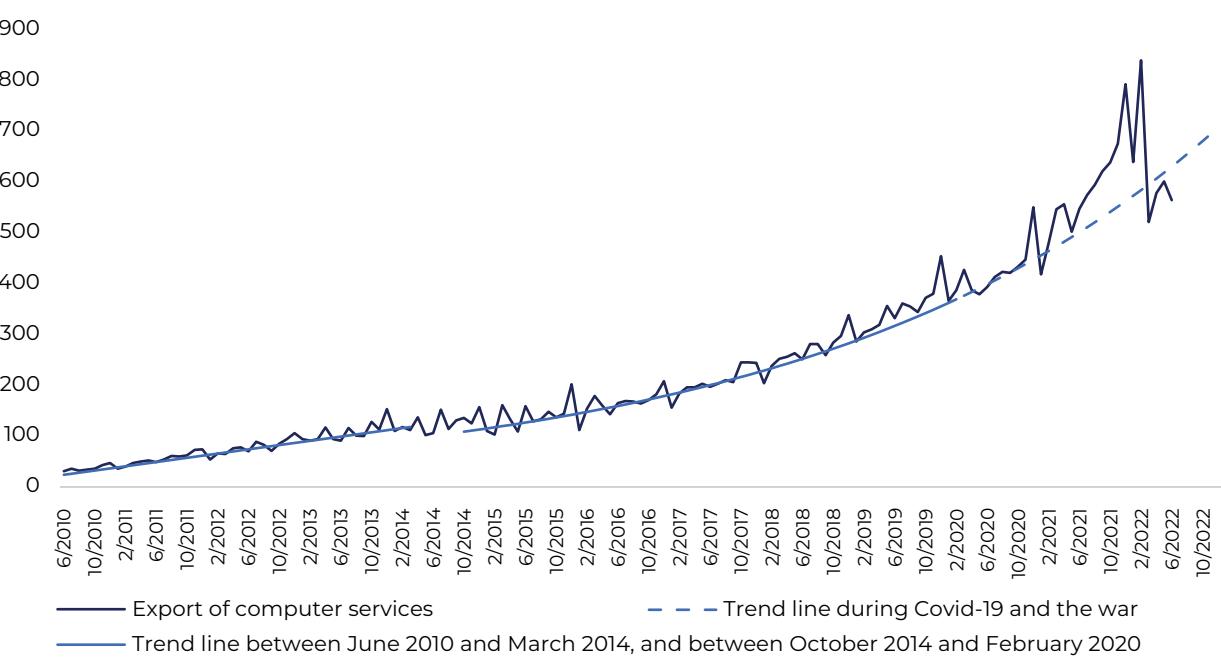
The sector in the country was too mature for that.

In 2010, Ukraine's information and communication sector contributed by only 3.1 per cent of GDP and accounted for just 1.1 per cent of exports of goods and services. Computer services made up just 0.6 per cent of exports.

The evolution was not easy – the whole Ukrainian economy experienced significant turbulence during the first Russian invasion of 2014, Covid-19 lockdown periods and, of course, the invasion and subsequent war that began in February 2022. The war slowed down the development of the sector for a couple of months, but the pattern of exponential growth, developed between 2014 and 2020, has not been broken yet.



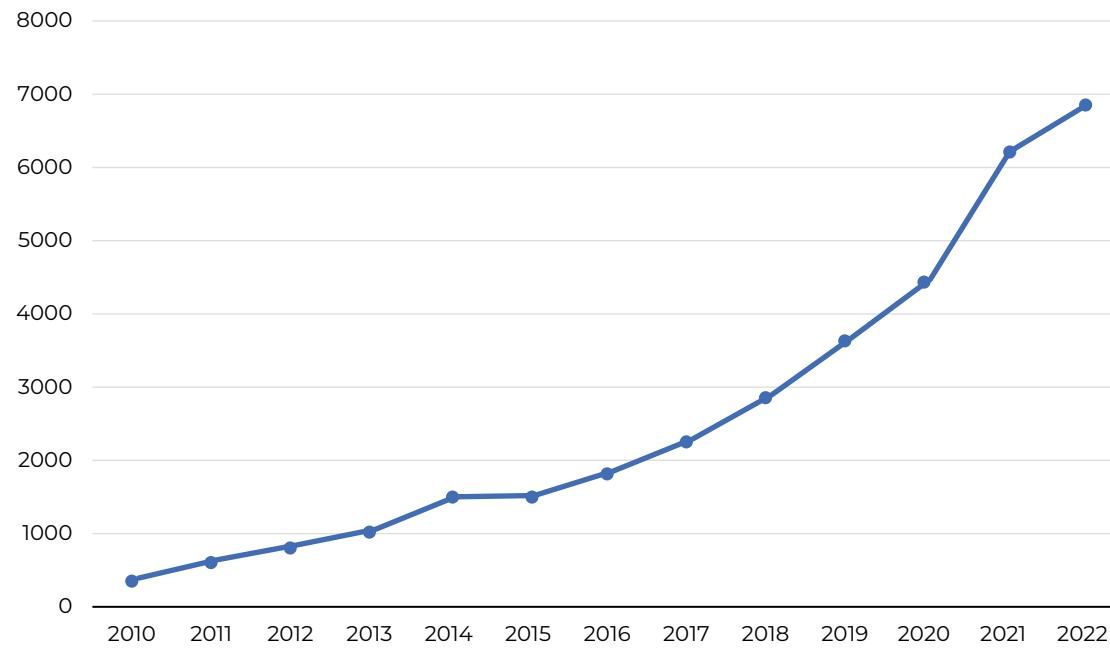
Export of computer services from Ukraine between June 2010 and December 2022



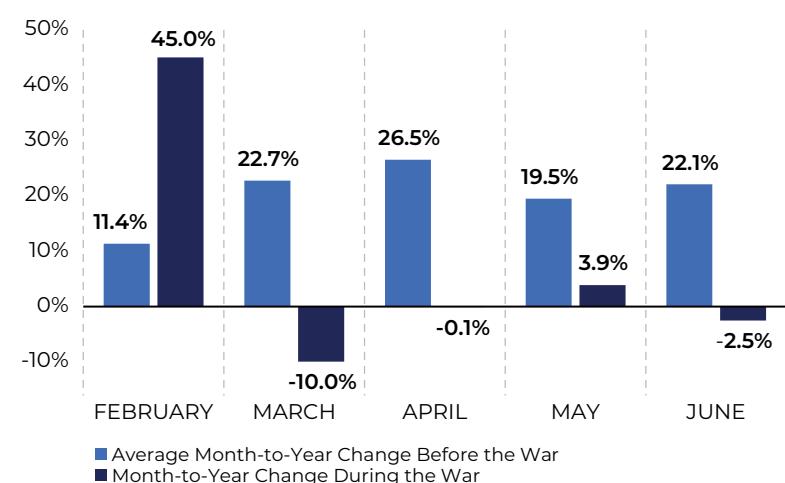
Despite the unfavourable conditions caused by Russia's invasion and its brutal war, the Ukrainian IT sector showed incredible growth in February 2022 – the single-month export figure amounted to 839 million US dollars, 31 per cent higher than January 2022, 45 per cent higher than the monthly average for 2021 and 75 per cent higher compared to February 2021. However, March – perhaps unsurprisingly given the circumstances – turned out to be less successful – an increase in February was followed by a month-on-month drop. A rebound in April and May followed the downturn and showed signs of stabilisation on the market.

Looking back at the whole of 2022, the value of exports of telecommunication, computer and information services as reported by the National Bank of Ukraine exceeded 6.8 billion US dollars and was more than 10 per cent higher than in 2021.

Export of ICT in Ukraine between 2010 and 2022



IT exports in Ukraine — monthly changes



With just a few exceptions, emerging Europe remains a strong delivery location and the war launched by Russia has in fact made the sector stronger. Not only has it drawn even more attention to the region but it has also grown the awareness of global buyers and investors of its capabilities. Only Serbia, which until recently was seen as Russia's strong ally, can be less favoured by foreign investors, and Georgia – an emerging outsourcing destination which did not join the sanctions that Western countries imposed on Russia.

As far as Ukrainian companies are concerned, they have become more aggressive, in the positive meaning of the word, and more self-confident, if they weren't before, that they can deliver high quality services. They have also internationalised heavily by opening offices not only in Europe but also across other continents and grown their skills to talk with foreign buyers. Also, potential investors have not lost their confidence in the emerging Europe region. On the contrary, unlike other locations, the region has built its strong value proposition and clearly is not merely a flavour of the year.

A VIEW FROM BUYING MARKETS

In the meantime, the UK tech sector is crying out for talent. The current tech talent shortage has been exacerbated by a wider backdrop of economic inactivity and warnings of some of the lowest rates of overall workforce participation in almost 30 years. In November 2022, Nash Squared's Digital Leadership report found that 68 per cent of the digital leaders surveyed in the UK said a lack of skills is standing in their way, while 57 per cent said they will never have enough access to enough tech staff.

"There are some 850,000 vacancies in the UK and the UK has always been a buy-side nation. We like to work with partners all around the world," says Kerry Hallard, the chief executive of the Global Sourcing Association and the chairwoman at the Global Technology and Business Services Council.

She adds that the appetite for partnering across the tech industry is massive at the moment as organisations are currently looking at how they can drive digital

transformation, or use technology enabled business processes to improve the customer experience.

"There is a bit of a sea change going on. So, you know, buyers trying to build resilience, so they're changing their global delivery footprints, they're blending them in a completely different way than they did before. But they're also looking at bringing smaller companies into their supply chain. There's a mandate that 25 per cent of spend in the public sector has to be with smaller companies, and 10 per cent of all marks for RFPs (request for proposals) has got to be on social value. And obviously, we've got the ESG agenda, which is really high," she adds.

In general, British companies – now more than ever – need fast access to flexible, innovative and skilled labour to help them achieve their quickly changing business objectives.

"Emerging Europe's countries are perfectly positioned to take advantage of the situation created by the transitional changes occurring within the industry. A relatively recent entrant onto the business services scene, these countries have garnered a reputation for producing high value services through the use of a highly skilled labour force, operating at consistently high rates of a conscientious and diligent work ethic, with high levels of English fluency, a quality that objectively appeals to many nations in the Western world," Hallard adds.



"Global organisations tend to operate multifaceted infrastructures internationally, most often with several locations throughout multiple countries. When one of these organisations decides to transfer activity from one site to another, everyone is affected: suppliers, distributors, service providers and consumers," says Debi Hamill, CEO at the International Association of Outsourcing Professionals (IAOP).

"Trends have always shown that proximity, cost, and language skills are the most significant determining factors for many businesses seeking services outside their native country. Culturally speaking, this is important for emerging Europe as it gives these countries a nearshore advantage. When it comes to emerging European countries, another advantage they have over other global markets is their friendliness toward neighbouring countries, which allows for business ease in gaining nearshore cost advantages," Ms Hamill adds.

"Unlike other leading delivery destinations such as India and the Philippines, the emerging Europe countries have typically been awarded contracts on a smaller scale but consisting of higher value transactional work.

"The smaller size of these contracts means their talent pools are not under the same level of threat to automation as countries such as India, who are predicted to lose about a third of their current work to robotic process automation (RPA), which has led to a wholesale upskilling and repositioning exercise for India. This therefore places the emerging Europe countries, who also benefit from close proximity and aligned time zones and cultures, in a strong position to continue growth, providing they continue

their investment in talent and infrastructure and maintain an appealing," says the GSA's Ms Hallard. "Over the last couple of years, the GSA has witnessed huge growth in its member companies investing in countries such as Poland, Czechia, Romania, Bulgaria and Ukraine – for the delivery of business services ranging from customer service through finance and accounts to software development – with Ukraine being the most recent destination to cement its reputation as a key tech hub. The investment has come in the form of establishing and growing shared service centres, as well as through partnering with domestic players," she adds.

The 2023 Global Outsourcing 100 includes over a dozen companies headquartered or with main delivery centres in the emerging Europe region, including Future Processing, Eleks, Svitla Systems, IBA Group, Innovecs, Solbeg, Intellias.

"However, for CEE countries to take full advantage of this opportunity open to them, it is integral that standards do not drop or stagnation occurs. They cannot sit on their laurels, and it is imperative that talent continues to be developed and nurtured, especially at middle management levels, where an ongoing dearth is predicted.

"Furthermore, as the landscape continues to evolve at a pace, the CEE region must ensure it stays value competitive – a significant increase in costs or attrition rates will negatively impact their opportunity to capitalise on the advantage afforded to them. This could and should be a golden period for the CEE region to prosper as a leading delivery destination serving buy-side companies directly, as well as service providers, around the world," the GSA's Hallard adds.

The emerging Europe region may not yet be of the size and scale of India as an outsourcing delivery destination, but it has emerged as an IT powerhouse over the last two decades and is catching up quickly. With over 5.4 million individuals employed in the ICT sector, more than twice as many as in Eastern Europe, India is unarguably the largest player in the sector globally. However, when we look at the number of IT employees per 100,000 inhabitants, emerging Europe's numbers are four times higher. In countries like Estonia, it is nine times higher.

With its progressive nature and rich talent pool of highly educated resources, together with a culture embedded in innovation and matched with the desire to deliver service excellence in the new global context backed by a strong entrepreneurial spirit developed in a challenging historical context, emerging Europe is a reliable global partner. On top of that, 2022 highlighted the massive resilience of the sector in the region and proved the region can deliver no matter what.



IT COMPETITIVENESS INDEX

The Future of IT gives a regional overview of the IT sector in the region, available talent, IT infrastructure, economic impact and current business environment as well as the room for potential growth. The IT Competitiveness Index outlined below evaluates the level of competitiveness of each individual country.

According to the 2023 edition, the Estonian IT sector is considered the most competitive in the emerging

Europe region for the second year in a row, followed by Lithuania, which gained one position since last year, and Poland, which lost one place. Estonia possessed the highest position in the region in 17 of 45 parametres, as well as topping one of four categories of the Index – Economic Impact.

Lithuania was ranked in the top five in the region in 17 of 45 parametres, while taking second position in two categories of the Index – Talent and

Business Environment. It showed especially good results in the Labour Force, Intellectual Property and Cybersecurity and Support for Industry Development components. Poland reached the top four in 11 of 45 parametres and topped the talent component of the Index. Poland continues to offer an abundance of IT talent, while ensuring its quality, which is proven by the high result in the Talent Competitiveness component.

Country	Rank 2023	Rank 2022	TOTAL	Talent	IT Infrastructure	Economic Impact	Business Environment
Estonia	1	1	65.59	21.55	12.74	13.95	17.36
Lithuania	2	4	64.03	24.65	12.16	9.79	17.43
Poland	3	2	60.90	25.92	11.89	9.00	14.10
Latvia	4	8	60.25	22.44	12.06	9.20	16.54
Hungary	5	9	57.90	23.99	12.44	8.30	13.17
Romania	6	6	57.54	22.91	14.55	8.69	11.38
Czechia	7	3	57.01	19.77	10.14	9.61	17.50
Slovakia	8	7	56.37	23.09	10.03	8.53	14.71
Slovenia	9	5	55.97	20.51	9.94	9.28	16.24
Bulgaria	10	11	54.76	21.60	11.70	10.36	11.10
Kosovo	11	10	52.55	20.30	12.98	11.73	7.54
Ukraine	12	14	52.36	21.67	11.07	10.86	8.75
Croatia	13	13	52.05	18.71	9.76	9.33	14.25
Serbia	14	12	51.85	19.94	11.24	9.22	11.44
North Macedonia	15	16	46.94	17.10	8.52	10.50	10.83
Moldova	16	17	45.82	14.39	11.55	9.47	10.41
Armenia	17	18	45.19	20.07	8.46	6.92	9.74
Belarus	18	15	44.65	19.12	9.30	10.47	5.76
Georgia	19	19	43.90	10.31	7.72	12.70	13.18
Montenegro	20	20	41.94	9.94	7.24	12.85	11.91
Albania	21	22	41.23	11.93	9.62	9.92	9.77
Azerbaijan	22	21	40.95	11.49	7.84	11.88	9.75
Bosnia and Herzegovina	23	23	40.45	15.62	6.22	11.09	7.52

Indeed, Poland tops the Talent component this year, gaining one position since last year. Strength of education and high talent competitiveness shaped the result in 2023. It is followed by Lithuania which is up by 11

positions in the component compared to the 2022 edition. Lithuania managed to improve its result in each subcomponent by increasing the scope of IT education, broadening the IT labour force and slightly improving its result in the

competitions constituting the Talent Competitiveness component. It is worth noting that despite being ranked 11th in the Talent component this year, Kosovo managed to keep the leading position in the education parametre.

Country	TOTAL FOR TALENT	Talent			Talent competitiveness
		Education	Labour force		
Poland	25.92	10.74	4.72		10.45
Lithuania	24.65	8.67	6.25		9.73
Hungary	23.99	10.50	5.33		8.16
Slovakia	23.09	7.28	5.70		10.12
Romania	22.91	9.43	3.43		10.06
Latvia	22.44	7.33	4.85		10.26
Ukraine	21.67	10.07	2.85		8.75
Bulgaria	21.60	8.21	3.64		9.75
Estonia	21.55	9.47	4.35		7.73
Slovenia	20.51	7.93	3.99		8.60
Kosovo	20.30	12.56	4.18		3.56
Armenia	20.07	9.83	4.85		5.40
Serbia	19.94	7.95	4.28		7.72
Czechia	19.77	7.08	5.44		7.24
Belarus	19.12	7.66	4.68		6.78
Croatia	18.71	8.39	3.09		7.23
North Macedonia	17.10	7.37	4.34		5.39
Bosnia and Herzegovina	15.62	4.57	3.80		7.25
Moldova	14.39	5.72	4.82		3.85
Albania	11.93	6.02	3.41		2.49
Azerbaijan	11.49	7.48	1.50		2.51
Georgia	10.31	5.20	1.02		4.09
Montenegro	9.94	5.45	2.64		1.84

The best IT infrastructure in the region can this year be found in Romania. Kosovo and Estonia follow, while Hungary and Lithuania complete the top five. Despite not scoring high in Digital Transformation and Non-Personnel Resources, Romania secured first position in IT Infrastructure by scoring significantly higher than its competitors in connectivity, providing fast and cheap internet connections. On the other hand, the position of Estonia was hampered by the cost of internet, which dragged its position down in the connectivity component.

Country	IT Infrastructure			
	Connectivity	Digital transformation	Non-personnel resources	TOTAL FOR IT INFRASTRUCTURE
Romania	14.55	9.93	3.64	0.98
Kosovo	12.98	5.79	5.24	1.95
Estonia	12.74	2.95	6.79	3.00
Hungary	12.44	7.32	3.77	1.35
Lithuania	12.16	6.16	4.20	1.81
Latvia	12.06	6.05	5.06	0.94
Poland	11.89	6.47	4.32	1.10
Bulgaria	11.70	6.10	3.76	1.84
Moldova	11.55	8.16	2.92	0.47
Serbia	11.24	5.70	4.96	0.59
Ukraine	11.07	6.57	3.93	0.58
Czechia	10.14	4.22	3.46	2.46
Slovakia	10.03	5.39	3.52	1.12
Slovenia	9.94	2.85	5.23	1.87
Croatia	9.76	4.23	4.52	1.01
Albania	9.62	4.76	4.54	0.32
Belarus	9.30	6.35	2.42	0.53
North Macedonia	8.52	4.23	3.96	0.32
Armenia	8.46	4.77	3.38	0.31
Azerbaijan	7.84	4.98	2.56	0.30
Georgia	7.72	4.71	2.61	0.40
Montenegro	7.24	4.52	2.40	0.32
Bosnia and Herzegovina	6.22	3.80	2.03	0.39

The IT sector is incredibly important for the Estonian economy – and that can be clearly seen from the results of the Economic Impact component. Efforts of the country to develop the sector have led to an incredibly high result in the economic performance subcomponent – 7.84 out of 9, which is about three points higher than Montenegro and Georgia, who take second and third position respectively. On the other hand, cost competitiveness allows Montenegro, Georgia, Kosovo, Bosnia and Herzegovina and Azerbaijan to maintain high positions. Covid-19 resilience contributes to Azerbaijan's high position.

Country	Economic Impact			
	TOTAL FOR ECONOMIC IMPACT	Economic performance	Cost competitiveness	Covid Resistance
Estonia	13.95	7.84	3.36	2.74
Montenegro	12.85	4.64	5.95	2.26
Georgia	12.70	4.89	5.30	2.51
Azerbaijan	11.88	2.60	5.28	4.00
Kosovo	11.73	3.34	6.74	1.65
Bosnia and Herzegovina	11.09	3.13	5.20	2.76
Ukraine	10.86	5.42	3.20	2.24
North Macedonia	10.50	4.03	3.44	3.02
Belarus	10.47	6.07	3.08	1.32
Bulgaria	10.36	5.54	3.39	1.43
Albania	9.92	3.16	5.04	1.72
Lithuania	9.79	4.29	2.12	3.39
Czechia	9.61	4.43	4.11	1.06
Moldova	9.47	4.67	2.75	2.05
Croatia	9.33	4.39	4.54	0.40
Slovenia	9.28	3.47	4.11	1.70
Serbia	9.22	4.23	2.94	2.05
Latvia	9.20	3.74	3.84	1.62
Poland	9.00	3.60	4.32	1.09
Romania	8.69	4.88	3.16	0.65
Slovakia	8.53	2.44	4.78	1.31
Hungary	8.30	2.88	4.48	0.93
Armenia	6.92	3.00	3.10	0.81

The most favourable business environment for the ICT sector can be found in Czechia this year – a gain of one position since last year. Though the following countries changed their rankings, the top five remains unchanged – Lithuania, Estonia, Latvia, Slovenia – in this order. The strongest intellectual property and cybersecurity sector is still in Estonia, as well as the strongest economic

competitiveness, while Czechia put the most effort in to support for industry development. Overall, the ranking shows that the differences between countries within the Business Environment component remain unchanged – with the result of Belarus being considered an outlier (the thresholds of the current edition are at 7.52-17.5 points, while in 2022 – 7.18-17.3).

Country	Business Environment			
	TOTAL FOR BUSINESS ENVIRONMENT	Intellectual property and cyber security	Support for industry development	Economic competitiveness
Czechia	17.50	4.71	8.26	4.53
Lithuania	17.43	5.27	7.76	4.40
Estonia	17.36	6.00	6.50	4.85
Latvia	16.54	5.14	7.21	4.20
Slovenia	16.24	4.34	7.43	4.47
Slovakia	14.71	4.69	6.18	3.84
Croatia	14.25	3.95	6.72	3.58
Poland	14.10	4.49	5.74	3.87
Georgia	13.18	3.27	6.76	3.14
Hungary	13.17	4.39	5.65	3.13
Montenegro	11.91	2.56	6.85	2.50
Serbia	11.44	3.51	5.62	2.31
Romania	11.38	3.87	4.58	2.93
Bulgaria	11.10	3.04	5.16	2.90
North Macedonia	10.83	3.26	5.62	1.95
Moldova	10.41	2.59	5.92	1.89
Albania	9.77	2.08	5.49	2.19
Azerbaijan	9.75	3.95	5.01	0.79
Armenia	9.74	2.40	4.96	2.39
Ukraine	8.75	2.01	5.12	1.63
Kosovo	7.54	2.26	3.26	2.02
Bosnia and Herzegovina	7.52	0.65	5.12	1.75
Belarus	5.76	1.98	2.17	1.61
Armenia	6.92	3.00	3.10	0.81

REGIONAL OVERVIEW

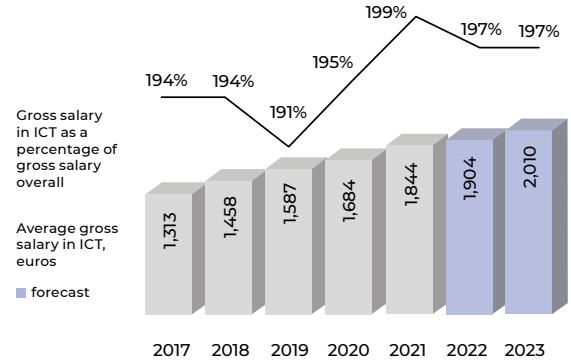
EMERGING EUROPE

The emerging Europe region shows a steady growing dynamic with respect to the number of people employed in the ICT sector and the average salary in the sector.

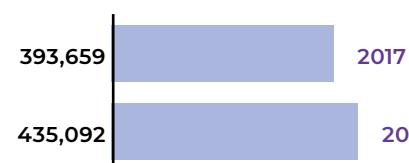
Both the average gross salary and the salary in ICT are up by about 50 per cent since 2016, significantly outperforming the rise of the consumer price index in most countries. On average, ICT specialists, who accounted for almost three per cent of the total number of people employed in 2021, earn about twice the average. The largest pay gap is observed in Armenia, while the lowest – in Slovenia.

The role of the ICT sector continues to grow – in 2021 it accounted for about five per cent of regional GDP. For the first time, the value added of the ICT sector reached more than 100 billion euros. About three quarters of it was created in Central Europe. An average ICT employee in the region produces more than 3,600 euros of value added monthly, while the output of an employee amounted almost 6,500 euros a month. The value of export of ICT services reached 46.8 billion euros in 2021.

ICT GROSS SALARY IN 2017-23



ICT STUDENTS



ICT GRADUATES

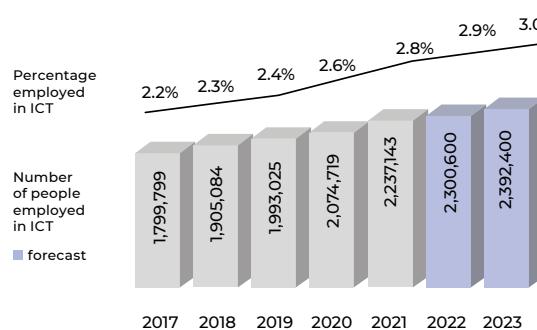


– a sharp increase from 38.8 billion euros in 2020. The sector showed a substantial level of resistance to Covid – it managed to outperform the linear trend based on the pre-Covid data in 15 of 23 countries of the region.

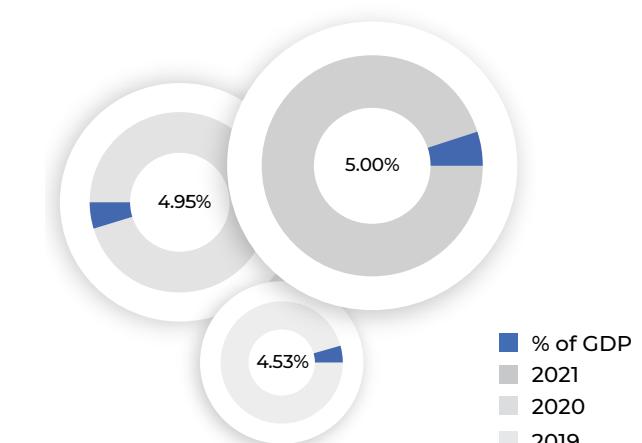
ICT education is also on a rise – the number of ICT students rose by more than 10 per cent in the last five years and is expected to reach 500,000 enrolled students over the next half decade. In 2021, 82,000 new ICT specialists entered the labour market from the universities. The academic excellence of universities in the emerging Europe region was proven by the Times Higher Education ranking by subject – in 2023 the University of Warsaw made it to the top-100 in computer science, while the University of Tartu reached the top-200. Lviv Polytechnic National University secured a spot in top-250 of the ranking.

Emerging Europe remains a significantly diverse and heterogeneous region, experiencing the influence of different factors in IT sector development. The uniting feature is still the pace of development and the increasing significance of the tech sector in the economy.

ICT EMPLOYMENT IN 2017-23



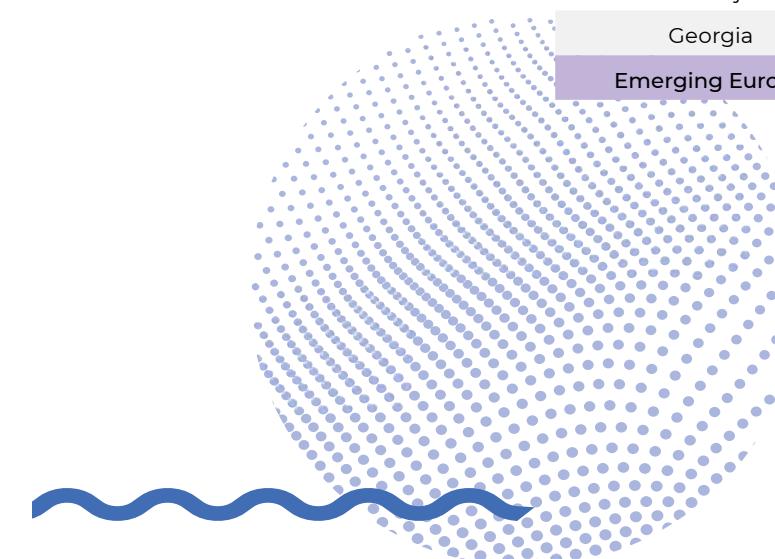
ICT VALUE ADDED



The average ICT employee compensation in the region reached 1,844 euros in 2021 – 160 euros more than the year before. The highest salaries are still in Lithuania, Estonia and Slovenia, and the lowest salaries in Azerbaijan and Georgia. On average, ICT specialists in Lithuania, Estonia and Slovenia earn around 50 per cent more than the regional average, while salaries in Azerbaijan and Georgia are more than three times lower than the regional average. The closest to the average is Croatia – with 1,854 euros a month (one per cent higher than the emerging Europe average). Last year it was three per cent higher than average.

There is still a clear difference between the overall level of ICT salaries in Central Europe and North-East Europe on the one hand and Eastern Europe and South East Europe on the other – the top of the list fully consists of countries from the first two subregions.

Country	Average salary in ICT (euros)	Average salary in ICT as percentage of the average regional ICT salary
Lithuania	2,860	155%
Estonia	2,804	152%
Slovenia	2,752	149%
Czechia	2,615	142%
Slovakia	2,264	123%
Romania	2,197	119%
Poland	2,148	117%
Latvia	2,088	113%
Hungary	2,038	111%
Bulgaria	1,900	103%
Croatia	1,854	101%
Serbia	1,661	90%
Belarus	1,535	83%
North Macedonia	1,353	73%
Bosnia and Herzegovina	1,158	63%
Moldova	1,059	57%
Montenegro	1,033	56%
Armenia	996	54%
Ukraine	791	43%
Kosovo	757	41%
Albania	705	38%
Azerbaijan	575	31%
Georgia	533	29%
Emerging Europe	1,844	100%



As in 2020, the highest number of ICT students per 100,000 people is estimated to be in Kosovo, while the second and the third highest values are observed in North Macedonia and Estonia. A little more attention to the volume of ICT students is needed in Slovakia and Azerbaijan. On average, there are 229 ICT students per 100,000 people in the emerging Europe region – a slight increase from 222 students per 100,000 in 2020.

Estonia and Albania unleashed the highest number of graduates on to the labour market in 2021. Ukraine reported slightly lower figures than in 2020, but remains in the top four in this parameter. On average, 43 ICT graduates per 100,000 people began contributing to the potential of the emerging Europe IT sector in 2021.

Country	Number of ICT students per 100,000 of population
Kosovo	717
North Macedonia	378
Estonia	360
Serbia	351
Latvia	326
Albania	299
Ukraine	286
Georgia	259
Hungary	249
Slovenia	239
Lithuania	234
Montenegro	223
Belarus	223
Czechia	210
Romania	209
Armenia	196
Croatia	193
Bulgaria	183
Bosnia and Herzegovina	179
Poland	178
Moldova	163
Slovakia	138
Azerbaijan	97
Emerging Europe	229

Country	Number of ICT graduates per 100,000 of population
Estonia	73
Albania	65
Belarus	55
Ukraine	54
Kosovo	54
Romania	49
Croatia	44
Montenegro	43
Azerbaijan	43
Serbia	42
Hungary	41
Armenia	41
Lithuania	40
North Macedonia	39
Latvia	39
Czechia	36
Slovenia	35
Poland	35
Bulgaria	34
Slovakia	30
Moldova	29
Georgia	22
Bosnia and Herzegovina	22
Emerging Europe	43

Around 6,500 euros in ICT output per one ICT employee was created in emerging Europe in 2021 – slightly more than in 2020. Some 3,670 euros of that figure are attributable to the value added – 234 euros less than in 2020. This means that the value and the share of intermediate consumption experienced an increase in 2021, which might be a sign of a slight tightening of the gross profit margins on the market combined with an increase in the costs of goods sold and costs of sales.

The highest output per person employed in ICT was in Estonia – 11,064 euros, followed by Romania and Czechia

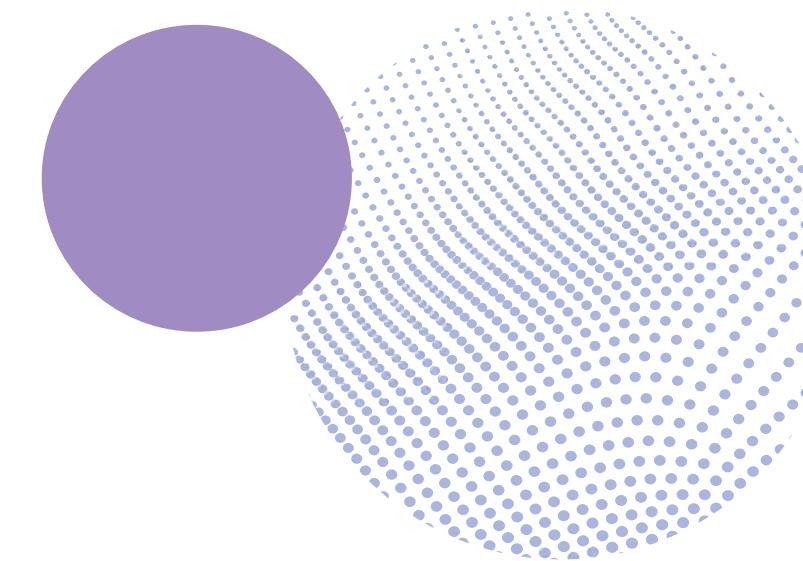
Country	Output per 1 employed in ICT, euros		
	2021	+/-	2020
Estonia	11,064	+1908	9,156
Romania	10,677	+925	9,752
Czechia	9,795	-453	10,248
Slovenia	8,730	+1095	7,635
Croatia	7,946	+1536	6,410
Bulgaria	7,233	+894	6,339
Poland	7,099	-771	7,870
Lithuania	6,975	-356	7,331
Slovakia	6,757	-384	7,141
Latvia	6,485	-114	6,599
Hungary	5,948	+354	5,594
Albania	5,396	-10	5,406
Montenegro	5,103	+687	4,416
Bosnia and Herzegovina	4,954	-369	5,323
Serbia	4,587	-211	4,798
Ukraine	4,295	+470	3,825
Georgia	3,354	+835	2,519
Belarus	3,126	+156	2,970
North Macedonia	2,827	-253	3,080
Moldova	1,893	-29	1,922
Armenia	1,606	-135	1,742
Azerbaijan	1,568	+21	1,547
Kosovo	1,356	+191	1,165
Emerging Europe	6,469	+97	6,373

– 10,677 and 9,795 euros respectively. The same countries top the value added ranking – with Romania leading (6,090 euros) and Estonia and Czechia following (6,403 and 5,930 respectively). The lowest output and value added per employee in 2021 were created in Armenia, Azerbaijan and Kosovo. Nevertheless, all of these countries demonstrate positive dynamics in improving the value of output and value added.

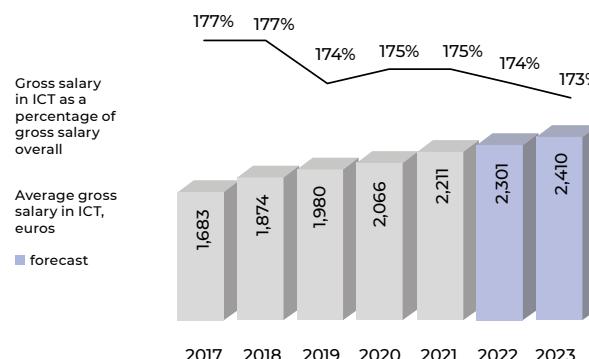
Country	Value added per 1 employed in ICT per month, euros		
	2021	+/-	2020
Romania	6,090	+1043	5,047
Estonia	6,403	+344	6,059
Czechia	5,930	-313	6,243
Croatia	4,482	+679	3,803
Slovenia	5,087	+1304	3,783
Poland	3,851	+55	3,796
Latvia	4,191	+246	3,945
Bulgaria	3,501	-447	3,947
Slovakia	4,082	-201	4,282
Hungary	3,537	+133	3,405
Lithuania	2,340	+186	2,153
Bosnia and Herzegovina	2,618	+50	2,568
Montenegro	3,190	-194	3,384
Belarus	2,165	-169	2,334
Albania	2,284	+286	1,998
Ukraine	2,209	+581	1,628
Georgia	2,472	+143	2,328
Serbia	2,046	+96	1,949
North Macedonia	1,382	+135	1,247
Moldova	1,086	-224	1,310
Azerbaijan	1,092	+16	1,076
Armenia	1,008	+200	807
Kosovo	3,786	+166	3,620
Emerging Europe	3,668	-234	3,902

CENTRAL EUROPE

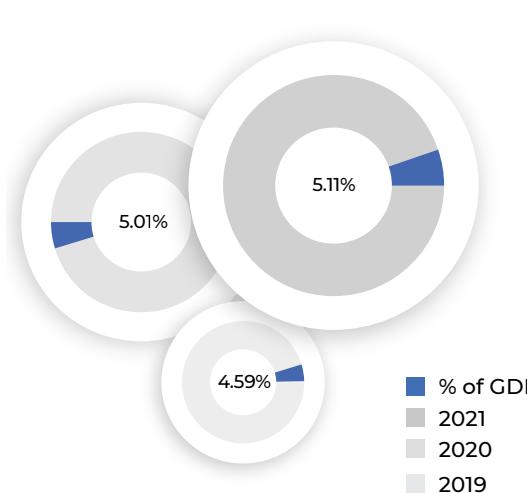
The IT sector of the Central European region (Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia) remained resilient in 2021, gaining significance in both employment and the value added created. The average IT salary surpassed the threshold of 2,200 euros – way more than in Eastern Europe or South-East Europe, but still behind North-East Europe. The salary gap in the IT sector continues to rise, amounting to more than 18 per cent in 2021. Unlike in the other subregions of the emerging Europe region, the pay gap between the economies as a whole and the IT sector remains stable at around 75 per cent. The dynamic of IT education is consistent with emerging Europe as a whole – a stable rise in the number of IT students and graduates within the last few years. The value added of the IT sector accounts for more than five per cent of GDP – that's the highest figure in the region. Still, the dynamics of IT services production allows us to make the assumption that the North-East Europe is going to surpass Central Europe in this parameter in the coming years.



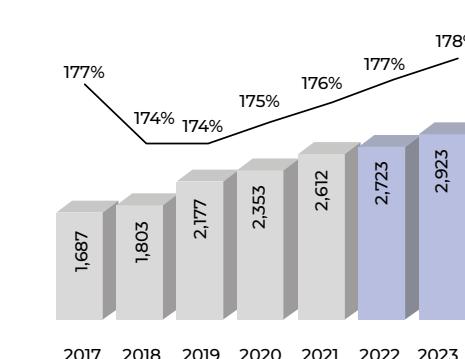
ICT GROSS SALARY IN 2017-23



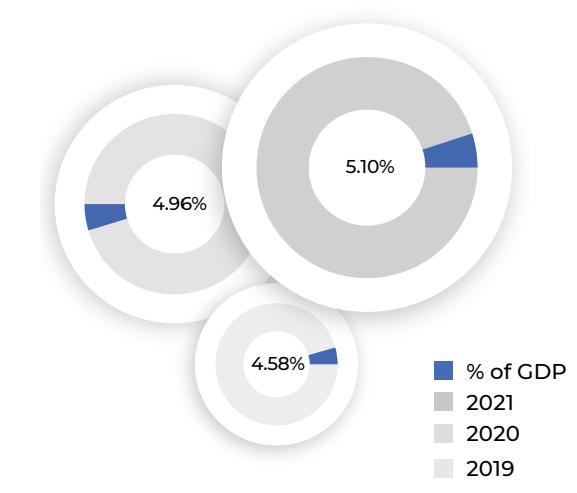
ICT VALUE ADDED



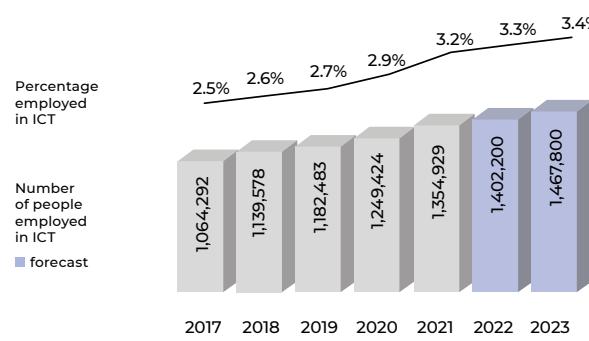
ICT GROSS SALARY IN 2017-23



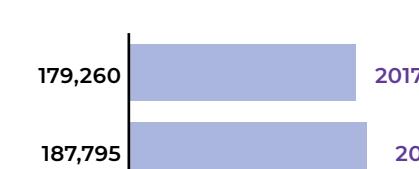
ICT VALUE ADDED



ICT EMPLOYMENT IN 2017-23



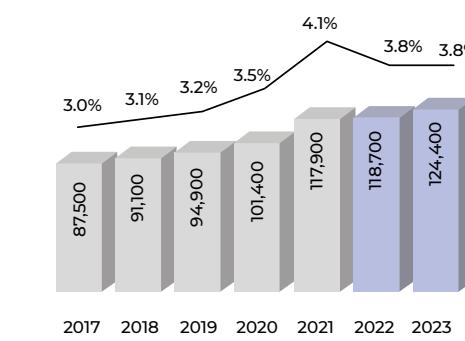
ICT STUDENTS



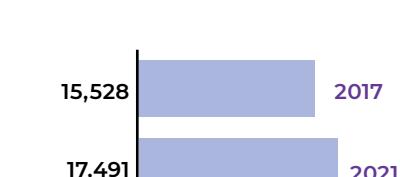
ICT GRADUATES



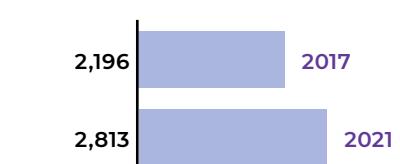
ICT EMPLOYMENT IN 2017-23



ICT STUDENTS

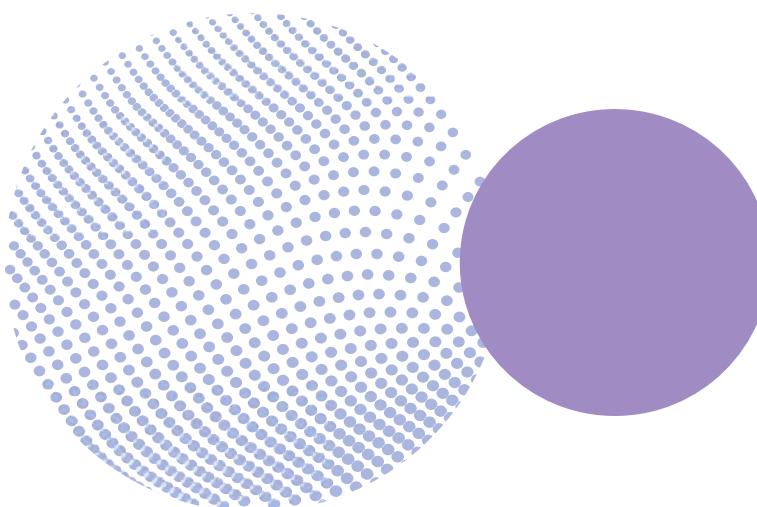


ICT GRADUATES

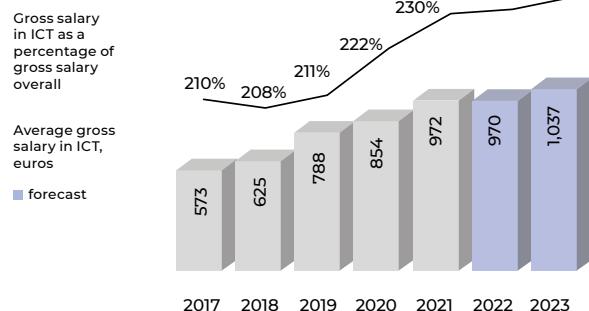


EASTERN EUROPE

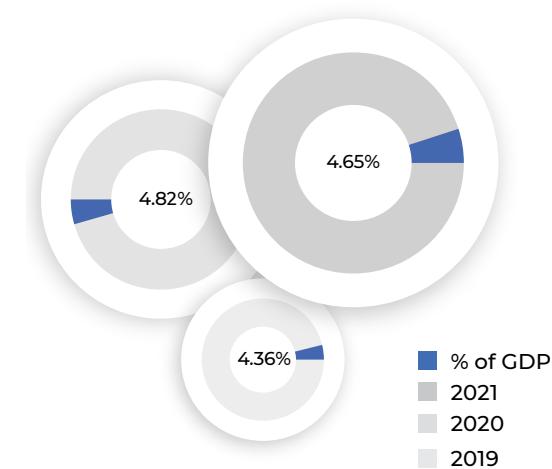
The development of the ICT sector in the Eastern European region (Armenia, Azerbaijan, Belarus, Georgia, Moldova, Ukraine) remains steady despite the turbulence experienced during Covid times and is expected to remain resilient despite the Russian invasion of Ukraine – the first data from 2022 allows us to make that statement. The region has experienced growth in both ICT salaries and employment, while the value added created seems to be slightly lower in terms of the percentage of GDP. Still, it does not break the trend of the sector's development. It is important to mention that with 581,000 ICT employees, Eastern Europe remains the second largest IT hub after Central Europe. The number of ICT graduates in 2021 was slightly lower than in previous years, as the largest ICT education hub – Ukraine – reported slightly lower figures in terms of the number of graduates than in previous years. Despite that, the number of students continues to grow reaching almost 170,000 in 2021.



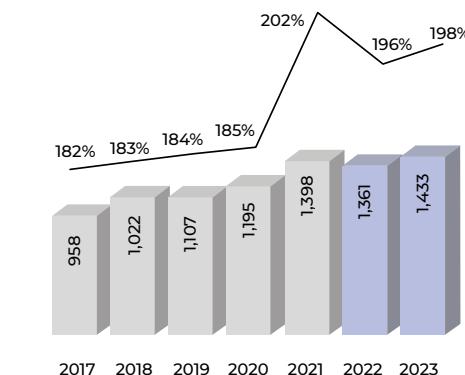
ICT GROSS SALARY IN 2017-23



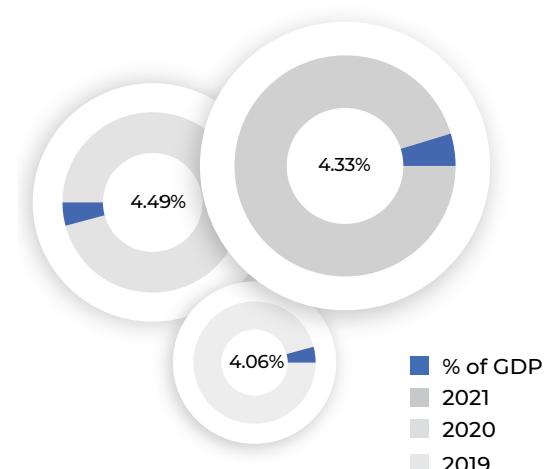
ICT VALUE ADDED



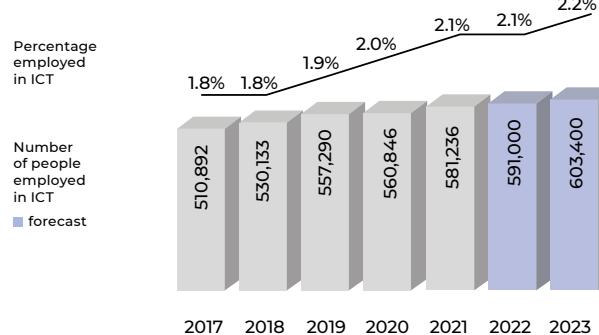
ICT GROSS SALARY IN 2017-23



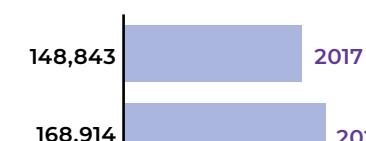
ICT VALUE ADDED



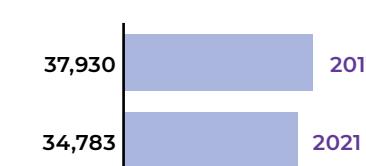
ICT EMPLOYMENT IN 2017-23



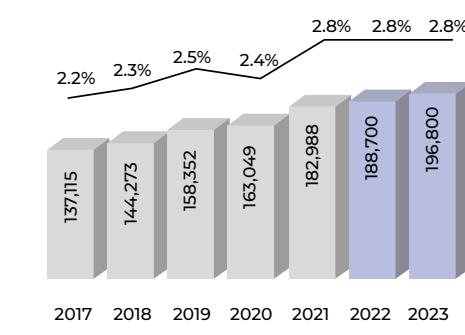
ICT STUDENTS



ICT GRADUATES



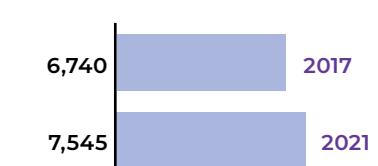
ICT EMPLOYMENT IN 2017-23



ICT STUDENTS



ICT GRADUATES



EMERGING EUROPE CONTINUES TO BE A DESTINATION OF CHOICE FOR GLOBAL BUSINESS BUYERS

From the extremely talented and cost competitive workforce to the high-quality infrastructure and support, it is clear why choices for outsourcing are now expanding beyond traditional locations.

As organisations based in the world's leading economies look to reduce operational costs and increase efficiency, many have looked beyond their traditional markets to explore opportunities for Global Business Services/Business Process Outsourcing (GBS/BPO).

As such, emerging Europe has quickly emerged as a prime destination choice for GBS/BPO service delivery, offering significant advantages in terms of quality, cost savings and availability.

More pertinently, growing technological capabilities and increasing levels of digital innovation have positioned the region well for highly specialised IT outsourcing (ITO) services at lower costs than other countries.

This chapter will explore why investing in the region's capacity for GBS/BPO delivery has paid off for many international investors and what emerging Europe locations one should consider when selecting a best-fit delivery site.

Emerging Europe has become a favoured GBS/BPO location among global buyers, operators and investors, particularly for digital and ITO services. In fact, for the third year in a row, Poland was ranked among the top five [Most Favoured Offshore CX Delivery Locations](#). In 2021, Poland tied third alongside the Philippines and Malaysia and in 2022 tied second with the Philippines.

Several enabling factors have served as the source of the region's emergence as a GBS/BPO location of choice.

UNTAPPED, HIGH-QUALITY TALENT

Forming the basis of Emerging Europe's flourishing GBS/BPO market is the increasingly vast pool of skilled individuals with expertise across a range of industries and technologies. With a literacy rate of 98.99 per cent, emerging Europe is benefitting from a sophisticated, high-quality education system.

For instance, Poland produces over two million secondary school graduates and 297,368 annual university graduates. With such a notable number of students entering and completing tertiary education, it is not surprising that an estimated 44 per cent of Poland's youth carry a higher education qualification.

Furthermore, among 25- to 65-year-olds in Czechia, approximately 17 per cent hold a masters university degree. Over 55 per cent of Lithuanian youth (25-34 years of age) have attained a tertiary education degree, while around 46 per cent of Latvian youth have at least a bachelor's degree.

This strong outflow of degree holders translates into a sustainable talent pipeline for GBS/BPO and ITO operators looking for youthful talent to deliver a range of non-complex to highly complex offshore services. This includes digital channel communication services, customer lifecycle management, technical support, data analytics and science services.

A noteworthy development from the region's talent pipeline is the substantial supply of software development specialists. In fact, emerging Europe has between 4,500 to 6,500 software development vendors employing over 1.4 million software development experts.

ENGLISH PROFICIENCY

The region's talent is also multilingual, especially in English, which is a major factor in the growth of GBS/BPO and ITO operations.

There are eleven emerging Europe countries that are regarded as having either a 'Very High Proficiency' or 'High Proficiency' in English. Croatia and Poland are regarded as the most proficient English-speaking nations in the region, ranking 11th and 13th respectively. Following not too far behind are Slovakia (15), Romania (17), Hungary (18) and Lithuania (19).

Country	Index Ranking	Proficiency Level
Croatia	11	Very High Proficiency
Poland	13	Very High Proficiency
Slovakia	15	High Proficiency
Romania	17	High Proficiency
Hungary	18	High Proficiency
Lithuania	19	High Proficiency
Bulgaria	21	High Proficiency
Czechia	23	High Proficiency
Latvia	25	High Proficiency
Estonia	26	High Proficiency
Serbia	27	High Proficiency

The ability to communicate easily with key Anglophone source markets, such as the United States, Canada, the UK and Australia has enabled emerging European GBS/BPO and ITO providers to establish strong relationships with buyers from these countries.

As such, language barriers are significantly reduced, allowing for smoother business operations and deepening the scope for GBS/BPO and ITO expansion across the region. Proficiency in English, along with several other European languages has developed a high degree of cultural compatibility not only between western and eastern European nations, but also global English-speaking markets.

COST COMPETITIVENESS

However, GBS/BPO and ITO talent in emerging Europe does not come at a premium, where operating costs and salaries are notably lower compared to those in major source markets.

For example, one of the region's largest GBS/BPO and ITO markets, Poland, has contact centre salary costs that are between 48 per cent and 64 per cent lower than those elsewhere in the European Union, the US, Australia and the UK. Czech contact centre salaries are approximately 39 per cent and Hungarian contact centre salaries are 63 per cent less expensive compared to those in the same source markets.

Source Market Average Contact Centre Salary Comparisons – Poland (in US dollars per month):

Outsourced Role	United States	Poland
Contact Centre Agent	2,330	585
Team Leader/ Supervisor	3,800	1,025
Contact Centre Manager	5,520	1,906
Quality Assurance	2,890	1,088

Source Market Average Contact Centre Salary Comparisons – Czechia (in UK pounds per month):

Outsourced Role	United Kingdom	Czechia
Contact Centre Agent	1,400	753
Team Leader/ Supervisor	2,080	1,707
Contact Centre Manager	3,300	2,991
Quality Assurance	1,750	1,372

Source Market Average Contact Centre Salary Comparisons – Hungary (in US dollars per month):

Outsourced Role	United Kingdom	Poland
Contact Centre Agent	1,400	488
Team Leader/ Supervisor	2,080	855
Contact Centre Manager	3,300	1,590
Quality Assurance	1,750	908

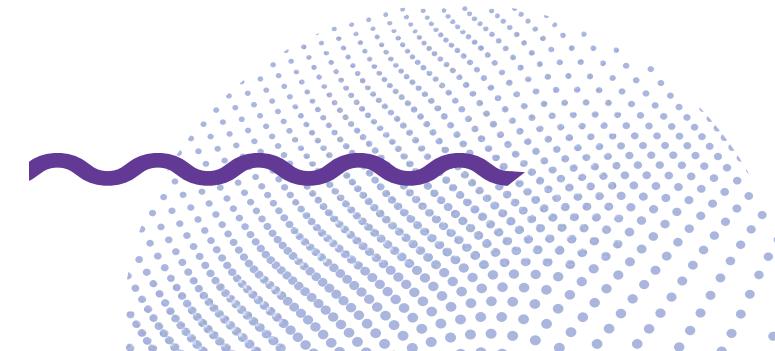
Source Market Average Contact Centre Salary Comparisons – Czechia (in US dollars per month):

Outsourced Role	United States	Czechia
Contact Centre Agent	2,330	902
Team Leader/ Supervisor	3,800	2,045
Contact Centre Manager	5,520	3,584
Quality Assurance	2,890	1,644

Source Market Average Contact Centre Salary Comparisons – Hungary (in UK pounds per month):

Outsourced Role	United Kingdom	Hungary
Contact Centre Agent	1,400	561
Team Leader/ Supervisor	2,080	944
Contact Centre Manager	3,300	1,729
Quality Assurance	1,750	775

Source: Genesis GBS/GBS.World



NEARSHORE AND OFFSHORE MARKETS SERVICED

Top, affordable talent offered by emerging European locations have increasingly driven enterprises in Western Europe to turn to service providers in the region. In addition, tech talent shortages experienced in Western Europe have served as an additional push factor for organisations in the region to look east for their ITO needs.

As such, emerging Europe's GBS/BPO and ITO operators have captured demand from the following nearshore markets:

- UK
- Germany
- Netherlands
- Norway
- Belgium
- Denmark
- Switzerland
- Sweden
- France
- Russia

The tech talent shortage is a shared phenomenon across all corners of the globe, presenting opportunities to tap into other global markets. Notably, the abundance of skilled IT specialists in emerging Europe have attracted buyers and operators in several offshore markets, including the following:

- US
- South America
- Asia-Pacific
- China
- Middle East
- Africa

MATURING LOCATION HIGHLIGHTS AND VALUE PROPOSITION

By encompassing these enabling factors into industry, as well as national strategies, several emerging Europe locations have flourished into mature [GBS/BPO locations](#).

The most notable of these include Poland, Czechia, Bulgaria, Serbia and Romania.

2022 GBS WORLD COMPETITIVENESS INDEX - DIGITAL AND ITO

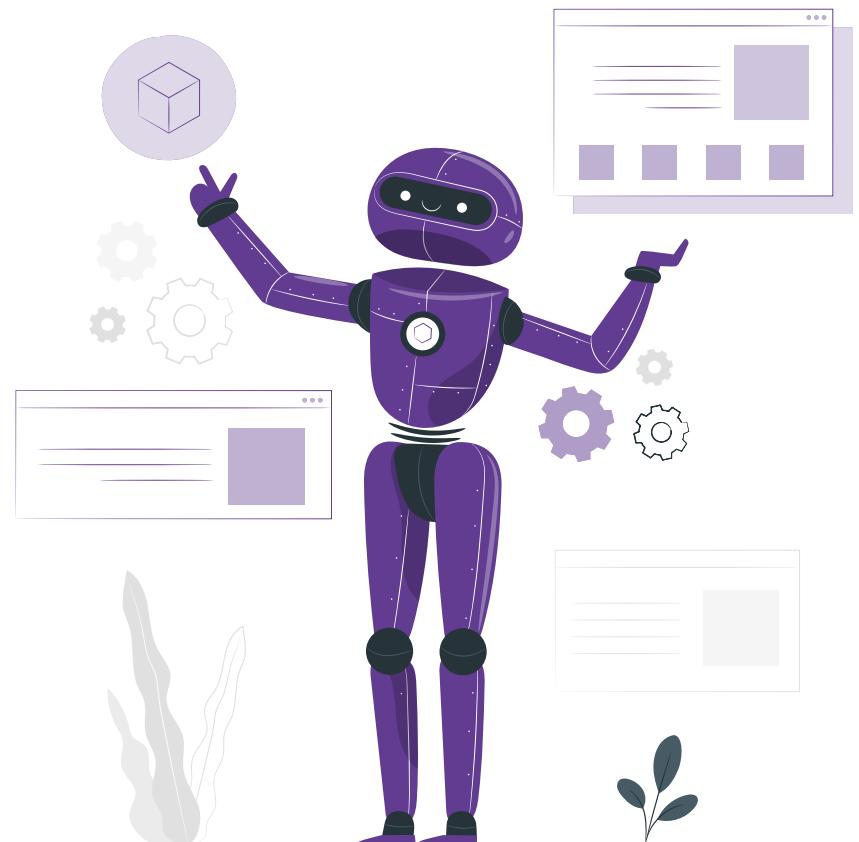
The region has not gone unnoticed in terms of its strengths in delivering digital and ITO services to offshore buyers. In this regard, the 2022 GBS World Competitiveness Index: Digital and ITO reveals the performance of emerging European countries in their ability to deliver digital and ITO services to global buyers.

Over 140 global buyers and enterprise executives of organisations that outsource and offshore to emerging Europe were asked to rank and rate each country, including service level delivery across various key business process areas. As a result, the top 10 countries were ranked according to their final scores and placed within three categories: High Performer, Proficient and Capable.

DIGITAL AND ITO RESULTS

Poland dominated the top positions across the range of digital and ITO service categories, due to its prominence in the top five positions on the global rankings. Consequently, Poland was rated the best delivery offshore location for technical and helpdesk support, while it took the top spot for general ITO, software development and data analytics and science services on the regional front.

Czechia featured among the top three among its Emerging European peers, ranking first for robotics and automation (RPA) and claiming second place for general ITO services. Other locations consistently ranked among the top five in emerging Europe and featuring favourably in the global rankings included Romania, Bulgaria and Croatia.



GENERAL ITO SERVICES

Flexing its digital and ITO capabilities on the global stage is Poland, who buyers rate as the third best offshore destination for general ITO services. Czechia is ranked seventh, while Estonia (12th) and Romania (13th) are among the top 15 globally for general ITO delivery.



India	6.47
Philippines	6.14
Poland	6.08
Egypt	5.47
Malaysia	5.47
Brazil	5.29
Czechia	5.24
China	5.22
Mexico	5.12
Taiwan	4.94
Argentina	4.94
Estonia	4.48
Romania	4.20
South Africa	4.06
Morocco	3.92
Hungary	3.90
Ukraine	3.83
Tunisia	3.83
Indonesia	3.61
Belarus	3.23
Nigeria	3.13
Mauritius	3.00
Singapore	2.82
Colombia	2.65
Lithuania	2.65
Thailand	2.65
Jamaica	2.55
Guatemala	2.47
Rwanda	2.47
Bangladesh	2.29
Slovakia	2.29
Nicaragua	2.19
Senegal	2.12
Costa Rica	1.76
Sri Lanka	1.59
Serbia	1.13
Kenya	1.13
Ghana	1.12
Chile	1.09
Haiti	1.08

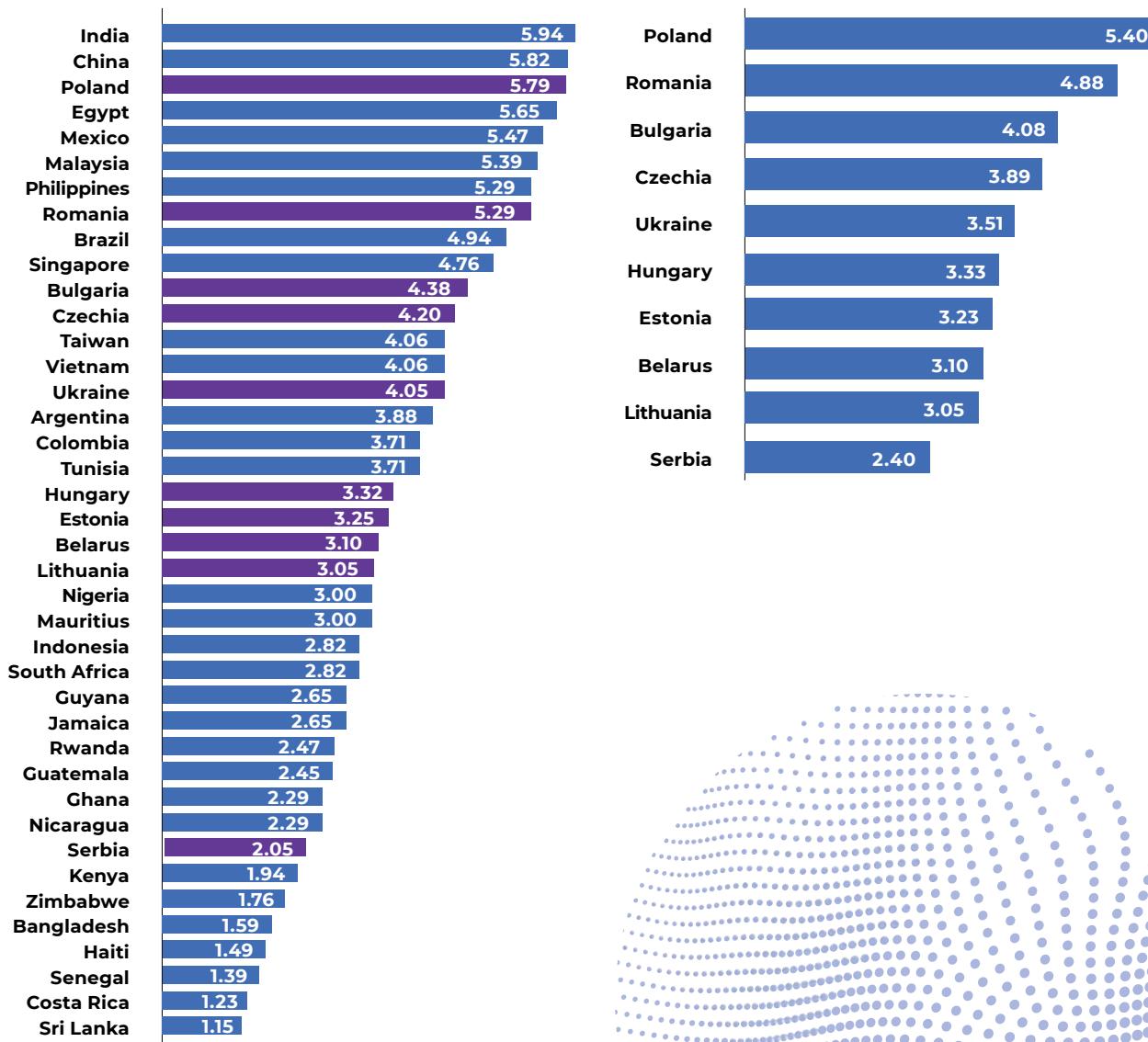
Poland	6.06
Czechia	5.24
Estonia	4.48
Romania	4.20
Hungary	3.90
Ukraine	3.83
Belarus	3.23
Lithuania	2.65
Slovakia	2.29
Serbia	1.13

Following these results, Poland is rated as the top destination in emerging Europe for general ITO services, scoring 6.06 out of 8. Ranking third in 2021 Czechia (5.24) climbs to second place. Meanwhile, Estonia (4.48) made a remarkable improvement by jumping six places to rank third in this year's index. Romania (4.20) and Hungary (3.90) followed close behind as prominent emerging Europe ITO destinations.

SOFTWARE DEVELOPMENT

Emerging Europe has rightfully earned the reputation as not only a nearshore, but offshore haven for software development outsourcing, with Poland being ranked third globally in this service category. Supporting Poland's globally renowned expertise in software development is its 295 300 software developers and its 1.2 billion euros gaming export industry.

Romania (8th), Bulgaria (11th), Czechia (12th) and Ukraine (15th) also make it in the top 15 placings. Bunched up from 19th to 22nd places are Hungary (19th), Estonia (20th), Belarus (21st) and Lithuania (22nd).



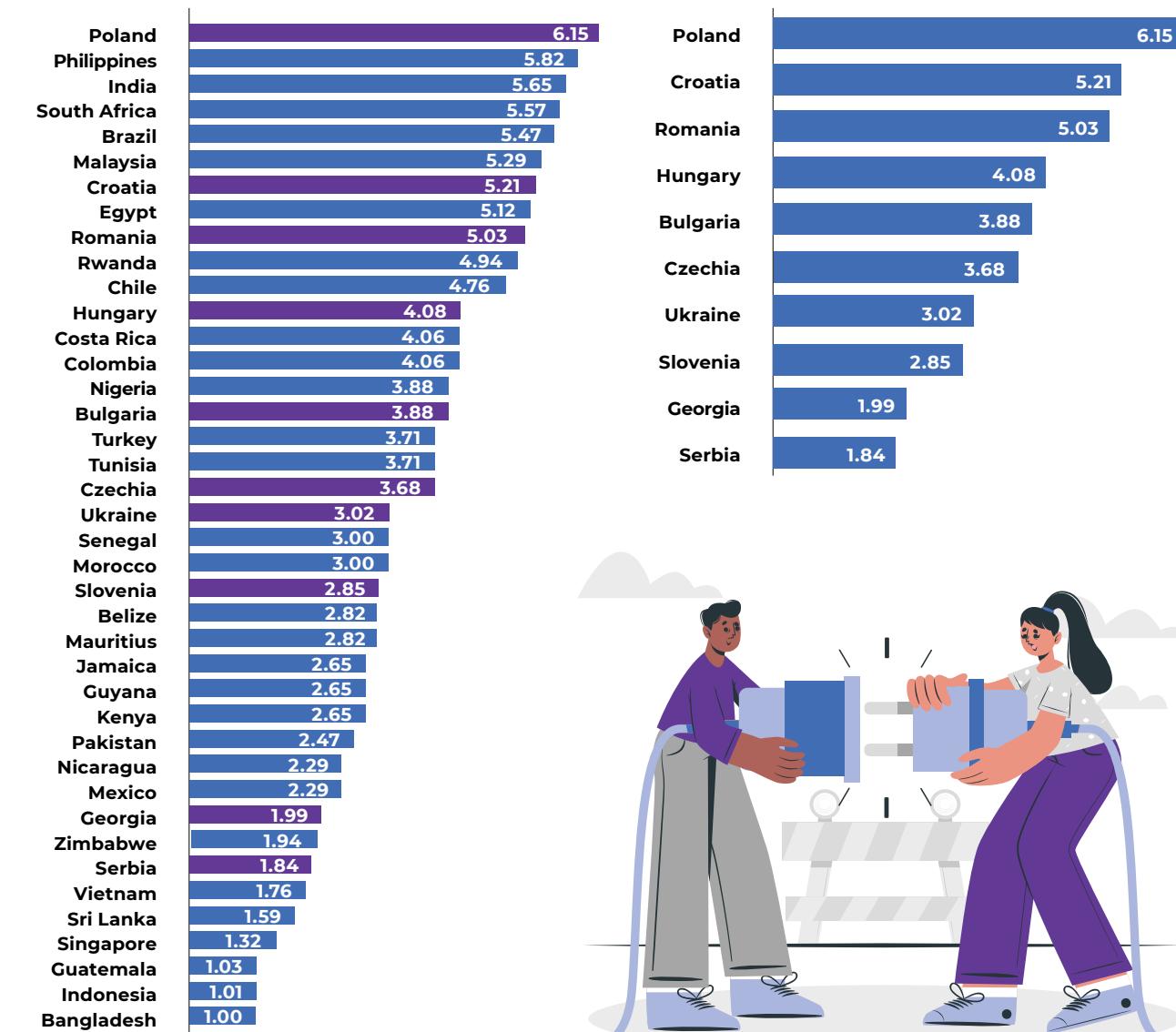
Regarded as a nearshore and offshore haven for software development outsourcing, Poland (5.40) clinched first place from Ukraine (3.51). Notably, Poland is ranked third globally for software development services.

Romanian software development providers continue to improve in their capabilities, as seen in the country's eighth global ranking, shifting it to second place from third in 2021 with a score of 4.88. Meanwhile, Bulgaria (4.08) and Czechia (3.89) jumped two places to rank third and fourth respectively.

TECHNICAL AND HELPDESK SUPPORT

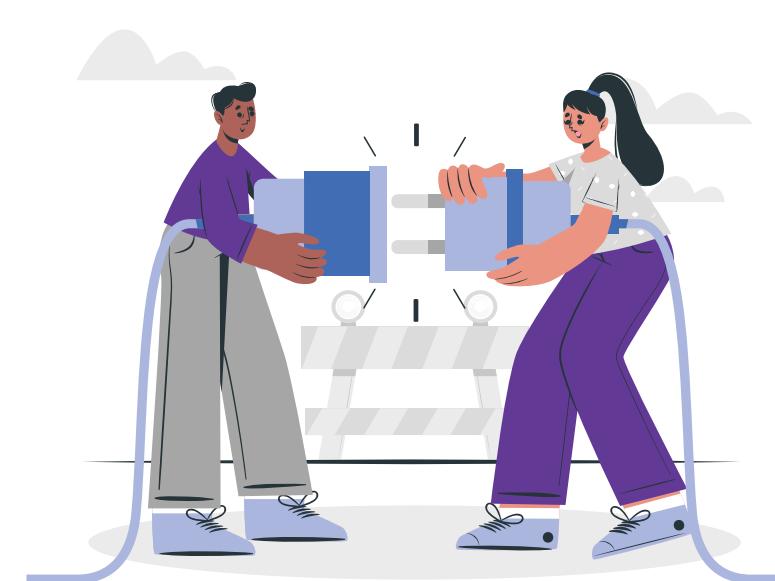
Poland's digitally-enabled and tech savvy youth population are key drivers to Poland's first place global ranking for technical and helpdesk support, overthrowing offshore giants Philippines (2nd) and India (3rd).

It seems digital know-how is reflective across the region's youth population, where Croatia and Romania are placed within the top 10, ranking seventh and ninth respectively. Hungary (12th) is also regarded as a desirable location for offshore technical and helpdesk support delivery.



Correspondingly, Poland (6.15) takes the top spot for technical and helpdesk support services in the emerging Europe region.

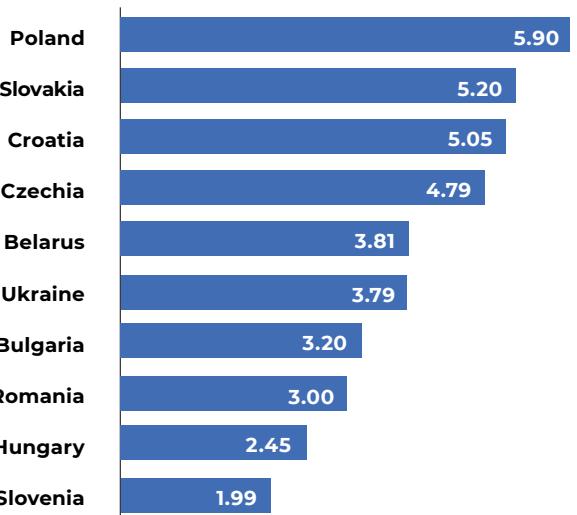
As consequence of ranking seventh globally, Croatia (5.21) made a remarkable improvement from its 2021 ranking, moving up from sixth to second place, while Romania (5.03) claims third place.



DATA ANALYTICS & SCIENCE

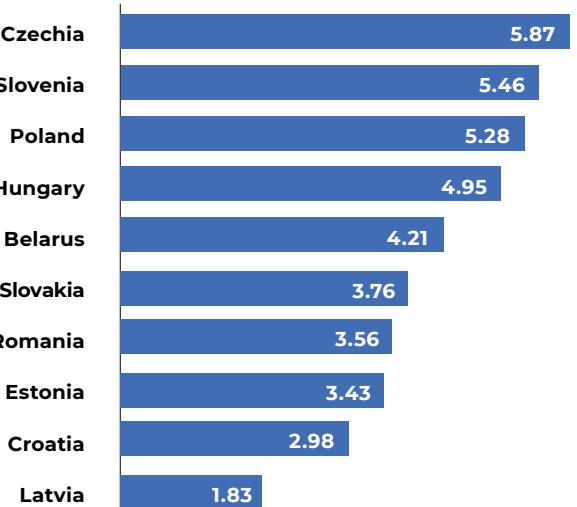
Poland continues to assert its dominance in the digital and ITO arena by ranking first in the emerging Europe region for data analytics and science services and second globally, scoring 5.90. In this regard, Poland maintains the top spot since the 2021 edition of the index.

Also maintaining its spot among the top three locations is Slovakia (5.20), while Croatia (5.05) moves from fourth to third compared to last year's index. Czechia (4.79) and Belarus (3.81) also shifted upwards by one place to rank fourth and fifth respectively.



ROBOTICS AND AUTOMATION

Well known for its robotics expertise and talent, Czechia was noted as a top overall delivery location for RPA outsourcing by digital and ITO buyers, scoring 5.87. Notably, Slovenia (5.46) and Poland (5.28) were also ranked as preferred locations along with Hungary (4.95). Belarus (4.21) entered the top five pool by shifting up a spot from the previous rankings in 2021.

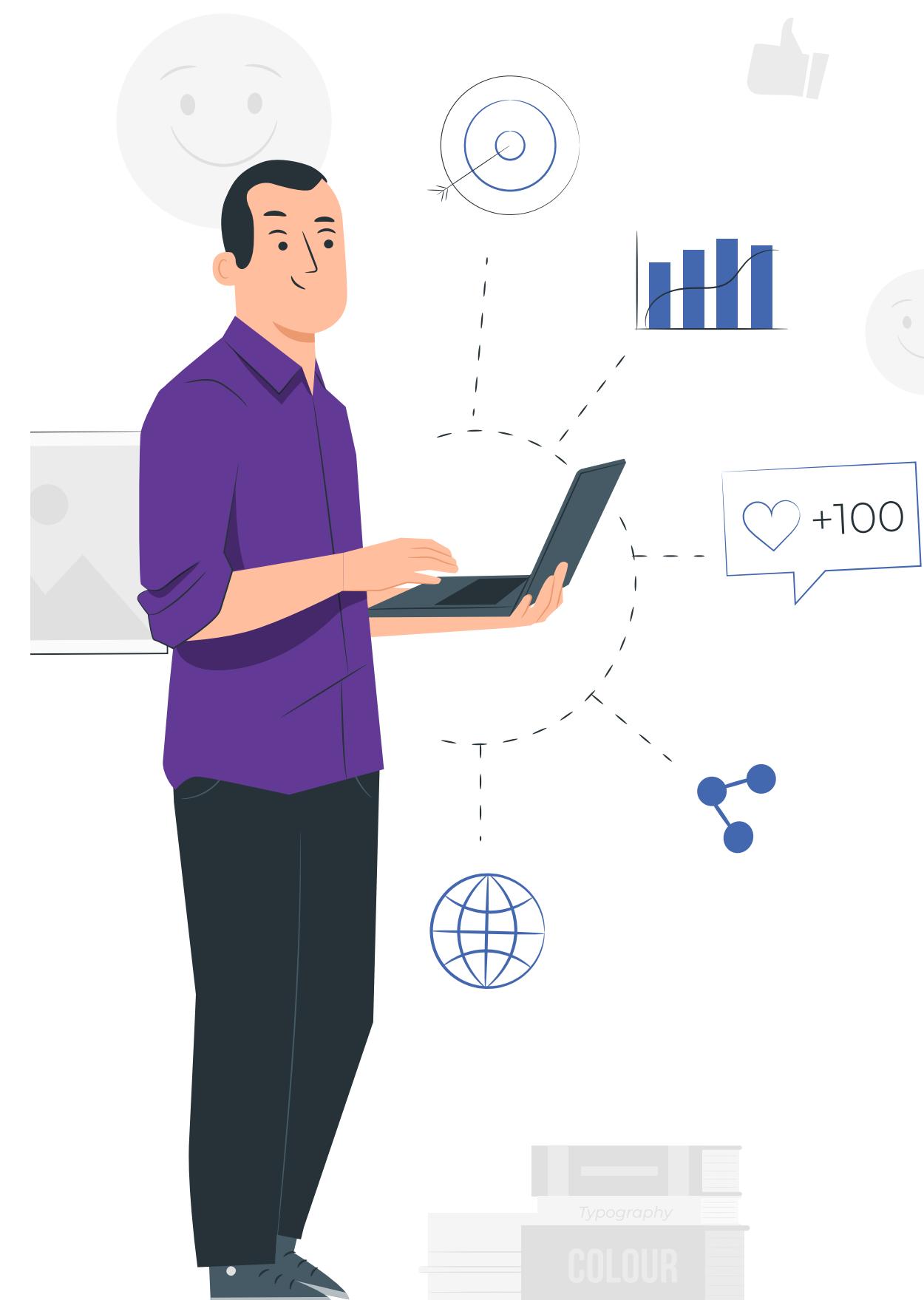


LOOKING FORWARD TO THE REGION'S OFFSHORING FUTURE

Certainly, emerging Europe's development as a favourable destination, with maturing digital hubs and centres of excellence for GBS/BPO/ITO services, is impressive. From the extremely talented and cost competitive workforce to the high-quality infrastructure and support, it is clear why choices for outsourcing are now expanding beyond traditional locations.

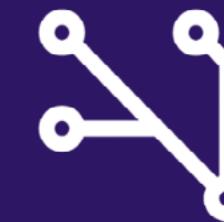
Poland remains the leader in this domain, seen by its strategic positioning and presence on the global stage. Nevertheless, other emerging European countries should not be discounted as they contain their own robust IT capabilities and bright English-speaking talent that can offer operators a wide range of diverse solutions from which to gain advantage.

As such, it will be interesting to observe how these nations develop their GBS/BPO/ITO sectors in the coming years. All signs point to growth in this locale – not just from within but from foreign investment interest as well. Ultimately, this will lead to a new generation of start-up and innovative outsourcing firms in emerging Europe.



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Become part of a worldwide community of 33,000 tech entrepreneurs, leaders, experts and investors — and have a role in making emerging Europe a global tech hub.



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EMERGING
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ADVOCATES**

a community by **EMERGING EUROPE**

Join the community

HOW FLEXIBLE, COMMUNITY-LED SPACES CAN BRING STAFF BACK TO THE OFFICES



KONRAD SZARUGA
HEAD OF FLEXIBLE WORKPLACE,
CBRE POLAND

The old school real estate motto of "location, location, location" is still relevant, but to keep up with today's trends, we need to focus more on people than premises.

Firstly, it is important to understand what exactly is meant by the term "flex office space". Flex office space typically refers to a type of workspace that can be rented out on a short-term or flexible basis, as opposed to traditional long-term leases.

This type of space is often fully furnished and equipped with various amenities, such as high-speed internet, conference rooms, and kitchen facilities. In other words, flex is to offices what a hotel is to the housing market.

One thing that ChatGPT may not tell you about Warsaw's flex office space market is the significant level of competition in this space. Currently there is almost 325 000 square metres of flexible space in Poland. Warsaw is responsible for 57 per cent of total stock, and current supply in the city is around 185,000 square metres with a further more than 10,000 square metres planned or under construction.

As demand for flexible workspace solutions has increased, so too has the number of providers offering these services. But not proportionally. Warsaw is now home to many coworking spaces and most of these are fully occupied. This puts pressure on prices which are going up – together with increasing cost of operation. On the other

hand it is extremely hard to open a new business centre in Warsaw because of the supply gap, the aftermath of Covid-19. This is the reason why most of our recent conversations with clients have focused first on securing space and only then only then on price.

Second, why flex? There are four main flex space advantages which are the key drivers of the popularity behind the workplace-as-a-service solution. The first reason is reduction in capital expenses – you take over fully furnished office space with access to common areas which very often include high quality meeting rooms, lounge areas, kitchen, terraces.

This means better, ready-to-use amenities for employees included in the price. And because at the end of the day this is a sharing economy, very often quality or utilisation of those spaces are better than in a standard office. How many companies choose professional coffee or a barista as part of their office amenities?

Of course, these are not the top priorities when you must develop the business or focus on growing headcount. But because you share the space with other companies, utilisation of the space and services is usually more efficient, hence lower day-to-day running costs.

Last but not least, flexibility in terms of size and time is very important, especially in times of high market volatility.

But all these reasons are shadowed by the most important one, especially for the IT/tech sector – community.

We all know the situation on the employee market in the tech sector – the number of memes with "IT guys" not willing to come to the office says it all. Many of our current clients have a problem with maintaining office attendance at 30 per cent per week. Some of them have attendance as low as 15 per cent with rotation on the level of 25 per cent.

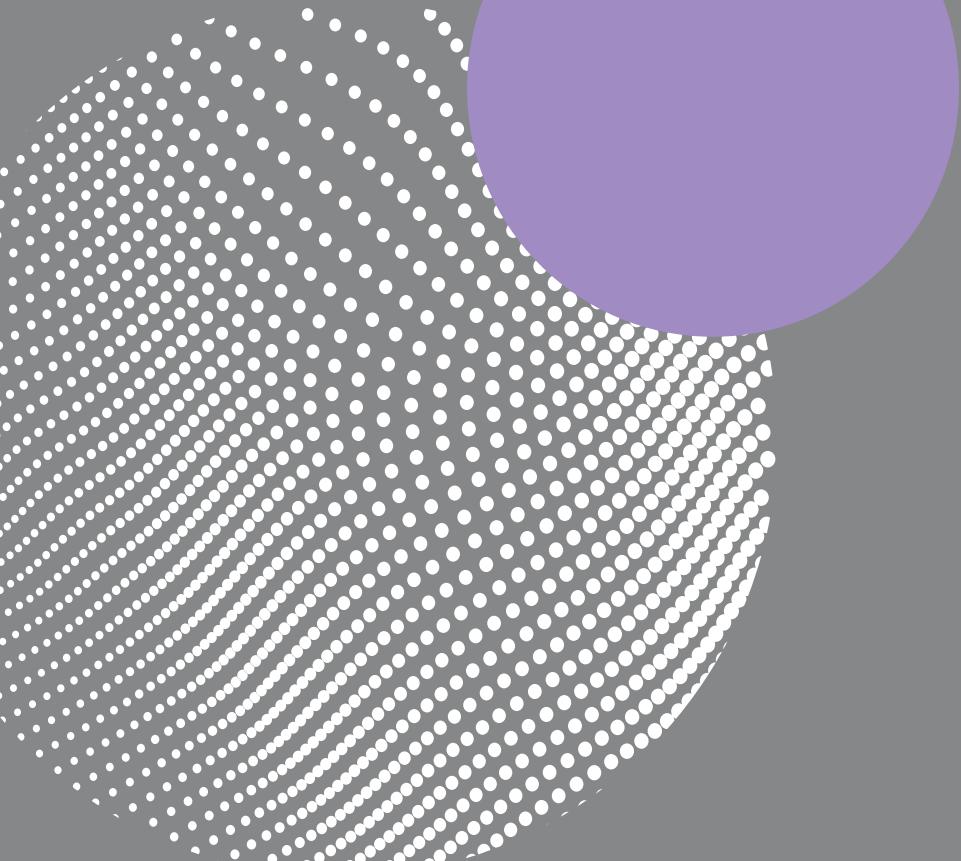
An office on the highest floor in the most expensive building won't change that. At the same time, there are operators who care about community management and their attendance is not less and often higher than 30 per cent.

Community management in the flex space is not something new, but it is little talked about and draws attention due to its non-excel friendly nature. However, it is a very important factor to consider when creating a company, especially one growing fast.

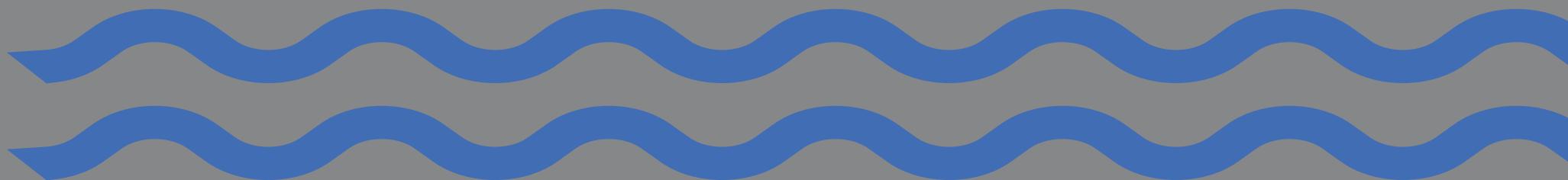
The motto of the old school of commercial real estate "location, location, location" is still very relevant, but to keep up with today's trends, we need to focus more on people than the premises themselves.

Otherwise, there will be no one who to show up. And is an empty location better than no location?





COUNTRY PROFILES



ALBANIA



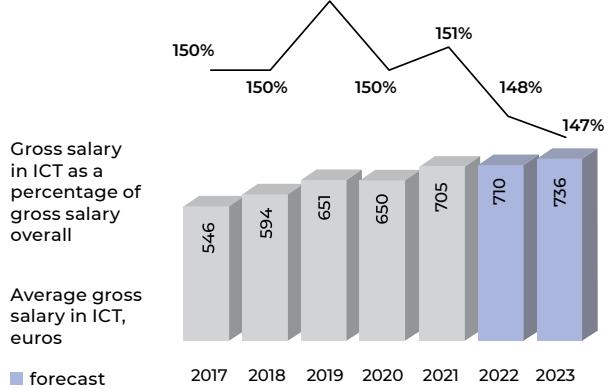
OVERVIEW

Population (million)	Employed population	GDP nominal (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	Inward FDI (millions, euros)
2.794	1,248,748	15,435	5,525	365%	1,234

Albania's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
49	53	48	67	47	33

ICT GROSS SALARY IN 2017-23



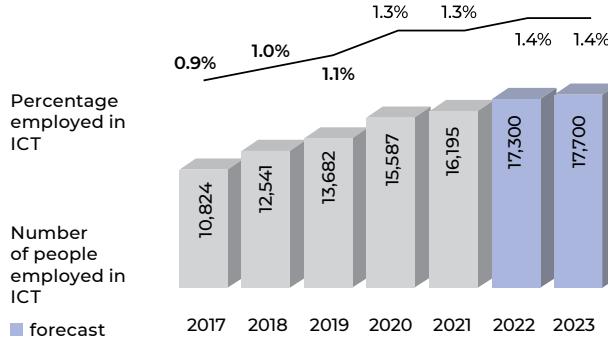
In recent years, Albania has made considerable progress in providing online public services, developing digital infrastructure, and establishing a strong legal framework. The government's strategic approach to using ICTs for governance has contributed to these achievements. However, the country still faces challenges, including insufficient investment, lack of rural connectivity, and low participation of female entrepreneurs in start-ups. A notable milestone for the country is the opening of EU accession negotiations in 2022 which is expected to provide additional opportunities for growth and development in the ICT sector.

Albania's ICT sector has continued to experience growth. The country's total value of ICT exports reached 97 million euros in 2021 - a 35 per cent increase from the previous year. This also marked a return to pre-pandemic levels. With ICT exports projected to grow even further in the future, the sector is increasingly becoming a vital contributor to the Albanian economy. The number of employees in the ICT sector has also risen reaching 16,195 in 2021, up from 15,587 the year before. In 2021, the share of ICT jobs in the country was at around 1.3 per cent, the same as the previous year but higher than in 2019. Furthermore, ICT exports as a share of GDP reached 0.63 per cent, changing the negative trend of the previous four years, while the ICT value added in the economy remained stable at around three per cent.

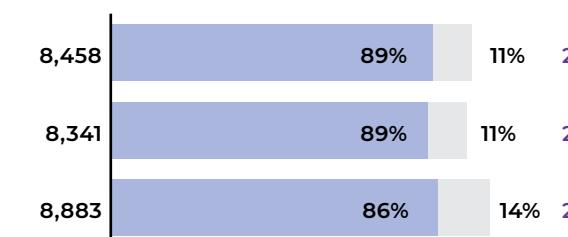
On the ICT education front, a rise in the number of graduates from 1,787 in 2020 to 1,830 in 2021, as well as the increase in the number of students from 8,431 to 8,883, is a positive sign. Most graduates in 2021 were bachelors (79 per cent) while the rest, 21 per cent, were masters and doctoral students.

Policy-wise, the government has continued to introduce new laws and reforms to strengthen the sector. In 2022, it adopted a national digital agenda for 2022-2026, while in 2021, it adopted the national cybersecurity strategy (2020-2025). Other legal reforms aim to create a more supportive environment and encourage investment for start-ups and innovation. Two recently approved laws

ICT EMPLOYMENT IN 2017-23

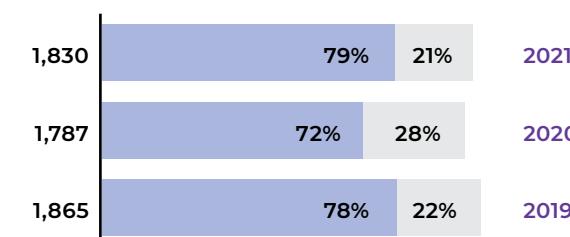


ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



bachelor
master's and doctoral

provide for a reduced corporate income tax rate for start-ups, and a legal framework for the development of fintech start-ups.

On the digitalisation of public services, Albania ranks 8th in Europe and 19th in the world (2021), according to a recent UN Digital Development Report. One of the key initiatives launched by the Albanian government is the e-Albania portal, which provides a centralised platform for accessing a range of public services online. Since January 2021, 95 per cent of all public services (1225 in total) are provided online. Two million users – citizens and businesses benefit from these services.

On the start-up scene front, Albania saw an improvement in 2022. It jumped three spots from the previous year in the Global Start-up Ecosystem Index (GSEI) ranking at 75th position worldwide. In addition, it ranked 20th among Eastern European countries. Tirana's start-up ecosystem is ranked 462 globally (out of the top 1000 cities) climbing by 27 places since last year. Tirana is also ranked first in Albania and 35th in Eastern Europe.

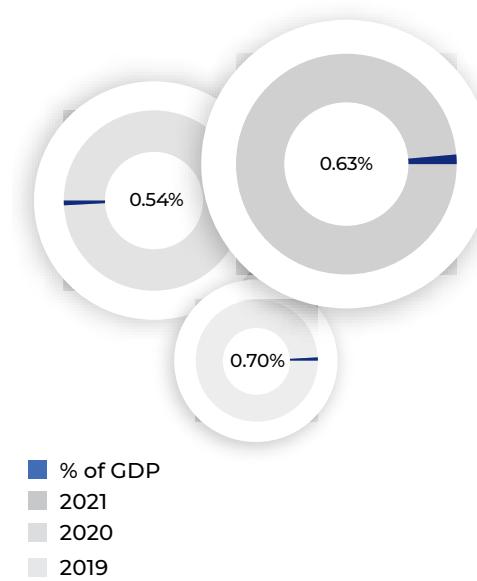
Albania's start-up scene is best represented in software and data, e-commerce, and retail, and in fintech. Some of the most successful stories in software and data are those of Kreatx

and Hello. Kreatx has developed an ERP and plans to make it accessible to companies for mobile usage. Hello is a mobile app that connects people in a two-minute conversation.

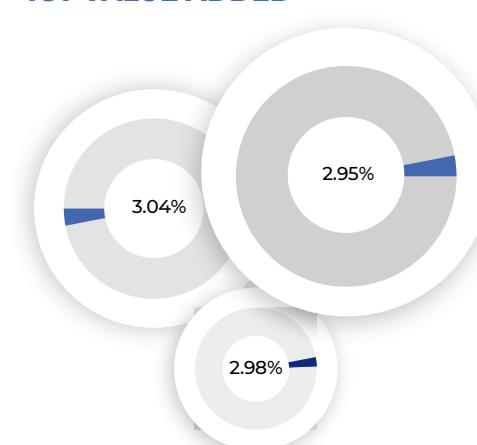
Several accelerators and platforms are functional such as Digital Tirana that provides necessary information for up-and-coming ICT businesses. In terms of ICT infrastructure as of 2019, nearly 62.1 per cent of the population had mobile broadband subscriptions, and in 2020, approximately 72 per cent of the total population had internet access. Additionally, the percentage of enterprises with faster (>10 MB/s) network connections increased from 79.8 per cent in 2020 to 90.5 per cent in 2021, indicating further improvements in the country's digital infrastructure.

Albania's IT Competitiveness Index ranking in emerging Europe climbs up to the 21st out of 23 nations. The number of IT graduates per 100,000 of population is impressive at 65.51, placing second in the region after Estonia which ranks first. Albania also ranks 5th in the Online Services Index and 3rd in the E-Participation Index. The speed of broadband Internet is 43.52 Mbps, while the cost of data is 16.64 euros. Additionally, Albania's Global Cybersecurity Index ranks 18th, suggesting a reasonable level of security readiness.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	87.9	68.4	96.3	72.2	96.9
of which export of computer services (millions, euros)	20.3	37.6	47.4	52.0	81.9

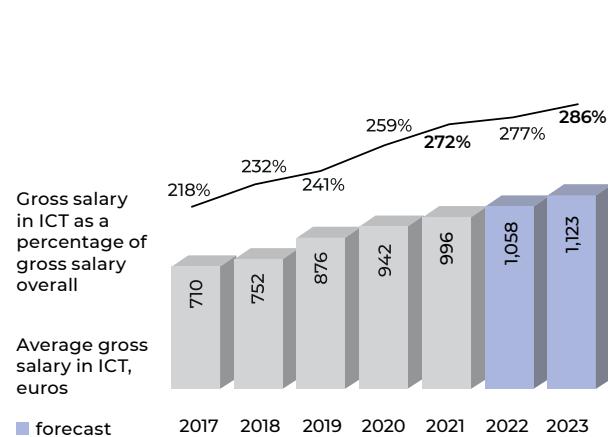
ARMENIA



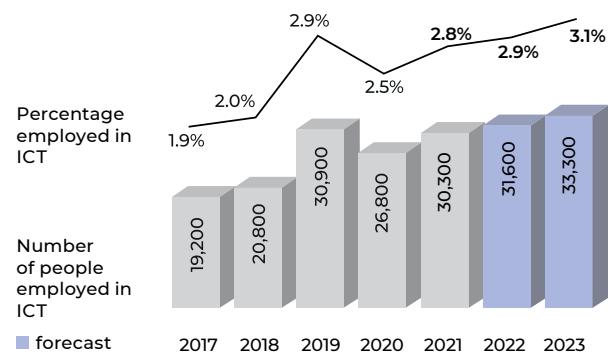
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
2.961	1,088,300	11,720	3,958	554%	379
Armenia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
50	48	-	85	57	64

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Over the past decade, Armenia's ICT sector has made remarkable strides, positioning itself as one of the top ICT outsourcing destinations in the region. Most of the ICT companies are in Yerevan, the country's capital city, reflecting the industry's high concentration there. The impressive growth of the ICT sector in Armenia is due to various factors, including the country's well-educated workforce, its strategic location at the intersection of Europe and Asia, and the government's initiatives and incentives to boost the sector.

The ICT sector is growing rapidly, providing more job opportunities and higher salaries. The percentage of people employed in ICT compared to the overall economy has risen from 1.8 per cent in 2015 to 2.8 per cent in 2021. Also, the average gross salary in ICT is consistently higher than the overall economy, with the gap widening over time. In 2021, the average gross salary in ICT was almost three times higher than the overall economy's average gross salary.

In addition, the ICT sector is becoming increasingly important to the economy in terms of its ability to generate income from exports. The percentage of GDP represented by ICT exports has steadily increased over the years, with a significant jump from 1.92 per cent in 2019 to 2.60 per cent in 2020, and further growth to 2.76 per cent in 2021.

ICT STUDENTS

5,816	88%	12%	2021
5,388	89%	11%	2020
4,796	90%	10%	2019

bachelor
master's and doctoral

ICT GRADUATES

1,137	80%	20%	2021
1,141	81%	19%	2020
1,355	79%	21%	2019

bachelor
master's and doctoral

On the education front, more students are opting for undergraduate studies in ICT but not necessarily pursuing advanced degrees. The number of ICT bachelor graduates has fluctuated over the years, with a peak of 1,039 in 2018 and a low of 649 in 2017. In contrast, the number of ICT masters/doctoral graduates has been more stable, with minor fluctuations ranging from 156 to 316 graduates in the last seven years.

Armenia's thriving start-up scene is making great strides in the global rankings and is quickly becoming the leading start-up hub in Eastern Europe. The success of unicorn PicsArt is a clear indication that Armenian entrepreneurs are hardworking and innovative, creating products that meet market demands.

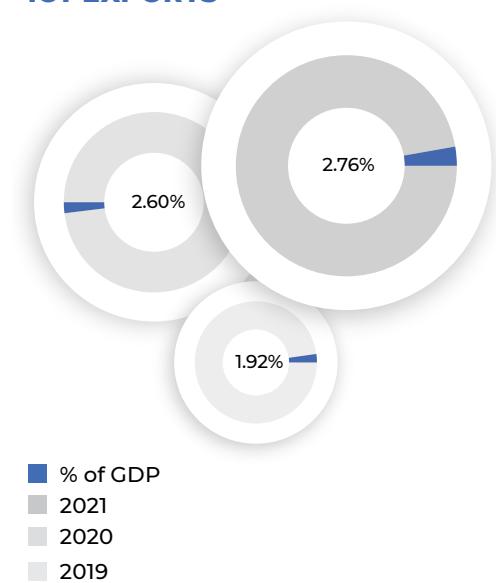
The Armenia Startup Academy is an excellent accelerator that provides entrepreneurs with valuable education and training to help them create successful businesses. By equipping start-ups with the right knowledge and skills, they are able to build products that are loved by their customers.

It is worth noting that Armenia's start-up ecosystem is strongest in social and leisure, software and data, and marketing and sales. Notable

start-ups include Renderforest, SoloLearn, and Krisp. Renderforest's free online video production platform is an excellent resource for businesses and individuals looking to create high-quality videos. SoloLearn's community learning platform is making programming knowledge accessible to people worldwide, while Krisp's AI-based audio processing software is offering real-time noise and voice suppression technology.

Armenia's IT competitiveness has seen a slight improvement, as it now ranks 17 out of 23 emerging Europe nations, up from 18th last year. The country has also demonstrated promising growth in terms of the number of IT graduates, ranking 2nd for the average annual increase in this field. Additionally, Armenia ranks 3rd in terms of the average annual increase of ICT specialists employed. However, the country still lags in some areas, such as the speed of broadband internet, where it ranks 19th with an average of 40.08 Mbps, and the cost of data, where it ranks 12th with an average of 15.73 euros. The Human Development Index and the Global Cybersecurity Index both rank Armenia at 22, indicating that there is still room for improvement in these areas as well.

ICT EXPORTS

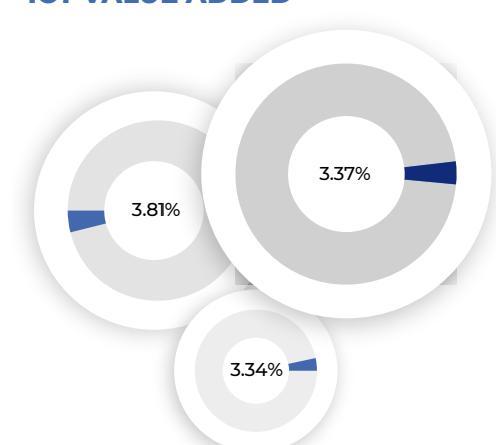


EXPORTS**

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	187.3	213.1	233.7	287.6	323.3
of which computer services (millions, euros)	146.6	164.2	198.4	260.8	295.5

** SOURCE: ITC, UNCTAD, WTO based on IMF statistics for 2016-2019 and estimated for 2020

ICT VALUE ADDED



AZERBAIJAN



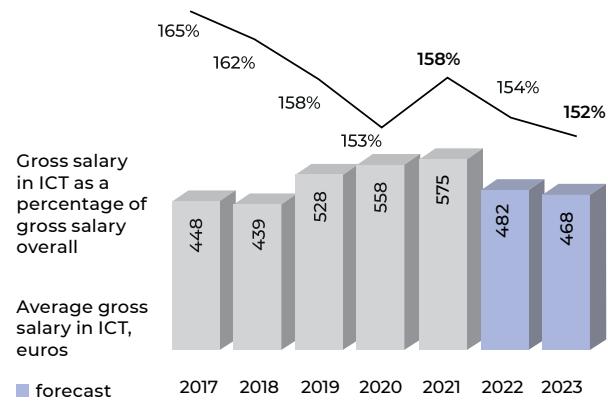
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
10.156	4,988,200	46,355	4,564	857%	-1,708

Azerbaijan's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
75	103	56	91	92	83

ICT GROSS SALARY IN 2017-23



Azerbaijan's ICT sector is vital to its economy, with stable employment numbers. With domestic digitalisation reforms and strategic trans-regional digital mega-projects like the Digital Silk Way, Azerbaijan aims to improve its digital ecosystem.

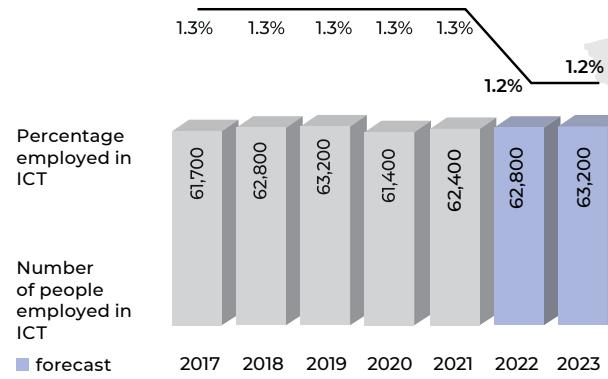
Despite a slight decline in 2020, the number of individuals employed in the ICT sector has remained relatively stable over time. In 2015, the sector employed 60,300 people, which increased to 63,200 in 2019, dipped to 61,400 in 2020, and then rebounded to 62,400 in 2021.

The progress in the ICT industry is in its early stages, with variable ICT export volume. In 2015, ICT services exports were at 78.2 million euros, with computer services exports at 15.8 million euros. There was a decline in 2016 and 2017, followed by an increase in 2018 and a decline in 2019. However, there was a significant increase in both ICT and computer service exports in 2021 after a slight increase in 2020.

In 2022, Azerbaijan's start-up scene grew, moving up four spots from the previous year to 85th worldwide and 21st in Eastern Europe, as per Startup Blink. Baku is the base for 98 per cent of Azerbaijan's start-ups, with a vibrant ecosystem ranked 443rd globally. Promising start-ups in Baku include Keepface, Clopos, and Nextsale, with strengths in software and data, fintech, and marketing and sales. Baku aims to expand the start-up ecosystem by serving as a domestic hub and encouraging seed funding in other cities like Ganja and Shamakhi. The country leads the Innovation and Start-up Ecosystems component of the EU4Digital Initiative, which facilitates networking among ecosystem actors. The EU will provide direct support to start-ups in the 2021-2027 funding period.

On the policy front, Azerbaijan is working to implement digitalisation reforms aimed at improving the domestic digital ecosystem, promoting economic prosperity, and establishing the country as a digital hub for the wider region. Many of these reforms are focused on public administration, and over the past decade, Baku has launched a range of digital initiatives, including the

ICT EMPLOYMENT IN 2017-23



ICT STUDENTS

9,839	91%	9%	2021*
10,200	92%	8%	2020*
10,013	92%	8%	2019

bachelor and short-term
master's and doctoral
* estimate

ICT GRADUATES

4,360	91%	9%	2021*
4,033	91%	9%	2020*
3,214	91%	9%	2019

bachelor and short-term
master's and doctoral
* estimate

State Control Information System, Digital Trade Hub, an electronic procurement platform, e-court system, e-healthcare, e-education, e-social services, and e-property, among others.

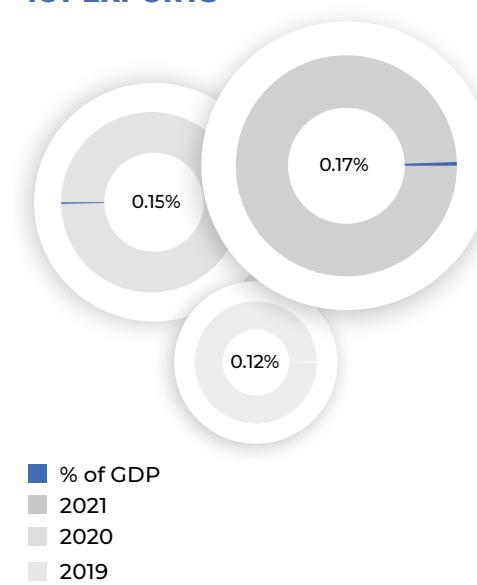
With its objectives tied to the Digital Trade Hub project, Azerbaijan became the first country in the world to offer interested international entrepreneurs' mobile residency (m-Residency) and the second, after Estonia, to offer electronic residency (e-Residency). These initiatives provide a government-verified electronic identity for online authorisation and electronic signatures through a special SIM card or digital token. In addition, to become a regional hub for Industry 4.0, the government established a new centre for Industry 4.0 in 2021. Same year, the government approved the Azerbaijan 2030 National Priorities for Socio-economic Development, which aligns with the efforts to develop the ICT sector.

In addition to domestic digitalisation reforms, Azerbaijan is also working on strategic trans-regional digital mega projects. One such initiative is the Digital Silk Way, launched in 2018, which aims to construct a modern fibre-optic network connecting Europe through Georgia and Azerbaijan to Central and South Asian markets. This project seeks to establish a digital ecosystem in line with global standards, reduce dependence on foreign internet providers, and improve access to various digital services for the 1.8 billion people living in the associated countries.

In education, the total number of IT graduates increased from 2,718 in 2015 to 3,214 in 2019. The total number of students peaked at 14,571 in 2016 and has since decreased to 10,013 in 2019.

Azerbaijan worsened its position in the IT Competitiveness Index this year, and now ranks 22nd out of 23 emerging European nations. However, the country has shown strength in economic resistance to Covid-19, ranking first for the second year in a row. Azerbaijan also ranked 11th in the International Property Rights Index and 10th in the Global Cybersecurity Index. However, the number of IT graduates per 100,000 of population was only 23rd, indicating room for improvement in this area. In terms of internet speed, Azerbaijan ranked 21st with a speed of 27.15 Mbps, while the cost of data ranked an impressive 5th at 11 euros.

ICT EXPORTS

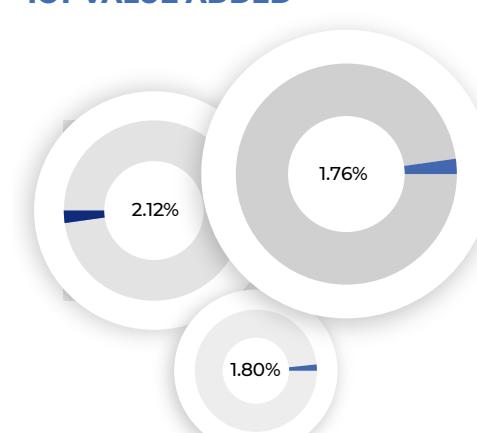


EXPORTS**

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	58.7	66.9	52.2	57.0	81.4
of which computer services (millions, euros)	5.3	5.7	11.1	11.4	6.2

** SOURCE: ITC, UNCTAD, WTO based on IMF statistics for 2016-2019 and estimated for 2020

ICT VALUE ADDED



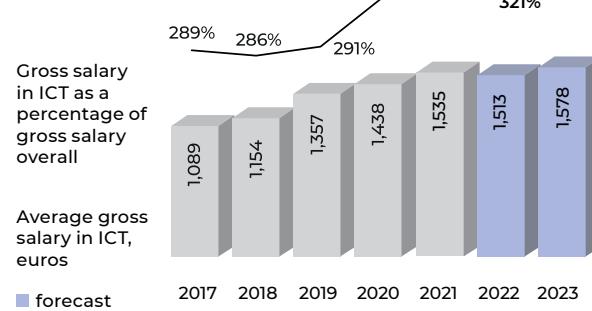
BELARUS



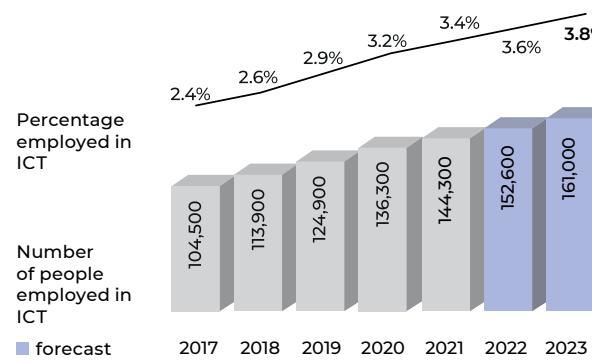
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
9.256	4,284,500	57,668	6,231	452%	1,233
Belarus's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
145	61	38	60	39	99

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Belarus is a landlocked country located in Eastern Europe with a population of around 9.3 million people. While Belarusian is the official language, spoken by 24 per cent of the population, around 70 per cent speak Russian as their official language. The country has a strong commitment to developing its ICT industry and producing a skilled IT workforce. It has made significant progress in developing its start-up ecosystem and promoting a skilled workforce, particularly in the ICT sector, which is a significant contributor to the country's economic growth.

On the start-up ecosystem scene, Belarus ranks 70th worldwide and 18th in Eastern Europe in the Global Startup Ecosystem Index (Startup Blink), with Minsk claiming the top spot in Belarus and ranking 313th globally. The country has notable start-ups such as OneSoil, Scorum, and Verv, which are disrupting the agricultural industry, revolutionising sports media platforms, and promoting healthy lifestyles. The social and leisure sector is also noteworthy, with Belarus ranking in the top 58 globally and hosting eight of the region's social and leisure startups. The software and data industry is also growing, ranking 64th worldwide.

The ICT sector is a significant contributor to the country's economic growth and development. The number of ICT specialists employed has consistently increased from 96,100 in 2015 to 144,300 in 2021, accounting for 3.4 per cent of total employment. The export of ICT services, particularly computer services, is also growing, with an overall growth

ICT STUDENTS

20,826	95%	5%	2021*
23,319	96%	4%	2020*
21,276	95%	5%	2019*

bachelor and short-term
master's and doctoral
* estimate

ICT GRADUATES

5,158	93%	7%	2021*
5,335	94%	6%	2020*
5,435	94%	6%	2019*

bachelor and short-term
master's and doctoral
* estimate

of 200.0 per cent and 248.5 per cent, respectively, from 2015 to 2021. The Belarusian Hi-Tech Park, set up in 2006, is recognised as a prominent hub for software and IT, with almost 900 companies, including leading European and global firms such as EPAM Systems, Game Stream, and Viber Media, being its residents.

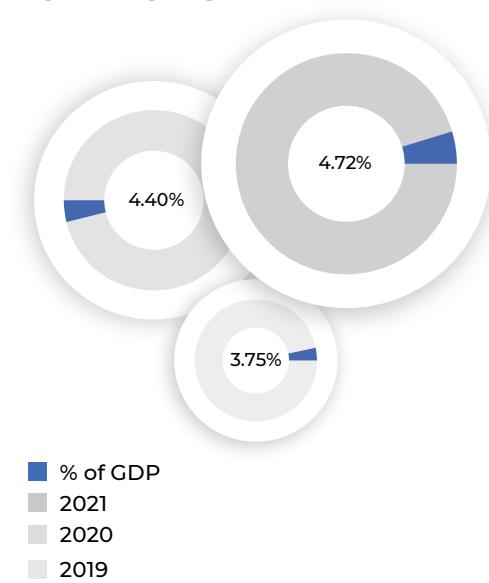
Belarus has a strong position in pursuing further digital transformation, with cellular telecommunication networks covering 99 per cent of its territory and 85 per cent of its population being internet users. However, there is an imbalance in internet and digital services availability, with only 73 per cent of rural residents having access compared to 89 per cent of urban residents. To address this, the government introduced a Digital Development of Belarus 2021-2025 programme that focuses on improving connectivity and digital skills. The programme includes measures for creating a modern information and communication infrastructure, implementing digital innovations in the economy and "smart cities" technologies, and ensuring the information security of such solutions. Additionally, the programme aims to improve the e-government infrastructure.

On the other hand, Belarus ranks last in economic freedom and regulatory category, and 21st in the Global Cybersecurity Index, implying that there is a room for significant improvements in these areas.

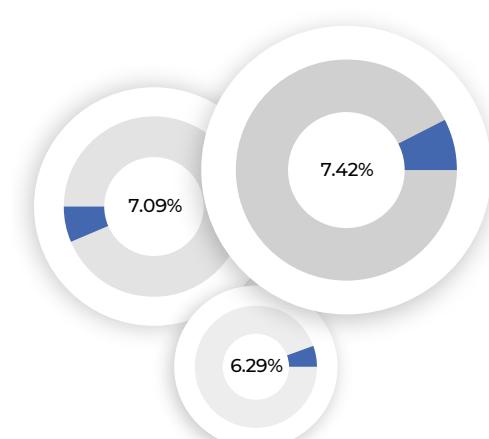
EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	1,289.2	1,572.5	2,155.0	2,364.0	2,720.6
of which computer services (millions, euros)	1,068.2	1,345.9	1,898.4	2,210.5	2,553.3

ICT EXPORTS



ICT VALUE ADDED



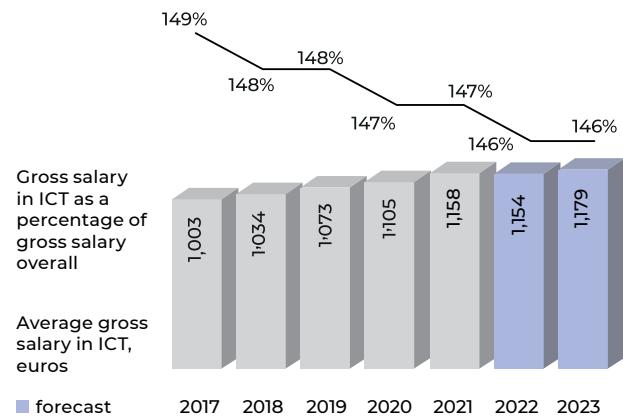
BOSNIA AND HERZEGOVINA



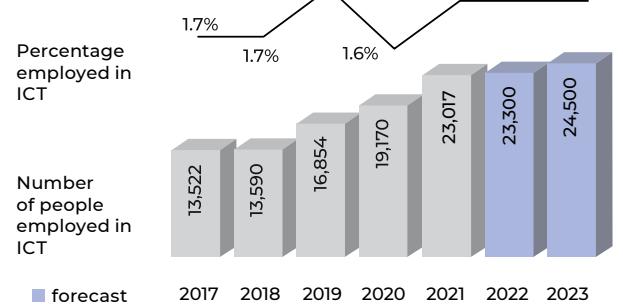
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
3.453	1,151,000	19,755	5,721	303%	519
Bosnia and Herzegovina's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 72) (2016)	Online Service Index (of 193)
63	63	62	74	26	108

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Bosnia and Herzegovina's ICT sector has experienced rapid growth in recent years, with a surge in new companies and innovative projects. The country's highly educated workforce has drawn the interest of global IT firms looking to outsource their operations. With its advantageous location, diverse culture, and cost-effective living standards, the country is an attractive destination for entrepreneurs and start-ups seeking to establish themselves in the region.

The average wage in ICT sector has increased steadily from 985 euros in 2015 to 1,158 euros in 2021. Moreover, in 2021, there were 23,017 people employed in the industry, which accounted for two per cent of the total employed population.

When it comes to ICT exports, there has been a steady increase from 0.75 per cent in 2015 to 1.32 per cent in 2021. This indicates that the ICT sector is becoming more important for the economy as a source of export revenue. On the other hand, the ICT value added as a percentage of GDP has remained relatively stable over the years, with a slight decrease from 4.53 per cent in 2015 to 4.46 per cent in 2021.

Bosnia and Herzegovina is a new player in the start-up scene but is actively working to create a supportive environment for entrepreneurship, innovation, and technological progress. However, its global ranking in the GSEI dropped ten spots to 95th in 2022, and it

ICT STUDENTS

6,227	90%	10%	2021
6,226	90%	10%	2020
6,035	90%	10%	2019

bachelor
master's and doctoral

ICT GRADUATES

762	84%	16%	2021
839	89%	11%	2020
822	82%	18%	2019

bachelor
master's and doctoral

ranks 23rd in Eastern Europe. The country offers various acceleration and incubator programs for start-ups, including SPARK, Fondacija 787, and Fondacija Mozaik. Additionally, the Innovation Centre Banja Luka and the Ministry of Programming provide support for Bosnian job creation and entrepreneurship. Despite its early-stage ecosystem, the country has some successful start-ups, such as Project Zdraviji.ba and Kliker.ba. Project Zdraviji.ba, offers health information, and a free online database of health workers and institutions. Kliker.ba is another web portal that compares financial and telecommunication services offered by providers in the country.

On the policy front, Bosnia and Herzegovina has made no progress in developing a countrywide strategy for ICT, including adopting a law on electronic identity and ensuring interoperability of e-signature services. Additionally, there is no comprehensive legislative framework for network and information system security, with only one entity (Republika Srpska) having a law in place. The lack of progress in these areas hinders the country's ability to fully embrace information society services.

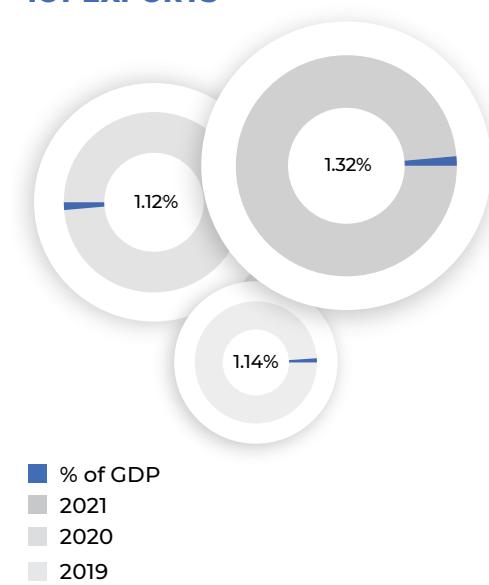
Bosnia and Herzegovina is making efforts to improve its

business environment and attract investments, such as expanding eligibility for investment incentives and streamlining administrative procedures. Despite these measures and the adoption of a new bankruptcy law, there is still no comprehensive strategic framework to address barriers to starting a business, tax rules, and regulatory differences across levels of government, which contribute to informality.

When it comes to education, the total number of graduates has been gradually decreasing from 888 in 2015 to 762 in 2021. On the other hand, the total number of students has fluctuated over the years, with a peak of 6,655 in 2016 and a slight increase to 6,227 in 2021.

In the IT Competitiveness Index, Bosnia and Herzegovina continues to rank 23rd. Nevertheless, the country's ICT sector saw the second-highest average annual increase in employment after Lithuania, further highlighting the potential of this industry. Despite economic challenges, the country's Covid economic resistance was ranked at number four among the emerging Europe nations, indicating a degree of resilience in the face of the pandemic.

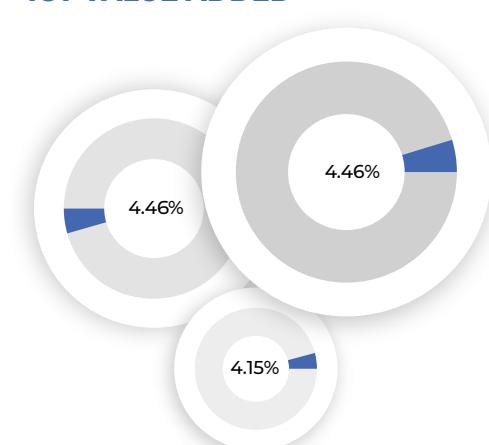
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	142.5	171.5	205.3	196.4	260.4
of which computer services (millions, euros)	83.2	101.1	137.6	143.4	202.8

ICT VALUE ADDED



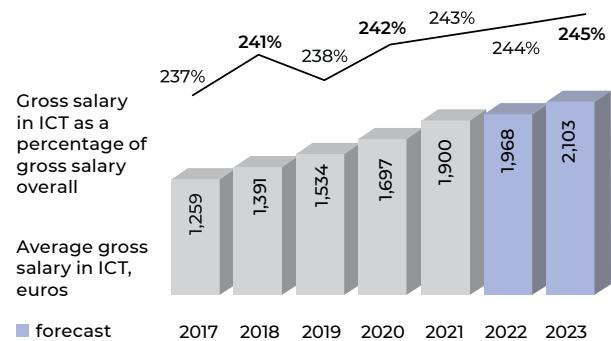
BULGARIA



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
6.839	3,076,500	71,070	10,392	493%	1,496
Bulgaria's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
32	44	49	68	21	65

ICT GROSS SALARY IN 2017-23



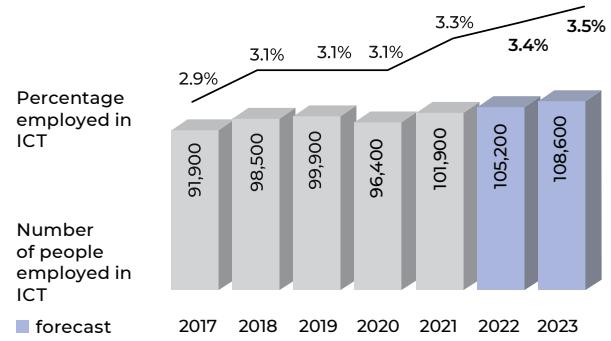
Bulgaria's ICT industry is characterised by a robust IT outsourcing sector, a developing start-up environment, and a highly skilled workforce. The ICT sector is a significant contributor to the country's economy, generating over three per cent of its GDP. In particular, the IT outsourcing industry is well-established, and many multinational corporations outsource their software development requirements to Bulgarian firms due to the country's favourable business environment and competitive pricing. The country's advantageous tax policies and access to EU funding make it an appealing destination for entrepreneurs seeking to establish and expand their enterprises.

It is worth noting that the ICT sector is a lucrative field to work in, with salaries that are consistently increasing and higher than average salaries in the economy. The average salary in the ICT sector has been consistently increasing since 2015. In 2021, it was 1,900 euros, a significant increase from the 1,034 euros reported in 2015. The percentage of ICT specialists in employment was 101,900, representing 3.3 per cent of people employed in the economy.

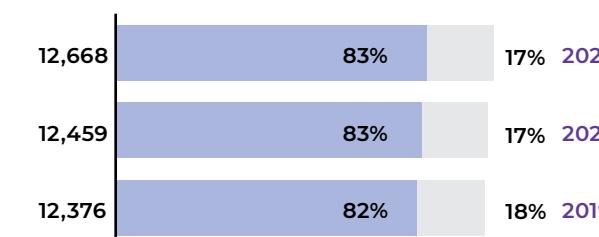
On the education front, 2021 saw a total of 12,668 IT students and 2,335 IT graduates, which was a slight increase from the previous year's figures of 12,459 students and 2,147 graduates. The use of ICT in education has become an integral part of the teaching and learning process in the country. To support the education process, a variety of ICT tools and technologies, including software applications, e-learning platforms, online resources, and multimedia materials are used from 2,600 educational institutions in the country, catering to more than one million students.

When it comes to policy reforms, the government has introduced the Digital Bulgaria 2025 Programme to modernise and widely implement intelligent IT solutions across all sectors of the economy and society. Furthermore, the programme seeks to strategically enhance digital competence and skills at all levels. In

ICT EMPLOYMENT IN 2017-23

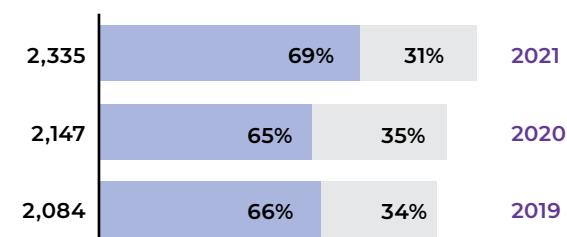


ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



bachelor
master's and doctoral

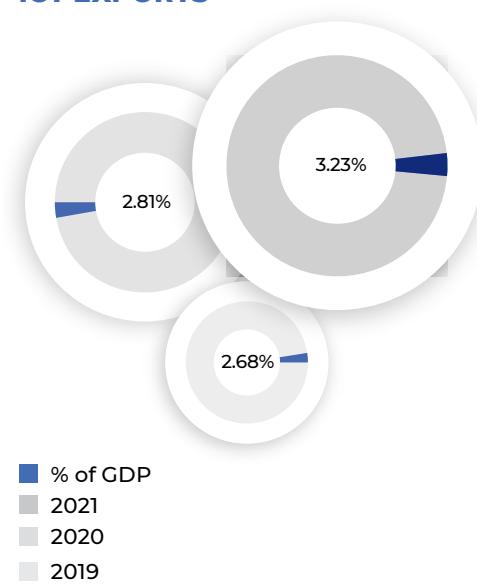
terms of digital skills development on a national level, Digital Bulgaria 2025 outlines three primary objectives focusing on modernising ICT education in schools and higher education, increasing the number of highly qualified ICT professionals, and improving the digital and ICT skills of the workforce. The latter objective includes the consideration of upskilling and reskilling programmes, which will be financed by the Bulgarian government.

In addition, the country has taken significant strides in advancing its digital public services through policy reform. In 2021, the country updated its National Strategy for e-Government to incorporate cutting-edge technologies such as AI, cloud computing, and blockchain. Bulgaria has established itself as one of the top countries in Eastern Europe for setting up a start-up, with three of its cities ranking in the top 1000 globally. Since 2022, Bulgaria has climbed to the 36th position worldwide and the 6th position in Eastern Europe. Some notable start-ups include GtmHub, Hyperscience, and Aeternity Blockchain. In energy and environment industry, successful start-ups include Domestina,

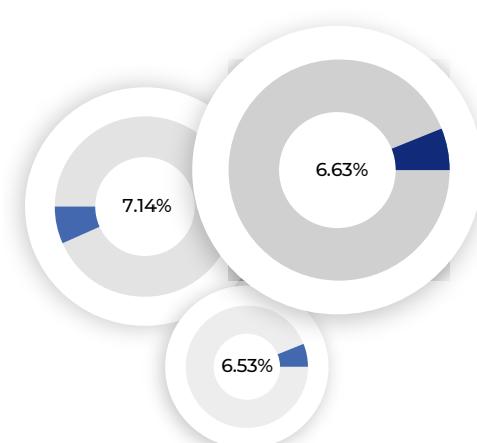
CogZum, and ViaExpo. Bulgaria's software and data start-ups are ranked 29th worldwide, with a concentration of around 38 start-ups in Eastern Europe. In addition, energy and environment is ranked 29th in the world, while marketing and sales is ranked 30th globally.

In the IT Competitiveness Index, Bulgaria remains strong, with a rank of 10, up from 11 last year. The country's IT infrastructure continues to be impressive, with secure internet servers per one million of population ranking the 5th in emerging Europe. The speed of broadband internet is also noteworthy, ranking 8th in the region with an average speed of 64.60 Mbps. Additionally, the cost of data is relatively affordable, ranking 6th with an average price of 11.88 euros. However, the payment gap between the ICT sector and the overall economy remains wide – reaching 143 per cent in 2021.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS**

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	1,018.2	1,246.0	1,652.8	1,730.0	2,296.1
of which computer services (millions, euros)	651.3	849.1	1,157.0	1,195.8	1,596.9

** SOURCE: ITC, UNCTAD, WTO based on IMF statistics for 2016-2019 and estimated for 2020

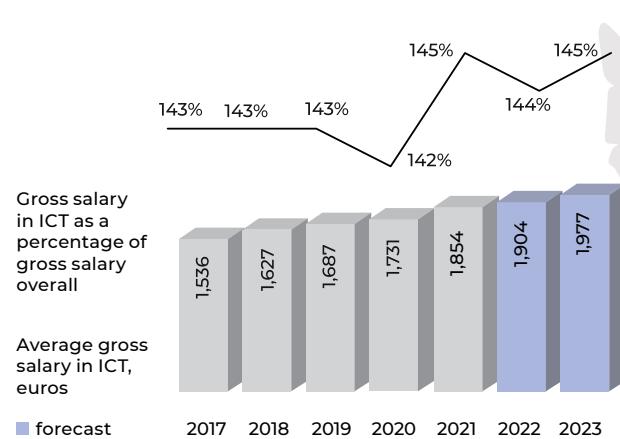
CROATIA



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
3.862	1,678,166	58,301	15,095	196%	569
Croatia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
46	34	40	40	11	36

ICT GROSS SALARY IN 2017-23



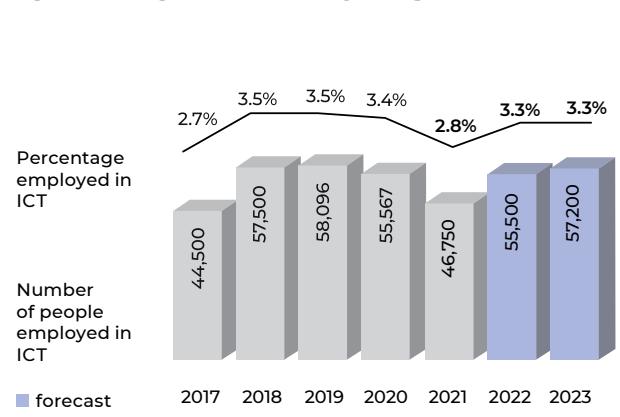
Croatia's digital economy has been on an upward trajectory in recent years. The ICT sector has been a key driver of this growth, offering higher salaries than the overall economy and experiencing consistent expansion. The country's policymakers are also actively working towards digital transformation, implementing several initiatives aimed at boosting competitiveness and skills development. Additionally, Croatia's start-up ecosystem is a notable strength, consistently ranked as one of the best in Central and Eastern Europe. This creates a conducive environment for innovative entrepreneurs looking to establish successful ventures.

In 2021, the ICT sector has experienced stronger growth in terms of average gross salary compared to the overall economy. The average salary in the ICT sector has increased from 1,731 euros in 2020 to 1,854 euros in 2021, which is an increase of approximately seven per cent.

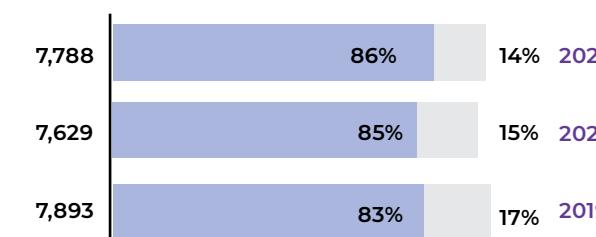
The ICT sector in Croatia employs a relatively small percentage of the overall workforce, but this percentage has been increasing in recent years. In 2015, there were 42,000 people employed in the ICT sector. In 2021, the ICT specialists employed reached to 46,750. The proportion of ICT specialists in the workforce in Croatia is relatively low, compared to the EU average of 4.5 per cent.

In 2021 the export of ICT services increased by 14.9 per cent from the previous year. Meanwhile, the export of computer services increased from 757.5 million euros in 2020 to 862.9

ICT EMPLOYMENT IN 2017-23

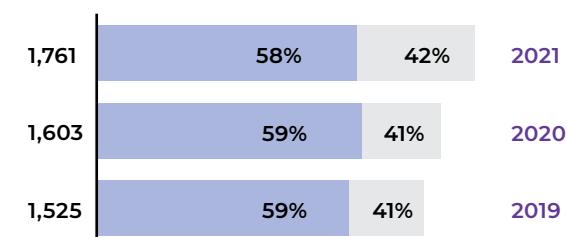


ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



bachelor
master's and doctoral

million euros in 2021, representing an increase of 13.9 per cent.

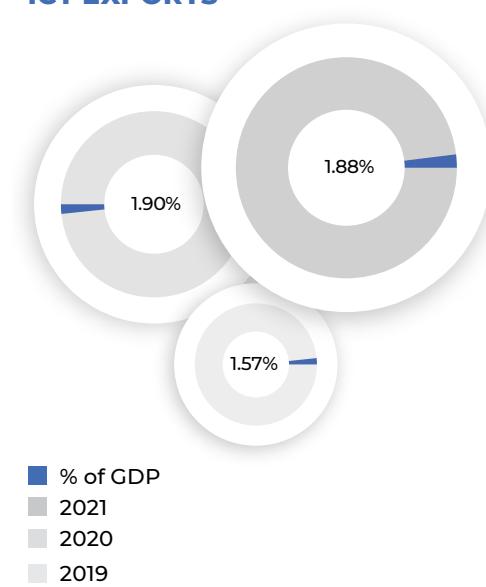
On the education front, Croatia has maintained a consistent number of students, with a minor fluctuation in the figures, over the last seven years. The number of students in 2021 was 7,788, which is a significant increase compared to the figure in 2015, which was 6,534. The number of graduates has increased, with a slight rise from 1,467 in 2015 to 1,761 in 2021, indicating that more students are completing their studies and entering the workforce. Additionally, 23 per cent of Croatian enterprises provide ICT training to their employees.

Croatia has taken several policy initiatives to drive its digital transformation. The country has developed a new Strategy for Digital Croatia 2030, while the National Development Strategy 2030 is also playing a vital role in guiding the digital transformation of the country's economy over the next decade. Croatia has worked towards the adoption of its smart specialisation strategy, which aims to improve the global competitiveness of Croatian enterprises through the development of digital business models and skills.

When it comes to the start-up ecosystem, Croatia is considered one of the best countries in Central and Eastern Europe to establish a start-up, with Zagreb, Rijeka, and Split being the top three cities. However, Croatia has fallen eight spots in the Global Startup Ecosystem Index, now ranking as the 45th best worldwide and 9th in Eastern Europe. Despite this, Croatia still has a place within the top 50 start-up ecosystems globally, with a strong presence in energy and environment, hardware and IoT, and social and leisure sectors. Noteworthy start-ups include OptimoRoute, Agrivi, and Include, while Rimac Automobili and Infobip are the country's two unicorns. Overall, Croatia has 144 start-up companies.

Croatia maintained its position in the IT Competitiveness Index - 13th place in emerging Europe. It retains 2nd spot in the EF English Proficiency Index. Meanwhile, its 5th ranking in Cybersecurity and 6th position in E-participation demonstrate a robust IT infrastructure and efforts to involve citizens in decision-making. Croatia's 6th place in the number of developers per 100,000 of population positions it to play a pivotal role in the regional ICT industry.

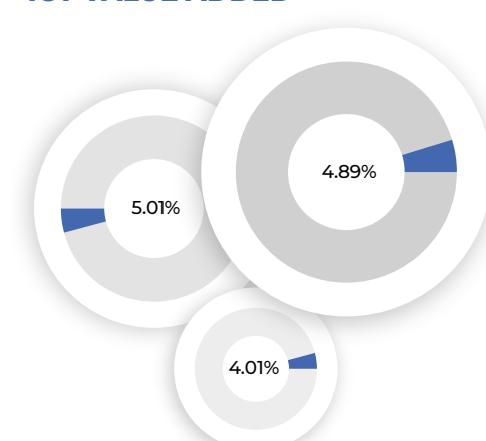
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	678.3	796.6	875.5	954.2	1,095.8
of which computer services (millions, euros)	524.0	623.6	674.7	757.5	862.9

ICT VALUE ADDED



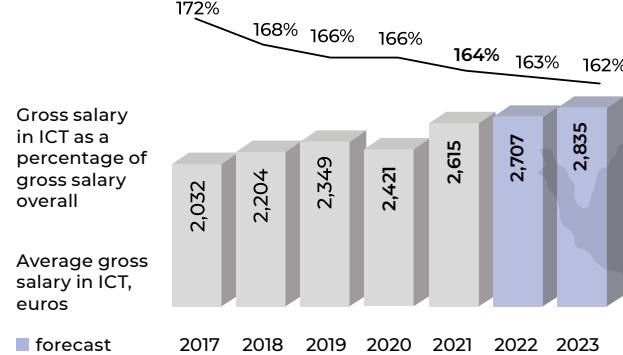
CZECHIA



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
10.517	5,213,369	238,253	22,655	316%	5,806
Czechia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
21	23	22	32	23	73

ICT GROSS SALARY IN 2017-23



With its prime location, robust economy, and business-friendly atmosphere, Czechia is rapidly gaining popularity as a top destination for entrepreneurs seeking to establish and expand their businesses in Central and Eastern Europe. Situated at the heart of Europe, Czechia has positioned itself as one of the most promising locations for start-ups in the region, thanks to its well-established ecosystem. Moreover, the substantial investments pouring into the country's start-up scene serve as a testament to its resilience, strength, and potential for future success and growth.

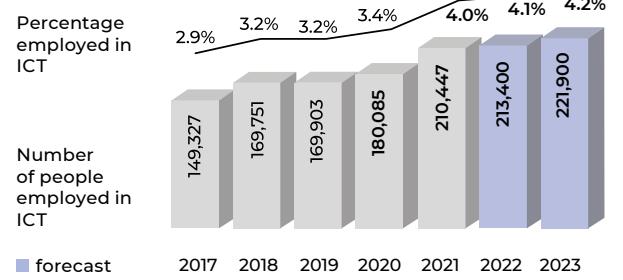
The ICT sector's importance to the overall economy is increasing, contributing significantly to the country's GDP. From 2015 to 2021, ICT exports as a share of GDP increased from 1.46 per cent to 2.20 per cent, and ICT value added as a share of GDP also rose from 4.67 per cent in 2015 to 6.29 per cent in 2021.

Moreover, the ICT sector is a high-growth and high-paying industry in Czechia. The average salary in the ICT sector has steadily risen from 1,797 euros in 2015 to 2,615 euros in 2021, reflecting a 45.6 per cent growth over the seven-year period. In the same fashion, the number of ICT specialists employed has been increasing. For instance, in 2015, there were 141,500 ICT specialists employed, which accounted for 2.8 per cent of total employment. By 2021, there were 210,447 ICT employed, comprising four per cent of total employment.

In the latest ranking of start-up ecosystems by Startup Blink, Czechia managed to maintain its position at 32 worldwide and 4th in Eastern Europe. The country has a strong focus on marketing and sales, software and data, and hardware and IoT, making it a popular destination for start-ups operating in these sectors. With notable start-ups like Kiwi, SocialBaker, and Worklio, Czechia is a great place to start and grow a business.

In the realm of accelerators, Czechia boasts a top-tier selection. Leading the charge is JIC Starcube, an international accelerator based in Brno that offers support to approximately one hundred registered companies in

ICT EMPLOYMENT IN 2017-23



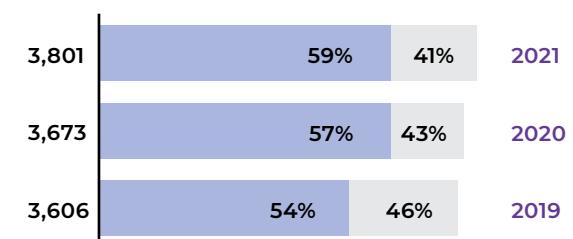
ICT STUDENTS



bachelor

master's and doctoral

ICT GRADUATES



bachelor

master's and doctoral

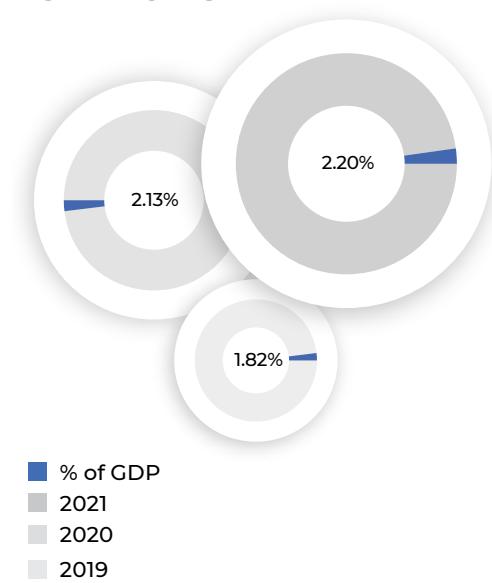
South Moravia. In Prague, StartupYard takes the second spot as a seed accelerator for tech start-ups. Their mission is to aid companies in building a successful product, launching quickly, and preparing to attract funding. Since 2011, StartupYard has accelerated 29 start-ups, with 19 still active, eight having raised angel capital, and four acquired. As a member of the Global Accelerator Network, StartupYard has established itself as a powerhouse in the industry. Rounding out the top three is AI Startup Incubator, which has a specialised focus on AI technology start-ups.

On the investments front, there are some notable examples. For instance, in 2021, Rohlik raised an impressive 190 million euros in funding, which was led by Partech and Index Ventures. Similarly, in 2022, Kiwi announced that it had secured an investment of 100 million euros from a preeminent global institutional investor to support the company's continued growth and expansion in the global travel industry. When it comes to education, the share of students pursuing ICT bachelors degrees has increased steadily from 67 per cent in 2015 to 73 per cent in 2021. The total number of students has also increased, with 22,449 students in 2021 compared to 21,492 in 2015.

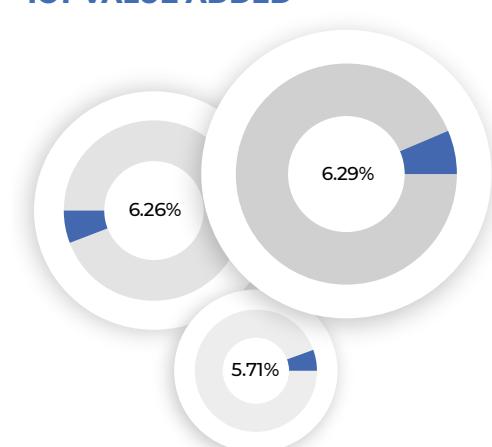
The new Czech government prioritises digital transformation in its four-year programme. A member of the cabinet is now directly responsible for digitalisation, especially in public services. The government is continuing its efforts to implement the Digital Czechia strategy, using funding from various sources. Czechia plans to increase the use of digital technologies by companies, train more ICT specialists, and ensure cross-border interoperability of digital public services, including e-health. The government aims to improve coordination among public institutions and offer new user-friendly services like virtual ID cards in mobile apps.

In the IT Competitiveness Index, Czechia ranks 7th among emerging European nations, a drop from last year's 3rd position. However, the country has maintained its impressive performance in other areas such as the International Property Rights Index and Regulatory Quality Index, where it ranks second. Additionally, the country's ICT sector output per employed worker is impressive, ranking third at 117,542 euros. The Human Development Index and Social Progress Index also demonstrate the country's commitment to sustainable development and quality of life, both of which rank second in the region.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	3,394.9	3,612.8	4,108.5	4,592.7	5,232.0
of which computer services (millions, euros)	2,603.2	2,847.2	3,435.2	3,718.2	4,143.1

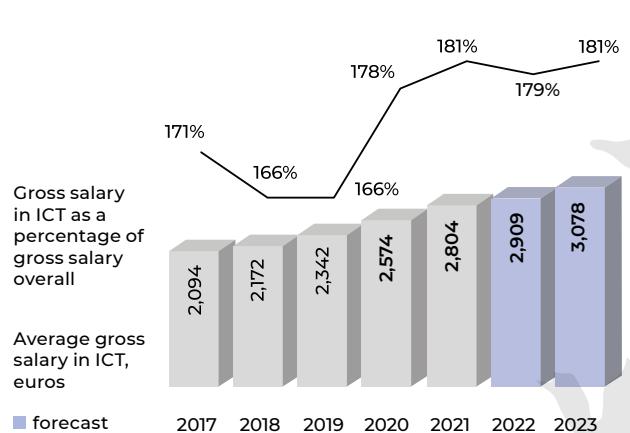
ESTONIA



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
1.332	654,200	31,445	23,611	495%	989
Estonia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
6	18	8	31	26	1

ICT GROSS SALARY IN 2017-23



Estonia, with a population of approximately 1.3 million, has gained a reputation for its advanced digital capabilities and entrepreneurial-friendly atmosphere. It is a trailblazer in digital signatures and paperless communication, with an astounding 99 per cent of government services offered online. This has made it a preferred location for foreign investment, as Estonia boasts a skilled workforce, a business-friendly environment, and advanced digital infrastructure, all of which make it an appealing destination for companies seeking to expand their operations. Furthermore, Estonia is recognised globally as a leader in digital innovation and has a flourishing start-up ecosystem.

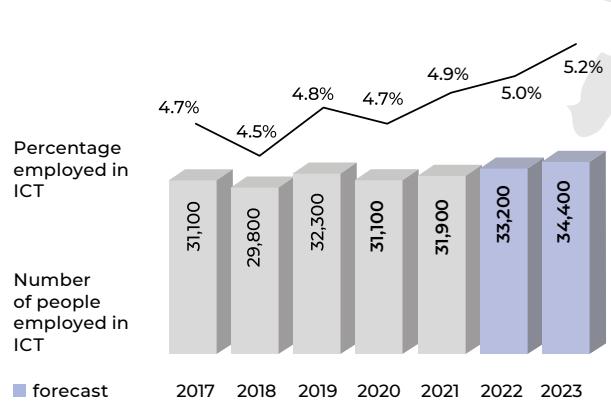
The country is also a flagship tax-competitive country not only in emerging Europe but even among the most advanced economies. It boasts a simple and transparent taxation regime with zero per cent tax on retained and reinvested profits, clear stock options regulation, and double taxation treaties in place with at least 60 countries. Moreover, it offers an affordable high quality of life, top-notch human capital, and a trustworthy legal system, making it one of the most favourable business climates in existence.

The ICT sector is an important and lucrative sector, offering higher salaries than many other sectors of the economy. Average wages in the ICT sector have been consistently higher than the average salary in the economy, with a significant gap between the two. In 2021, the average gross salary in ICT was 2,804 euros, while the average gross salary in the economy was 1,548 euros.

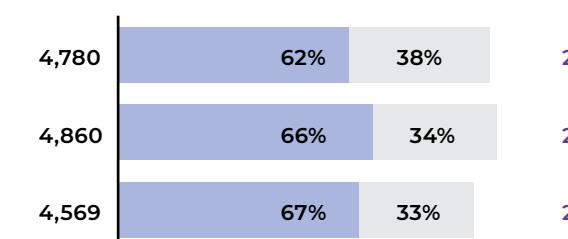
On the education front, the number of ICT bachelor graduates has been increasing from 2015 to 2021, with a small dip in 2018. In 2021, this figure was 554, representing 57 per cent of the total graduates. Similarly, the number of postgraduates has also been increasing reaching 421 in 2021, representing 43 per cent of the total graduates.

In 2020, ICT exports as a percentage of GDP increased to 3.60 per cent, up from 3.36 percent in 2019. Similarly, the percentage of ICT value added as a percentage of GDP increased to 6.86 per cent in 2020, up from 6.03 per cent in 2019. This indicates that the ICT sector added more value to the economy during the Covid-19 pandemic. However, the most significant increase occurred in 2021, where the percentage of ICT exports as a percentage of GDP jumped to

ICT EMPLOYMENT IN 2017-23



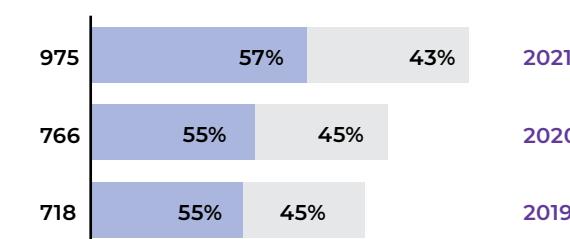
ICT STUDENTS



bachelor

master's and doctoral

ICT GRADUATES



bachelor

master's and doctoral

5.62 per cent, an increase of nearly two percentage points from the previous year. Additionally, the percentage of ICT value added as a percentage of GDP increased to 7.41 per cent in 2021, up from 6.86 per cent in 2020, indicating that the ICT sector continued to contribute more value to the economy.

Estonia's leadership in tech start-ups and entrepreneurship continues. As per the Estonian Startup Database, the country has seen a consistent increase in start-up growth, with 1,452 start-ups as of 2022. Estonia's thriving start-up ecosystem is a heavyweight in the European tech scene, with 10 unicorns, including Skype, Playtech, and Bolt, to its name. With 7.7 unicorns per million people, Estonia leads Europe in unicorns per capita. Estonia's start-up ecosystem has over 150 support organisations, including incubators and investment funds, available to help businesses accelerate. Startup Blink ranks Estonia's vibrant start-up scene at 13th place within the global top 20, with four cities in the top 100. In 2022, Estonia's start-up scene was first in Eastern Europe.

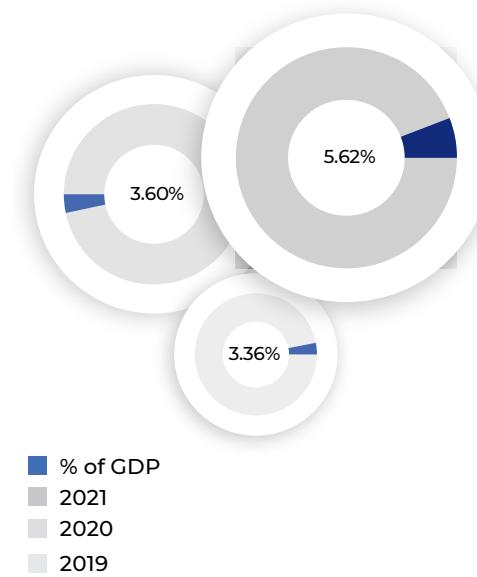
In terms of funding, Estonia has surpassed most European countries, with investment levels reaching 3.6 per cent of its GDP in 2022. Furthermore, Estonia remains at the forefront of VC investments per capita and start-up creation, with a remarkable 1,967 euros raised per capita and one start-up for every 1,048 people, leading the entire European region in this regard.

On the policy front, in 2021 Estonia made further progress adopting its Digital Agenda 2030. This strategy aligns with the Gigabit Society connectivity targets and has as the main objective to ensure that high-speed, dependable, and reasonably priced electronic communication connections are available throughout the country by 2030, regardless of location.

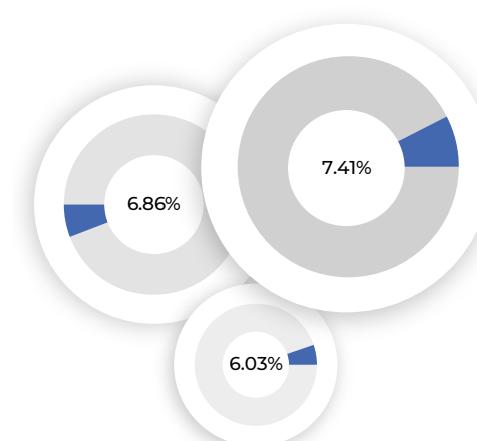
It is worth noting that since its launch in 2017, Estonia's Start-up Visa programme has been instrumental in attracting start-ups to the country by enabling founders to relocate their businesses to Estonia and access the full range of benefits offered. The programme has also made it easier for Estonian start-ups to hire talent from outside the European Union. The programme has been a huge success, with over 2,700 applications received from start-ups interested in moving to Estonia. As a result, 25 per cent of Estonian start-up founders now hold foreign citizenship, and the programme has had a significant impact on Estonia's business ecosystem.

Estonia retains its top position in the IT Competitiveness Index for emerging Europe, for the second consecutive year. The country boasts the highest number of IT graduates per 100,000 inhabitants, with 73.21 graduates per 100,000 people. Additionally, Estonia also leads in the number of developers per 100,000 population, with 1,655 developers per 100,000 inhabitants. The Online Service Index and E-Participation Index also rank Estonia in the top position.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	646.2	816.5	931.8	989.4	1,768.0
of which computer services (millions, euros)	463.8	606.0	699.8	726.1	1,398.8

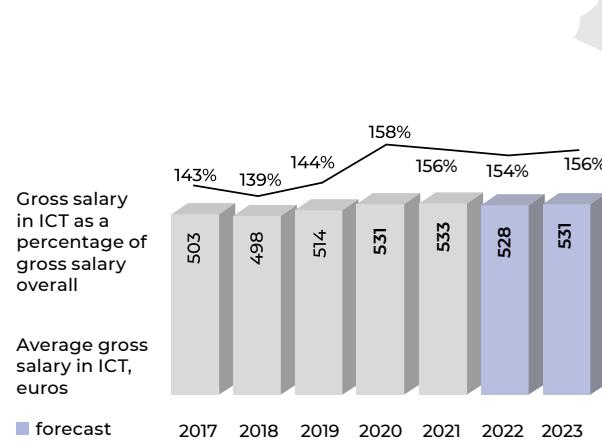
GEORGIA



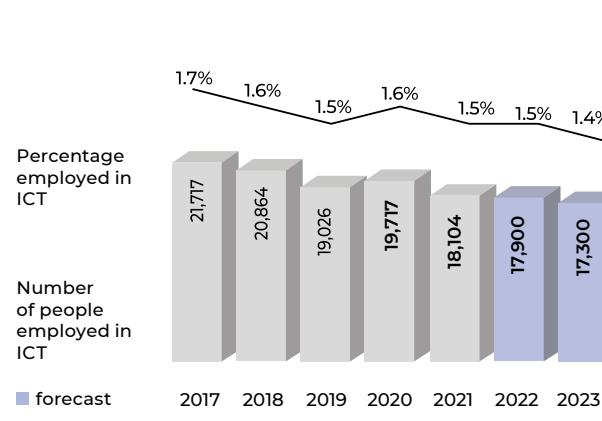
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
3.689	1,217,417	15,748	4,269	479%	1,153
Georgia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
35	50	66	63	45	84

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Situated at the crossroads of the Middle East, Asia, and Europe, Georgia presents an advantageous location for forging international partnerships and expanding business opportunities, supported by its rapid development. Tax exemptions are offered for R&D activities, and the start-up industry benefits from generous government grants.

From an enterprise perspective, Georgia boasts exceptional ease of doing business, with entrepreneurs able to obtain business operation permits within a single day. Moreover, the country's low labour costs compared to other nations, along with other cost advantages, make it a highly appealing destination for business activities.

The ICT sector in Georgia offers higher salaries than the overall economy, with the average wage being 156 per cent of the overall economy's wage in 2021. However, the number of people employed in the ICT sector has decreased from 22,245 in 2015 to 18,104 in 2021, and the percentage of ICT sector employees compared to the overall employment has also been decreasing since 2017, now standing at 1.5 per cent. Despite this, the export of ICT services, particularly computer services, has been increasing over the past seven years, indicating a growing demand for ICT products and services both domestically and internationally.

In 2022, Georgia's start-up scene experienced growth, with a global

ICT STUDENTS

9,656	90%	10%	2021
8,434	91%	9%	2020
7,916	91%	9%	2019

bachelor
master's and doctoral

ICT GRADUATES

826	78%	22%	2021
917	85%	15%	2020
881	83%	17%	2019

bachelor
master's and doctoral

ranking of 73rd and 19th in Eastern Europe according to StartupBlink. Fintech, software and data, and transportation are the dominant sectors. Successful fintech start-ups include PAYZE, an online payment platform, and Kernel, which offers invoicing and digital financial instruments. Tbilisi, home to 96 per cent of the country's start-ups, has a thriving ecosystem.

One of the most significant breakthroughs in Georgia's tech scene occurred in 2021 when Pulsar AI, a local start-up, was acquired by New York's Spincar, a provider of digital sales solutions for auto retailers. Spincar paid tens of millions of US dollars for the acquisition, calling it the most advanced conversational artificial intelligence (AI) platform in the industry. Two years earlier, Pulsar AI had become the first tech business in Georgia to receive foreign early-stage investment, raising 1.2 million US dollars in US venture capital. This deal marked the country's first international exit.

The Georgian government has implemented various reforms aimed at improving the efficiency of its public sector and institutional frameworks, including a development strategy called Georgia 2020 that

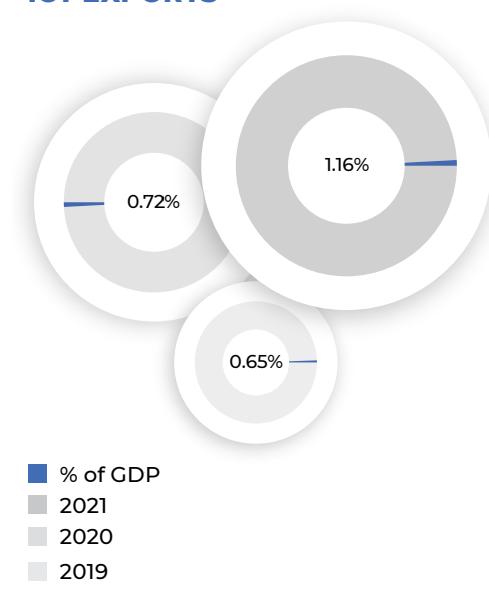
focused on expanding e-governance and improving access to public services. The current Government Programme 2021-2024 continues this focus on digitalising public institutions and upgrading remote services. Georgia has established a network of one-stop-shops and a unified digital services portal, my.gov.ge, offering hundreds of digital services for citizens and businesses.

On the education front, Georgia

has seen an increase in the number of students, reaching 9,656 in 2021, but the number of graduates has fluctuated, with a high of 1,147 in 2018 and a low of 826 in 2021.

Unfortunately, the country still has a low number of graduates per 100,000 population in emerging Europe at 23. In the IT Competitiveness Index, Georgia holds 19th position, the same rank as last year. While in the number of developers per 100,000 of population, it ranks 21st with 218 developers. However, the country has a high regulatory quality and economic freedom, ranking 5th in both categories. These rankings indicate that the country has a favourable environment for businesses to operate in and supportive regulations.

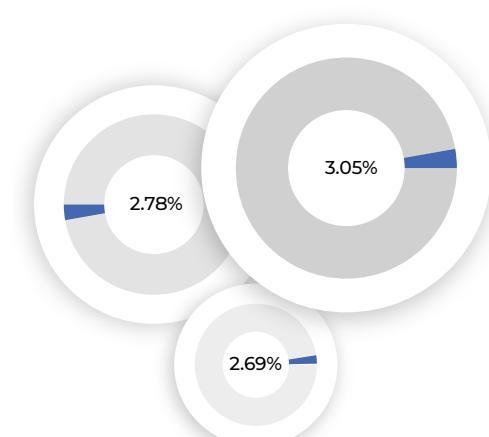
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	79.6	71.6	101.7	99.7	182.5
of which computer services (millions, euros)	35.5	36.0	55.9	59.5	117.5

ICT VALUE ADDED



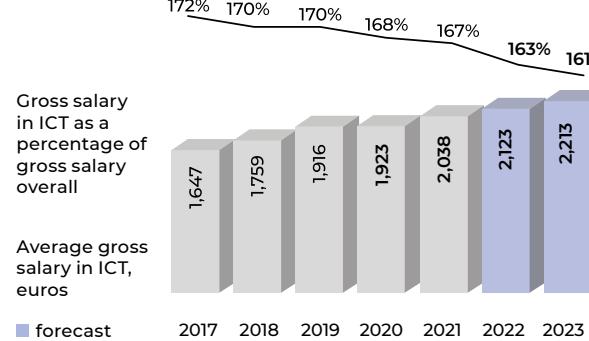
HUNGARY



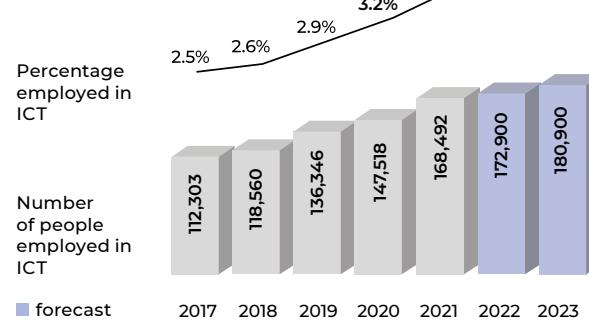
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
9.689	4,634,550	153,751	15,869	238%	5,459
Hungary's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
54	42	36	46	18	56

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Hungary's ICT sector is growing in importance, with a rising number of employees and higher salaries. The sector now employs 168,492 people, accounting for 3.6 per cent of the total workforce, up from 2.5 per cent in 2015, and salaries reached 2,038 euros in 2021. However, while the percentage of ICT value added to GDP has increased from 4.09 per cent in 2015 to 4.65 per cent in 2021, the percentage of ICT exports as a percentage of GDP has only risen from 1.45 per cent to 1.70 per cent in the same period.

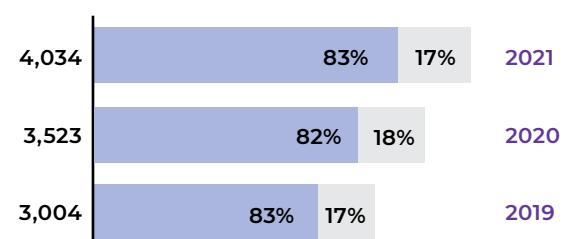
Hungary has emerged as a leading start-up hub in Eastern Europe. However, the country slipped two spots in the GSEI in 2022, currently standing at 13th in Eastern Europe. The start-up ecosystem is experiencing significant growth, with over 1,500 start-ups being supported by more than 140 investors (dealroom.co). The country's notable start-ups such as Prezi, SEON, Fraud Fighters, and Bitrise, as well as successful education start-ups like Codecool, Logiscool, and Xeropan, are contributing to Hungary's burgeoning entrepreneurial landscape. The foodtech industry is also showing promising growth, with a concentration of about 24 of the region's total foodtech start-ups. Furthermore, the combined enterprise value of Hungary's start-ups has skyrocketed to 2.4 billion euros in 2022, up from 584 million euros just five years ago, highlighting the potential of Hungary's start-up ecosystem.

ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



bachelor
master's and doctoral

The country has been working on building a business-friendly environment for investors and entrepreneurs. It offers a range of tax incentives and subsidies for foreign investors, including a nine per cent corporate tax rate, one of the lowest in the European Union.

Hungary is prioritising digital skills and industry growth with its Digital Workforce Programme, aiming to equip employees and increase the number of professionals in the ICT industry. The government is committed to using digitalisation to create high-value jobs and address labour market challenges, with a comprehensive National Digitalisation Strategy in place from 2021 to 2030. The strategy focuses on four key areas aligned with the Digital Decade Compass: digital infrastructure, skills, economy, and state. Hungary aims to surpass the EU average in digital development and be a top 10 EU economy in digitalization by 2030, a significant challenge.

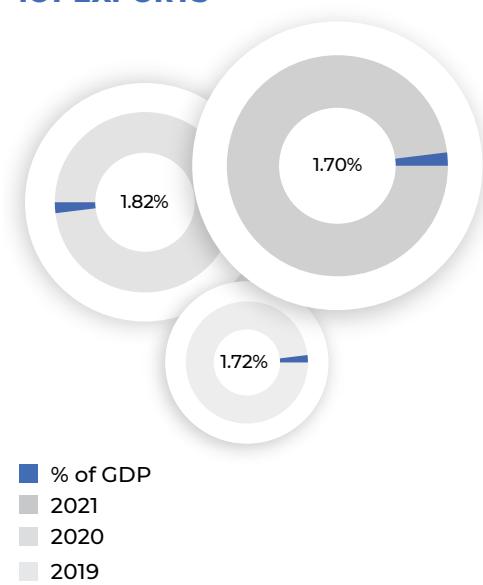
When it comes to digital public services, there has been significant progress on the demand side of e-government, as evidenced by the fact that 81 per cent of internet users interacted with public administration online in 2021, a substantial increase

from 64 per cent in 2019, and higher than the EU average of 65 per cent in 2021. By the end of 2021, the number of public services offered online had surpassed 3,000, almost double the previous year's figure. Since 2018, online administration has been compulsory for businesses.

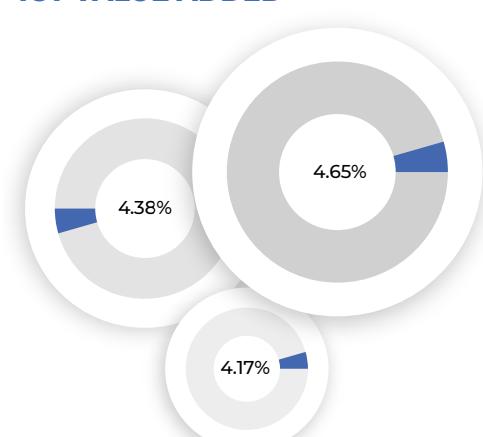
On the education front, over the past seven years, the number of graduates has steadily increased, from 1,714 in 2015 to 4,034 in 2021. The largest year-over-year increase occurred between 2015 and 2016, with a 72 per cent jump in the number of graduates. Generally, there has been a 135 per cent increase in the number of graduates from 2015 to 2021.

Hungary has moved up in the IT Competitiveness Index, now ranking 5th compared to its 9th position last year. Its average broadband internet speed ranks 2nd in emerging Europe, with a speed of 118.79 Mbps. In addition, Hungary remains a large and fast-growing IT student hub, ranking among the top four in the region in terms of numbers of IT students and annual growth in the number of IT graduates. In terms of English proficiency, Hungary ranks 6th according to the EF English Proficiency Index score.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	2,159.8	2,372.1	2,512.5	2,502.1	2,617.2
of which computer services (millions, euros)	1,856.9	2,070.2	2,248.9	2,276.5	2,374.6

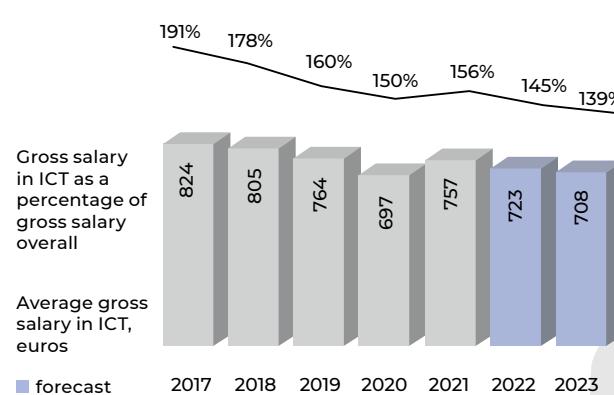
KOSOVO



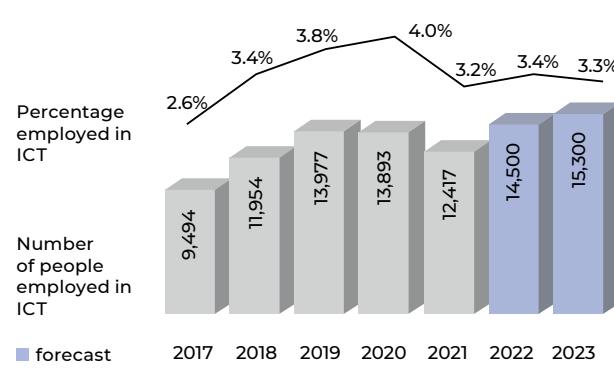
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
1.774	386,870	7,958	4,486	-	421
Kosovo's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
78	-	75	-	-	-

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Kosovo is experiencing an ICT boom. According to the prime minister, Albin Kurti, ICT is one of the five priority sectors in the economy with the highest potential for growth and innovation. This comes as no surprise given many highly knowledgeable ICT companies and a big community of ICT experts.

The ICT sector is an important part of the economy, employing a significant number of workers. Employment in the sector increased steadily from 2015 to 2019, but declined in 2020 and 2021. The percentage of workers in ICT compared to the total workforce varied, with the highest percentage in 2020 at four per cent, possibly due to the shift towards remote work. In 2021, the average gross salary in ICT was 757 euros, up from 697 euros the previous year. The percentage of ICT exports as a share of GDP has been steadily increasing, reaching 1.24 per cent in 2021 from 0.97 per cent in 2015. The percentage of ICT value added as a share of GDP has remained stable, with a slight increase from 2018 to 2020.

The government's top priorities include implementing digital transformation, ensuring cyber security, nurturing a thriving innovation ecosystem, and developing a skilled workforce. Since 2013, a digital agenda spanning 2013-2020 has been in place, and a new Kosovo 2030 Digital Agenda is under development. In 2021, the country

ICT STUDENTS

12,897	95%	5%	2021*
12,367	94%	6%	2020*
4,550	91%	9%	2019*

bachelor
master's and doctoral
* estimate

ICT GRADUATES

963	79%	21%	2021*
925	79%	21%	2020*
527	86%	14%	2019*

bachelor
master's and doctoral
* estimate

made significant strides by passing a new law on electronic identification and formulating the Education Strategy 2022-2027, which, for the first time, includes plans for digitising schools. A law on cybersecurity is also on the agenda for adoption.

When it comes to IT talent growth, the government has taken proactive measures, including setting up the Innovation Fund that funds pioneering education projects, and launching the Digital Kosovo Initiative, a digital advocacy platform aimed at enabling Kosovo citizens to promote the country's digital integration as digital diplomats. On the formal education front, the total number of students in Kosovo increased from 6,293 in 2015 to 12,897 in 2021. The number of total graduates increased steadily from 2015 to 2021, with a significant increase from 2019 to 2020.

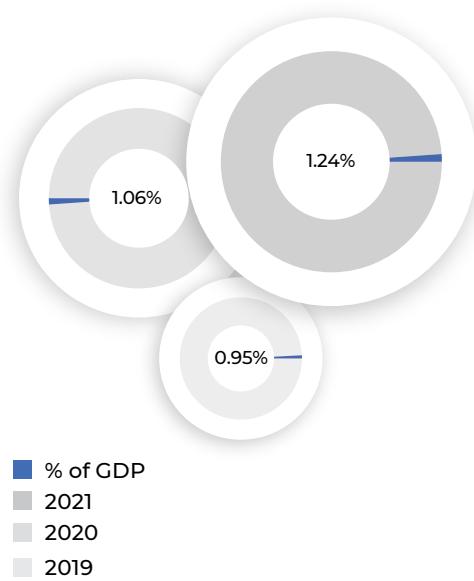
Despite several initiatives, Kosovo's ecosystem is still young. In the start-up sphere, according to StartupBlink, Kosovo ranks 24th in Eastern Europe. There are currently 90 active start-ups, but still there is no unicorn. The most notable start-ups are: MerJep.com, Kosovo 2.0 and Kutia. The government is committed

to invest in the further development of the national innovation ecosystem by supporting several platforms such as the Innovation and Training Park in Prizren and the Digital Technology Park in Bérnica.

On the e-government front, Kosovo's e-government portal is currently up and running, providing access to over 30 fully digitised services. Furthermore, to foster innovative concepts for public services, an innovation programme called GOV4SAA has been launched. This initiative aims to enhance public services for citizens, businesses, and other stakeholders through innovation.

In the IT Competitiveness index, Kosovo ranks 11th out of 23 emerging European nations. However, the country has the highest number of IT students per 100,000 of the population and the first rank in the average annual increase in ICT sector wages. Kosovo also ranks 4th in the E-Participation Index, indicating a high level of citizen engagement in digital services. The cost of data in Kosovo is relatively low, ranking 7th with a cost of 11.93 euros. However, the speed of broadband Internet is not as impressive, with a rank of 14th and an average speed of 55.28 Mbps.

ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	46.6	55.8	67.2	71.7	98.8
of which computer services (millions, euros)	15.4	21.4	33.9	39.4	61.0

ICT VALUE ADDED



LATVIA



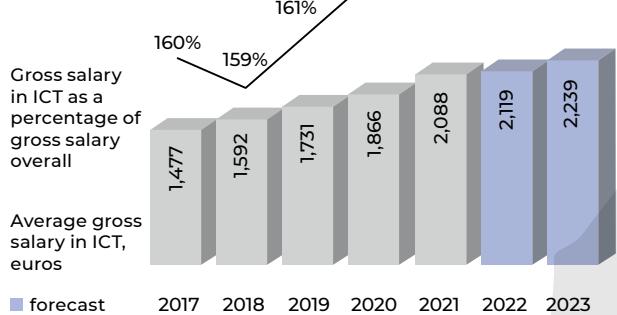
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
1.876	864,000	33,696	17,964	377%	5,325

Latvia's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
17	32	24	39	25	35

ICT GROSS SALARY IN 2017-23

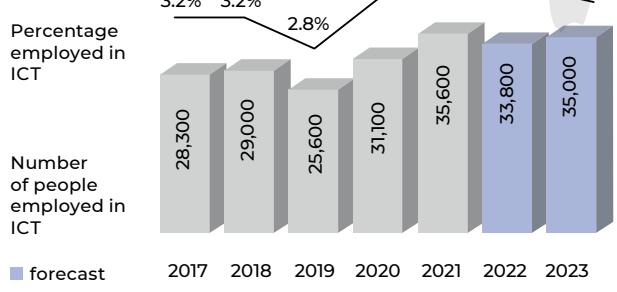


Latvia's commitment to digital transformation and its efforts to improve its digital infrastructure and services suggest that the country is on the right track towards achieving its digital goals and aspirations.

Latvia's start-up ecosystem is a regional powerhouse of innovation, ranked at number 43 globally in 2022, and is the eighth-best start-up hub in Eastern Europe. Riga, the top-ranked city in Latvia, is ranked at 197 globally. There are currently 366 start-ups in Latvia, which raised 92 million euros in investments in 2022. Latvia's start-up scene is particularly strong in education, hardware and IoT, and fintech. Some of the most successful education start-ups include Edurio, Anatomy Next, and University Turiba, with about 19 of the region's hardware and IoT start-ups concentrated in the country.

In 2022, Latvian start-ups made major strides with their innovative products and services, as evidenced by the significant deals they closed. Aerones, a company that specialises in robotic solutions for wind turbine inspection and maintenance, secured 38.9 million US dollars in funding. Juro, a contract automation platform used by several internationally renowned brands raised 23 million US dollars; Giraffe360, the essential 3-in-1 virtual tour camera for real estate agents, raised 15 million US dollars in a new funding round led by Founders Fund. Start-ups to watch in 2023 include Copy Monkey, Lande, and Longenesis.

ICT EMPLOYMENT IN 2017-23



ICT STUDENTS

6,179	80%	20%	2021
5,943	80%	20%	2020
5,674	80%	20%	2019

bachelor
master's and doctoral

ICT GRADUATES

730	76%	24%	2021
671	73%	27%	2020
650	80%	20%	2019

bachelor
master's and doctoral

The ICT sector in Latvia offers lucrative job opportunities and has been growing significantly over the years. In 2015, the average salary in the sector was 161 per cent higher than the overall economy, with this trend remaining relatively constant up to 2021. The number of ICT specialists employed in Latvia has been increasing steadily.

The sector is contributing significantly to the country's economy through the export of ICT and computer services, which has been increasing steadily from 2015 to 2019, with a significant surge in 2021. The number of students pursuing ICT education has also been on the rise since 2015, reaching 6,179 in 2021. However, the number of graduates has been fluctuating over the years, with a slight increase in 2020 and 2021 after a gradual decrease until 2019.

Policy-wise, in 2021 Latvia adopted its 2021-2027 Digital Transformation guidelines, which provide a comprehensive strategy for the country's digital transformation. These guidelines are complemented by the 2021-2027 Education Development guidelines, the 2021-2027 Latvian National Industrial Policy guidelines, and the 2021-2027

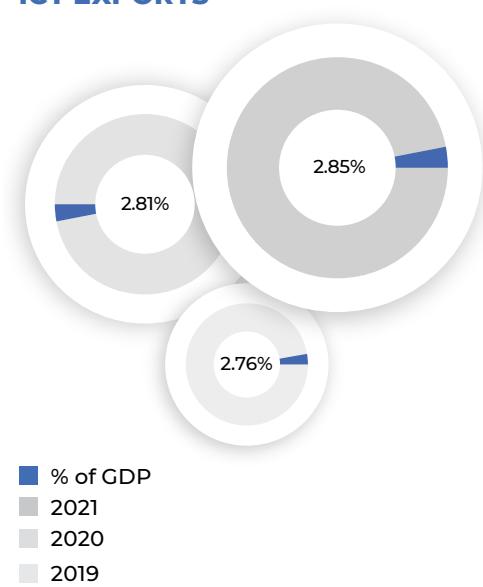
Public Health guidelines, all of which work together to further support Latvia's digital transformation.

Latvia is a top performer in providing digital public services to its citizens and businesses. With an impressive 84 per cent of internet users also e-government users, Latvia surpasses the EU average in the use of pre-filled forms. Furthermore, Latvia is actively working to improve the digital skills of its public administration to enhance the user-centricity and inclusiveness of its digital public services.

In the IT Competitiveness Index, Latvia ranks 4th, which is a considerable improvement from the previous year's ranking of 8th. The country's strong focus on cybersecurity is evident from its impressive ranking of 3rd in the Global Cybersecurity Index.

In addition, Latvia has a high percentage of employment in the ICT sector, ranking 3rd with 4.12 per cent of the overall workforce being employed in the industry. Furthermore, Latvia's impressive number of developers per 100,000 of population, ranking 4th with 1,027 developers, is a testament to the country's commitment to technological innovation and growth.

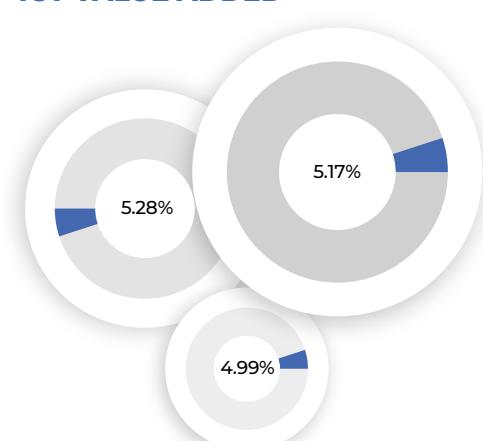
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	624.0	780.0	846.0	852.0	960.0
of which computer services (millions, euros)	386.0	442.0	499.0	527.0	624.0

ICT VALUE ADDED



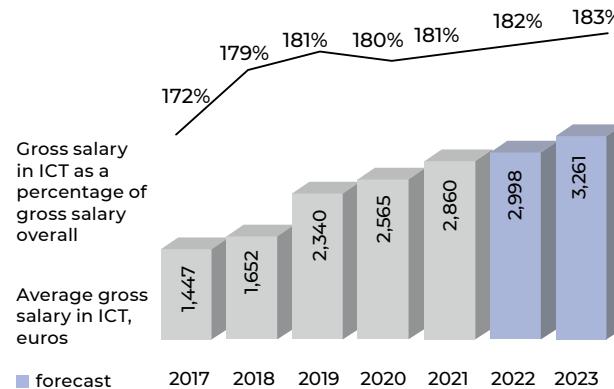
LITHUANIA



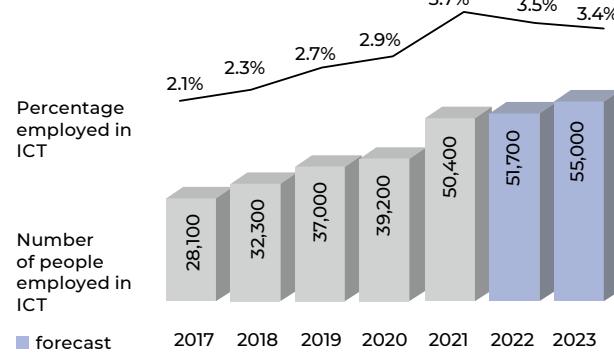
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
2.806	1,368,600	56,179	20,021	443%	2,053
Lithuania's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
20	29	35	35	19	28

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



The ICT sector is an important and growing industry in Lithuania. Average wages steadily increased from 2015 to 2021, from 1,229 euros to 2,860 euros. In terms of employment, the percentage of people employed in the ICT sector as compared to overall employment also been increasing, reaching 3.7 per cent in 2021, up from two per cent in 2015. Within the sector, the number of ICT specialists employed has risen by 47 per cent from 2015 to 2021 (reaching 50,400 in 2021). On the other hand, the ICT value added to GDP has also been steadily increasing, with a notable rise from 2019 to 2020, when the percentage increased from 3.51 per cent to 3.73 per cent. In 2021, ICT value added accounted for 3.77 per cent of Lithuania's GDP.

With a dynamic and growing start-up ecosystem, Lithuania has become an increasingly attractive destination for both entrepreneurs and investors. The country boasts a thriving start-up scene, with three cities ranking among the top 1000 globally. Despite dropping one spot in the 2022 Global Startup Ecosystem Index, Lithuania still maintains an impressive 17th position worldwide and is second in Eastern Europe.

Notable Lithuanian start-ups include Eneba, Bankera, and Kevin, while Vilnius is home to two unicorns: Nord Security, a provider of digital security and privacy solutions, and Vinter, an online marketplace. In terms of marketing and sales, Lithuania is a top five destination in Eastern Europe, with 114 marketing and sales start-ups.

ICT STUDENTS

6,532	91%	9%	2021
6,570	91%	9%	2020
6,513	91%	9%	2019

bachelor
master's and doctoral

ICT GRADUATES

1,108	86%	14%	2021
974	86%	14%	2020
922	85%	15%	2019

bachelor
master's and doctoral

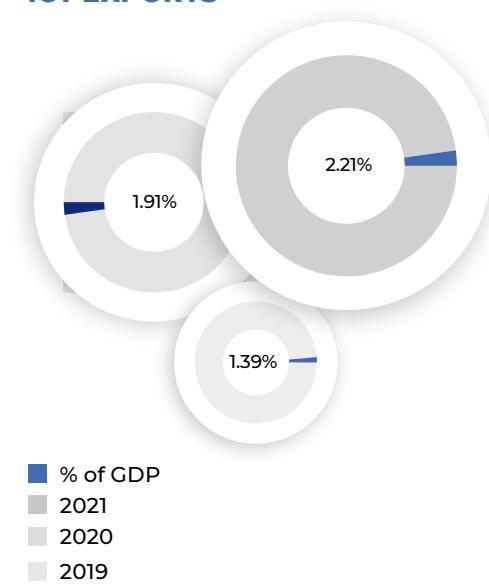
On the education front, the number of students increased 5.2 per cent from 2017 to 2021, while the number of graduates increased more significantly, by 45.3 per cent. In addition, the country is focusing on digital education through the EdTech project, improving school connectivity via the 'Creating a safe electronic environment for children' project, and prioritising IT vocational education and training schools. The country is also promoting gender equality in the digital sector, with 24 per cent of ICT positions held by women, and initiatives like the Women Go Tech mentorship programme.

The national progress strategy for 2030 recognises the critical role that information and digital technology infrastructure plays in promoting economic growth and competitiveness. In addition to the overall strategy, the Lithuanian government has also established targeted plans in various areas, such as the Lithuanian industry digitalisation roadmap and the National Cybersecurity Strategy 2018-2023. Lithuania is an excellent example of a country that has embraced the potential of digital technology to improve public services.

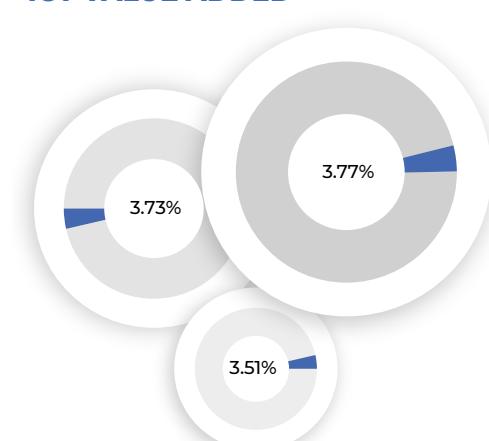
EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	489.5	555.5	679.8	952.1	1,239.1
of which computer services (millions, euros)	373.3	455.3	575.2	837.4	1,110.8

ICT EXPORTS



ICT VALUE ADDED



MOLDOVA



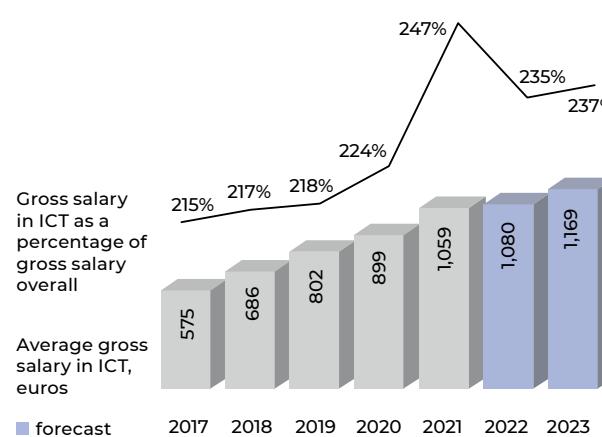
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
2.604	843,400	11,566	4,442	824%	264

Moldova's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
96	51	55	80	42	60

ICT GROSS SALARY IN 2017-23

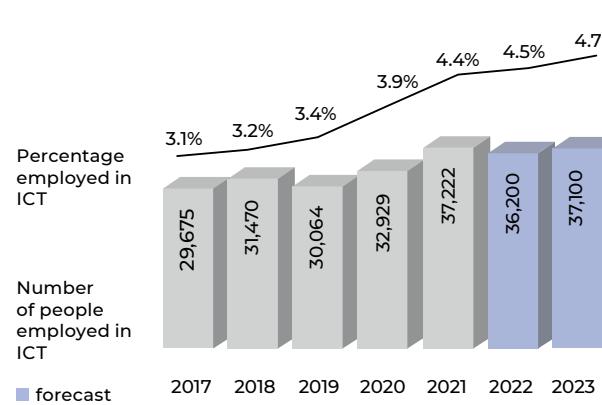


Despite ongoing challenges in developing a strong digital economy and skilled workforce, Moldova's government has implemented measures to foster the growth of its IT sector and advance the use of digital technologies. This effort has put the country at the forefront of digital transformation in government services. The IT sector could be a valuable driver of economic growth for Moldova, especially considering the increasing number of students and graduates pursuing ICT studies. Moreover, the country's reputation as an IT and technology hub is on the rise, thanks in part to low data costs and fast broadband internet speeds.

On the e-government front, in 2018, the government approved a modernisation project for government services that spans from 2018 to 2023. In addition, the national eServices portal servicii.gov.md currently offers Single-Sign-On access to 178 e-services and information on 649 administrative services. Moreover, the open data platform date.gov.md provides access to 10,884 resources. The payment system MPay integrates 86 administrative public services and has processed approximately 20 million transactions to date.

The ICT sector plays a valuable role in Moldova's economic growth and pays higher salaries than the overall economy. The ICT services exports have shown a positive trend from

ICT EMPLOYMENT IN 2017-23



ICT STUDENTS

4,233	86%	14%	2021
4,055	84%	16%	2020
3,654	84%	16%	2019

bachelor
master's and doctoral

ICT GRADUATES

759	76%	24%	2021
819	74%	26%	2020
777	73%	27%	2019

bachelor
master's and doctoral

2015 to 2021, with a steady increase in value from 146 million euros to 339.6 million euros, a rise of over 132 per cent. The export of computer services has been particularly impressive, increasing over 460 per cent in the same period. On the other hand, the average gross salary in 2021 was 247 per cent higher than that of the overall economy. Salaries in the sector have increased over time, with the average gross salary being over 2.5 times higher in 2021 than it was in 2015. Employment in the ICT sector has also steadily increased, with a significant jump in 2020 and another increase in 2021, reaching 4.4 per cent of total employment.

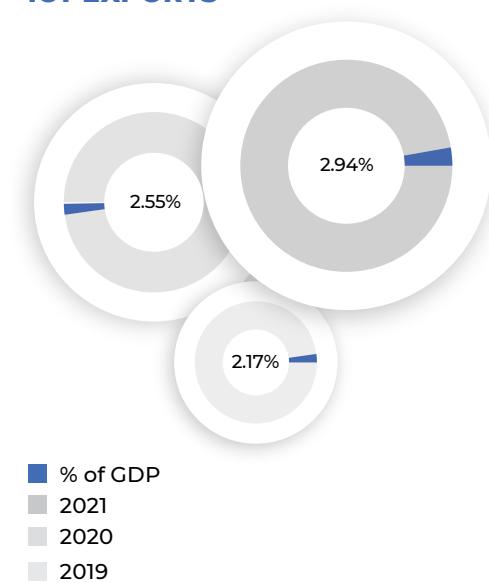
When it comes to education, Moldova has seen a rising number of ICT students and graduates. The number of ICT students increased to 4,233 in 2021 from 4,055 in 2020. Similarly, the number of ICT graduates has consistently risen - from 651 in 2015 to 753 in 2021.

In 2022, Moldova's ranking in the GSEI is 22nd in Eastern Europe. The country's start-up industry is primarily focused on software and data, health, as well as e-commerce and retail, with notable startups such

as Planable, Fagura, and A1. Planable serves as a centralised hub for social media teams to collaborate on content, A1 is an online marketplace that offers integrated services for buying and selling, while Fagura facilitates connections between investors seeking higher profits and borrowers seeking lower interest rates than those offered by traditional banks.

The country ranks 16th in the IT Competitiveness Index, an improvement from the previous year when it was ranked 17th. The country ranks 21st in terms of the number of IT students per 100,000 of population, with a ratio of 162. In terms of data costs, Moldova is ranked number one, with a low cost of just 6.57 euros. The country also boasts a fast broadband internet speed, ranking third with an average of 105.01 Mbps..

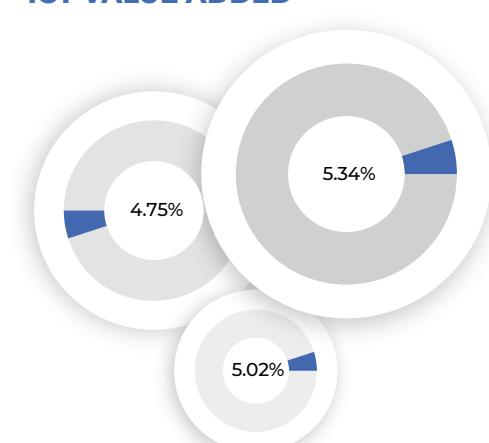
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	155.5	190.8	231.7	265.3	339.6
of which computer services (millions, euros)	90.5	130.8	180.7	226.3	298.8

ICT VALUE ADDED



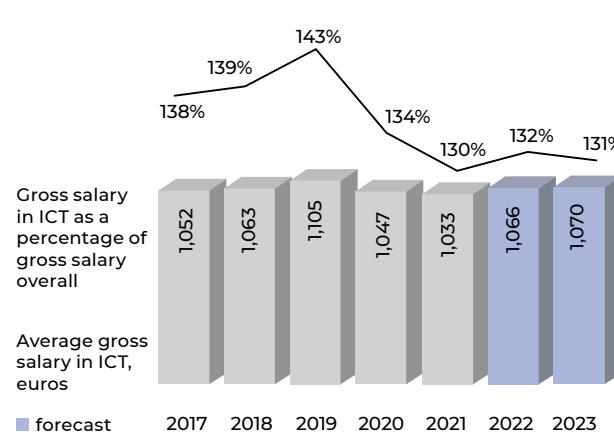
MONTENEGRO



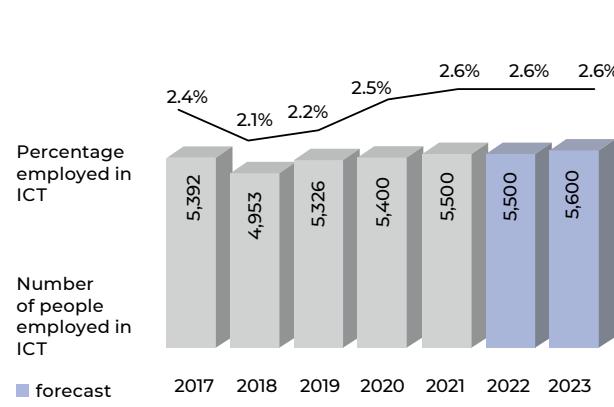
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
0.618	212,600	4,955	8,022	405%	664
Montenegro's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
77	49	53	49	-	93

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Montenegro has a small population of 618,000 and operates an open economy with a favourable tax policy, including one of the lowest corporate and personal tax rates in Europe at nine per cent. The government is focused on developing the IT industry and digital economy, with several initiatives and innovation funds set up. From 2015 to 2021, the ICT sector in Montenegro has offered consistently higher salaries than the overall economy, although the percentage difference has declined in recent years. The average salary in the sector increased from 1,042 euros in 2015 to a peak of 1,105 euros in 2019 before declining to 1,033 euros in 2021. Despite fluctuations in the number of employed ICT specialists, the sector employed between two per cent to 2.6 per cent of the overall workforce during the same period, with 5,500 employed in 2021. Montenegro's ICT exports have also shown a positive trend, increasing from a 1.47 per cent rise in 2020 to 2.06 per cent in 2021.

When it comes to ICT education, more students are opting to pursue higher education. The number of total students increased from 1,102 in 2015 to 1,387 in 2021. During the same period, the number of total graduates has also shown a consistent increase, from 171 in 2015 to 269 in 2021. In 2021, Montenegro made significant progress in digital transformation, adopting the Digital Transformation Strategy 2022-2026, the Strategy for Digitalisation of the Education System 2022-2026, and the Law on

ICT STUDENTS

1,387	93%	7%	2021
1,344	94%	6%	2020
1,288	94%	6%	2019

bachelor
master's and doctoral

ICT GRADUATES

269	95%	5%	2021
240	95%	5%	2020
227	96%	4%	2019

bachelor
master's and doctoral

Electronic Documents. There are currently 410 e-government services available from 50 institutions, and the government introduced e-payment opportunities and digital ID cards for selected services in 2022. Additionally, the open data portal data.gov.me was improved, and a new, user-friendly web portal (gov.me) was launched. To enhance national cyber security, the government established a cybersecurity agency and adopted a cyber security strategy for the period 2022-2026.

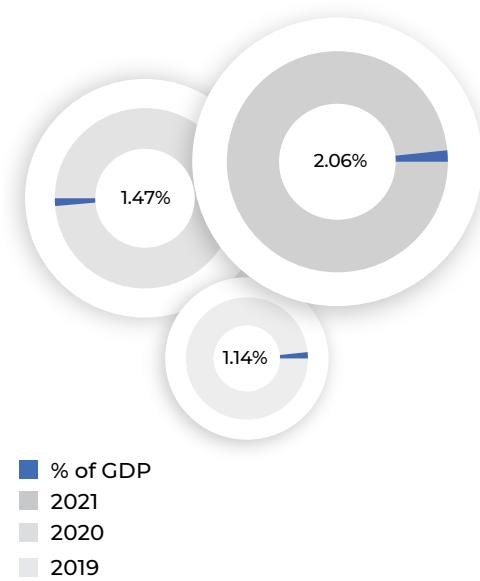
To support innovation and technological development, the Montenegrin government established a national innovation fund in 2022. Although there is no ICT cluster in the country, Technopolis provides support to businesses through its innovation and entrepreneurship centre. The upcoming inauguration of the Science and Technology Park in Podgorica is also expected to boost innovation and technological development in the country.

The start-up scene in Montenegro is in its developing stages, with the presence of several start-up incubators and accelerators, including Start-Up Centre Montenegro and Digitalizuj.Me. These programmes offer mentorship, funding, and support to start-ups. Despite

being a young start-up ecosystem, Montenegro has a few start-ups that are making efforts to gain recognition at an international level. For example, Spectro Solutions provides an intelligent fire detection service, Medpack aims to improve adherence to therapy, and Flash operates in the fintech industry connecting banks, businesses, and customers through a single platform. Flash has introduced a mobile application that enables clients to make cashless and cardless payments at various locations and online. Guidi is another notable success story that offers a platform for visiting famous places in a unique way. Additionally, the Digital Accountant offers a solution that enhances businesses by digitally transforming administrative and accounting processes.

Montenegro ranks 20th in the IT Competitiveness Index. The country boasts an impressive annual increase in the export of computer services, averaging 9.23 per cent of GDP, earning it the top spot among the emerging Europe countries. In terms of salaries, the average wage in the ICT sector is 130 per cent of the average salary in the economy, securing Montenegro the 2nd spot among its peers. When it comes to regulatory quality, Montenegro ranks 3rd.

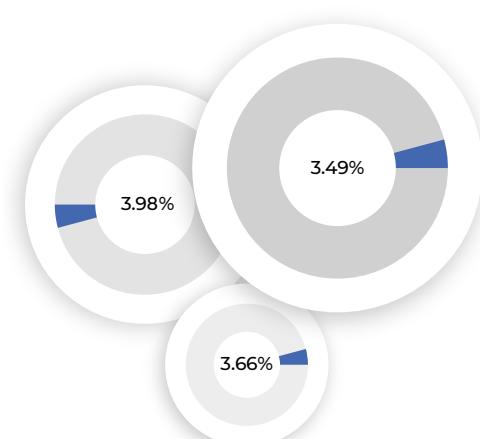
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	54.5	68.7	56.3	61.6	101.9
of which computer services (millions, euros)	12.7	19.8	29.5	39.5	72.1

ICT VALUE ADDED



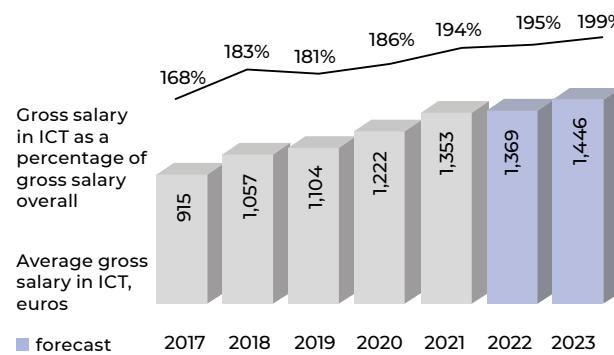
NORTH MACEDONIA



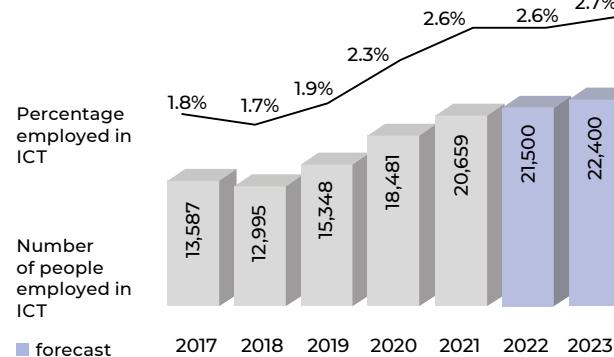
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
1.837	795,087	11,691	6,364	273%	606
North Macedonia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
56	58	67	78	-	66

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23

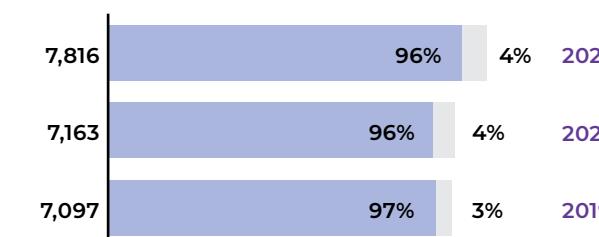


Since gaining independence in 1991, North Macedonia has made significant strides in improving its economy and is now classified as an upper-middle-income country. The milestone of opening EU accession negotiations in 2022 is a noteworthy political achievement for the country. However, there are still several challenges that need to be addressed, including innovation, education, and infrastructure investment.

In terms of policy reforms, the government established the Fund for Innovation and Technology Development (FITD) in 2013, with the aim of encouraging innovation by providing resources and funding to SMEs. Moreover, it developed a national ICT strategy for 2023-2027, which is aligned with the EU's Digital Economy and Society Index (DESI) goals. The strategy sets clear objectives for government infrastructure, centralisation of ICT and e-government services, and the establishment of a digital transformation agency. Additionally, the government has announced plans to create a 27 million euros hybrid investment fund to support start-ups and innovative companies.

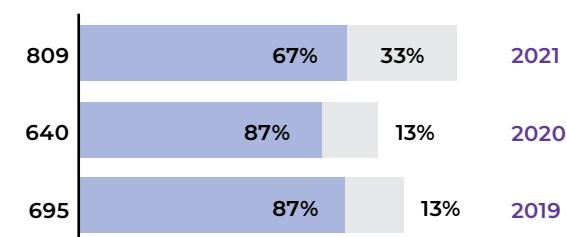
On education, the country has implemented mandatory ICT subjects from third grade in primary schools, demonstrating a strong commitment to integrating technology into education from an early age. Over the past seven years,

ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



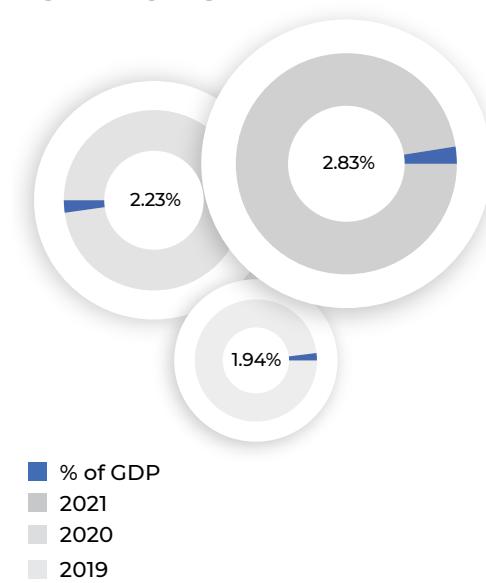
bachelor
master's and doctoral

the number of graduates has varied from a low of 567 in 2016 to a high of 809 in 2021. Meanwhile, the number of students has been steadily increasing, reaching a high of 7,816 in 2021 from 5,766 in 2015.

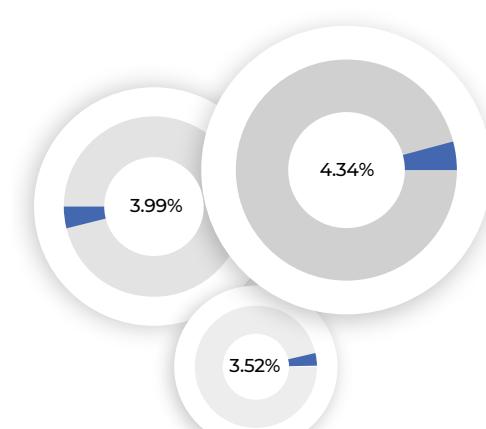
The ICT sector is the fastest-growing industry in the country. As of 2020, there were approximately 1,957 ICT companies that specialise in software and IT services, telecommunication, ICT manufacturing, ICT trade, and other IT services. The most prominent sector among these is software and IT services, with around 8,500 individuals employed in this segment. Several large ICT businesses, including Microsoft, Cisco, and Oracle, are operational in the country, contributing to the sector's growth.

North Macedonia's performance on the IT Competitiveness Index improved slightly last year, moving up from 16th to 15th place. The country boasts an impressive number of IT students per 100,000 of population, coming in second. Additionally, North Macedonia has shown resilience in the face of the Covid-19 pandemic, ranking third. However, the country's broadband internet speed is relatively slow, with an average of 31.60 Mbps, and the cost of data is on the higher side, with an average of 17.61 euros.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	147.5	183.8	218.1	241.8	330.8
of which computer services (millions, euros)	122.4	153.9	187.4	214.9	295.5

POLAND



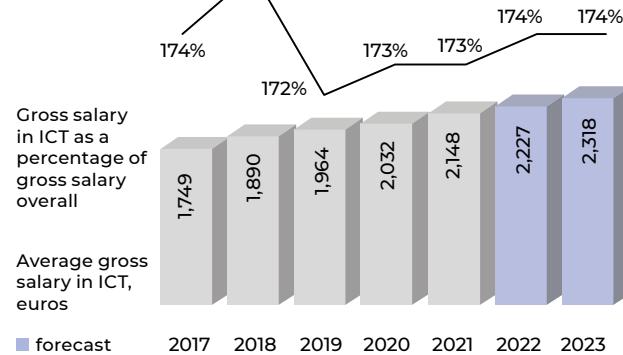
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
38.080	16,656,000	574,464	15,086	256%	24,816

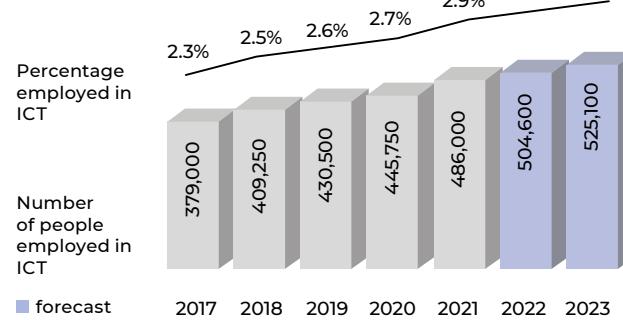
Poland's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
40	39	10	34	13	43

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



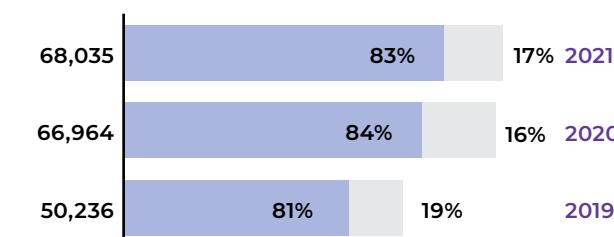
Poland's remarkable performance in IT and education showcases its position as a leading player in the region. The ICT sector is growing with increasing numbers of employed ICT specialists and a higher contribution to the overall economy. The thriving start-up ecosystem, increasing VC availability, and government support programmes make Poland a top destination for start-up activity.

The importance of the ICT sector in Poland is on the rise, with better remuneration packages than other industries in the economy. The sector has witnessed a remarkable growth in average wages from 1,598 euros in 2015 to 2,148 euros in 2021. The number of employed ICT specialists has also been consistently increasing, with 486,000 employed in 2021 compared to 369,000 in 2015, a growth rate of approximately 31 per cent over the period.

The ICT sector's contribution to the economy has also been steadily increasing, with ICT exports as a share of GDP rising to 1.57 per cent in 2020 and 1.71 per cent in 2021. Additionally, the ICT sector's value-added as a percentage of GDP has been on the rise, reaching 4.02 per cent in 2020 and 4.25 per cent in 2021.

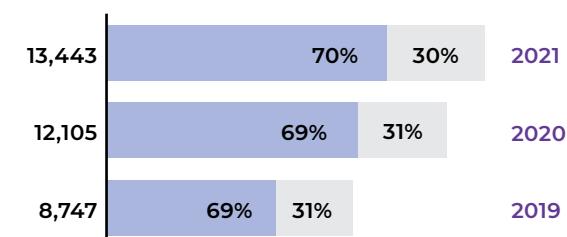
Poland has made remarkable progress in the implementation of e-government initiatives, particularly in digital public services. The country has launched numerous initiatives aimed at enhancing citizen and business access to

ICT STUDENTS



bachelor
master's and doctoral

ICT GRADUATES



bachelor
master's and doctoral

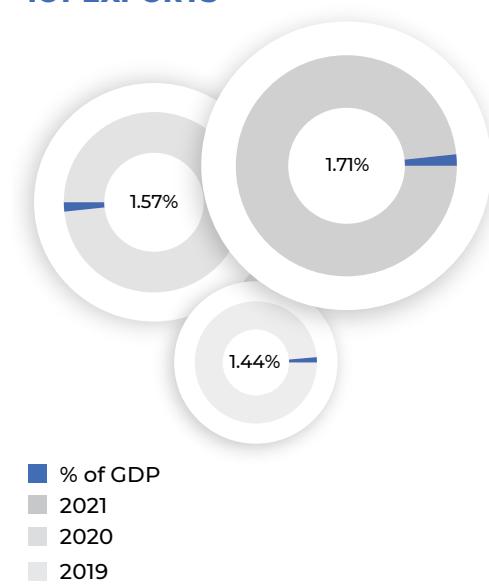
public services online, such as the ePUAP platform and the Central Register and Information on Economic Activity system. This system enables businesses to register and manage their activities online, streamlining processes related to business operations. These initiatives exemplify Poland's dedication to leveraging technology to improve public services and make them more accessible to citizens and businesses.

Poland's start-up ecosystem is a leading force in innovation in the region, ranking at 33 globally and fifth in Eastern Europe (Startup Blink). The country excels in e-commerce and retail, marketing and sales, and health sectors. Its marketing and sales sector is also among the top 20 worldwide and holds a significant concentration of 75 of the region's total marketing and sales start-ups. According to Startup Stash, there are currently over 3,000 start-ups operating in Poland. VC availability is also increasing, further boosting Polish start-ups. The country has over 100 incubators and accelerators, and the number continues to grow each year. The growth in the start-up ecosystem is evident in the VC raised by Polish start-ups, with 793 million euros raised in 2021 and 448 million euros raised in the first half of 2022.

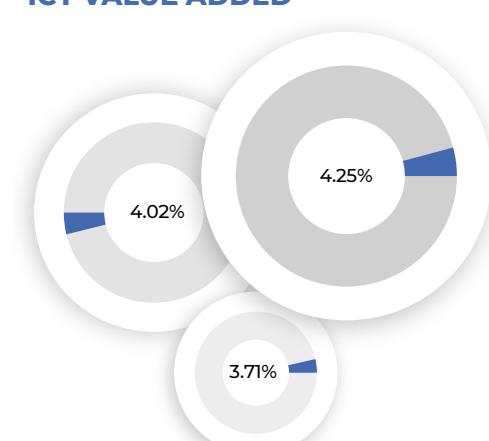
In addition to the thriving start-up ecosystem and increasing VC availability, Poland also offers a range of government programmes designed to support start-ups. One such program is Start in Poland, which targets young entrepreneurs from abroad and offers access to funding, internationalisation opportunities, and more.

Poland ranks third in the IT Competitiveness Index, although it has slipped from second spot last year. In the PISA Mathematics ranking, Poland secures an impressive second place. Similarly, Poland secures an admirable second position in the TopCoder rank. The country also excels in language proficiency, ranking among the top three countries in the EF English Proficiency Index and has a strong performance in cybersecurity, where it secures a commendable fourth position in the Global Cybersecurity Index. Poland's remarkable performance in IT, education, and social welfare showcases its position as a frontrunner in the region.

ICT EXPORTS



ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	5,627.9	6,784.8	7,692.0	8,235.9	9,805.2
of which computer services (millions, euros)	4,753.5	5,700.9	6,666.9	7,157.9	8,509.9

ROMANIA

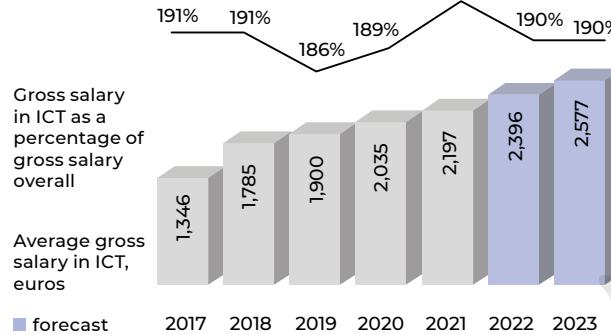


OVERVIEW

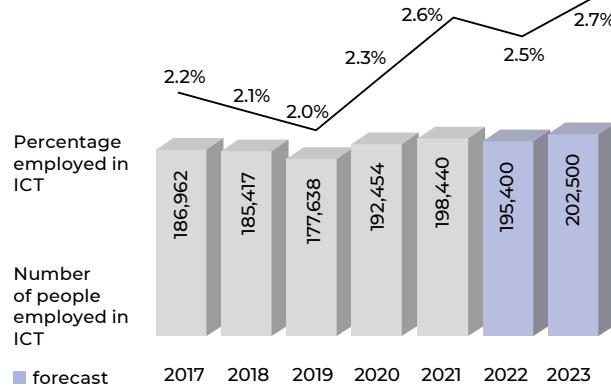
Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
19.042	7,755,487	241,308	12,672	603%	8,610

Romania's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
53	43	52	53	17	70

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



Romania has made significant progress in recent years in building a business-friendly environment, supporting the growth of IT talent, and building a digital economy.

The ICT sector in Romania has seen significant growth in recent years, with average gross salaries increasing from 1,137 euros in 2015 to 2,197 euros in 2021. In 2020, the average gross salary in the sector was 2,035 euros, with the overall gross salary in ICT being 195 per cent of that in the economy. The number of ICT specialists employed has also increased, with 198,440 people employed in 2021, making up 2.6 per cent of the employed population.

On the education front, Romania has seen an increase in the number of students and graduates in the ICT sector over the past few years. In 2021, there were 40,063 students and 9,308 graduates, compared to 32,661 students and 5,992 graduates in 2015. Most graduates in 2021 were bachelors degree holders, accounting for 73 per cent of the total, while 27 per cent were masters and doctoral degree holders.

Romania's ICT sector plays a significant role in the economy, with its share of ICT exports as a percentage of GDP increasing from 2.15 per cent in 2017 to 2.91 per cent in 2021. The sector has also witnessed an upward trend in ICT services exports, with computer services being the most significant contributor, valued at 5.1 billion euros in 2021.

ICT STUDENTS

40,063	77%	23%	2021
39,458	76%	24%	2020
39,147	78%	22%	2019

bachelor and short-term master's and doctoral

ICT GRADUATES

9,308	75%	25%	2021
9,054	73%	27%	2020
8,703	73%	27%	2019

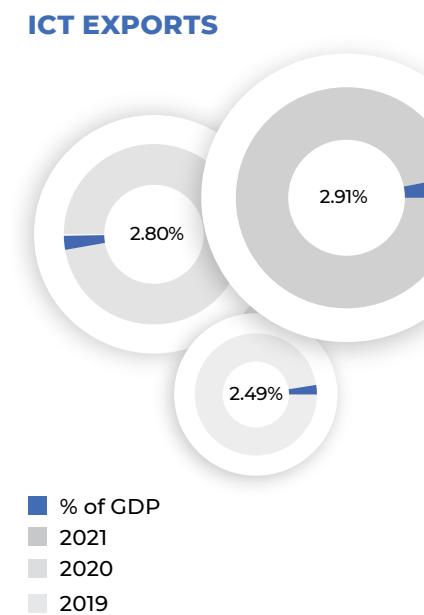
bachelor and short-term master's and doctoral

In 2022, Romania's start-up ecosystem experienced significant growth, leading to a two-spot jump in global GSEI rankings, surpassing Luxembourg, and becoming the seventh-best country for start-ups in Eastern Europe and 39th in the world. The Romanian start-up scene is highly competitive in software and data, foodtech, and marketing and sales. Romania's foodtech industry is among the top 41 globally, with around 22 per cent of the Eastern Europe's total foodtech start-ups. Marketing and sales rank 42nd globally. In addition, the country's software and data industry ranks 37th in the world and has seen success from start-ups like 123 ContactForm, Druid, and Kinderpedia. Bucharest, the country's capital is the leading city for start-ups in Romania, ranking 108th worldwide, followed by Cluj-Napoca and Timișoara.

Regarding policy, the government is giving priority to digitalisation efforts and implementing regulations that support businesses while simplifying legislation. One of the government's main goals is to lead the digital transformation of the public sector through the e-government public policy for 2021-2030. This policy

framework outlines the necessary services and tools to improve e-government services, which are currently lagging the EU's levels. Unfortunately, only 17 per cent of internet users currently engage with e-government services, making it essential to implement these reforms.

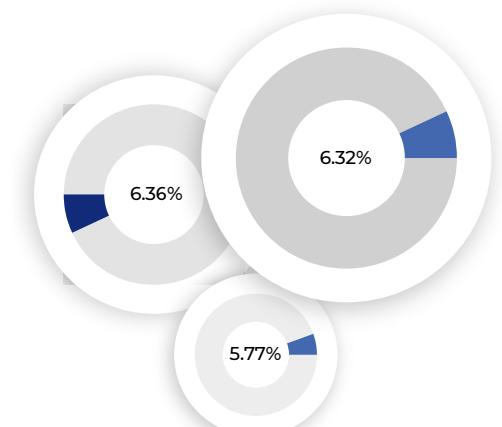
In 2022, Romania ranked 6th in the IT Competitiveness Index, maintaining its position from the previous year. The country performed well in terms of ICT output per employed person, ranking 2nd in emerging Europe. Additionally, the cost of data in Romania ranked 3rd among its regional peers, with an average cost of 7.07 euros. Romania also boasted the fastest broadband internet speeds in emerging Europe, with an average speed of 160.65 Mbps. However, the country's number of IT students and graduates ranked 3rd in the region. In terms of intellectual property, Romania ranked 7th in the International Property Rights Index, and 8th in the ICT Regulatory Tracker Index.



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	4,008.5	4,796.7	5,591.8	6,160.0	6,992.0
of which computer services (millions, euros)	2,764.0	3,418.4	4,112.4	4,612.0	5,110.0

ICT VALUE ADDED



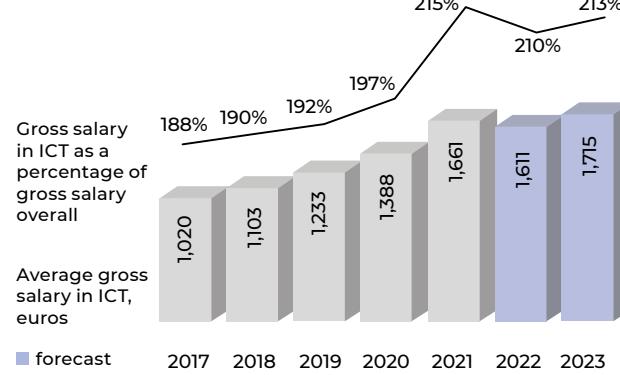
SERBIA



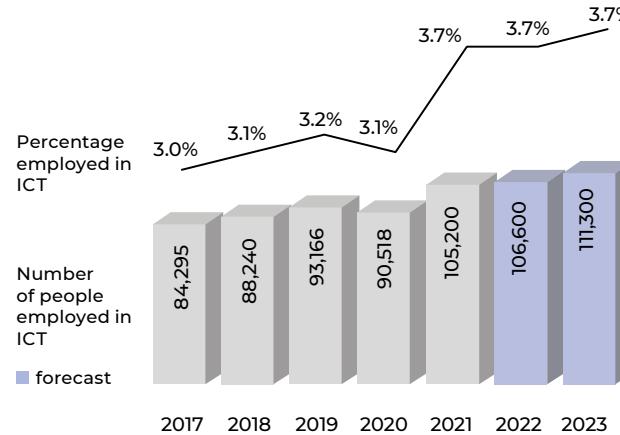
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
6.797	2,848,800	53,335	7,847	387%	5,060
Serbia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
58	45	46	63	27	26

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



In recent years, Serbia has made noteworthy advancements in creating a favourable business climate and drawing foreign direct investment (FDI). The country's ease of doing business ranking improved from 48th to 44th out of 190 countries, as per the World Bank's Doing Business report of 2020. The government has implemented several reforms to improve the business environment, including simplifying the registration process for new companies, reducing taxes, and enhancing the efficiency of the judicial system.

According to the Global Innovation Index (2020) by the World Intellectual Property Organisation (WIPO), Serbia ranks 53rd out of 131 countries. The ICT sector, which has become the most significant part of Serbia's economy, receives approximately one-third of the government's economic investments. The sector has generated over 650 million euros, contributing to 10 per cent of the country's GDP.

In addition, ICT exports as a share of GDP has steadily risen from 1.71 per cent in 2015 to 3.48 per cent in 2021. The percentage of individuals employed in the sector has also increased from 2.8 per cent in 2015 to 3.7 per cent in 2021. Moreover, the consistent growth in the average wage in the ICT sector indicates that highly skilled workers find the sector increasingly attractive. For example,

ICT STUDENTS

24,107	87%	13%	2021
23,061	87%	13%	2020
22,536	88%	12%	2019

bachelor
master's and doctoral

ICT GRADUATES

2,912	77%	23%	2021
3,166	79%	21%	2020
3,154	77%	23%	2019

bachelor
master's and doctoral

the average wage increased from 911 euros in 2015 to 1,661 euros in 2021.

When it comes to policy and investments, the Serbian government has set aside 65 million euros for science and technology centres and invested 70 million euros in technical infrastructure to assist start-ups. It has also developed a Development Strategy (2021-2026) which aims to create an information society, and a citizen and business-centric e-government system. In addition, the programme Serbia Ventures was promoted in 2022. The goal of the Serbia Ventures, organised by the Serbia Innovation Fund in partnership with the Office of the Prime Minister and the Digital Serbia Initiative, is to offer support to private venture capital funds in the country. The Innovation Fund will invest in newly established venture capital funds in Serbia, assisting these funds in creating a significant market impact on Serbia's innovation ecosystem.

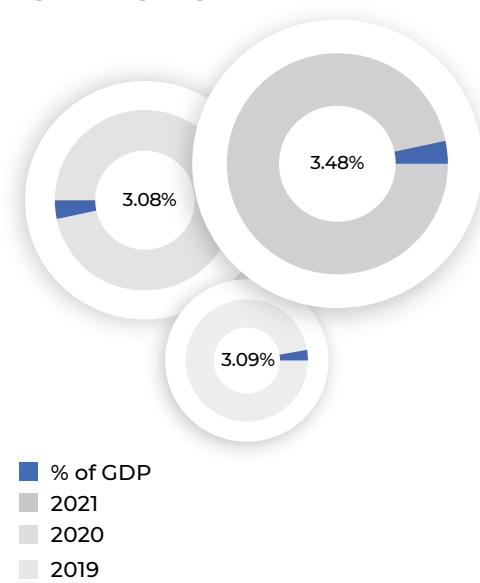
Last year, Serbia's start-up scene witnessed growth, climbing one position from the previous year to rank 52nd globally, according to Startup Blink. The country leads the way as a major start-up hub in

Eastern Europe, currently occupying 14th position. The start-up industry is mainly focused on software and data, energy and environment, and social and leisure sectors.

Despite not having produced a unicorn yet, Serbia has seen several successful exits in recent years. For instance, in 2019, the Serbian cloud computing start-up, Frame, entered into a partnership with the American company Nutanix, in the most significant acquisition by a Serbian start-up, worth 165 million US dollars.

Serbia's position on the IT Competitiveness Index is 14th, down from last year's 12th. However, the country has performed well in the E-Participation Index, ranking second, and the Online Services Index, ranking third. Yet, in the International Property Rights Index, Serbia is ranked 17th, and in the Corruption Perception Index and Regulatory Quality Index, the country is ranked 19th and 17th respectively. Despite these areas of improvement, there is still room for Serbia to strengthen its policies and regulations related to property rights and corruption.

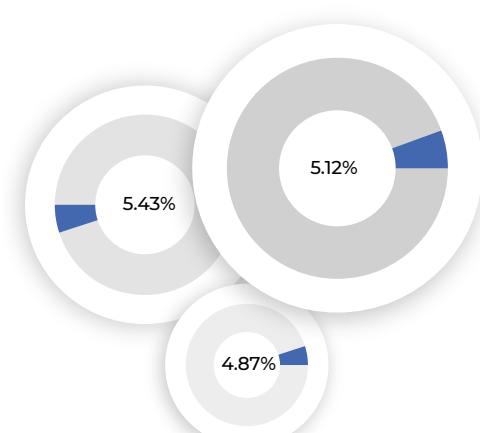
ICT EXPORTS



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	898.9	1,134.6	1,422.4	1,439.0	1,857.1
of which computer services (millions, euros)	759.7	1,016.1	1,269.6	1,325.7	1,727.0

ICT VALUE ADDED



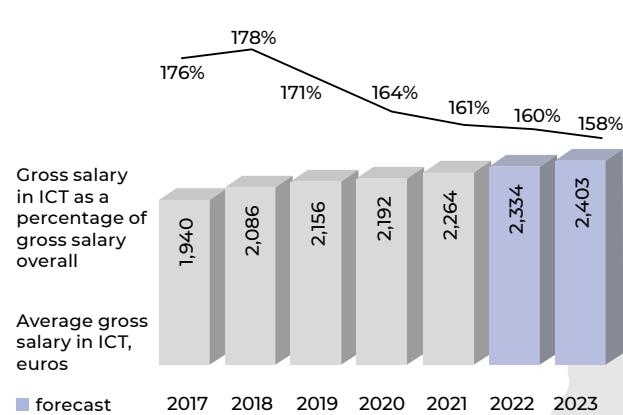
SLOVAKIA



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
5.435	2,560,600	98,523	18,128	279%	59
Slovakia's position in international rankings					
Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
33	35	32	45	15	63

ICT GROSS SALARY IN 2017-23



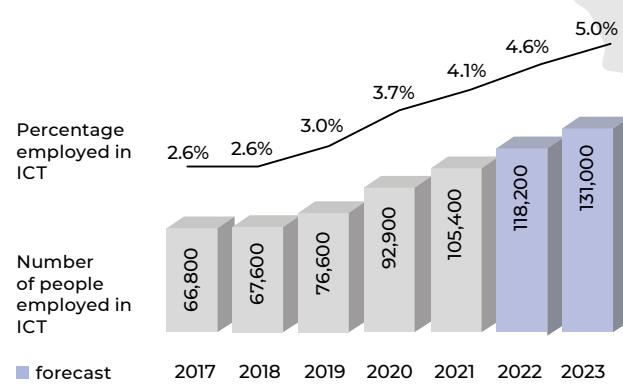
With its geographical location in the middle of Europe, euro currency, emerging start-up ecosystem, cost-effective and skilled labour, Slovakia represents a country with a lot of potential and opportunities for established and new investors.

Slovakia extends investment incentives to various types of investors, such as small and medium-sized enterprises, large corporations, and both new and existing investors. Additionally, there are various forms of assistance available, including research and development super-deductions and favourable tax regimes. For example, technological centres are eligible for a minimum of 100,000 euros in fixed assets. As for corporate income tax (CIT), Slovakia's current rate is 21 per cent.

Slovakia has emerged as a prominent player in the global start-up ecosystem with a strong presence in marketing and sales, hardware and IoT, software and data sectors. Slovakia has been ranked 58th in the world and 15th in Eastern Europe in the GSEI. It has several acceleration programmes, including Startup Centre at USP TECHNICON, CEED Tech – Slovakia, and Launcher.

In 2022, the country witnessed a surge in marketing and sales start-ups, with Bloomreach being a notable success story. Bratislava, Kosice, and Trnava are the top three cities in terms of start-up activity, with the country's hardware and IoT sector ranked 38th globally, and

ICT EMPLOYMENT IN 2017-23



ICT STUDENTS

7,522	78%	22%
7,363	76%	24%
7,356	76%	24%

ICT GRADUATES

1,625	59%	41%	2021*
1,681	60%	40%	2020
1,562	58%	42%	2019

bachelor and short-term

master's and doctoral

* estimate

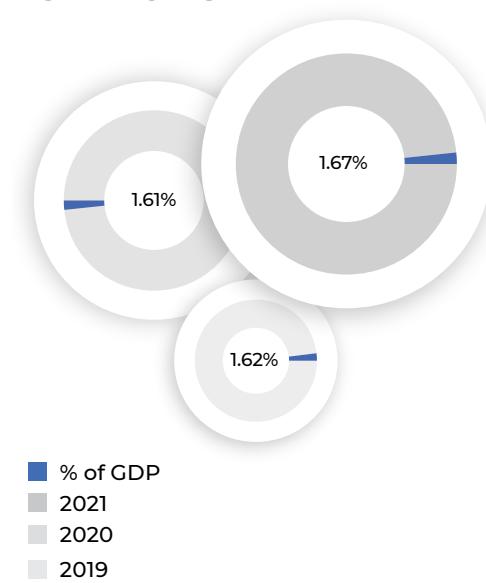
software and data sector ranked 54th. Notable start-ups aside from Bloomreach include GreenWay Operator, and Photoneo. According to StartupBlink, there are 78 start-ups, three accelerators, and seven coworking spaces in the country. Despite Slovakia suffering from an ongoing problem with lack of support and investment for start-ups from state, there are many talented start-ups that have successfully exited or raised capital. For example, GymBeam, Pixel Federation, DNA ERA, Slido, Simplicity, Exponea, minit, and Superscale. During 2015 and 2021, Slovak start-ups raised 159 million euros in VC funding (Dealroom).

The ICT sector is a vital and growing industry with high salaries, increasing employment, and exports. Employment in the sector has surged from 65,500 in 2015 to 105,400 in 2021. The percentage of people employed in the sector has also increased from 2.7 per cent to 4.1 per cent. The average gross salary in the ICT sector is consistently higher than the overall economy, with a percentage difference ranging from 161 per cent to 185 per cent. The export of ICT services has been steadily increasing, reaching a peak of 1.65 billion euros in 2021.

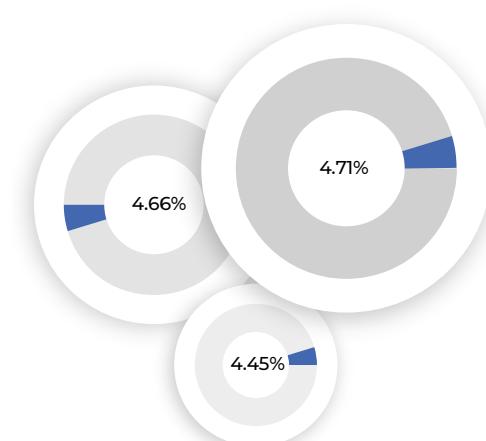
EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	1,369.3	1,499.4	1,526.8	1,503.4	1,649.6
of which computer services (millions, euros)	957.6	1,084.3	1,089.1	1,094.9	1,203.1

ICT EXPORTS



ICT VALUE ADDED



SLOVENIA



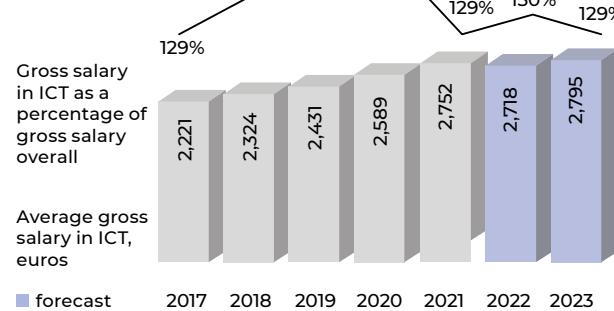
OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
2.107	971,250	52,208	24,776	196%	1,517

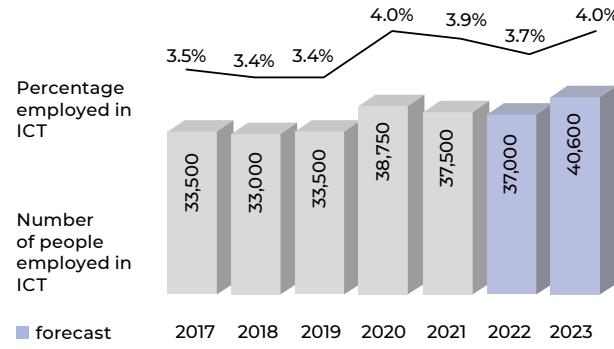
Slovenia's position in international rankings

Index of Economic Freedom (of 176)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 88) (2018)	Online Service Index (of 193)
37	27	14	23	9	22

ICT GROSS SALARY IN 2017-23



ICT EMPLOYMENT IN 2017-23



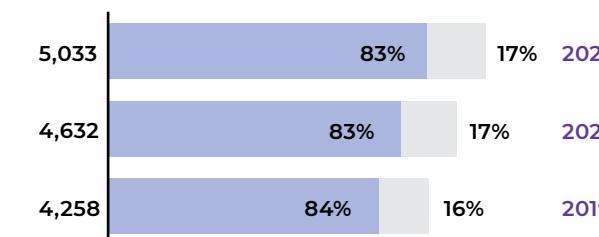
Slovenia's ICT sector is flourishing, with a thriving start-up ecosystem that has seen significant growth in recent years. The country's prioritisation of digital transformation through policies that emphasise technology and digital literacy has contributed to this positive trend. Additionally, Slovenia's strong emphasis on education and the well-being of its citizens has created an environment that supports the growth of the ICT sector.

With an increasing number of people employed and rising wages in the field, the ICT sector is experiencing growth. While there was a slight decrease in employment in 2021, the export of ICT services has been steadily increasing, with a significant portion coming from computer services. This indicates a growing demand for Slovenia's skilled workforce and competitive pricing in the global ICT market.

In 2021, the average wage in the ICT sector was 29 per cent higher than the overall economy's wage, suggesting a potentially growing demand for skilled professionals in this field. Moreover, the number of people employed in the ICT sector has been increasing since 2015, representing 3.9 per cent of total employment in the economy.

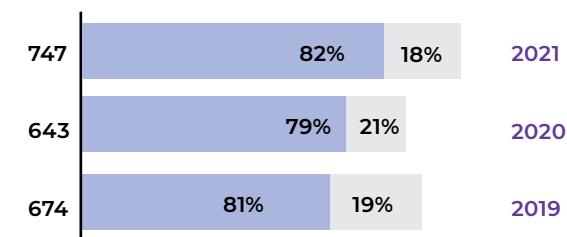
Slovenia has made significant progress in building a thriving start-up ecosystem in recent years. The country is ranked 47th in the

ICT STUDENTS



bachelor and short-term
master's and doctoral

ICT GRADUATES



master's and doctoral

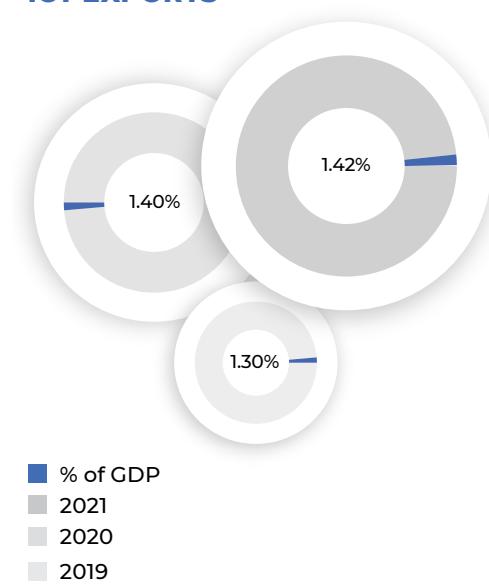
world and 11th in Eastern Europe in the GSEI (2022), with Ljubljana being the top-performing city in the country. Slovenia has 129 tech start-ups, including one unicorn - CargoX - which provides blockchain-based Smart Bill of Lading solutions. The country's start-up scene is concentrated in foodtech, transportation, and hardware and IoT, with successful start-ups such as JuicyMarbles and Termodron in foodtech, and a concentration of 20 transportation start-ups. The start-up ecosystem is supported by top-notch accelerators such as ABC Accelerator and Hevoknik Startup School. The country prioritises digital transformation through policies that emphasise technology and digital literacy. It follows the 'digital by default' and 'once-only' principles and uses enablers such as digital identity and data rights to improve government services. Its regulatory framework reflects a commitment to digital transformation, and the Digital Slovenia 2030 strategy will integrate all sectoral strategies. Tax relief and grants are available to incentivise the uptake of digital solutions, with organisations such as the Slovene Enterprise Fund and DIH Slovenia promoting digitalisation among

SMEs. Cybersecurity is a priority, with a strategy to strengthen the system against threats. Slovenia has this year dropped to ninth place in the IT Competitiveness Index, down from its previous position of fifth. However, the country has a lot to boast about as it ranks first in the EF English Proficiency Index score and tops the Human Development Index, which demonstrates its strong emphasis on education and the well-being of its citizens. Moreover, Slovenia takes second spot in the region for the number of developers per 100,000 people, showcasing its dedication to technology. The country also ranks third in the PISA Mathematics assessment, indicating the high quality of its education system. The number of students has risen by nearly 40 per cent from 2015 to 2021, while the number of graduates has increased by approximately 15 per cent. In 2021, Slovenia had one of the best performing education systems in emerging Europe with 238 students and 35 graduates per 100,000 inhabitants.

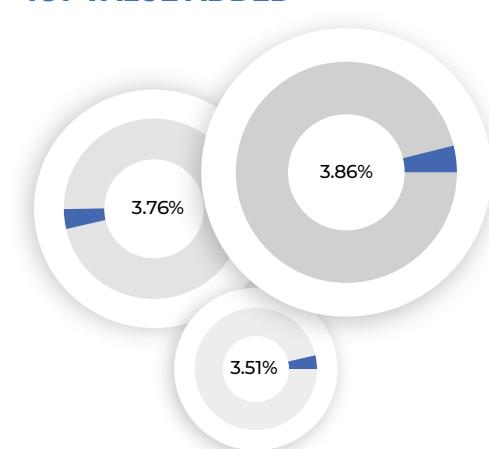
EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	543.6	539.5	628.7	659.2	743.0
of which computer services (millions, euros)	172.1	205.7	253.4	264.1	299.2

ICT EXPORTS



ICT VALUE ADDED



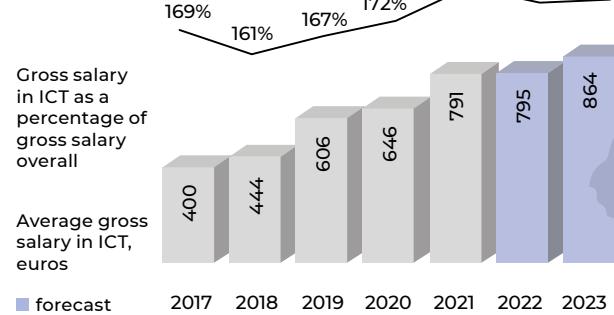
UKRAINE



OVERVIEW

Population (million)	Employed population	GDP in current prices (millions, euros)	GDP per capita (euros)	GDP change 2001-2021 (%)	FDI Inflow (millions, euros)
40.998	15,610,000	169,171	4,126	409%	6,549
Ukraine's position in international rankings					
Index of Economic Freedom (of 177) (2022)	Social Progress Index (of 169)	PISA Mathematics 2018 (of 78)	Human Development Index (of 190)	EF English Proficiency Index (of 111)	Online Service Index (of 193)
130	52	43	77	35	34

ICT GROSS SALARY IN 2017-23

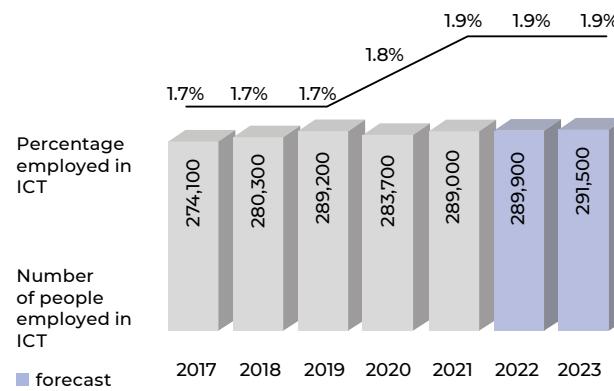


Ukraine is a rising ICT hub in boasting a highly educated population and a cost-effective data infrastructure that is attractive to businesses. Despite Russia's full-scale invasion of the country, launched in February 2022, the Ukrainian government is committed to digital transformation. Its ambitious goal is to make Ukraine the world's most technologically advanced nation by 2030, with a robust ICT sector, efficient customs, and favourable tax conditions. Furthermore, last year Ukraine gained EU membership candidacy, a historic moment for the country that promises well for its future integration with the bloc.

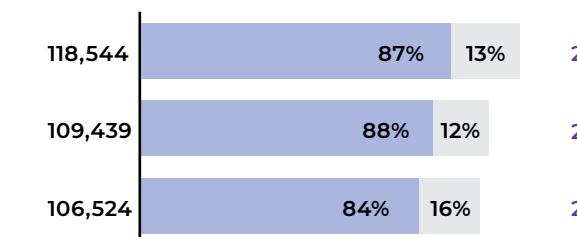
On the start-up scene, Ukraine proudly holds the title of a leading start-up hub in Eastern Europe, ranking 12th in the region (Startup Blink). The thriving tech industry is well-represented in areas such as marketing and sales, software and data, and social and leisure. There are 467 tech companies operating in Ukraine, including some notable success stories. GitLab, a comprehensive DevSecOps platform for software innovation, has achieved a successful exit, while People.ai and Grammarly are two unicorns that have made a significant impact in the industry.

People.ai is an AI-powered platform that helps enterprise sales, marketing, and customer success teams uncover every revenue opportunity from every customer. Grammarly meanwhile is a digital writing assistant used by millions of people worldwide to enhance their communication and make it more effective. As an Inc. 500

ICT EMPLOYMENT IN 2017-23

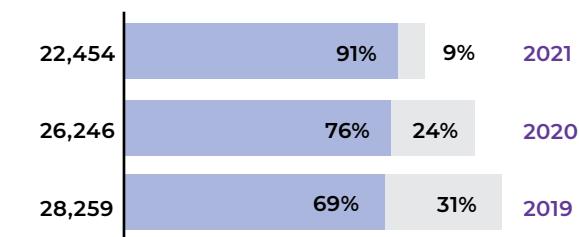


ICT STUDENTS



bachelor and short-term
master's and doctoral

ICT GRADUATES



bachelor and short-term
master's and doctoral

company, Grammarly has offices in San Francisco, New York, and Kyiv, adding to Ukraine's reputation as a centre of tech innovation.

The ICT sector in Ukraine is an esteemed industry to work in. The average wage has increased from 293 euros in 2015 to 791 euros in 2021. The number of ICT specialists has been also increasing - from 272,900 in 2015 to 289,000 in 2021. In addition, both ICT exports and ICT value added continue to increase, but with some variation during 2020 and 2021. ICT exports as a share of GDP slightly increased from 3.31 per cent in 2020 to 3.55 per cent in 2021.

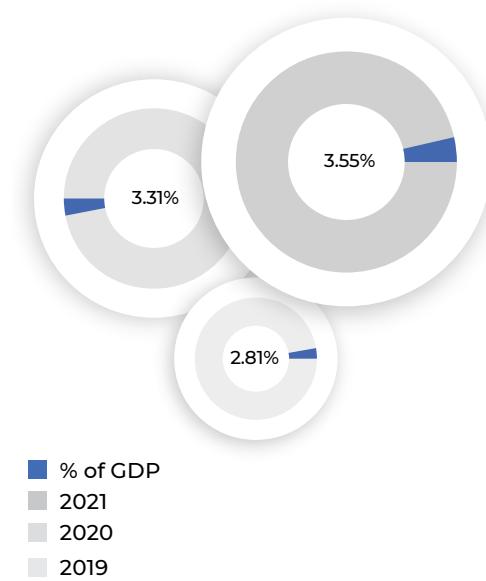
In terms of digital transformation, Ukraine has achieved significant success, with almost 19 million citizens benefiting from the *Diia* platform, an e-government service that facilitates communication between the state and its citizens. Before 2022, *Diia* already offered a one-stop-shop portal for entrepreneurs, along with fast business registration and digital signature on smartphones. Additionally, *Diia.City* provides legal and tax framework for IT companies, and over 380 companies have received *Diia.City* resident status.

Ukraine's efforts in digital transformation have been recognised globally, with the country being among the first non-EU nations to issue digital Covid-19 certificates in 2021, equivalent to those issued by EU authorities and accepted for travel within the EU. The country has also prioritised strengthening its cyber security posture. In 2021, Ukraine established a National Cyber Centre, which is responsible for protecting state information resources and cyberspace more broadly.

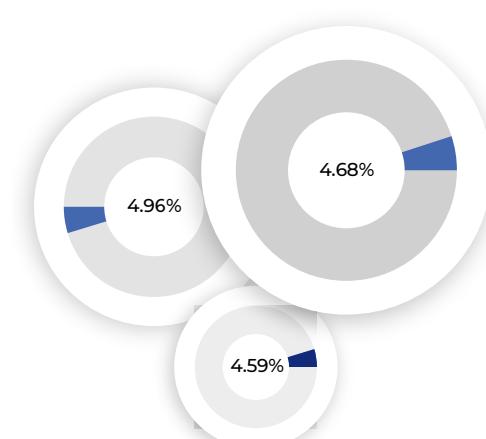
Despite the full-scale war in Ukraine, the government has continued to work towards digitisation. Currently, it is using satellite internet technology from Starlink to ensure stable internet connections for critical infrastructure facilities.

Ukraine has made good progress in the latest IT Competitiveness Index, ranking in 12th place, up from 14th place last year. The country has a high number of IT students and graduates per 100,000 of population, ranking seventh and fourth respectively. This has contributed to the country's success in the TopCoder and Google Code Jam rankings, where it ranks third and fifth. Additionally, Ukraine boasts a low cost of data, the fourth cheapest in the region.

ICT EXPORTS



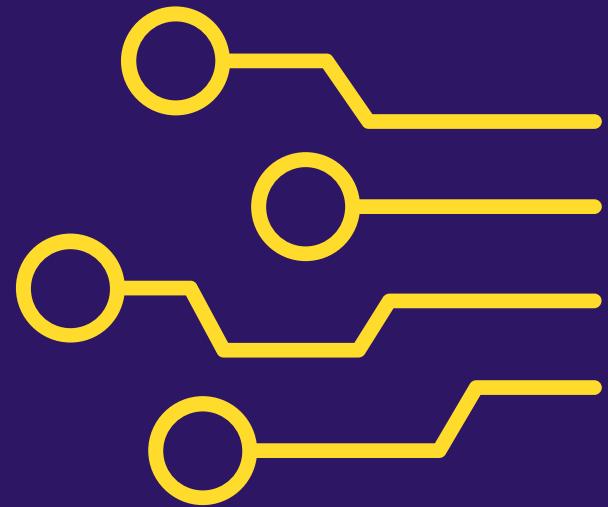
ICT VALUE ADDED



EXPORTS

	2017	2018	2019	2020	2021
Export of ICT services (millions, euros)	2,443.2	2,940.8	3,868.8	4,536.0	6,008.9
of which computer services (millions, euros)	2,199.7	2,713.1	3,727.6	4,400.3	5,870.3

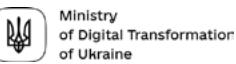
SUPPORT DIGITAL UKRAINE



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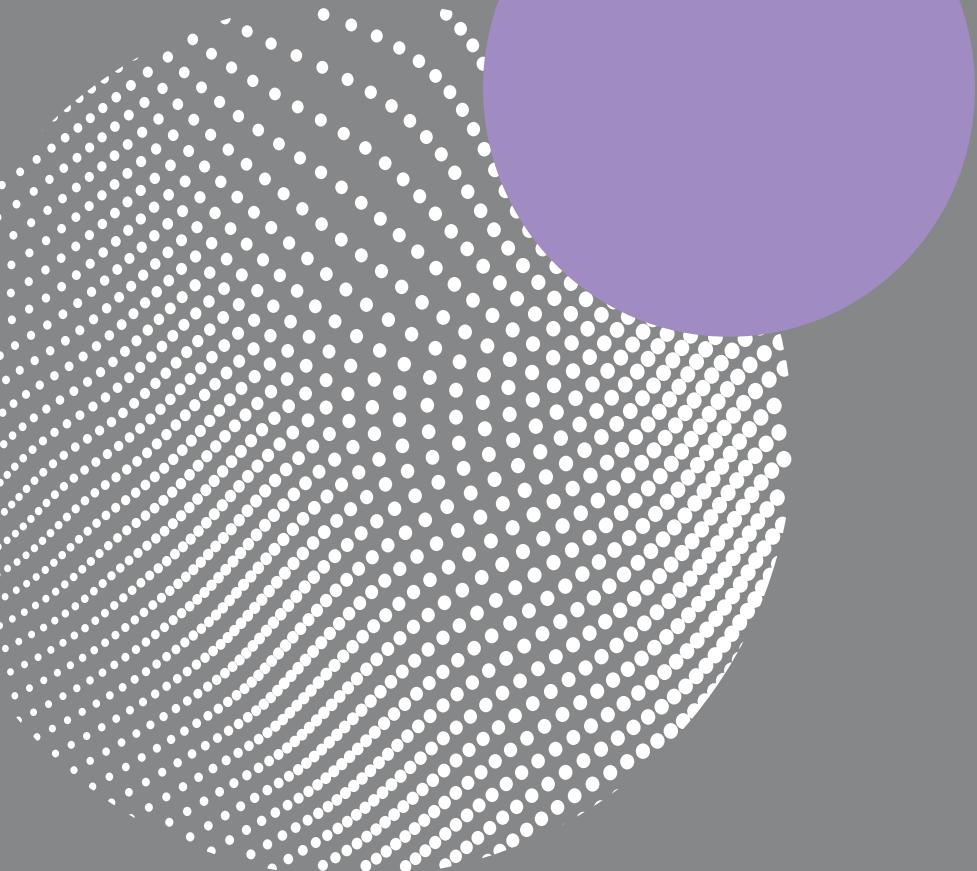


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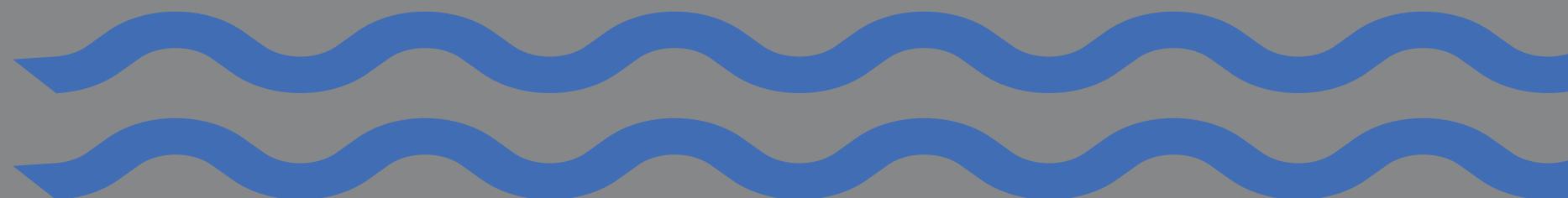


Help us raise global awareness of
the potential of Ukraine's tech ecosystem
and reassure international partners.

The livelihoods of 300,000 people depend
on the tech sector staying afloat.



ADDITIONAL RESOURCES



TECHNOLOGY ECOSYSTEM

Albania

Albanian Business Services Association
 Albanian ICT Association
 Albanian Innovation Accelerator
 Business Incubator Korca
 CEED Albania
 IDEA
 Protik Innovation Centre
 UK-Albania TechHub
 Uplift Start-up Accelerator Programme Western Balkans
 Yunus
 Tirana Inc.
 Growpreneur

Armenia

Catalyst Hi-Tech and Entrepreneurship Development Foundation
 Enterprise Incubator Foundation
 Start-Up Armenia Foundation
 Union of Advanced Technology Enterprises of Armenia (UATE)
 Union of Employers of Information and Communication Technologies

Azerbaijan

Azerbaijani National Academy of Sciences — Institute of Information Technology
 Founder Institute Azerbaijan Start-Up Accelerator
 NEXT STEP Innovation Centre

Belarus

Belarus Hi-Tech Park
 Imaguru
 Scientific and Technological Association "Infopark"
 Tech Minsk

Bosnia and Herzegovina

Beezone
 Bit Alliance
 Fondacija Mozaik
 HUB387
 Intera Technology Park
 Linnovate
 QLab

TECHNOLOGY ECOSYSTEM

Bulgaria

Association of the Bulgarian Leaders and Entrepreneurs (ABLE)
 Bulgarian Association of Software Companies (BASSCOM)
 Bulgarian Association of Information Technologies (BAIT)
 Bulgarian Centre of Women in Technology (BCWT)
 Bulgarian Entrepreneurship Centre
 Bulgarian Private Equity and Venture Capital Association (BVCA)
 Bulgarian Start-up Association (BESCO)
 Data Science Society
 Economic Development via Innovation and Technology (EDIT)
 ICT Cluster Plovdiv
 Law and Internet Foundation
 Microsoft Innovation Centre Bulgaria
 Sofia Tech Park
 Start it Smart
 Start-up Factory
 Start-up Foundation

Croatia

BIOS Incubator Osijek
 Croatian Information Technology Association (CITA)
 HUB385
 Impact Hub Zagreb
 PISMO Incubator Novska
 Start-up Incubator Rijeka
 Zagreb Innovation Centre
 ZIP — Zagreb Entrepreneurship Incubator

Czechia

Association for Information Technologies and Telecommunications (ICTU)
 Czech IT Cluster
 Czech Technology Park Brno
 DEX Innovation Centre
 StartUpYard
 Green Light
 UP21
 Impact Hub
 Prague IoT Centre
 ESA Business Incubation Centres
 Information Technology and Telecommunication Association (AITAT)
 Science and Technology Park Pilsen
 SIC South Moravian Innovation Centre
 Technology Park of Information and Communication Technology in Zlín

Estonia

Ajujaht
 Buildit Accelerator
 ClimateLaunchpad
 e-Estonia
 Elevator Startup Labs

Estonian Association of Information Technology and Telecommunications (ITL)
 GameFounders
 Start-up Estonia
 Start-up Wise Guys
 Tallinn Science Park Tehnopol
 TalTech Mektoryst
 Tartu Biotechnology Park
 Tehnopol Start-up Incubator
 VUNK Start-up Labs

Georgia

Georgian ICT Association
 Georgian Innovation and Technology Agency (GITA)
 Georgian IT Cluster

Hungary

Alliance Informatics and Innovation Cluster
 Association of Hungarian IT Companies (IVSZ)
 Hungarian Service and Outsourcing Association (HOA)
 ICT Association of Hungary

Kosovo

Innovation Centre Kosovo
 Kosovo Association of Information and Communications Technology (STIKK)
 Technology Park in Shtime

Latvia

Latvia Technology Park
 Latvian Information and communications technology association (LIKTA)
 Latvian IT Cluster
 Start-Up Latvia

Lithuania

Association of the information technology, telecommunications and office equipment companies of Lithuania (INFOBALT)
 Digital Rocket LT Cluster
 Fintech Lithuania Cluster
 Kaunas' Science and Technology Park
 Klaipėda's Science and Technology Park
 Vilnius' Sunrise Valley Science and Technology Park

Moldova

Moldova IT Park
 Moldovan Association of Private ICT Companies (ATIC)
 Tekwill

Montenegro
 ICT Cortex
 Montenegrin Business Angel Network (MeBAN)
 Montenegrin IT Cluster
 Science and Technology Park of Montenegro
 Tehnopolis

North Macedonia

Bitoal Acceleration Programme
 Fund for Innovation and Technology Development
 ICT Chamber of Commerce of Republic of North Macedonia (MASIT)
 Seavus Accelerator
 SEEUTechPark
 Skopje Technology Park
 Startup Macedonia
 Technology Park SEEU Tetovo
 UKIM Accelerator
 X Factor Accelerator

Poland

AIP Link
 Aspire — Association of IT and Business Services Companies
 Association of Business Service Leaders (ABSL)
 Białystok Science and Technology Park
 Bydgoszcz IT Cluster
 Cambridge Innovation Centre
 Cracow Technology Park
 Entrepreneurial Poland Foundation
 FundingBox Accelerator
 Gdańsk Starter
 Huge Thing Accelerator
 HugeTECH Accelerator
 ICT West Pomerania Cluster
 Inkubator Technologiczny Samsung
 Lublin Science and Technology Park
 Mazovia Cluster ICT
 National Capital Fund (KFK)
 National Centre for Research and Development (NCBR)
 Polish Agency for Enterprise Development (PARP)
 Polish Chamber of Information Technology and Telecommunications
 Polish Development Fund (PFR)
 Polish Games Association
 Poznań Science and Technology Park (PSTP)
 ProProgressio
 ReaktorX
 Silesia ICT Cluster
 Start-up Spark — Lodz Special Economic Zone
 Start-Up Spark Accelerator
 Wielkopolska ICT Cluster

Romania

Association for Information Technology and Communications of Romania (ATIC)
 Cluj IT Cluster
 Different Angle Cluster
 HIT Park (Hemeiuș Information Technology)
 ICT Oltenia Cluster
 Innovation Labs
 IT&C Cluster Lower Danube
 IXperiment
 Liberty Technology Park Cluj
 Romanian Software Industry Association (ANIS)
 Romanian Start-ups
 Romanian IT
 Blockchain Association
 Startarium
 Transilvania IT Cluster

Serbia

Digital Serbia Initiative
 ICT Cluster of Central Serbia
 NiCAT Cluster
 Science and Technology Park Niš
 Science Technology Park Belgrade
 Science Technology Park Cacak
 Serbian Blockchain Initiative
 Serbian Games Association
 Union of ICT Societies of Serbia (JISA)
 Vojvodina ICT Cluster – VOICT

Slovakia

IT Association of Slovakia (ITAS)
 Košice IT Valley
 Launcher Start-up and Innovation Studio
 Slovak Alliance for Innovative Economy (SAPIE)
 Slovensko Digital
 Startup center TUKE
 Young Entrepreneurs Association of Slovakia (YEAS)
 CIVITTA

Slovenia

ABC Accelerator
 Katapult
 Ljubljana University Incubator
 Mladi podjetnik
 Slovene Enterprise Fund
 Slovenian Business Angels Slovenian Business Angels
 Startaj.si
 Start-Up Slovenia
 Technology Park Ljubljana
 Tovarna Podjemov – Start:up Slovenia

Ukraine

1991 Open Data Incubator
 Diia.City
 GrowthUP
 IT Dnipro
 IT Ukraine Association
 Kharkiv IT Cluster
 Kyiv IT Cluster
 Lviv IT Cluster
 LvivTech.City
 Odessa IT Cluster
 Sector X
 Tech Ukraine
 The Ukrainian Association of FinTech and Innovation Companies
 Ukrainian Internet Association
 Ukrainian Venture Capital and Private Equity Association (UVCA)
 UNIT.City
 W.tech





OLEKSII TOPORKOV
SENIOR DATA ANALYST,
EMERGING EUROPE

METHODOLOGY

The research covers **23 countries** of the emerging Europe region ('Emerging Europe'):

- I. **six countries** of the **South East Europe** region – Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia;
- II. **three countries** of the **North East Europe** region – Estonia, Latvia, Lithuania;
- III. **eight countries** of the **Central Europe** region – Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia;
- IV. **six countries** of the **Eastern Europe** region – Armenia, Azerbaijan, Belarus, Georgia, Moldova, Ukraine.

We are constantly working on improving the methodology of our research to make the results as valuable for the stakeholders of the region as possible. This is the third year we have created the IT Competitiveness Index, and this year's index methodology includes best practices from the first two releases, while ensuring comparability with last year's results.

National and international data collection methodologies remain focused on the ICT sector as a whole, incorporating IT services into the structure of information and communication services. We would like to express our hope for the development of more IT-focused methodologies in the coming years. On a more positive note, macroeconomic, social, and demographic data in the emerging Europe region has become increasingly standardised and intercomparable. Data dissemination and communication with external

vendors has become more convenient and efficient, and we want to offer special thanks to all the statistical offices, central banks and other official authorities who cooperated with us during the data collection process.

Data collection in the Central Asia region remains challenging – the comparability of methodology remains insufficient to ensure the credibility of the results. We are nevertheless committed to including this region in our Future of IT research and we will continue our efforts to incorporate it in the coming years.

Finally, it should come as no surprise that there is a lot of heterogeneity in the emerging Europe region. We believe however that the region may provide a joint value proposition in the ICT sector, contributing to global value chains using the abundance and high quality of ICT talent, creating a favourable ICT environment and using a developed and contemporary ICT infrastructure.

DEFINITIONS OF THE CONCEPTS USED IN THE RESEARCH

Average salary in the economy – average gross salary, average gross wage, average gross earnings or average nominal wages in the economy.

ICT gross salary – average gross salary or average gross wage or average gross earning or average nominal wages in NACE Rev. 2 section J 'Information and communication'. The terms 'average salary in ICT', 'average ICT salary', 'average wage in ICT' are used interchangeably and characterise the abovementioned concept.

Labour data is collected according to the Labour Force Survey data (according to the methodology of the International Labour Organisation). This approach refers to the data on number of employed persons, number of unemployed persons, number of economically active persons / labour force, number of persons employed by the sector or field of the economy.

Average regional ICT salary is calculated as a weighted average of gross ICT salaries in the individual economies considering the number of persons employed in ICT in the individual economies.

Labour force refers to the sum of employed and unemployed persons.

Number of people working in ICT – number of persons employed in NACE Rev.2 section J 'Information and communication'. Terms 'number of people working in ICT', 'number of persons employed in ICT', 'ICT employment', 'number of IT specialists' and 'number of ICT professionals' are used interchangeably and characterise the abovementioned concept.

Number of ICT specialists per 100,000 of population is calculated by dividing the number of people working in ICT by population and multiplied by 100,000.

ICT value added refers to the value added of NACE Rev. 2 section J 'Information and communication' in current prices used in the gross domestic product calculation by production approach. Data in the local currency is converted to euros using the exchange rate of the national currency of respective country in respective year as reported by UNCTAD. Data in US dollars is converted to euros using the exchange rate of the respective year as reported by UNCTAD.

ICT value added as percentage of GDP is calculated by dividing to the value added of NACE Rev. 2 section J 'Information and communication' in current prices by the GDP in current prices.

Export of ICT services refers to the export of 'Telecommunications, computer and information services' (component 9 according to EBOPS 2010) and is a sum of 'Telecommunication services' (EBOPS 2010 code 9.1) export, 'Computer services' (EBOPS 2010 code 9.2) export and 'Information services' (EBOPS 2010 code 9.3) export. The Balances of Payments of the counties and the International Trade Center database are the sources of the statistics. Data from the ITC database are acquired in US dollars and converted to euros using the exchange rate of the national currency of the respective country in respective year as reported by UNCTAD. Terms 'export of ICT services', 'ICT export', 'ICT exports' are used interchangeably.

Export of computer services refers to the export of 'Computer services' (EBOPS 2010 code 9.2).

Export of ICT services as percentage of GDP is calculated by dividing the export of ICT services by the GDP in current prices.

Population refers to the resident population at the end of the year. Bosnia and Herzegovina's population refers to the mid-year present population.

Nominal GDP refers to the gross domestic product in current prices. The calculation based on the gross domestic product in local currency divided by the exchange rate of the local currency unit (or US dollars in case data are reported in US currency) to euros in the respective year as reported by UNCTAD.

GDP per capita is calculated by dividing the nominal GDP by the population of the country.

GDP change 2001-2021 is calculated as the difference between the gross domestic product in current US dollars in 2001 and 2021 in per cents. The source of the data is the World Bank database.

Inward FDI refers to the value of inflows of foreign direct investments in 2021. The source of the data is the UNCTAD database. Kosovo's inward FDI figure is based on the data from the Central Bank of the Republic of Kosovo. Data in US dollars are converted to EUR using the exchange rate of USD to euros in respective year as reported by UNCTAD.

Number of ICT students refers to the number of students in the field 06 'Information and Communication Technologies' according to the International Standard Classification of Education (ISCED Fields of Education and Training (ISCED-F) 2013) (levels 5-8 according to ISCED 2011). The figure for the respective year reflects the numbers as of the start of the academic year, that started in the respective year. The sources are data from the national statistical authorities and the Eurostat database.

Number of ICT students per 100,000 of population is calculated by dividing the number of students in the field 06 'Information and Communication Technologies' by the population and multiplied by 100,000.

Number of ICT graduates refers to the number of graduates in the field 06 'Information and Communication Technologies' according to the International Standard Classification of Education (ISCED Fields of Education and Training (ISCED-F) 2013) (levels 5-8 according to ISCED 2011). The sources are national statistical authorities and the Eurostat database.

Number of ICT graduates per 100,000 of population is calculated by dividing the number of graduates in the field 06 'Information and Communication Technologies' by population and multiplied by 100,000.

Number of bachelor and short-term students/graduates refers to the number of students/graduates on the 5th and 6th level of education according to the International Standard Classification of Education (ISCED) 2011.

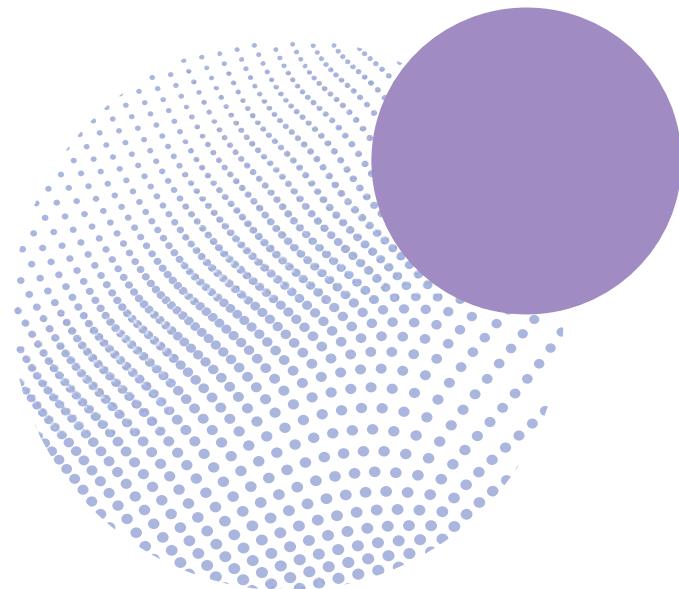
Number of master's and doctoral students/graduates refers to the number of students/graduates on the 7th and 8th level of education according to the International Standard Classification of Education (ISCED) 2011.

NOTES

Missing figures are modelled based on the data for available years using linear approximation or exponential smoothing.

In case of a break in series due to changes in the national methodology data were adjusted. In case of changes related to the change in taxes or contributions that affected the gross wage no adjustments were made.

Forecasts that are included in the country profiles are based on available information for 2021 and our own analysis, as well as modelling using exponential smoothing.



IT COMPETITIVENESS INDEX METHODOLOGY

The IT Competitiveness Index consists of 47 parameters divided between four sections, each of them consisting of three subsections:

1. Talent – 40 per cent, which is composed of three subsections with a total of 18 parameters:
 - 1.1. Education – 20 per cent. Composed of 10 parameters:
 - 1.1.1. Number of ICT students. Based on the data for 2021 (when official data is available) or estimates for 2021 (when official data is unavailable). Weight: 1 per cent.
 - 1.1.2. Average annual increase or decrease in the number of ICT students. Based on the official data for 2017-2021 or mix of official data and estimates for the same period. Weight: 2 per cent.
 - 1.1.3. Number of ICT graduates. Based on the data for 2021 (when official data are available) or estimate for 2021 (when official data is unavailable). Weight: 1 per cent.
 - 1.1.4. Average annual increase or decrease in the number of ICT students. Based on the official data for 2017-2021 or mix of official data and estimates for the same period. Weight: 2 per cent.
 - 1.1.5. Number of ICT students per 100,000 of population. Based on the data for 2021 (when official data is available) or estimate for 2021 (when official data is unavailable). Weight: 1.5 per cent.
 - 1.1.6. Average annual increase or decrease in the number of ICT students per 100,000 of population. Based on the official data for 2017-2021 or mix of official data and estimates for the same period. Weight: 2.5 per cent.
 - 1.1.7. Number of ICT graduates per 100,000 of population. Based on the data for 2021 (when official data are available) or estimate for 2021 (when official data is unavailable). Weight: 1.5 per cent.
 - 1.1.8. Average annual increase or decrease in the number of ICT graduates per 100,000 of population. Based on the official data for 2017-2021 or mix of official data and estimates for the same period. Weight: 2.5 per cent.
 - 1.1.9. International Mathematical Olympiad Rank. Based on the data for 2022. Weight: 3 per cent.
 - 1.1.10. PISA Mathematics rank. Based on the data for 2018. Weight: 3 per cent.
 - 1.2. Labour force – 8 per cent. Composed of 5 parameters:
 - 1.2.1. Number of people working in ICT. Based on the data for 2021. Weight: 1 per cent.
 - 1.2.2. Average annual increase or decrease in the number of people working in ICT. Based on the data for 2017-2021. Weight: 1.5 per cent.
 - 1.2.3. Number of people working in ICT as percentage of total employed in the economy. Based on the data for 2021. Weight: 2 per cent.
 - 1.2.4. Average annual increase or decrease in the number of people working in ICT as percentage of total employed in the economy. Based on the data for 2017-2021. Weight: 2.5 per cent.
 - 1.2.5. Number of developers per 100,000 of population. Based on Stackoverflow data for 2019. Weight: 1 per cent.
 - 1.3. Talent competitiveness – 12 per cent. Composed of 3 parameters:
 - 1.3.1. Number of TopCoder participants per 1 win in TopCoder competition. Data were extracted on August 27, 2021. Weight: 3 per cent.
 - 1.3.2. EF English Proficiency Index rank. EF EPI ranking for 2021 was used. The number of points assigned to Slovenia is based on the result in 2018 ranking. Number of points assigned to Bosnia and Herzegovina is based on the result in 2017 ranking. Weight: 4 per cent.
 - 1.3.3. Google Code Jam Qualification Round result. Log of the position acquired by the highest-ranked participant from the respective country. Weight: 5 per cent.
2. IT Infrastructure – 20 per cent, which is composed of three subsections with a total of eight parameters:
 - 2.1. Connectivity – 10 per cent. Composed of four parameters:
 - 2.1.1. Speed of broadband Internet. Based on the data of Ookla Speedtest data on download speed for December 1, 2022. Weight: 5 per cent.
 - 2.1.2. Cost of data. Based on the data on the average cost of monthly subscription for broadband internet for 2023 by Cable.co.uk. Weight: 5 per cent.
 - 2.2. Digital transformation – 7 per cent. Composed of 3 parameters:

- 2.2.1. Online Service Index value. OSI is a part of the UN E-Government Development Index. Based on the data for 2022. Weight: 2.5 per cent.
- 2.2.2. E-Participation Index value. Based on the E-Participation Index 2022 by the UN. Weight: 2.5 per cent.
- 2.2.3. Percentage of Individuals using the Internet. Based on the data for 2021 as reported by ITC and national statistical authorities. Weight: 2 per cent.
- 2.3. Non-personnel resources – 3 per cent. Composed of 1 parameter:
- 2.3.1. Secure Internet servers per 1 million of population. Based on the data for 2021 as reported by the World Bank and Netcraft. Weight: 3 per cent.
3. Economic impact – 20 per cent, which is composed of three subsections with a total of 11 parameters:
- 3.1. Economic performance – 9 per cent. Composed of six parameters:
- 3.1.1. Export of computer services as a percentage of GDP. Calculated as the volume of export of computer services (EBOPS 2010 service category 9.2) as reported by national banks, national statistics offices or ITC divided by GDP as reported by the World Bank. Based on the data for 2021. Weight: 1.5 per cent.
- 3.1.2. Average annual increase or decrease of the volume of export of computer services as percentage of GDP. Based on the data for 2017-2021. Weight: 2.5 per cent.
- 3.1.3. Output of ICT per one employed person in the ICT sector. Based on the official, estimated or forecasted data for 2021. Output of ICT per one employed person is defined as quotient of the value added and intermediate consumption of the information and communication sector (NACE Rev. 2 section J 'Information and communication') divided by the number of employed in the sector as reported by national statistics office or ILO. Weight: 1 per cent.
- 3.1.4. Average annual increase or decrease of the output of ICT sector per one employed person in the ICT sector. Based on the data for 2017-2021. Weight: 1.5 per cent.
- 3.1.5. Value added of ICT as percentage of GDP. Parameter is calculated by dividing the value added of ICT by GDP. Based on the data for 2021. Weight: 1 per cent.
- 3.1.6. Average annual increase or decrease of the value added of ICT sector as percentage of GDP. Based on the data for 2017-2021. Weight: 1.5 per cent.
- 3.2. Cost competitiveness – 7 per cent. Composed of 4 parameters:
- 3.2.1. Average salary in ICT sector. Based on the data for 2021. Weight: 1.5 per cent.
- 3.2.2. Average annual increase or decrease of the average salary in ICT sector. Based on the data for 2017-2021. Weight: 2.5 per cent.
- 3.2.3. Average salary in ICT sector as percentage of the average salary in the economy. Calculated as a quotient after division of the average salary in ICT sector by the average salary in the economy for the respective year. Based on the data for 2021. Weight: 1 per cent.
- 3.2.4. Average annual increase or decrease of the average salary in ICT sector as percentage of the average salary in the economy. Based on the data for 2017-2021. Weight: 2 per cent.
- 3.3. Covid resistance – 4 per cent. Composed of 1 parameter:
- 3.3.1. Covid resistance. Calculation of the Covid resistance parameter is based on the mean value describing the quotient derived by dividing the factual data on the volume of export of computer services (parameter 1), average gross salary in the ICT sector (parameter 2), value added in the ICT sector (parameter 3), number of persons employed in the ICT sector (parameter 4), and gross domestic product (parameter 5) for 2020 and 2021 by the linear forecast for the same parameters for 2020 and 2021 based on 2015-2019 data:
- $$\text{COVID Resistance} = \left(\sum_{n=1}^5 \frac{\text{Fact}_n}{\text{Forecast}_n} \right) / 5 * 100\%$$
- where:
 Fact_n factual value for parameter n;
 Forecast_n linear forecast for parameter n.
Weight: 4 per cent.
4. Business environment – 20 per cent, which is composed of three subsections with a total of 10 parameters:
- 4.1. Intellectual property and cybersecurity – 6 per cent. Composed of two parameters:
- 4.1.1. International Property Rights Index value. Based on the index value for 2022. Weight: 3 per cent.
- 4.1.2. Global Cybersecurity Index value. Based on the index value for 2020. Weight: 3 per cent.
- 4.2. Support for industry development – 9 per cent. Composed of 3 parameters:
- 4.2.1. The ICT Regulatory Tracker Index value. Based on the index value for 2022. Weight: 3 per cent.

- 4.2.2. The Regulatory Quality Index value. Based on the index value for 2021. Weight: 3 per cent.
- 4.2.3. The Regulatory Quality Index value change between 2015 and 2021. Calculated as a difference between the value in 2021 and 2016. Weight: 3 per cent.
- 4.3. Economic competitiveness – 5 per cent. Composed of 5 parameters:
- 4.3.1. Economic Freedom Index value. Based on the index value for 2022. Weight: 1 per cent.
- 4.3.2. Youth Progress Index value. Based on the index value for 2022. Weight: 1 per cent.
- 4.3.3. Human Development Index value. Based on the index value for 2022. Weight: 1 per cent.
- 4.3.4. Corruption Perception Index rank. Based on the ranking for 2022. Weight: 1 per cent.
- 4.3.5. Social Progress Index value. Based on the index value for 2022. Weight: 1 per cent.

In case the figure is unavailable due to absence of the country in rankings, the weighted average figure for other components within the section is applied. Countries are assigned between 10.00 and 100.00 points for each parameter. 10.00 points are assigned to the country which has the worst figure in the region, 100.00 points are assigned to the country which has the best figure in the region.

Calculations for the parameters 1.1.1.-1.1.8.; subcategory 1.2.; parameters 1.3.3., 2.1.1., 2.1.3., 2.1.4.; subcategories 2.2., 2.3., 3.1., 3.3., 4.1., 4.2.; parameters 4.3.1.-4.3.3, 4.3.5 are done using the following formula:

$$\text{Points} = \left(10 + \frac{\text{Value}-\text{Min value}}{\text{Max value}-\text{Min value}} \right) * \text{Weight}$$

where:

Max value – the highest figure in the region;

Min value – the lowest figure in the region;

Weight – weight of the parameter.

Calculations for the parameters 1.3.1., 2.1.2.; subcategory 3.2. are done using the following formula:

$$\text{Points} = \left(100 - \frac{\text{Value}-\text{Min value}}{\text{Max value}-\text{Min value}} \right) * \text{Weight}$$

where:

Max value – the highest figure in the region;

Min value – the lowest figure in the region;

Weight – weight of the parameter.

Parameters 1.1.9., 1.1.10., 1.3.2., 4.3.4. are described by the position in ranking, so the following methodology is used:

1. Country with the highest rank in the region is assigned 100 points.
2. Country with the 8th rank in the region is assigned 70 points.
3. Country with the 15th rank in the region is assigned 40 points.
4. Country with the 23rd rank in the region is assigned 10 points.

For the countries from the 1st to 8th position number of points is calculated as following:

$$\text{Points}_1 = \left(100 - \frac{\text{Value}-\text{Min value}_1}{\text{Max value}_1-\text{Min value}_1} \right) * 30$$

where:

Max value_1 - lowest rank in the first group of countries;

Min value_1 - highest rank in the first group of countries;

Weight – weight of the parameter.

For the countries from the 9th to 15th position number of points is calculated as following:

$$\text{Points}_2 = \left(70 - \frac{\text{Value}-\text{Min value}_2}{\text{Max value}_2-\text{Min value}_2} \right) * 30$$

where:

Max value_2 - lowest rank in the second group of countries;

Min value_2 - highest rank in the second group of countries;

Weight – weight of the parameter.

For the countries from the 16th to 23rd position number of points is calculated as following:

$$\text{Points}_3 = \left(40 - \frac{\text{Value}-\text{Min value}_3}{\text{Max value}_3-\text{Min value}_3} \right) * 30$$

where:

Max value_3 - lowest rank in the third group of countries;

Min value_3 - highest rank in the third group of countries;

Weight – weight of the parameter.

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 Central Bank of Montenegro
 Central Bank of the Republic of Kosovo
 Central Statistical Bureau of Latvia
 Central Statistical Office of Poland
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 Croatian National Bank
 Czech Statistical Office
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 HaridusSilm
 Hungarian Central Statistical Office
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 Kosovo Agency of Statistics
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 Ministry for Innovation and Technology (Hungary)
 Ministry of Economics of the Republic of Latvia
 Ministry of Economy and Infrastructure of the Republic of Moldova
 Ministry of Education and Science of the Republic of Latvia
 Ministry of Education of Azerbaijan
 Ministry of Education of the Republic of Armenia
 Ministry of Education, Science and Sport of the Republic of Slovenia
 Ministry of Education, Youth and Sports (Czechia)
 Ministry of Finance of the Republic of Estonia
 Ministry of Finance of the Republic of Lithuania
 Ministry of Science and Higher Education of the Republic of Poland
 National Bank of Slovakia

National Bank of Poland
 National Bank for Foreign Economic Affairs of the Republic of Uzbekistan
 National Bank of Georgia
 National Bank of Moldova
 National Bank of Romania
 National Bank of Serbia
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 National Bank of the Kyrgyz Republic
 National Bank of the Republic of Belarus
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 State Statistical Office of the Republic of North Macedonia
 State Statistics Service of Ukraine
 Statistical Committee of the Republic of Armenia
 Statistical Office of Montenegro (MONSTAT)
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 Statistical Office of the Republic of Serbia
 Statistical Office of the Slovak Republic
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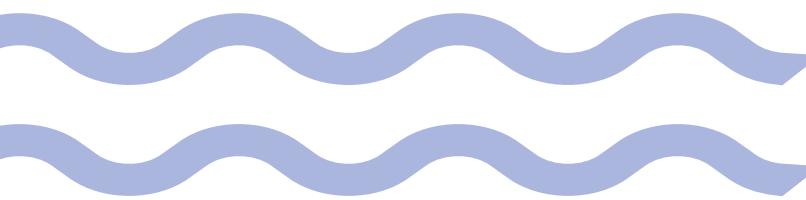
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 Czech Invest: Investment and Business Development Agency
 Datareportal
 Dealroom.co
 Deloitte
 Development Agency of Serbia
 Digital Kazakhstan
 Digital TV Europe
 E-Estonia
 Economist Intelligence Unit
 EE Times India
 EF English Proficiency Index
 Enterprise Incubator Foundation
 Ernst & Young
 EU4DIGITAL
 Eurasianet
 European Bank for Reconstruction and Development
 European Commission
 European Investment Bank
 Eurostat
 Financial Times
 Forbes
 Foreign Investment Promotion Agency of Bosnia and Herzegovina
 Foreign Policy
 Future of Life Institute
 Game Reactor
 Georgia Today
 Georgian National Investment Agency
 German Corporation for International Cooperation (GIZ)
 German Outsourcing Association
 Global Sourcing Association
 Go Vilnius
 GOV
 Harvard Advanced Leadership Initiative - Social Impact Review
 Heritage Foundation
 Hungarian Investment Promotion Agency
 IBM

India Times
 International Association of Outsourcing Professionals
 International Centre for Defense and Security
 International Federation of Robotics
 International Mathematical Olympiad
 International Monetary Fund
 International Telecommunication Union
 International Trade Centre — TradeMap
 Invest Bulgaria Agency
 Invest in Estonia
 Invest Lithuania
 Invest Romania
 Invest Slovenia
 Investment and Development Agency of Latvia
 Irish Times
 Klaster Lithuania
 Kosovo Investment and Enterprise Support Agency
 KPMG
 Labs of Latvia
 McKinsey & Company
 Ministry of Communications and Informatization of the Republic of Belarus
 Moldovan Association of ICT Companies
 Mondaq
 NASDAQ
 National Agency of Investment and Privatisation
 National Alliance for Local Economic Development
 Netherlands Enterprise Agency
 Netokracija
 Nordea
 OECD - Organisation for Economic Co-operation and Development - on the Policy Responses on the Impacts of the War in Ukraine
 OECD — Organisation for Economic Co-operation and Development
 OECD — Organisation for Economic Co-operation and Development — Programme for International Students
 Oxford Business Group
 Poland In
 Polish Investment and Trade Agency
 Politico
 Postnord
 PR Legal
 Prague Post
 President of the Republic of Azerbaijan
 PricewaterhouseCoopers
 Raiffeisen Bank
 Reuters
 Romania Insider
 Sifted
 Slovak Investment and Trade Development Agency
 Slovakia Tech

Social Progress Imperative
 Speedtest Global Index – Ookla
 Stackoverflow
 Startup Blink
 Startup Estonia
 Startup Poland
 Startup Stash
 Statista
 TechCrunchThe-pool
 Topcoder
 Transparency International
 UiPath
 Ukraine Digital News
 Ukraine Invest
 Ukrinform
 UNCTAD — United Nations Conference on Trade and Development
 UNDP - United Nations Development Programme in Bosnia and Herzegovina
 UNDP — United Nations Development Programme
 UNEP — United Nations Environment Programme
 United Nations Conference on Trade and Development – UNCTADstat
 United Nations Educational, Scientific and Cultural Organisation database
 United States Department of Commerce
 University of Central Asia
 University of Pennsylvania
 Vestbee
 Vienna Institute for International Economic Studies
 Visegrad Group
 World Bank
 World Movement for Democracy
 World Population Review
 World Trade Organisation
 ZDNet
 Emerging Europe's own news site and previous reports and analyses



ABBREVIATIONS AND ACRONYMS

BiH – Bosnia and Herzegovina
 BPM5 – Fifth Edition of the Balance of Payments Manual
 BPM6 – Sixth Edition of the Balance of Payments and International Investment Position Manual
 BPO – Business Process Outsourcing
 DESI – Digital Economy and Society Index
 EBOPS – Extended Balance of Payments Services Classification
 EF EPI – EF English Proficiency Index
 EMEA – Europe, the Middle East and Africa
 EU – European Union
 FDI – Foreign Direct Investment
 GDP – Gross Domestic Product
 GITA – Georgian Innovation and Technology Agency
 HDI – Human Development Index
 HTP – High-Tech Park
 ICT – Information and Communications Technology
 IDC – International Data Corporation
 ILO – International Labour Organisation
 IMF – International Monetary Fund
 IMO – International Mathematical Olympiad
 ISCED – International Standard Classification of Education
 IT – Information Technology
 ITO – Information Technology Outsourcing
 ITC – International Trade Centre
 KPO – Knowledge Process Outsourcing
 MBAN – Montenegrin Business Angels Network
 Mbps – Megabits per second



NACE – European Classification of Economic Activities

NATO – North Atlantic Treaty Organisation

NGO – Non-Governmental Organisation

OECD – Organisation for Economic Co-operation and Development

PISA – Programme for International Student Assessment

R&D – Research and Development

SaaS – Software as a Service

STEM – Science, Technology, Engineering, and Mathematics

UK – United Kingdom

UNCTAD – United Nations Conference on Trade and Development

UNDP – United Nations Development Programme

UNICEF – United Nations Children's Fund

US – United States

USA – United States of America

USSR – Union of Soviet Socialist Republics

UVCA – Ukrainian Venture Capital and Private Equity Association

VC – Venture Capital

WTO – World Trade Organisation

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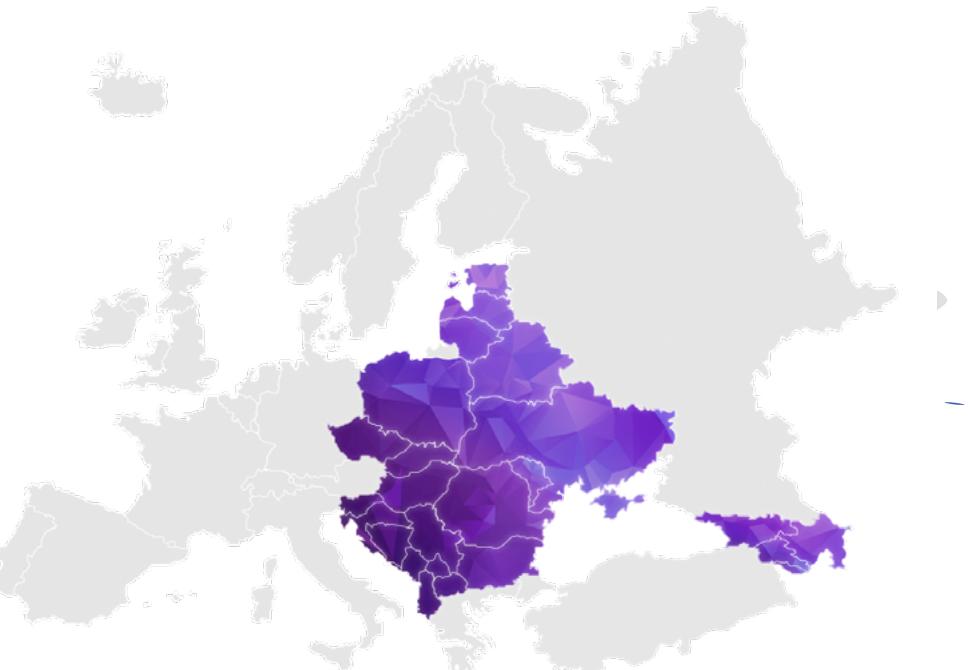
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