

e-SKILLS IN EUROPE

SLOVAK REPUBLIC

COUNTRY REPORT

JANUARY 2014

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1 Overview

The university study programmes tend to adjust more to the market demand of ICT skilled people through the following actions:

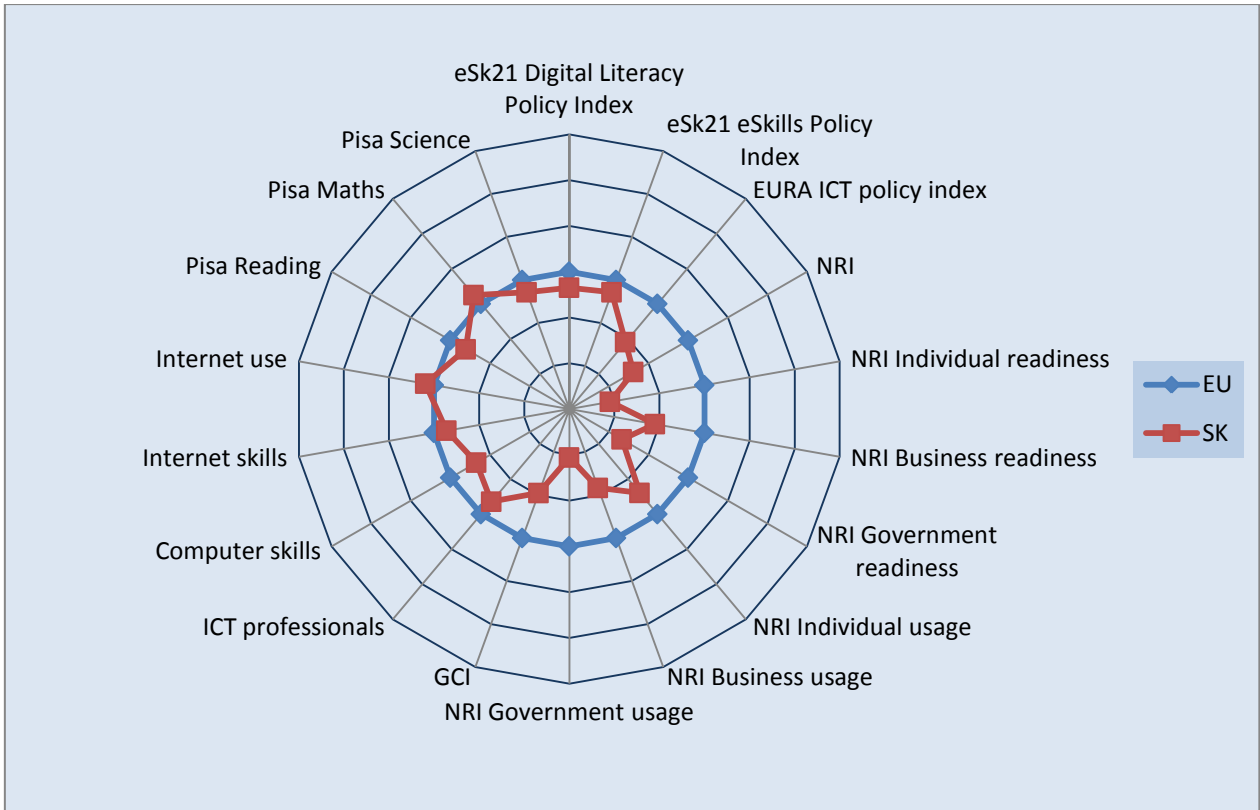
- Closer cooperation between universities and private sector;
- Support of scientific and technological parks;
- Support of spin-off and start-up companies in so called incubators.

These actions intend to ensure the sufficient supply of graduates in computer sciences, informatics, mathematics, engineers, etc.

Furthermore, investments into education should become of prime importance, including tax incentive for private companies which invest in research and development. It is also necessary to decrease bureaucracy related to public funds.

2 Indicators on innovation, competitiveness and ICT skills

Slovak Republic						
	Score 2009/2010	Rank 2009/2010	Score 2011/2012	EU27 Rank 2011/2012	Change (Rank)	Comment
eSkills21 study: 'e-skills' index 2010	2	12				Max.: 5.0
eSkills21 study: 'Digital literacy' index 2010	2.5	15				Max.: 9.0
EuRA e-skills index	1.9	24				Max.: 5.0
ICT practitioners in % of total employment 2012			2.94%	15		EU average: 3.43%
Digital literacy skills of the population 2009/11:						
• Individuals with high level of computer skills	21%	19	23%	22	↓	EU average: 28.52%
• Individuals with high level of Internet skills	7%	19	12%	14	↑	EU average: 13.67%
• Individuals using the Internet (last three months)	70%	11	74%	14	↓	EU average: 71.33%
Global Competitiveness Index (GCI) 2010/12	4.3	19	4.19	24	↓	Max.: 5.61 EU median: 4.52
Networked Readiness Index (NRI) 2010/12	4.2	21	3.79	26	↓	Max.: 5.6. EU median: 4.5
• Individual readiness	5.65	19	4.18	27	↓	
• Business readiness	4.74	17	3.92	24	↓	
• Government readiness	3.98	22	3.17	27	↓	
• Individual usage	3.33	20	4.64	20	↔	
• Business usage	4.91	17	3.07	24	↓	
• Government usage	3.98	22	2.84	27	↓	
PISA scores (2009) in:						
• Mathematics	497	8				EU median: 493
• Science	490	19				EU median: 498
• Reading	477	20				EU median: 489

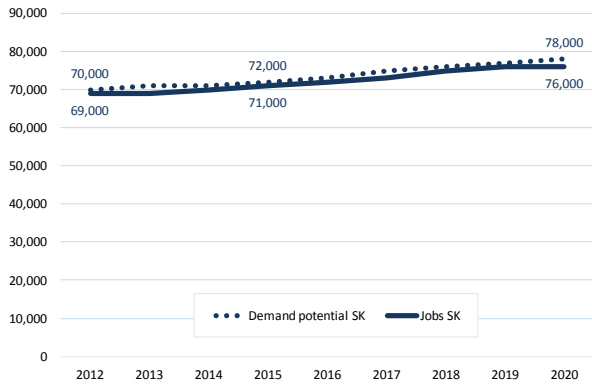


3 E-skills demand and supply forecasts 2012 – 2015 - 2020

Slovak Republic			
	SK	Rank EU27	EU27
ICT practitioner workforce 2012	69,000	18	7,403,000
ICT practitioner workforce 2012 as percent of total workforce	2.9%	15	3.4%
Assumed excess demand 2012	1,500	18	274,000
Forecast excess demand 2015	600	22	509,000
Forecast excess demand 2020	900	21	913,000
Forecast ICT practitioner jobs 2015	71,000	18	7,503,000
Forecast ICT practitioner jobs 2020	76,000	18	7,950,000
Workers 2012 - Management, business architecture and analysis level	6,000	22	1,477,000
... as percent of total workforce	0.3%	25	0.7%
Workers 2012 - ICT practitioners, professional level	22,000	20	3,393,000
... as percent of total workforce	0.9%	21	1.6%
Workers 2012 - ICT practitioners, technician and associate level	41,000	15	2,532,000
... as percent of total workforce	1.7%	4	1.2%
Growth core ICT workforce 2001-2010	6.2%	9	3.0%
Growth core ICT workforce 2008-2010	-1.4%	23	2.6%
Growth core ICT workforce 2011-2012	-13.0%	24	3.9%
Growth broad ICT workforce 2011-2012	-21.7%	27	1.8%
ISCED 5A/B first degree graduates in Computer Science, 2011	1,378	15	113,000
... graduates per 1000 population aged 20-24	3.4	15	3.6
... graduates 2011 as percent of 2006 (= peak EU)	127%	6	88%
Vocational training graduates in Computer Science, 2011	2,171	7	67,000

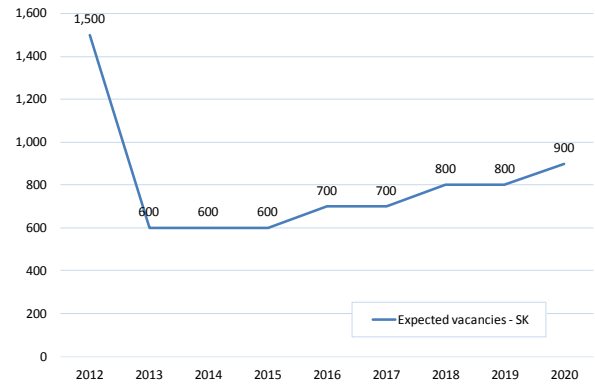
Sources and notes: see annex.

ICT workforce: Demand and Jobs in Slovak Republic 2012-2020 (Main Forecast Scenario)



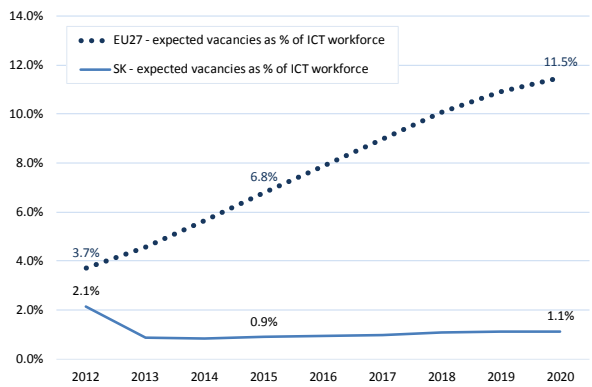
Source: empirica 2013

e-Skills shortage: Potential vacancies in Slovak Republic 2012-2020 (Main Forecast Scenario)



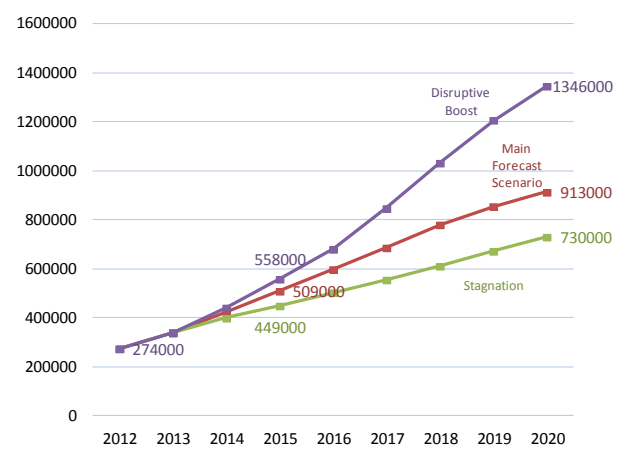
Source: empirica 2013

Potential vacancies as percent of ICT workforce Slovak Republic 2012-2020 (Main Forecast Scenario)



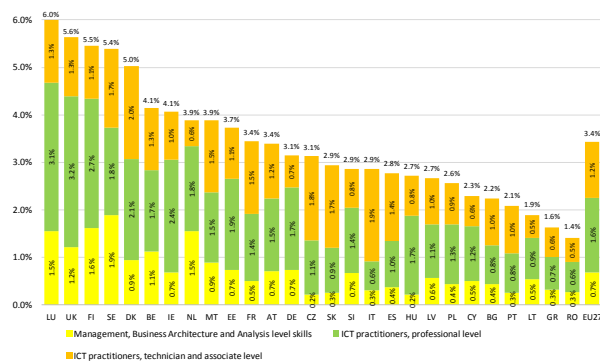
Source: empirica 2013

Potential vacancies in Europe (EU27) by scenario 2012-2020



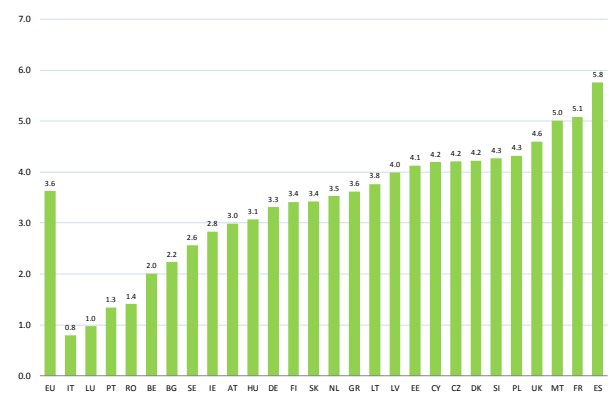
Source: empirica 2013

ICT practitioner workforce as percent of total workforce in EU Member States in 2012



Source: empirica 2013

First degree graduates in Computer Science (ISCED 5A/B) per 1000 population aged 20-24, 2011



Source: empirica 2013

4 Policy and major stakeholders initiatives

ICT is one out of 12 Government's priorities. **National Strategy of the Slovak Republic for digital inclusion** intends to raise awareness of citizens at risk. It aims specifically at accessibility and usability of ICT, increasing digital literacy and competences in ICT use, reducing geographical digital divide, promoting ICT for the elderly. The Slovakian e-Government strategy includes an e-Education part, which aims at increasing **digital literacy** of citizens as a strategy for **digital inclusion**. Moreover, there is an existing special **ICT strategy** for primary and secondary education, which is focused on digital competences for students and teachers, including several national projects dedicated to building ICT competences of teachers in primary and secondary education. The focus of national projects of higher education establishments and R&D institutions lies on building hardware and network capacities, but also on international cooperation and cooperation with SMEs. As an example of good cooperation with private companies, the cooperation with Cisco within the framework of Cisco Networking Academy programme can be mentioned, which is included in the curricula of selected schools (teaching internet technology skills). Part of the programme is offered at universities and partly at upper secondary schools as an optional course. The programme provides training and certifications in computer networks that have to support students at IT labour market. 60 laboratories have been set up and some 300 students a year receive certificates.

The **ICT Strategy for Primary and Secondary Education** helped to improve ICT in schools up to the EU average level and to integrate ICT competencies as a professional standard for teachers. A data centre with educational digital resources has been developed. It is set out to enhance information systems in education with networking and educational services, to increase the quality of schools to the EU standard.

Among stakeholder initiatives which support NGO projects (e.g. Infovek), the **Slovak Society for Computer Science (SSCS)** can be noted. In 2011 it has launched the initiative **Digital Literacy for All** with the aim to setup and execute pilot projects oriented to increasing the digital literacy of various disadvantaged groups. Nine projects that won the funding of the SSCS, successfully delivered training and subsequently the **ECDL** certification to elderly people, socially disadvantaged and unemployed persons. It is believed that the successful execution of the pilot projects will initiate similar projects spreading digital literacy among various marginalized groups. The initiative of the SSCS was awarded by the ECDL Foundation with the "Best Practice Award 2011" in the category Social Inclusion.

Further activities in this field include participation in the European **eSkills Week**. The main aim of Slovakia's activities within this context are to help young people better understand the opportunities related to careers in ICT, and the relevance of digital skills for their prospects on the labour market more generally. The local organiser is the **IT Association of Slovakia**. As a part of this initiative, a so-called **IT Fitness Test** was carried out for the first time in 2010 and again in 2012 in order to evaluate IT skills of secondary school and university students, track changes over time and compare them to other countries in which the instrument was applied as well, namely the Czech Republic, Poland and the Russian Republic. Nearly 30,000 tested their IT user skills in 2010 and 48,000 in 2012.

Košice IT Valley is a multi-stakeholder partnership between private companies and universities. Thanks to this cooperation university curricula have been modernised in order to better reflect labour market demand; the quality of lectures has been improved by inviting external lecturers coming from members' organisations. The initiatives that have been organised in cooperation with Košice IT Valley include TechDays and ImagineCup. Participating companies have set up their own programmes to strengthen cooperation with the region's universities. The Dual-learning project

launched by T-Systems, for example, gives high school graduates the possibility to opt for 2-3 years of additional study at the high school with supervision of T-Systems rather than choosing university.

Summary Assessment of Slovakian e-Skills Activities: ●●

Slovakia does not have a master strategy towards e-skills and lacks measures taken with direct regards to securing future supply of ICT practitioners apart from some university based programmes and general measures targeting improvements in the system for initial education.

Summary Assessment of Slovakian Digital Literacy Activities: ●●●

There is a National Strategy of the Slovak Republic for digital inclusion. Educational measures play a major role, as do indirect measures such as e-government or public infrastructures and SME support.

Summary Assessment of Slovakian e-Leadership & Digital Entrepreneurship Activities: ●

No initiatives identified.

Like in the precursor study¹ the assessment of the information gathered resulted in two activity indices, one for digital literacy and one for e-skills computed for each country. These were computed based on data from 2009 and 2013. The e-leadership skills activity index was computed only for 2013, as no data had been collected on this topic in 2009. In the following the focus will be on the e-skills activity index; we first mapped the e-skills activity index values against the Networked Readiness Index (NRI)² for each of the 27 Member States.

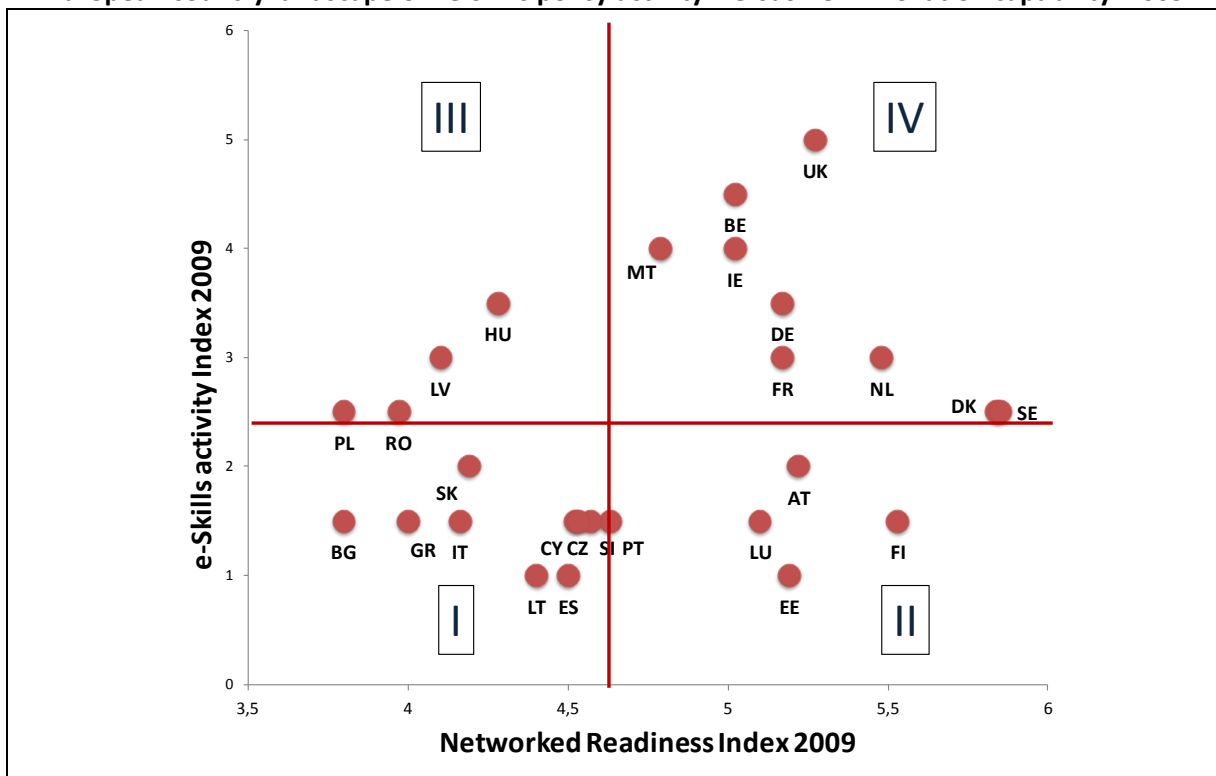
This allows for putting the results of the e-skills policy and activity analysis in the different countries in the wider context of each country's propensity to exploit the opportunities offered by ICT using data which can be obtained from the country values on the Networked Readiness Index (NRI).

The following figure allows a comparison of the results from this exercise for 2009 and 2013. In the graphical illustrations four quadrants are shown which are built by using the European averages on the NRI and those on the e-skills policy activity index for the respective years in order to group the countries into four main clusters.

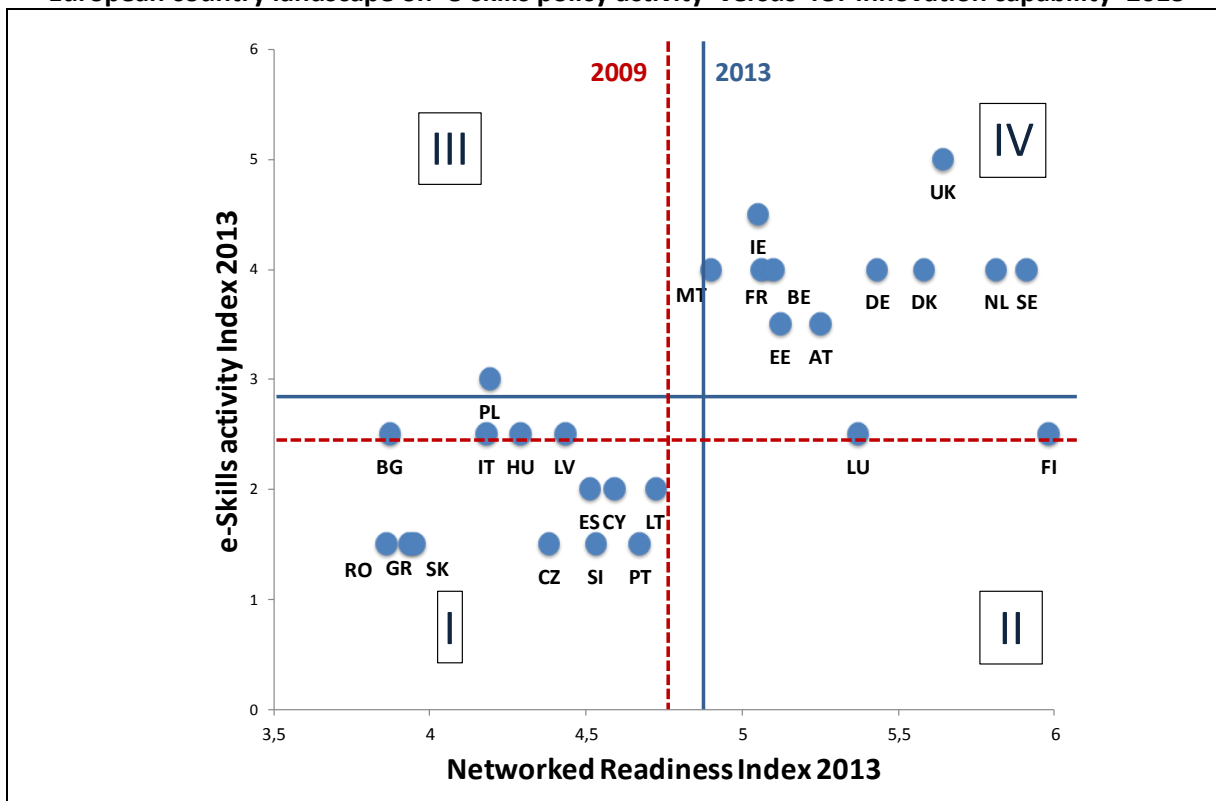
¹ Hüsing, T. and Korte, W.B. (2010) "Evaluation of the Implementation of the Communication of the European Commission 'e-Skills for the 21st Century'", URL: http://ec.europa.eu/enterprise/sectors/ict/files/reports/eskills21_final_report_en.pdf

² The World Economic Forum's Networked Readiness Index (NRI) measures the propensity for countries to exploit the opportunities offered by ICT. It is published annually as part of the Global Information Technology Report. The NRI is a composite of three components: the environment for ICT offered by a given country (market, political and regulatory, infrastructure environment), the readiness of the country's key stakeholders (individuals, businesses, and governments) to use ICT, and finally the usage of ICT amongst these stakeholders. For further information on the NRI see www.weforum.org/issues/global-information-technology.

European country landscape on 'e-skills policy activity' versus 'ICT innovation capability' 2009



European country landscape on 'e-skills policy activity' versus 'ICT innovation capability' 2013



Overall and for e-skills related policies and initiatives a strong increase of activity levels over the five-year time span can be identified. The unweighted average e-skills policy index score increased from 2.4 to 2.9 between 2009 and 2013. This is encouraging news.

Our analysis revealed that in 2009 three of the four quadrants are well populated by different countries with only 7 countries belonging to the group of top performers both, in terms of e-skills policy index as well as NRI, and 11 Member States constituting those best described as low activity countries (bottom left quadrant).

Five years later the situation has changed significantly; we are now faced with a situation which can be described as a dichotomy in Europe on these indicators: top performing countries as opposed to countries with low activity levels and NRI performance, with only three countries (Poland, Luxembourg and Finland) in transition phases between these clusters.

The group of top performers has grown from 7 to 11 with Sweden, Denmark, Austria and Estonia entering this cluster to which the United Kingdom, the Netherlands, Belgium, Ireland, Malta, Germany and France already belonged in 2009. However, the group of low activity countries is still substantial in terms of numbers of countries with 13 EU Member States – almost 50% showing a below average performance on the NRI and on the e-skill skills policy activity index.

EU Member States fall into two very distinct groups: 41% of the Member States are top performers, almost 50% are low activity countries, and 11% located between these two clusters.

While the former have been successful on the e-skills front and capable of exploiting ICT to become innovative and more competitive the latter group of low activity countries still has a rather long way to go to achieve both.

A look at the Member States' positions in the NRI ranking (Networked Readiness Index) reveals that again, those countries with high NRI positions also show high e-skills policy activity levels. The countries moving up in terms of migrating into the 'top performers' cluster include Sweden, Denmark, Austria and Estonia, as well as the Netherlands and France which managed to further increase their e-skills policy activity level.

Countries at the risk of losing ground include Hungary, Latvia and Romania which dropped down into the first cluster of countries, i.e. those lagging behind.

European country clusters on 'e-skills policy activity' versus 'ICT innovation capability' 2013

I : low NRI + Low level of e-skills policy activity	II : High NRI + low level of e-skills policy activity
Romania, Greece, Slovakia, Czech Republic, Slovenia, Portugal, Spain, Cyprus, Lithuania, Bulgaria, Italy, Hungary, Latvia	Luxembourg, Finland
III : Low NRI + high level of e-skills policy activity	IV : High NRI + high level of e-skills policy activity
Poland	United Kingdom, Ireland, Sweden, Netherlands, Denmark, Germany, Belgium, France, Malta, Austria, Estonia

5 Selected multi-stakeholder partnerships

The following is a list of multi-stakeholder partnerships of major relevance to the e-skills issue:

- **ICT Strategy for Primary and Secondary Education:** The ICT Strategy for Primary and Secondary Education was a major programme (2008-11, total budget: € 362 million) to foster use of ICT in schools in the Slovak Republic. The overarching objective was to sustain and raise through ICT in education the level of competitiveness of Slovakia in the global market, to integrate ICT competencies into teacher professional standards, to increase application of information systems and networking in education and educational services, and thus to lift the quality of schools to EU benchmarks. As part of the strategy, a knowledge centre of educational digital resources was set up; ICT competencies have been integrated as key competence to the national curricula; ICT competencies of teachers have improved substantially, and a modern ICT infrastructure in the educational system been established. Lessons learnt include the observation that not enough effort was spent on management and support, and that use of Structural Funds for financing complex strategies and action plans can entail risks. Moreover, some stakeholders appeared to be resistant to change as a result of lack of awareness of ICT's relevance for school education.
- **Nemaj na salame ("Mind Your Future"):** This is an information campaign for high school leavers and young university students initiated in 2011 by PosAm, a Slovakia based private sector IT company employing about 300 employees and providing IT management systems and related solutions. Cooperation partners include the Economic Policy Institute, a private sector think-tank. The campaign is promoted publically by the Slovak Digital Champion. The background of the campaign was the observation that the unprecedented boom in higher education in Slovakia has led to a widening of the gap between university education and the demand of employers on the country's labour market: Employers demand technical and engineering skills, while most students apparently prefer to choose humanities as their subject. To address this mismatch, the "Mind Your Future" campaign seeks to work as an eye-opener for high school leavers, many of whom still tend to believe that any university degree will guarantee them a satisfactory career – which as a matter of fact is not the case anymore. The campaign's website includes motivational videos of graduates who succeeded in their field. A massive Facebook campaign has been launched and leaflets distributed to all high schools in Slovakia. Feedback suggests that the promotion of technical skills in general and IT skills in particular has contributed to an increase in interest in technical degrees. Moreover, a survey of employers has been conducted, asking them about their experience as recruiter of graduates from a Slovak university, their recruiting plans for the near future and the advice they would give to prospective graduates.

6 Success of e-skills policies and activities in meeting the objectives of the EU e-skills agenda and other relevant European initiatives

The extent to which policies, initiatives and multi-stakeholder partnerships have been successful in helping meet the objectives of the EU e-Skills agenda and other relevant European e-Skills initiatives as seen by national experts is further described below along key actions and action lines of the EU e-Skills strategy and other relevant EU initiatives.

“Longer term cooperation”

Over the past couple of years there has been significant increase in cooperation between universities and private sector. As a result of such cooperation university study plans have been modified in order to “produce” graduates with skills reflecting market demand. Private companies use to choose already skilled students in universities, who could be given special training so that the hiring process after the graduation would be smoother. As a part of this cooperation, different specific area-based clusters have been set-up around the universities (IT Valley, CISCO Academy, etc.).

“Human resources investment”

EU Structural Funds look to be more appropriate in this regard. The development of human resources will be provided through this mechanism and national resources. Following are the priority axes: Reform of the Education and Vocational Training System, Life-long Learning as the Basic Principle of a Knowledge Society, Support to Education of Persons with Special Educational Needs, Modern Education for the Knowledge Society for the Bratislava region. Through this mechanism different managerial and software skills of students and teachers have to be improved by applying innovative ICT solutions.

“Attractiveness of ICT jobs”

Many international companies (e.g. T-systems, Cisco, Siemens, Sap, Ness, Ariba, AT&T, etc.) entered the Slovak market in the past couple of years. This resulted in significant increase in the market demand for skilled IT people. Although there is an increase in the number of IT graduates, although it is still not sufficient.

According to the survey that was carried out by the job portal profesia.sk in 2011, professions related to ICTs and informatics were among the most desirable professions on the labour market.

The national unemployment rate for ICT skilled people is estimated to be around 3%, in comparison to the 14.5% average for the entire Slovakian labour force.

Average wages in the ICT sector range from € 1,026 to € 1,874 depending on job position. This is about 27% to 232% more than the average wage in Slovakia.

“Employability and e-inclusion”

There is no information about any e-inclusion activities yet.

“Lifelong acquisition of e-skills”

Besides the ECDL certification, there are various life-long learning programmes offered in Slovakia. However, these programmes are focused mainly on acquiring general ICT skills.

“Closing the e-Skills gap”

The main trigger in closing the e-Skills gap seems to be the high-speed internet connection. Thanks to this, even children can interact with their friends through different social medias. Such early interaction with the PC and internet is seen as a great advantage and such students can get very quickly familiar with different advanced software solutions and so obtained the e-Skills easier.

Researched and prepared by:



**empirica Gesellschaft für Kommunikations- und
Technologieforschung mbH, Bonn, Germany**

Oxfordstr. 2

53111 Bonn, Germany

e-Mail: info@empirica.com

For the European Commission
DG Enterprise and Industry



Annex: data sources

	Source
eSkills21 study: 'e-skills' index 2010	eSkills21 study carried out by empirica. Report available at http://goo.gl/WKV7r
eSkills21 study: 'Digital literacy' index 2010	
EuRA e-skills index	EU-RA 2009: Financial and fiscal incentives for e-Skills: State of play in Europe. Synthesis report. http://www.e-skills-funding.com/images/stories/PDF/synthesisreport.pdf
ICT practitioners in % of total employment 2012	LFS data made available by Eurostat
Digital literacy skills of the population 2009/11:	Eurostat, database "isoc_ski"
• Individuals with high level of computer skills	
• Individuals with high level of Internet skills	
• Individuals using the Internet (last three months)	
Global Competitiveness Index (GCI) 2010/12	The Global Competitiveness Report 2011-2012: http://www.weforum.org/reports/global-competitiveness-report-2011-2012
Networked Readiness Index (NRI) 2010/12	The Global Information Technology Report 2011-2012: www.weforum.org/issues/global-information-technology
• Individual readiness	
• Business readiness	
• Government readiness	
• Individual usage	
• Business usage	
• Government usage	
PISA scores (2009) in:	OECD, http://www.oecd.org/pisa/
• Mathematics	
• Science	
• Reading	

Indicator	Source	Further remarks
ICT practitioner workforce 2012	Eurostat Labour Force Survey. Some imputations and assumptions not in the original data but done by empirica apply	The definition can be looked up in the final report, Gareis et al. 2014: E-SKILLS: MONITORING AND BENCHMARKING POLICIES AND PARTNERSHIPS IN EUROPE.
ICT practitioner workforce 2012 as percent of total workforce		LFS based, number of ICT practitioners / number of workers in all occupations
Assumed excess demand 2012	Empirica, IDC	This is calculated using the percentage of vacancies per existing job and is based on a survey carried out in 2012. As some countries were not covered, several assumptions apply
Forecast excess demand 2015		Forecasts are scenario based and the methodology can be found in the final report (see above). Forecast of demand in the six largest countries (DE, UK, FR, IT, ES, PL) is based on country specific economic scenarios, for the 21 smaller countries only an aggregate scenario was developed and figures allocated according to ICT employment shares.
Forecast excess demand 2020		
Forecast ICT practitioner jobs 2015		
Forecast ICT practitioner jobs 2020		
Workers 2012 - Management,	Based on Eurostat Labour Force	LFS based, definitions can be looked up in the final

business architecture and analysis level	Survey, some definitions and calculation by empirica. Some imputations and assumptions not in the original data but done by empirica apply.	report.
... as percent of total workforce		
Workers 2012 - ICT practitioners, professional level		
... as percent of total workforce		
Workers 2012 - ICT practitioners, technician and associate level		
... as percent of total workforce	Based on Eurostat Labour Force Survey, some definitions and calculation by empirica. Some imputations and assumptions not in the original data but done by empirica apply.	ISCO-88 groups 213 and 312. Due to the break in series in 2010/11 only partly comparable to later data.
Growth core ICT workforce 2001-2010		
Growth core ICT workforce 2008-2010		
Growth core ICT workforce 2011-2012		ISCO-08 groups 25 "ICT professionals", 35 "Information and communications technicians".
Growth broad ICT workforce 2011-2012		Equals the "ICT practitioner workforce"
ISCED 5A/B first degree graduates in Computer Science, 2011	Eurostat, database "educgrad_5"	This figure represents a count of first degrees in ISCED 5A and first qualifications in 5B. See discussion of this indicator in the final report.
... graduates per 1000 population aged 20-24	Eurostat, databases "educ_grad5" and „demo_pjangroup"	Graduates as above. The denominator is used to make data comparable but there is no age restriction in the number of graduates. Some imputations and assumptions may apply.
... graduates 2011 as percent of 2006 (= peak EU)		
Vocational training graduates in Computer Science, 2011	Eurostat, database "educ_grad5"	Number of Computing graduates in Upper secondary education (level 3) - pre-vocational and vocational programme orientation and Post-secondary non-tertiary education (level 4) - pre-vocational and vocational programme orientation. Some imputations and assumptions may apply.