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Academic journal of economic studies

Provided in Cooperation with:
Dimitrie Cantemir Christian University, Bucharest

Reference: Bugudui, Elena/Ciobanu, Ghenadie (2018). The development of the digital economy in the context of regional development in Romania. In: Academic journal of economic studies 4 (1), S. 213 - 220.

This Version is available at:
http://hdl.handle.net/11159/1882

Academic Journal of Economic Studies
Vol. 4, No. 1, March 2018, pp. 213–220
ISSN 2393-4913, ISSN On-line 2457-5836

The Development of the Digital Economy in the Context of Regional Development in Romania

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Abstract *Romania aims to make the digital economy a leading place in the new architecture of regional development. This will in fact contribute to the development of a high quality regional and local management that will be reflected in the activity of local and regional public institutions, in the development of SMEs in underdeveloped regions and will contribute to the creation of new jobs for young people and for other excluded social and informational groups. The use of new technologies leads to a profound change in the structure of the workforce. This paper presents the evolution of the employed population in the field of IT & C, with the presentation of the leaps made at the regional level in the period 2008 - 2016. The paper also presents aspects of Romania's position on the digital market of the European Union, highlights aspects of the impact of digital economy development, with a weight-of-GDP analysis at both national and developmental levels.*

Key words digital economy, IT & C, workforce, economic growth, GDP

JEL Codes: B41, C15, F63, J48

1. Introduction

The notion of digital economy or the new economy implies the widespread use of IT & C to transform economic activities, restructure companies, reduce physical consumption and invest in human resources. Economic growth in terms of increased environmental protection, creation of new places of work, changes in the functioning of markets, is also due to the exponential growth of mobile communications of the number of Internet users, generally the IT & C sector contribution. An example of this is the US economy, which has registered 8 years of continuous growth, annual growth of more than 4%, unemployment below 5% and inflation below 2%.

ICT development is closely linked to the need to bring a qualitative plus to the classical economy. The use of ICT leads to the reduction of the expenses incurred in the relationship between the supplier and the beneficiary, a maximum operability, finally leading to the satisfaction of all the participants involved in the labor market, but also to an improvement of the quality of life. In a Europe weakened by the economic crisis, when millions of people have been affected by poverty and social exclusion, have lost their jobs, and faced with demographic aging, and in the last years it has been seen that the active age population is in a continuous decline, threatening the sustainability of social assistance systems. On the other hand, there is a shortage of human resources capable of ensuring the development but also maintaining an economy based on informational computerized technology.

2. Literature review

The European Commission launched on 3 March 2010 a document entitled "The Europe 2020 Strategy" - A European Strategy for Smart, Sustainable and Inclusive Growth. One of the strategic priorities is the Digital Agenda for Europe, capitalizing on the potential of ICT - an initiative aimed at enabling citizens and businesses to benefit fully from the benefits of digital technology.

The European Commission makes a preliminary assessment of the main priorities, policy objectives and ICT measures, grouped into 6 major action areas: 1.Secure of high speed internet access; 2.The creation of the digital single market; 3.Development of Sustainable Digital Society; 4. Consolidate security and confidence measures in online technologies ;5. Developing research and innovation in the field; Develop open standards and interoperability by updating the European Interoperability Framework (EIF).

In March 2010, Romania set the national targets, starting from the same year's conclusions of the European Council, which mainly target three major areas of action:

- the public administration and its modernization,

- the private sector and the indirect support of its competitiveness,
- the broader population, by ensuring access to ICT resources and digital inclusion. At the general level of the Romanian population, the most pressing need aims at improving the use of broadband infrastructure, both in terms of the total population and the urban-rural relationship.

The areas of action of the National Strategy are:

Field of Action 1 – eGovernment.

Field of action 2 - ICT in Education, Health and Culture.

Field of action 3 - e-Commerce, ICT and research-development-innovation.

Field of action 4 - Broadband and digital service infrastructure.

The final version of this document was published in 2014, when the action directions were revised to accelerate sustainable economic development, being in line with European trends. It was built on 7 pillars (see National Strategy on Digital Agenda for Romania 2014-20120). Although the National Strategy for the Digital Agenda for Romania 2014-20120 is based on the Europe 2020 strategy, due to the gap between Romania and the EU, we cannot reach the targets unless we will recover the gaps. Telecom specialists (2017) felt that access to high-speed internet was a sine qua non condition for reaching European targets. It will have the following effects: eliminating social inclusion for geographically isolated groups, developing regional business activities, improving the quality of life, developing telemedicine, developing distance learning, developing e-commerce and, last but not least, expanding e-government.

An important objective is the gradual penetration of the digital economy into the economic and social life of modern society in the 21st century. It should be understood that the notion of digital economy does not imply an alternative or an integral substitute for the classical economy.

Information & Communication Technologies represent the infrastructure of the digital economy, they are essential for the EU's economic growth. The latest data collected by the European Union shows that both EU citizens and businesses are more oriented towards the online environment, have greater confidence and a higher level of IT skills. The authors of the paper "Aspects of Digital Economy Development in Romania" (2015), coordinated by dr.ec. Ciobanu, G. appreciates that the development of Romania's economy in line with global trends implies the long-term development of the digital economy as well. Worldwide, the digital economy is growing seven times more than the rest of the economic sectors. Much of this increase was due to the use of the internet in high-speed broadband. Broadband networks, today, have as much impact as a century ago electricity and transport networks. These underpin the development of smart cities, innovative services in e-health, e-culture, data production. *"The degree of digitization is low in Romania, compared to the European Union average. For example, one in three Romanians have never used the internet (a situation similar to that in Bulgaria and Greece). In 2014, the share of the population that had no experience of using the internet (either at home, at work or elsewhere) was the highest in Romania (39 percent) Bulgaria (37 per cent), Greece (33 per cent), Italy (32 per cent) and Portugal (30 per cent). At the other end, there are Denmark (3 per cent), Luxembourg (4 per cent), The Netherlands (5 per cent), Finland, Sweden and the United Kingdom (all 6 per cent), "*according to Telekom Romania experts.

The implementation of the actions of the National Strategy for the Digital Agenda for Romania will generate, in the period 2014-2020, an estimated impact on Romania's economy of about 3% growth on GDP and 2% on jobs.

3. Methodology of research. Results and discussions

The analysis was carried out on the basis of the data provided by the National Institute of Statistics, using the statistical quantitative methods of quantitative data analysis. The study period was 2000-2014 for GDP and for the employed population, 2008-2016, both at national and regional level.

1. Analysis of the impact of the development of IT & C in the evolution of GDP for Romania

Analyzing the contribution of the Information and Communications branch to the GDP of Romania, between 2000 and 2014, there is a range of 4 to 5 percent, with a maximum of 5.01-5.04% in the years 2007 and 2008.

Minimum values were recorded in 2005 (3.95%), but also in 2012 (3.99%), followed by steep growth in 2013 to 4.95 percent, 4. Romania's average of 4.84% is not representative of government policies, because the Bucharest Ilfov region has an average contribution of 11.27%, except for this region; the average is only 2.46% in GDP. Although there is progress, significant gaps remain in relation to the EU average in terms of: the use of e-government services, the general use of the internet and digital literacy, increasing citizens/businesses' trust in the use of e-commerce, and the integration of

ICT solutions in areas such as education, health and culture. For the European Union, the 5% target is a target for the 2020 horizon. The development and sustainability of the IT & C sector is currently based on two solid pillars: offshore/near shore and on-demand. In 2014, the sector reached 2.4 billion euros, following an increase of 12.5%, four times faster than Romania's GDP.

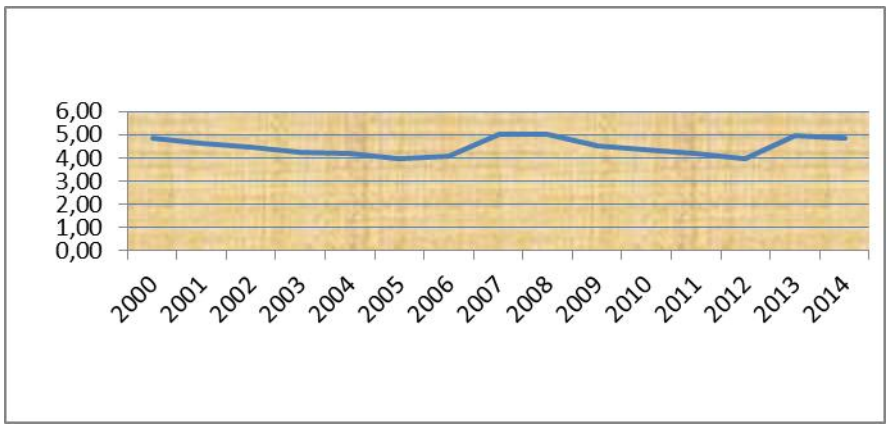

Figure 1. Contribution of I & C to Romania's GDP

At regional level, the chart shows that Bucharest Ilfov region, as expected, in the analyzed period, the highest contribution, with an average of 11.27 percent, maximum value in 2007, 14.28 percent, and a minimum value of 9.15% in 2012, in the half of the analyzed period, with values exceeding 11.23 percent. The entire Bucharest Ilfov region recorded the highest increase of 5.12%. Among the other development regions, the West Region has a maximum of 5.11 percent, registered in 2008. The last place is the South Muntenia region, with an average of 1.48 percent, a maximum of 2.18 and a minimum of 0.97 percent, recorded in 2005. This positioning is also due to the fact that, being near Bucharest Ilfov Region, a large part of the industries are concentrated in the capital. It is worth mentioning is the North West Region, which, at the end of the analyzed period, recorded the largest contribution after Bucharest Ilfov, but in the same descending trend as the other regions (except BI).

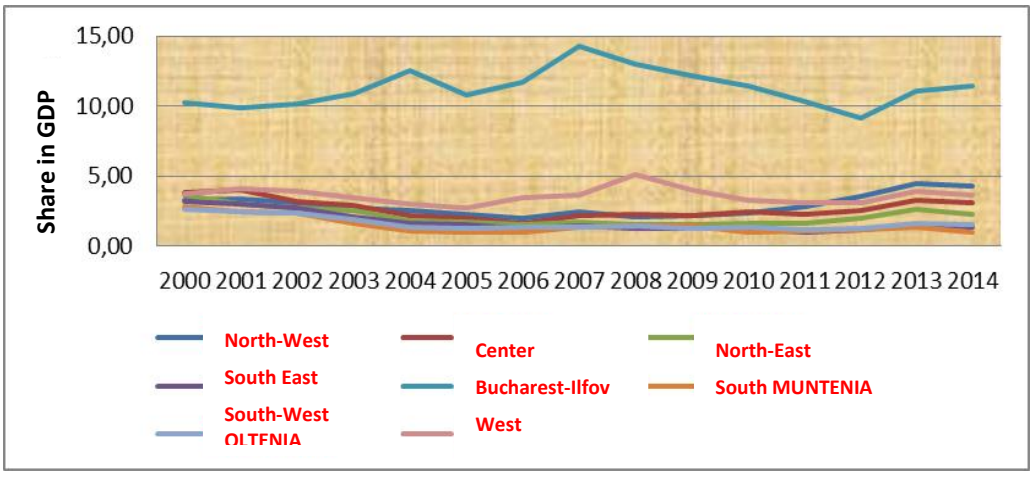

Figure 2. The contribution of the I & C branch at the level of the Development Regions

2. Analysis of the employed population in IT & C sector

Close to the evolution of a branch of the economy is also the factor, the human resource, the employed population in the field, the quality of training and the productivity of labor. In this context, The National Employment Strategy 2014-2020 aims to boost efforts to meet the 2020 employment target set by Romania, i.e. a 70% employment rate for the 20-64 age groups. If we look at the level of population occupied by branches of the economy, we can see that the TI & C occupied population is comparable to other branches. This has been steadily rising since 2009, in 2016 being 163, 36% of the lowest level. It is well known that Romania has a high quality of the specialized labor force in this field, the labor force we are exporting at a considerable level.

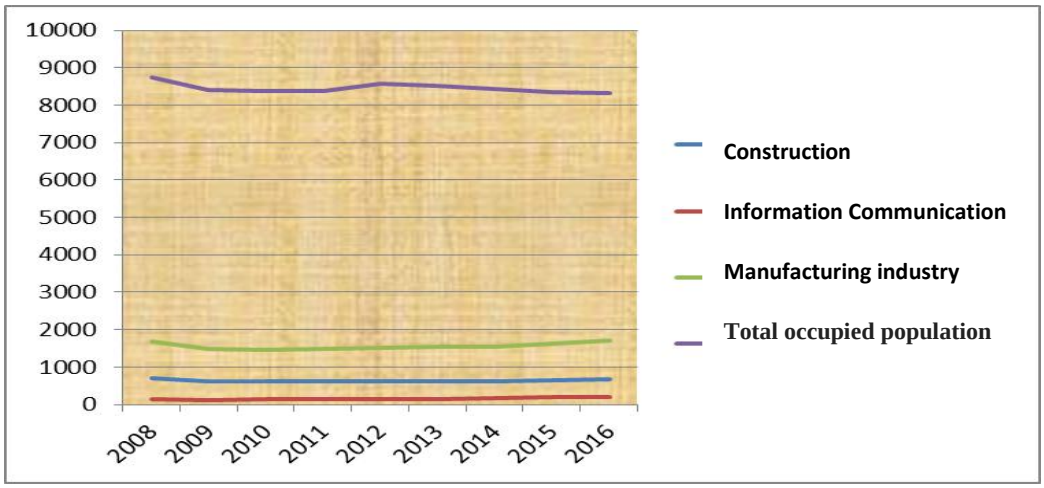

Figure 3. Population occupied in the main branches of the national economy

On Development Regions, the situation is presented in Figure 4. There is an increase in the share of the occupied population in IT & C in the total occupied population, as well as a higher net value in Bucharest Ilfov Region.

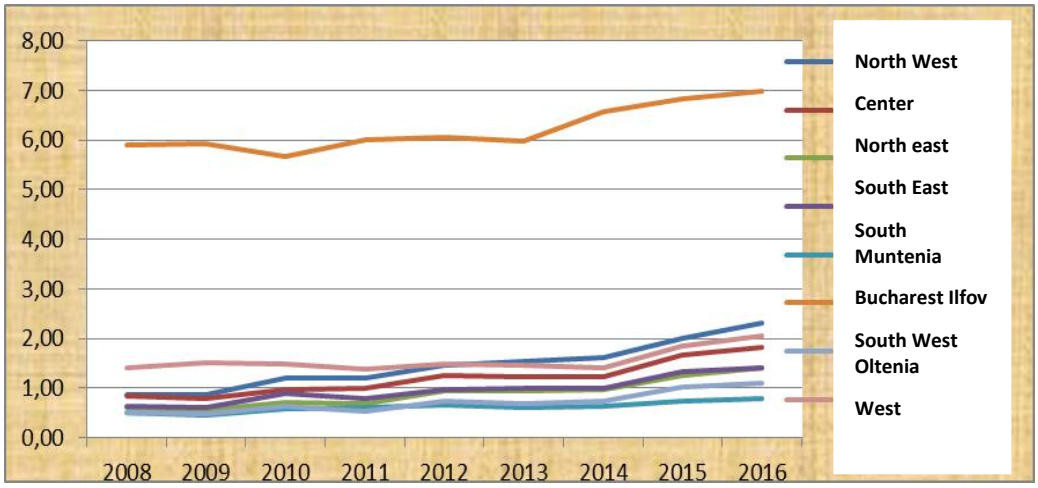

Figure 4. Share of employed population in IT & C, by Development Regions

Of the other regions, the North West and West Region are the first places, the last places being South Muntenia and South West Oltenia. Positioning is important, but Growth Ratio in the last period gives us the perspective of the evolution of this indicator. Figure 5 shows an encouraging aspect, namely that a significant increase over the period under review is registered by the NV Region, but also South West Oltenia, a region known as the North East, with the highest unemployment rate.

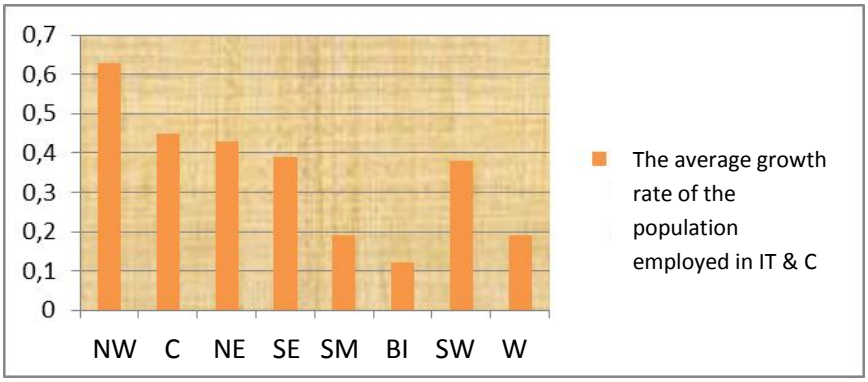

Figure 5. The average growth rate of the population employed in IT & C

3. Digital Agenda for Romania

In the context of the Europe 2020 Strategy, the definition of the National Digital Agenda Strategy for Romania, adapted to the current economic and social reality of Romania occupies a priority role for the development of digitization in various branches and fields of activity The principle underlying the National Strategy is the creation of a competitive environment, encouraging and attracting citizens and tax-paying businesses, which in turn will ensure sustainable long-term growth. According to the Eurostat study on the use of ICTs by individuals and households:

45% of Romanian users use the Internet at least once a week

52% of Romanian users are confident in online shopping and online banking

33% of Romanian users are worried about abuse of personal data online

37% of Romanian users are worried about security issues with online payments.

Continuing Vocational Training - Lifelong Learning with ICT.

*Public libraries are paving the way for hiring***.** The Europe 2020 Strategy for Sustainable Growth in the European Union aims to provide jobs for three quarters of 20 to 64-year-olds by 2020.

E-Social Inclusion. Social inclusion is a set of multidimensional measures and actions in the medical, work, education, medical, ICT, mobility, security, justice and culture, designed to combat social exclusion on the basis of criteria such as poverty, geographical location, disability and others.

Social inclusion and the fight against poverty are among the objectives of the European Union that lead to growth and jobs. Thus, formal and informal education of citizens is proposed for the development of digital competences at all levels of education.

Access to and use of computer computers

In Romania, a representative project on e-Inclusion was *"Access to Information and Communication Technology (ICT) and Improvement of Digital Skills".* This project aimed at facilitating access to ICT services by providing ICT equipment and internet connection, and also by promoting and facilitating access to ICT. A total of 255 rural communities across the country, representing 1.8 million citizens, have been able to be part of this new knowledge-based economy through the successful deployment of local e-commerce networks.

According to the data provided by the European Commission in 2014 in the Romanian Dashboard, only 8% of the population aged 16-74 used the Internet in 2013 to purchase goods and services in Romania. In Bucharest, 14% of the population aged 16-74 used the internet for online shopping in 2011, registering a significant increase, compared to 7% in 2009 and 8% in 2010. E-commerce conducted by the business environment in 2013, only 9% of SMEs in Romania has sold goods and services online, and large businesses have reached 13% for the same year.

1. Increase the level of information for online service providers and e-commerce users. An important barrier to the development of e-commerce is the lack of information at the level of online and internet service providers.

2. Knowledge and innovation capacity of regions depends on many factors - entrepreneurial culture, workforce skills, education and training institutions, innovation support services, technology transfer mechanisms, infrastructure for ICT innovation, researcher mobility, business incubators, new sources of funding, and local creative potential.

According to the paper "Access of the Population to Information and Communication Technology", works prepared annually by INS in the years 2010-2014 The study presents information on population access to various communication technologies (personal computers, mobile phones, and Internet access. The aim is to highlight the frequency and purpose of using information technology, the place of deployment, the use of computers and the Internet at home).

According to the methodological explanations, for the study carried out by the National Institute of Statistics the data source is Statistical survey on population access to information and communication technology in households (ICTs), which is carried out annually, in accordance with Council and European Parliament Regulation no. 808/2004 on Community statistics on the information society. The survey is addressed to urban and rural households, from all counties of the country and from Bucharest, existing households in the sample, respectively members of households aged 16-74 years. The statement used the formula: Low, Medium and Higher Training Levels. These are obtained by grouping training levels as follows:

- *low: no school graduate, primary, gymnasium;*
- *environment: professional, complementary or apprentices, first grade of high school, lyceum, post-secondary or technical masters;*
- *higher: university (short-term and long-term), postgraduate - master, doctorate, post-doctoral.*

People who have never used the computer from 2007 to 2014 have been permanently decreasing overall on all groups the situation has evolved thus, in 2009 there were 55.1% of those who did not use the computer, up to 39.7% in 2014, and today we already have an inverse figure of 60, 3% of computer users.

Table 1. Structure of households after home-based computer equipment, by residence area, between 2011 and 2014

	2011		2012		2013		2014	
	urban	rural	urban	rural	urban	rural	urban	rural
They do not have a PC at home	38.3	73.4	31, 7	68.3	30.2	62.5	29, 1	69.9
They have their PC at home	**61.7**	26 ,6	**66.4**	31, 7	**69.8**	37.5	**70.9**	29, 1

Source: INS

The information presented in the above table highlights the tendency of households to grow in computers both in urban and rural areas. In urban areas in 2011 they had 61.7% of the population, and in rural areas only 26.6, In these four years, the share increases from 61.7% to 70.9% in 2014. While in rural areas there is an insignificant weight of 29.1, although the years 2012 and 2013 had a corresponding increase of 31, 7 and 37, 5. Of the total households in Romania, *almost half (46.8%) had a home computer* (46.8%) in 2011, higher than in 2010 (44.2%).

In Romania, more than half (54.4%) *have access to the home network*, with most of them (70.9%) focusing on urban areas. Territorial, at the level of 2014, internet connection was more prevalent in households in the Bucharest-Ilfov region (*more than 3 households out of 4 had home Internet access*), followed largely by the West, Northwest, (*about 3 out of 5 households*), South East and Center (*2 out of 4 households*).

The increase in the share of households with computers in 2011, compared to the previous year, was felt both in the urban area (*from 59.2% to 61.7%)* and in rural areas (*from 23.7% to 26.6% %).*

In recent years, the development of information and communication technology has led to the emergence of new technologies for accessing the Internet. Of the total households in Romania, almost half (46.8%**)** *had a home computer* in 2011 (46.8%), compared with (44.2%) in 2010.

Of households that own a computer at home, more than three quarters live in urban areas. The increase in the share of households with computers in 2011, compared to the previous year, was felt both in the urban area (from 59.2% to 61.7%) and in rural areas (from 23.7% to 26.6%).

Of the total households in Romania, almost half (46.8%) had a home computer (46.8%) in 2011, higher than in 2010 (44.2%). Of households that own a computer at home, more than three quarters live in urban areas. The increase in the share of households with computers in 2011, compared to the previous year, was felt both in the urban area (from 59.2% to 61.7%) and in rural areas (from 23.7% to 26.6% %). Of the total households in Romania, almost half (46.8%) had a home computer (46.8%) in 2011, higher than in 2010 (44.2%). Of households that own a computer at home, more than three quarters live in urban areas. The increase in the share of households with computers in 2011, compared to the previous year, was felt both in the urban area (from 59.2% to 61.7%) and in rural areas (from 23.7% to 26.6%).

In 2011, 43.3% of Romanian households *have access to the home network*, 78.6% are concentrated in the urban area. In 2014, a large proportion of households (84.7%) use PCs to access the Internet at home.

Portable computers (laptop, netbook, tablet) are used by 1 in 3 households. In a much smaller proportion, other devices such as mobile phones and smartphones (20.0%) are used.

In a territorial profile, a large proportion of households *used PCs* (about 80%) *to access the Internet.* The largest share belongs to the West region (95.9%), and the lowest share of the South-East Region (77.8%). The portable computer (laptop, notebook, tablet) is used in the largest proportion in the Bucharest-Ilfov region (46.9%) and Center (41.6%). At the opposite end, there are households in the North and West regions that used this type of device to a much smaller extent (*27.4% and 28.6% respectively).*

The use of technology by occupational categories of the head of the household, mentions the moment when the highest use of the PC for the use of the Internet at home are in households run by employers *(87.3%),* self-employed *(86.9%)* and employees *(85.4%).* Portable computers (laptop, netbook, tablet) are used by households run by employers *(67.5%),* students *(56.5%)* and employees *(40.6%).* Using mobile phones or smartphones, it is obvious that student-led households hold the highest shares *(41.9%),* and retirement households use the slightest proportion of these types of devices *(15.4%).*

In 2011**,** *43%* of households in Romania have access to the home network, 78.6% are concentrated in urban areas. In 2014, a large proportion of households *(84.7%)* use PCs to access the Internet from home. Portable computers (laptop, netbook, tablet) are used by 1 in 3 households. In a much smaller proportion, other devices such as mobile phones and smartphones (20.0%) are used. On residential locations, the use of Internet access devices keeps the same distribution as on the whole country.

Table 2. Proportion of households who have accessed the Internet at home by type of devices used by development region in 2014

	2010	2011	2012	2013	2014
Bucharest – Ilfov	61.9	65.2	68.8	72.5	84,8
Center	37.4	41.1	43.4	49.5	79,4
Northwest	39.4	42.9	52.7	56.9	84,1
West	44.4	49.5	56.6	58.3	95,9
South-West Oltenia	32, 0	38.4	44.3	48.0	85,2
South Muntenia	32.9	40.3	44.8	47.2	82,9
South East	36, 0	39.6	48.9	51.2	77,8
Northeast	33.1	35.6	40.9	45.7	88,0
Total	38.9	43.3	49.3	52.9	84,7

Source: *NIS, information from the Population Access Study*

4. Conclusions

Digital technologies and the internet turn the world we live in. The digital economy, also called the new economy, will boost competitiveness, transform Europe's industrial sector. In order to get the best results, the European Commission has proposed that, by the end of 2016, to enter into force the Strategy for a Single Digital Market that would contribute € 415 billion a year to the EU economy and create hundreds of thousands of jobs. This initiative was driven by a deeper analysis of the situation of the 28 digital markets. As far as Romania is concerned, it records different results. At connectivity, we are close to the European average. In the other chapters, Romania is the last, specifically, to the use of the Internet and digital public services and e-government, although this chapter is on the agenda of all Romanian governments. Regarding the European Union's target for the IT & C sector contribution to GDP of 5% in 2023, Romania is close enough, 4.84%, in 2014, the important contribution being in Bucharest Ilfov Region (11.87%), for the other 7 regions, the average is 2.90% in regional GDP. In the context of the analysis carried out*, it is necessary to apply the development policies of the digital economy for regional development.* The potential of digital technologies to enable competitiveness, entrepreneurship and innovation is highlighted in the 2020 Entrepreneurship Action Plan.

Regional decision makers need to be engaged in the process of developing the opportunities offered by the digital revolution, encouraging the digital transformation of existing businesses and supporting digital businesses in the Romanian regions.

The efficient use of digital technologies is a key factor for a competitive economy that creates new jobs. The greatest use of advanced digital technologies by SMEs can stimulate growth and employment. The analysis reveals that businesses and SMEs, in particular, often struggle with digital developments, barriers to cross-border trade, administrative and regulatory burdens, and insufficient access to finance. The development regions in Romania need to be strengthened in this area to strengthen the digital knowledge base; catalyzing a favorable digital business environment; facilitating access to finance; promoting digital skills and talent; strengthening a digital entrepreneurial culture.

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