

# Enterprise Policies for Tackling the Digital Skills Shortage

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## ABSTRACT

Nowadays as results of the turbulent crisis, economies are confronted with the effects of the financial crisis, consequently many European states members are faced with strategic challenges in decisions about personnel development. Some of industries have faced shortages in the digital skill attainment of the currently employed personnel, or short supply of IT-related personnel due to the inadequacy of new entrants on the labor market. These problems are encountered in several traditional industries affected too rapidly by the technological advance. Along to these aspects, there are other difficulties for employers and employees as well, such as structural changes in job offering in various sectors or disparity in the employees; age categories – because of high unemployment rates in youth for instance. These are complemented by fewer job opportunities for young individuals (eventually, graduates for the tertiary sector of formal education) that fit according to their specializations or even new type of skills' demand – much oriented on the digitalization. The paper intends to presents some empirical aspects raised from the statistical evidence useful to point out critical aspects in the domestic and eventually, European approach to enterprise policy, in developing proper curricula to empower the academic institutions to provide knowledge, to foster skills for current enrolled students. On short term already, the future workforce needs to be prepared for the digitalization of the professional activity, regardless the specific domain of work and, in this view; companies should be in the position to manage this potential crisis of the labour market.

**KEYWORDS:** digital divide, digital literacy, digital shortage/gaps, personnel policy

**JEL CLASSIFICATION:** O30

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## INTRODUCTION

Today's digital transformation in the multiple aspects of the professional life brings new challenges, needs and opportunities, especially for employees and this is particularly interesting for young people, graduates of various level of formal education in their attempt to find a suitable and rewarding positions. As ever more daily tasks are carried out online, everyone needs enhanced digital skills to participate fully in society. Also, this is challenging for the currently employed persons, in different fields of activity, after spending certain periods in a job position as the nature of the professional tasks is altered by the intrusion of the digital pressure to master digital skills. Efimova explained in a study that employees, under special circumstances, change the working environment and the current is organization and chains of authority by fostering direct communication across organizational boundaries, from employee to customer, and across group boundaries within

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organizations. The policy of “being digitally smart” becomes an asset for the company but is promoted by the personnel – so, it is crucially more important to have employees who are broadly informed, connected and wired to the powerful advanced technologies (Efimova & Grudin, 2008).

It is obvious and it is desirable that a digitally literate population can stimulate the digital economy and also be more effective and productive for their own benefits in their jobs. It is widely recognized that more and more digital literacy is a prerequisite of a successful path career and consequently, proper training is necessary to give young Europeans the possibility of using ICT so as to constructively participate in society and enter the labour market.

For that desiderate, a multiple-agent approach is needed consisting in a network of educational institutions, training centers, companies and research and development units. As Chisu pointed out a weak collaboration between companies and educational institutions generates a lack of rapid response from the educational system to the requirements of the market economy, amplifying the deficiency of competences, especially in fields with continual technological development or in those where new occupations are constantly appearing (Chisu, 2012). The subject is not yet satisfactorily covered as most of the existing literature that deals with the digital divide in the educational system focuses either on schools or universities, but rarely do we see a vertical approach where the system is considered as a whole (Peña-López, 2009).

The Digital Agenda of the EU has approached this digital divide, by prioritising digital literacy and competence under the European Social Fund. Digital Literacy is increasingly becoming an essential life skill and the inability to access or use ICT has effectively become a barrier to social integration and personal development. Recently, though various actions, institutions of the EU Commission have emphasised in their documents that digital skills are useful tools to improve employability feature of individuals by upgrading the professional required standards or, simply, by allowing access online to job prospects. The annual digital scoreboard confirmed the need for structural economic reform across Europe and for supplementing the number of ICT jobs (Directorate General Information Society of the European Commission, 2012).

The Digital Agenda for Europe, introduced in by the European Commission in 2010, described seven pillars of the Europe 2020 Strategy with actions designed to allow meeting the growth targets established for 2020.

The EU's Digital Agenda was launched in 2010 as part of the flagship EU 2020 growth strategy, with the primary aims being to apply single market rules to the digital market, create a single payments area and increase use of the Internet. There are several crucial areas concerning the digitalization of the society and business environment, and among them the issues of digital literacy skills, the risks of digital exclusion, respectively the need of applying information and communications technologies to address modern challenges that the actual society is facing. Among these areas, the one in attention is the *Enhancing digital literacy, skills and inclusion (Pillar VI)* – figure 1.

The targets are set for the current decade and it is stipulated that the advances in meeting these targets are measured by Digital Agenda Scoreboard. According to the European

Digital Agenda, Europe's citizens, businesses and innovators are generating enough digital demand to put Europe into sustainable economic growth, but fail to supply relevant digital skills, undermining this potential. Also, the Digital Agenda mentioned some barriers in reaching the 2020 targets as: fragmented digital markets; lack of interoperability; rising cyber-crime and risk of low trust in networks; lack of investment in networks; insufficient research and innovation efforts; lack of digital literacy and skills; missed opportunities in addressing societal challenges. It proposes to better exploit the potential of Information and Communication Technologies in order to foster innovation, economic growth and progress.

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| ▪ Prioritize digital literacy and competences for the European Social Fund     | ▪ Evaluate accessibility in legislation                      |
| ▪ Develop a framework to recognise ICT skills                                  | ▪ Ensure the accessibility of public sector websites         |
| ▪ Prioritise digital literacy and skills in the 'New skills for jobs' flagship | ▪ Helping disabled people to access content                  |
| ▪ Increase participation of women in the ICT workforce                         | ▪ Member States to implement digital literacy policies       |
| ▪ Educate consumers on the new media   | ▪ Member States to implement provisions on disability        |
| ▪ EU-wide indicators of digital competences                                    | ▪ Member States to mainstream eLearning in national policies |

**Figure 1. List of Actions in the Digital Agenda**

Source: European Commission (2013a)

As it is documented in some report, an analysis of Europe's labour market (Accenture report, 2012), engagement with a panel of leading academics and policy experts and survey of 500 decision makers across Europe brought light in some aspects related to the skill shortage and its consequences:

- 72% of survey respondents recognize that actual Europe needs to concentrate on the investment larger funds designated to education and skills development;
- 86 percent of decision makers report that they have either reduced or frozen their levels of investment in skills and training over the last 12 months;
- 43% of decision makers believe that they are currently facing at least a moderate shortage of required skills. For 13 percent of business respondents, such shortages are acute. In particular, decision makers report shortages in international business skills, high end analytics, manual working and digital literacy. At both ends of the skills spectrum, gaps are being encountered.

**1. SOME DEFINITIONS AND THE DIGITAL DIVIDE CONCEPTUAL FRAMEWORK**

The interest for the subject of endowment of digital skills and literacy comes from the more general issue of *digital divide* used to describe gaps and pattern of access to and use of computers and the internet across the population and countries. The term digital divide refers to the unequal access by some members of society to information and communications technology, and the unequal acquisition of related skills. For the domestic level, the digital divide may be described in terms of gender, income, and race groups, and

by locations. Digital divide refers to the social and economical differences between communities that have access or not to computers and Internet (Hîncu, Frăţilă, & Tanţău, 2010). In the same time, it take into account abilities of communities to use their technologies communication and information technologies, due to different levels of education and technical studies, although the differences between groups that have access or not to useful and quality digital information. The issue is placed in the top subjects in the contemporary discussion about the ICT influence on the domestic competitiveness of a certain economy (Borisov & Şerban, 2012).

Digital literacy policies have evolved as the information society has developed in Europe, essentially in *three stages*. Firstly, the priority was given to access and connectivity; secondly, policies began to promote skills for basic computer and Internet use and lastly, more sophisticated and sustainable digital skills were drawn in. So far, most effort has been devoted to the first and second stages whereas the third stage, which promotes more advanced Internet use (including critical thinking, trust, confidence and multiplatform use), is only now starting in most countries (Dijk, 2008).

The latest report on the measurement of the Information Society (2012 edition) provided by the International Telecommunication Union (2012) has provided the most recent computations for the ICT Development Index and mentions about the shrinkage of the overall digital divide. The Digital Agenda tackles the digital divide and assesses that one in three households in Europe is still without internet connection, while just under a quarter of adults have never used the Internet. However, it revealed that Internet use continues to increase, with 68 percent of Europeans regularly using the Internet, not far short of the commission's target of 75% by 2015.

Data used in the paper come from the surveys on ICT (Information and Communication Technologies) usage in households and by individuals - Eurostat's surveya on ICT usage in households and by individuals, respectively, on ICT usage in enterprises. For collecting data on the use of information and communication technology, the internet, e-government, e-business and e-commerce in enterprises, the Community survey on ICT usage and e-commerce in enterprises is conducted every year since 2002. The enterprises with 10 or more persons employed, analysed in three size categories (small, medium and large), classified in the NACE Rev.2 sections and groups are interview about internet access and connectivity issues, various aspects of e-government and e-commerce. The list of subjects consists of: ICT systems and their usage in enterprises, use of the Internet and other electronic networks by enterprises, e-commerce, e-business processes and organisational aspects, use of ICT by enterprises to exchange information and services with governments and public administrations (e-government), ICT competence in the enterprise unit and the need for ICT skills, barriers to the use of ICT, the Internet and other electronic networks, e-commerce and e-business processes, ICT expenditure and investment, ICT security and trust, use of ICT and its impact on the environment (Green ICT), access to and use of the Internet and other network technologies for connecting objects and devices (Internet of Things), access to and use of technologies providing the ability to connect to the Internet or other networks from anywhere at any time (ubiquitous connectivity).

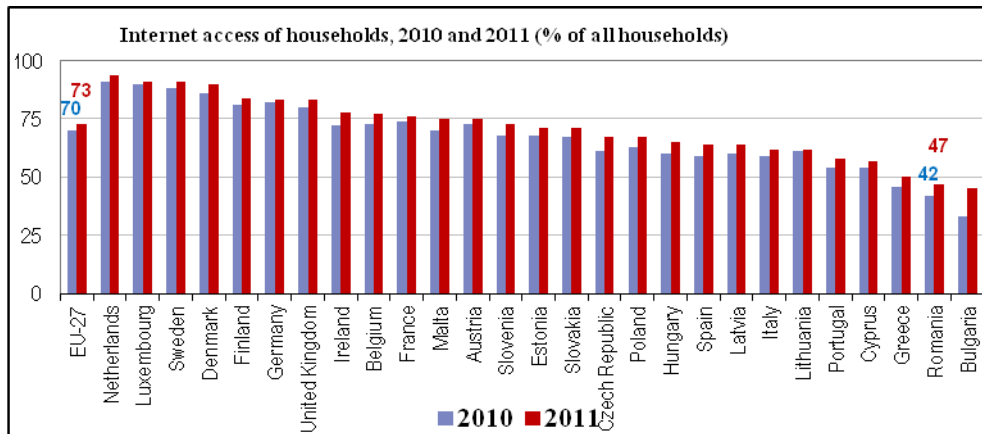
For individuals and households, following aspects were considered for survey: the availability of computers and the Internet in households, access to selected IC technologies (data collected at household level), use of mobile phones and computers, location,

frequency of use (data collected at individual level), devices and communication systems used, type of connection to the Internet, use of the Internet, frequency, place of use and activities, special modules on e-skills, advanced services, security and trust, etc. The population of household consists of all households having at least one member in the age group 16 to 74 years. Households are asked about internet access by any member of the household at home, individuals about the last time of internet use, frequency and place of use, mobile use, activities and e-skills.

The Eurostat registers data on “*E-skills of individuals and ICT competence in enterprises*” using two indicators “Individuals’ level of *computer skills*” (in terms of percentage of the total number of individuals aged 16 to 74) and “Individuals’ level of *Internet skills*” (also, as percentage of the total number of individuals aged 16 to 74).

Large digital divides remain when looking at the share of the population who never used the internet in different countries. The share of internet access varied among Member States, ranging from more than 90% of households in Luxembourg, Denmark, the Netherlands and Sweden to approximately 40% in Romania and Bulgaria – figure 2.

Romania, as developing country, confronts quite heavily the problem of digital divide. A constant lag (compared to the average of the EU member states) was maintained, for the last decade with a slow adjustment in the recent years, because of the poor results in reaching access to the modern technologies.



**Figure 2. Use of ICTs and use of online services, 2010-2011**

Source: Eurostat (2013)

*Digital literacy* refers the skills required to achieve digital competence, the confident and critical use of ICT for work, leisure, learning and communication.

*Level of basic computer skills* are measured using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to computer use, without these skills being assessed, tested or actually observed. Six computer-related items were used to group the respondents into levels of computer skills: copy or move a file or folder; use copy and paste tools to duplicate or move information

within a document; use basic arithmetic formula (add, subtract, multiply, divide) in a spreadsheet; compress files; connect and install new devices, e.g. a printer or a modem; write a computer program using a specialised programming language.

*Level of internet skills* are measured using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to internet use, without these skills being assessed, tested or actually observed. Six Internet-related items were used to group the respondents into levels of Internet skills: use a search engine to find information; send an e-mail with attached files; post messages to chatrooms, newsgroups or any online discussion forum; use the Internet to make telephone calls; use peer-to-peer file sharing for exchanging movies, music etc.; create a web page.

## 2. EMPIRICAL EVIDENCE FOR THE EUROSTAT DIGITAL INDICATORS

Our purpose is to present a mapping of Romania current state in ICT in the enterprise habits of Internet and computer activities and in individuals's e-skills endowment; this is based on European Union ICT indicators, pointing out some theoretical aspects useful for designing national strategies or in practice for industry/business environment. The indicators of digital competences will help us to measure and benchmark the needed level of digital competencies and the interpretations can help the policy planners in developing further plans to guarantee social cohesion and e-Inclusion across Europe.

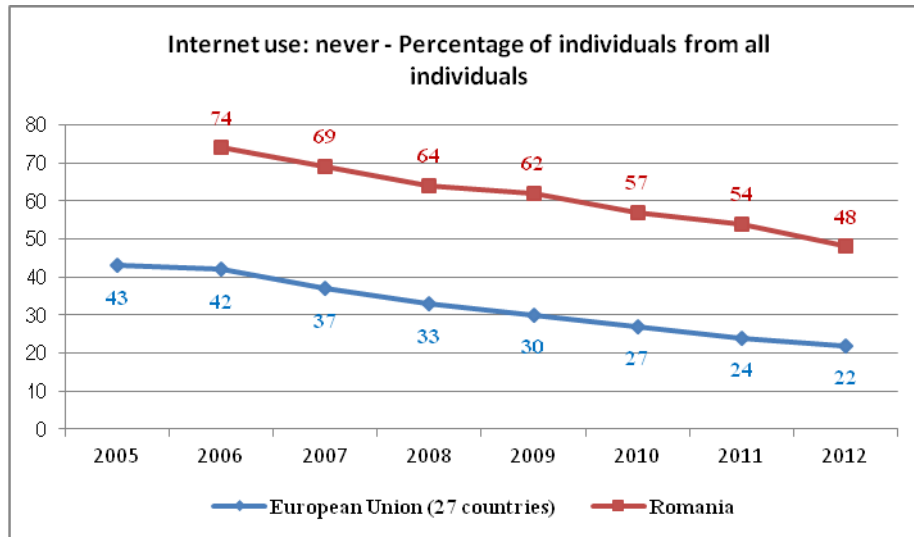
As one of the basic requirements for an individual to become digitally competent is to have access to ICT, such indicators are addressed in the following section. The access to ICT comprises access to a computer and the internet, but also to other more recently developed devices that rapid technological developments have made available such as laptops, smart phones, tablet PCs, games consoles, PDAs and digital television.

**Table 1. Use of ICTs and use of online services, 2009-2011**

	Computer use			Internet use			Used internet for finding information on goods or services		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
EU-27	69	71	73	65	69	71	52	56	57
Romania	42	41	43	33	36	40	12	26	27

Source: Eurostat (2013)

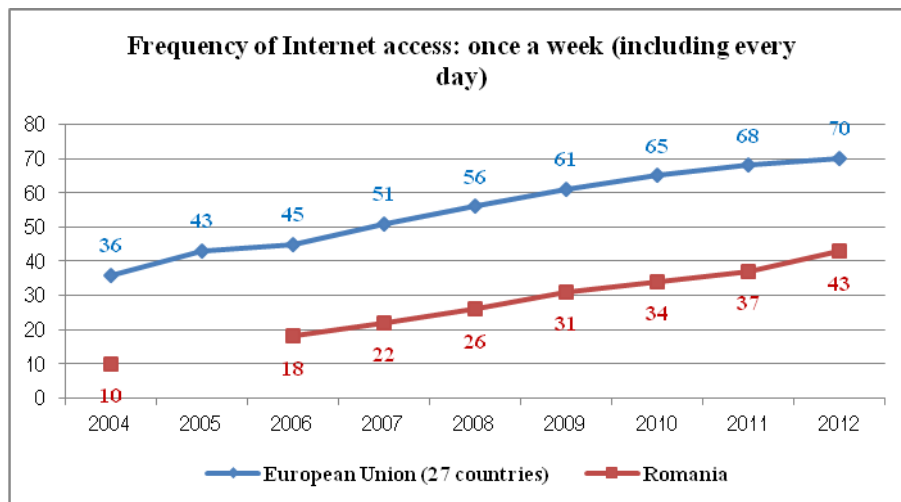
In 2012, the highest shares of the population with no past experiences in internet use at all whether at home, at work or at any other place were registered in Romania (48%) and Bulgaria (42%) on contrary, the lowest figures were Sweden (5%), the Netherlands, Denmark and Luxembourg (6%). In the EU27, the proportion of individuals who never used the internet declined from 42% in 2006 to 22% in 2012; for Romania, the figures were declining from 74% in 2006 to 48% in 2012 (figure 2).



**Figure 3. Individuals who have never used the internet, EU27, 2006-2012**  
(% of individuals)

Source: Eurostat (2013)

Over 70% of European citizens use the internet frequently – but still 30% have never used it; for Romania, the percentages are quite unfavorable – barely 43% of the individual have used the Internet, meaning a significant fraction of 57% have never been used it. In 2012, in Romania 43% of the population use the internet regularly (at least once a week), up 5% compared to the previous year 2011, and still with a large difference (27%) below the EU average of 70% – figure 3.



**Figure 4. Frequency of Internet access: once a week (including every day)**

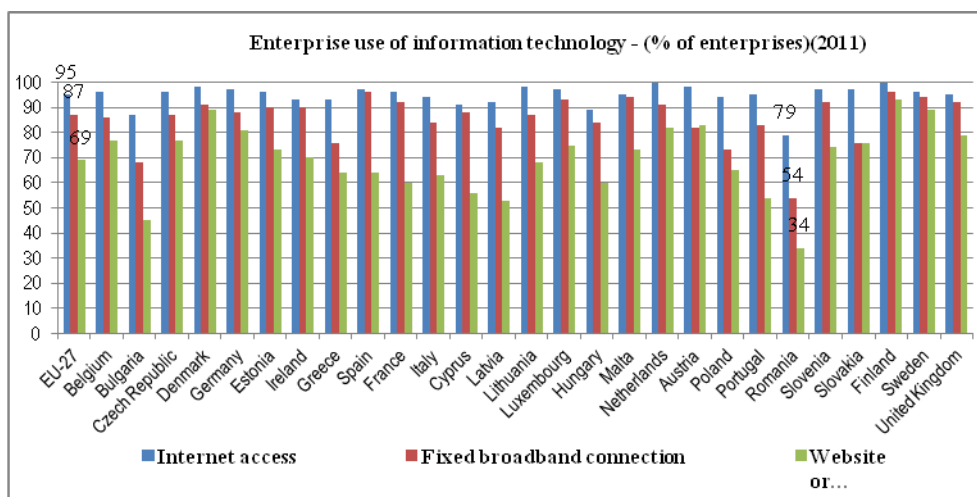
Source: Eurostat (2013)

Moreover, disabled persons, those belonging to the households in the first income quantiles, or those from the sparsely distributed areas (as regard the population density) are faced with particularly increased difficulties in benefiting fully from new electronic content and services offered by Internet or computer usage.

For Romania, as it is reported by the Digital agenda, the Non-users largely comprise the old and the less well-educated in all Member States, as well as large proportions of the general population in less connected countries (such as Bulgaria, Greece, Italy, Portugal and Romania). Women generally have lower operational ICT skills levels than men, while young people under 24 are generally very digitally competent. In summary, persistent age, gender and education gaps are the key challenges that need to be addressed on the road towards enhanced digital literacy in Europe (European Commission, 2013b).

In the EU27, the recent decline in the proportion of non-users in the EU was minor, from 24% in 2011 to 22% in 2012, and it is still 8% above the EU target of 15 % non-users set for 2015 according to the plan of Digital Agenda (DA). In the same line, of DA targets for the 2015, there are: 75% of population using Internet regularly, 60% of disadvantaged people using the Internet regularly, the broadband coverage for all (for the EU27, at the actual level of 95%), the 25% of the population using e-government and returning forms, 50% of the population using e-government etc.

In the case of enterprises there is a similar situation – as compared to the 95% of the European enterprises having access to the Internet, in Romania in 2011, only 79% of these were privileged to it. In terms of the broadband connection, the performance gap between Romania as compared to the EU27 is 33% and in terms of companies with website or homepage the gap reveals a negative difference of 35% - figure 5.



**Figure 5. Enterprise use of information technology, January 2011 (% of enterprises)**

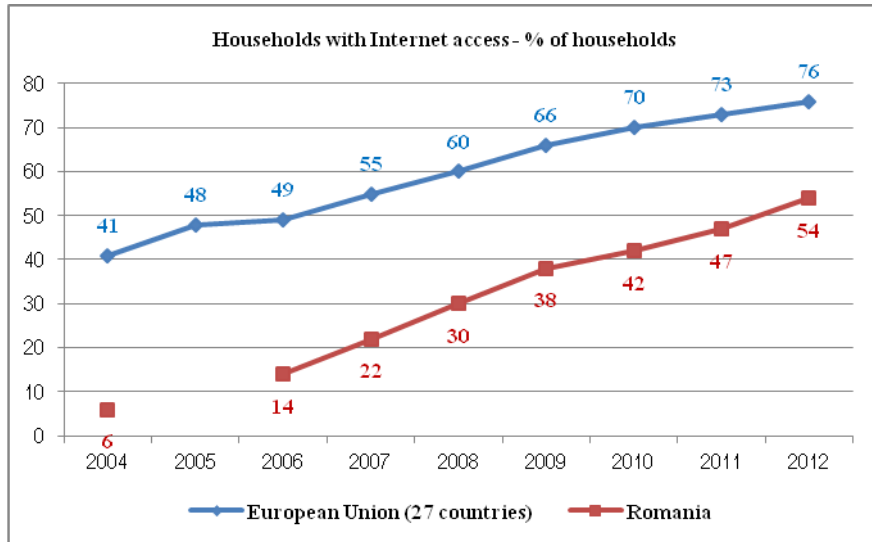
Source: Eurostat (2013)

The proportion of households in the EU with access to the internet was 76% in 2012, an increase of 6% compared with 2010 (figure 6). Broadband access enables higher speed



when browsing and performing activities. It has now reached a level close to saturation among households with internet access. In the EU27, 72% of households have access to broadband at home, an increase of 11% compared with 2010.

Significant disparities in broadband takeup by households remain in 2012, with a rate of only around 50% of households in Bulgaria, Greece and Romania. However, Bulgaria and Romania showed impressive recent growth. The proportion of households with broadband connections in these countries doubled between 2010 and 2012. Between 2008 and 2012, the highest growth, more than 30%, was recorded in the Czech Republic, Romania and Slovakia.



**Figure 6. Internet access and broadband internet connections in households (%)**

Source: Eurostat (2013)

The main reasons for not being online are intended lack of interest, lack of skills and equipment and access costs. Having in attention such disparities in the figures for Romania, in the recent years (mainly, the 2006-2012 period, without years 2007 and 2009 that failed to provide data), there are at least three significant disproportions in the responses about the causes of not having Internet access.

The largest percentages, in negative gaps, are registered in Romania (in the descendant order of magnitude) for: costs too high for the equipment, costs too high for the access, lack of skills and access not needed – figure 7.

For the EU27, the largest percentages are registered for: access not needed, lack of skills, costs too high for the equipment, and, then, on a fourth place, the costs too high for the access – figure 8.

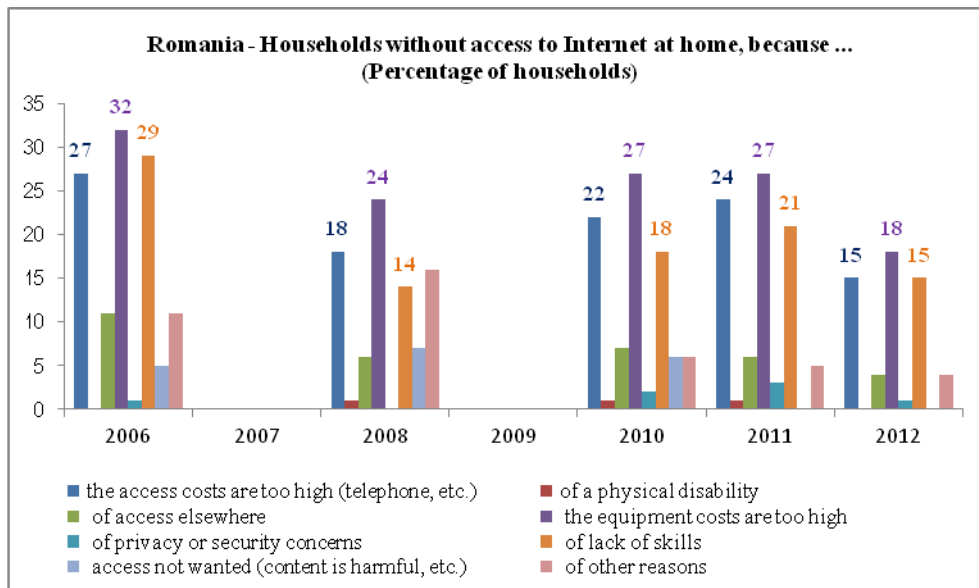


Figure 7. Reasons for not having Internet access in Romania

Source: Eurostat (2013)

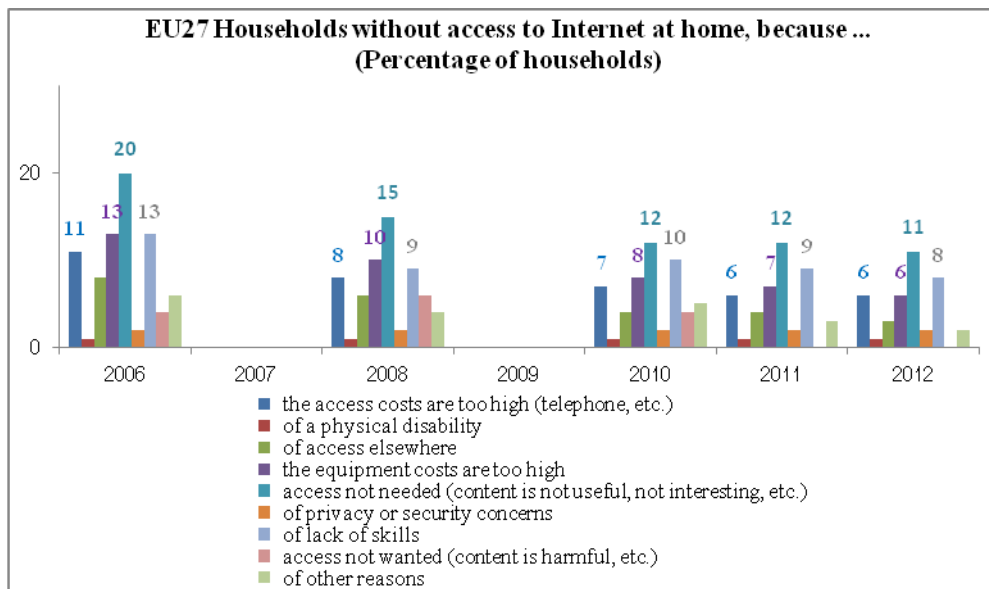


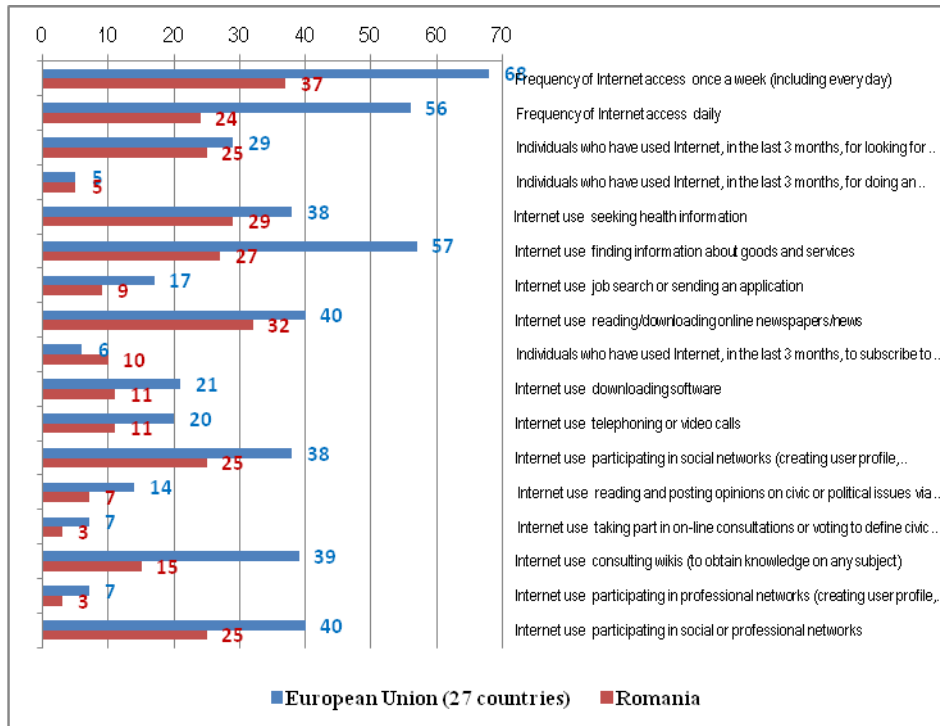
Figure 8. Reasons for not having Internet access in EU27

Source: Eurostat (2013)

Even the behaviour of the individuals is subject to the accessibility of the Internet services. The main categories registered by the Eurostat database relate to: users communicating by e-mail and in social media, searching for information about goods and services, reading

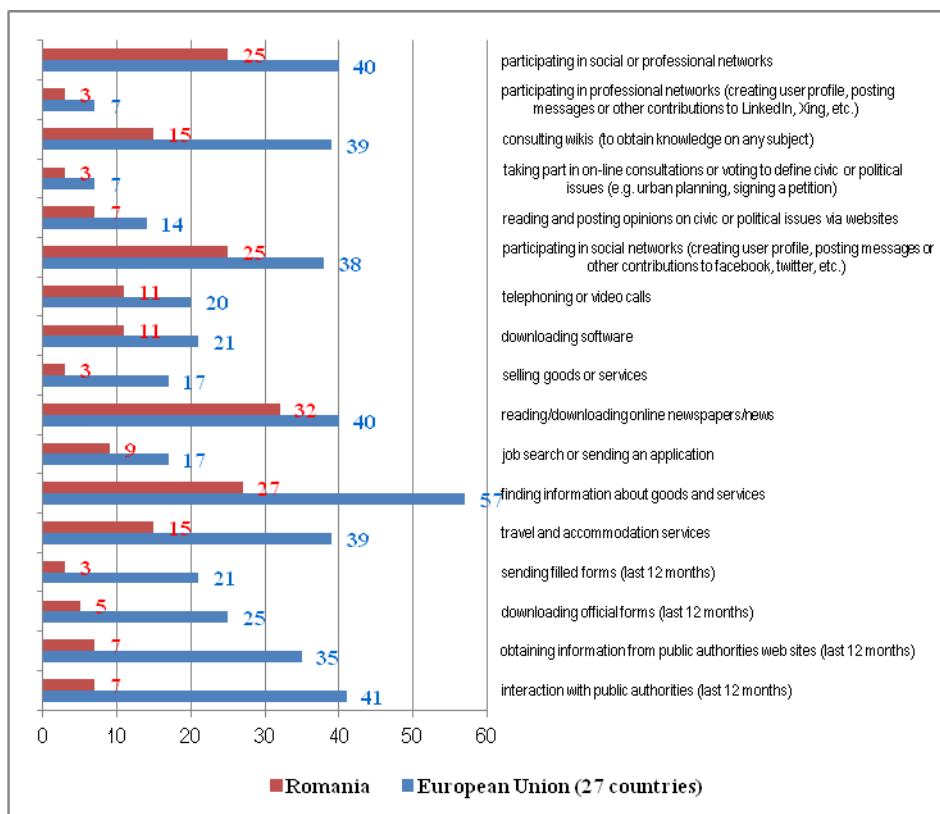
online news and used internet banking, sending/receiving emails, posting messages to social media, telephoning or video calls over internet, listening to webradios or watching web television, playing or downloading games, images, films or music, playing networked games with others, uploading self-created content to websites, creating websites or blogs, finding information about goods or services, reading online news, newspapers, internet banking, use of services related to travel, making an appointment with practitioner.

In figures 9 and 10, there put in evidence the habits of Internet activities for communication, entertainment and other consumer interests – the gaps in activity level is remotely placed, at far distance for Romanian individuals as compared to the EU27 citizens. It strikes the distances between number of individuals using the Internet frequently – from 68% in UE27 to 37% in Romania for the weekly usage and, respectively, from 56% to 27% for the daily usage.



**Figure 9. Internet use and activities, EU27 and Romania, 2011**  
 (% of individuals of all individuals)

Source: Eurostat (2013)



**Figure 10. Internet activities – Individuals, 2011, EU27 and Romania**  
 (% of individuals of all individuals)

Source: Eurostat (2013)

In the EU-27, 92% of the enterprises covered by the survey on ICT usage in enterprises) had internet access via a fixed broadband connection as of the beginning of 2012 (table 2) while in Romania, the figure is reduced to 76%.

**Table 2. Enterprises with broadband access (fixed or mobile) - % of enterprises of all enterprises, without financial sector (10 persons employed or more) in 2011**

Country	All		Small enterprises		Medium enterprises		Large enterprises	
	2011	2012	2011	2012	2011	2012	2011	2012
EU 27	89	92	88	91	96	97	99	99
Romania	57	76	53	73	74	87	89	96

Source: Eurostat (2013)

As registered in the most recent year 2007, there are large differences in the figures related to the percentages of the enterprises that employed ICT or IT specialist during the last year – in Romania, for the large size companies, the number is only 5% as compared to the 70% in the EU27. For all enterprises, the number for Romania is approx. ten times smaller than the one in The EU27 – table 3.

**Table 3. Enterprises who employed ICT/IT specialists - Percentage of enterprises of all, without financial sector (10 employed persons or more) - 2007**

	All	Small enterprises	Medium enterprises	Large enterprises
EU 27	18	12	39	70
Romania	2	2	2	5

*Source: Eurostat (2013)*

There are some indicators for assessing difficulties in recruiting ICT specialists not only caused by demand – table 4. For all enterprises, the number of companies having difficulties in finding ICT specialists was similar in Romania and EU27; the situation applies even for the large sized enterprises. Yet, it is harder for Romanian larger companies to find proper specialists with digital skills (17%) than it is reported in the EU27 (11%) – table 4.

**Table 4. Enterprises who recruited or tried to recruit personnel for jobs requiring ICT skills during 2006- Percentage of enterprises of all, without financial sector (10 employed persons or more) - 2007**

	All	Small enterprises	Medium enterprises	Large enterprises
Enterprises who had hard-to-fill vacancies for jobs requiring ICT specialist skills				
EU 27	3	3	6	18
Romania	3	3	4	17
Enterprises who had hard-to-fill vacancies due to applicants' lack of skills in the use of ICT				
EU 27	3	3	5	11
Romania	4	3	6	17
Enterprises who recruited/tried to recruit personnel for jobs requiring skills in the use of ICT				
EU 27	16	13	28	51
Romania	12	11	15	30
Enterprises who recruited/tried to recruit personnel for jobs requiring ICT specialist skills				
EU 27	7	5	14	36
Romania	7	6	10	26

*Source: Eurostat (2013)*

For the enterprises who recruited/tried to recruit personnel for jobs requiring skills in the use of ICT, for all sizes, in the EU27 the percentage was 16%, and the similar portion for the enterprises who recruited/tried to recruit personnel for jobs requiring ICT specialist skills was 7%. The percentages for Romania were 12% in the case of personnel asked to apply for jobs requiring skills, respectively, 7% for the specialized personnel for jobs requiring ICT skills.

## 2. THE CURRENT SITUATION IN ROMANIA IN THE DIGITAL SKILLS AREA

According to the Digital Agenda scoreboard, Romania is now the only member state where a majority of people do not regularly use the web. It is the country with the lowest penetration level in the EU and its penetration growth rate is the same as the EU average rate. In January 2012, the penetration rate of fixed broadband is 15.2% of the population, up by 1.2% year-on-year but still 12.5% below the EU average of 27.7% (Fox, 2012).

**Table 5. Percentage of individuals (%) in Romania and EU27 - Use of ICTs and use of on-line services (% of individuals aged 16 to 74)**

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Individuals - Computer use* (last use – within the last 12 months)									
EU27	55	61	62	65	68	71	73	75	76
Romania	18		33	38	38	44	46	48	53
Individuals - Internet use** (last use – within the last 12 months)									
EU27	47	54	55	60	64	68	71	73	75
Romania	15		25	28	32	37	40	44	50
Internet use: communication – Individuals***									
EU27		44	44	50	55	59	63		
Romania			18	21	26	30	33		

Source: Eurostat (2013)

The issues concerning digital literacy are placed in a multi-faced perspective, on one hand, it is targeting ICT sector by its growth rhythm and budget volumes and, on the other hand, it reaches social inclusion aspects.

**Table 6. Computer skills of individuals, 2011**

	Copied or moved a file or folder		Used arithmetic formulae in a spreadsheet		Created electronic presentations		Written a computer program	
	Aged 16 to 74	Aged 16 to 24	Aged 16 to 74	Aged 16 to 24	Aged 16 to 74	Aged 16 to 24	Aged 16 to 74	Aged 16 to 24
<b>EU-27</b>	63	89	43	67	31	59	10	20
<b>Romania</b>	38	72	20	46	8	18	6	16

Source: Eurostat (2013)

**Table 7. Computer and Internet skills – the cumulated percentage on the all low, medium and high level (% from all individuals) Individuals' level of computer skills; % of the total number of individuals aged 16 to 74**

	2005	2006	2007	2009	2011	2012
<b>Computer skills</b>						
EU27	64	57	60	64	66	67
Romania		28	29	36	39	35
<b>Internet skills</b>						
EU27	53	55	60	72	73	53
Romania		23	28	42	44	0

Source: Eurostat (2013)

**Table 8. The e-skills indicators for Romania (2006-2011)**

<b>Indicator</b>	<b>2006</b>	<b>2007</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<i>Internet related activities</i>					
LOW_Individuals who have carried out 1 or 2	14	16	25	20	
MEDIUM_Individuals who have carried out 3 or 4	7	10	16	17	
HIGH_Individuals who have carried out 5 or 6	2	2	1	7	
<i>Computer related activities</i>					
LOW_Individuals who have carried out 1 or 2	13	14	17	15	14
MEDIUM_Individuals who have carried out 3 or 4	10	10	10	14	13
HIGH_Individuals who have carried out 5 or 6	5	5	9	10	8

*Source: Eurostat (2013)*

### **3. THE FINDING RESULTS AND DISCUSSION ON ENTERPRISE POLICY**

In the previous section there are given values for the main indicators concerning the Internet use, as the access and digital skill variables. The focus is directed toward the gap between figures according to a set of indicators in the Internet and computer use for Romania and the EU27. In each case, one may notice the discrepancy in the level and the intensity of usage indicators and the poor performance displayed by Romania. Yet, these worrying positions may be overpassed as, in the majority of cases, the rhythm of development in the ICT sector and in the skill endowment registered for the recent time intervals. Further, more advanced statistical models can be developed based on existing data sets to highlight the priorities in the investment and resource allocation for the ICT sector and toward the Information society. The analysis may be driven to point out the convergence pattern for the domestic economy and society, or, alternatively for the regional levels, or in the direction of e-exclusion studying the most at-risk segments of a population and the necessary target actions to alleviate them.

The digital illiteracy has become lately a tough barrier to social integration and personal development. This paper concerns with enterprise policy in respects to the concepts of 'digital skills', its endowment is required to bridge the various digital gaps and allow the various labour force segments to properly work with new digital technology, regardless the activity sector. As results of the missing skills, the digitally illiterate persons are missing out more benefits in the labour market (from safer and better job positions). Without proper action, the Europeans participant on the labour market may find themselves down in a downward spiral driven by skills shortage, unemployment and social exclusion.

Businesses must address skills issues not only for themselves but for the broader communities in which they operate. More business-university partnerships and alliances are needed; by integrating further upstream into the education supply chain, businesses can shape the skills and expectations of students, to help them prepare for professional success.

Strong consensus that there is a need for more action on several levels: 1) raising awareness of the need for digital literacy, particularly among the digitally excluded, focusing on how digital tools can help on specific needs/requirements related to their lives 2) concrete training and education measures for less digitally skilled and 3) digital skills related to jobs (high level skills or basic skills for e.g. office work). However, given the complexity of the skills ecosystem, the panoply of players involved in education and the long timeframes over

which interventions occur, getting the right degree of coordination and long-term investment is extremely difficult.

Today the ICT sector accounts for 8 million jobs and 6% of EU gross domestic product (GDP) ; there is an important need to address ICT-related skills (e-skills) issues in order to respond to the growing demand for highly-skilled ICT practitioners and users, meet the fast-changing requirements of industry, and ensure that every citizen is digitally literate in a lifelong learning context requiring the mobilisation of all stakeholders.

The subject of digital skills is linked to the evidence that to many state members in the EU need to address measures to foster their future competitiveness on the international market - to increase investment allocation in education and training, enfancing interest for enhancing ICT skills development. These measures come on a week economic background in which there is much pressure on public budgets for education and research and development sectors. Thus, efficient and effective solutions should be found to match the digital skills demand on the labor market and the supply derived from the formal education institutions, and the motivation for self-improvement of the employees – all disparity in meeting this correlation impede porpes use of resources – at personal level for individuals (in terms of salaty, job satisfaction, etc.) and for the company's productivity or even, on the business development strategies.

The objective for the formal education system is to prepare well fitted graduates with proper digital skills and to boost general public's awareness of new ICT skills, offering opportunities to self – development, to participate in ICT training seminars, conferences and competitions with a particular focus on young people and entrepreneurs. Businesses can help to reactivate skills of the unemployed by offering training, outreach or awareness programmes. Powering up the third education sector and fostering greater volunteer opportunities can also help people keep their skills fresh during periods of unemployment, and help them return to permanent employment.

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