

Empirical analysis of ICT, economic growth and competitiveness in the EU

by

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ABSTRACT

For the time being, the digital revolution represents a key factor for a competitive and sustainable global economy and the Information and Communication Technologies bring an important contribution to the economic recovery. In the emerging economies, ICT play a decisive role in the economic, social and personal development.

Worldwide, all types of technologies have progressed but ICT represents a key factor for the economic growth in emerging countries.

The paper aims to accomplish an analysis of ICT sector in the EU Member States during 2006 – 2010 period. The comparative study is investigating the relation between the global competitiveness and the ICT sector share in national economies in the EU27.

Keywords: ICT, economic growth, competitiveness, emerging economies

INTRODUCTION

The digital era or the information era has a significant influence on society and organizations, involving important changes both at organizational and individual level.

The ICT use “becomes essential for the largest part of active population in the developed and emergent countries” (Baltac, 2011).

The emerging economies faced the financial and economic crisis storm in 2008-2009 by making fast and effective measures at fiscal and monetary level.

According to IMF analyses concerning „emerging Europe”, within the framework of the EU, one may speak about EU emerging state, thus referring to Bulgaria, Hungary, Latvia, Lithuania, Poland, Romania.

“Growth in emerging Europe is projected to remain unchanged from last year—at 4.4 percent in 2011—and then to decline to 3.4 percent in 2012”, as stated by IMF study.

According to the World Bank studies on a sample of 20,000 businesses in 50 developing countries, “companies using ICT see faster sales growth, higher productivity, and faster employee growth.”

All national economies are significantly shaped by the opportunities concerning the information generation and communication. These activities are essential in view to create and disseminate knowledge. The continuous improvement of ICT – internet, mobile phones, electronic banking services – are significantly transforming how the knowledge is generated and communicated, implicitly how the institutions, markets are operating or how the economies are developing. In the 21st century, they are providing a new electronic communication infrastructure for economy, able to transmit all forms of information –data, pictures, voice, music, movies, video – by means of global networks at reduced costs, triggering the increase of the number of opportunities, their diversification in light to generate and communicate information in the national economies.

Taking into consideration the broad and intensive use of ICT, the economies are transforming into knowledge economies where the activities related to the generation, dissemination and application of knowledge represent the main factor for economic growth and development.

Knowledge becomes a “public-private” good and it “incorporates the characteristics of a public good with decisive impact on the economic development” (Matei and Matei, 2011). This transformation is expressed both by “the rapid increase and development of new ICT and their application in the sectors of economy” (Freeman C., Louca E., 2001).

In this context, it is important to understand that ICT represent new products, services and also factors aimed at transformation of the economic and social processes and activities. Firstly, ICT leads to the increase of the speed and number of modalities aimed at the transfer of information. Secondly, ICT may store and transfer various types of information in electronic format. These two aspects of ICT trigger the change of modalities for the

information use in the processes of production and consumption. As stated by Bresnahan and Trajtenberg (1995), they represent „genuine engines of the economic growth”, as they dispose of a broad range of users and at the same time they are complementary to other activities.

The Central and Eastern European countries are facing significant challenges concerning the adaptation of their economies in light to compete efficiently on the European and world markets. Among these challenges, it is worth to remark the necessity to increase productivity, to adapt the structure of economy in a global knowledge economy, to intensify innovation and develop new products and services which should meet the changing demand at national and international level.

ICT may support all the above challenges by: increasing the productivity, increasing the component „knowledge” for goods, services and production processes, enhancing the capacity of organisations to identify and respond in real time to the changing demands on the national and international markets, enabling the innovations for products and services, leading to start up of new companies, improving the skills and adaptability of labour force.

ICT sector has a powerful impact on the economic performance as it is characterised by a high degree of technological progress and productivity and it has also an important social impact. According to the World Summit on the Information Society (WSIS), the objectives envisaged by 2015 comprise the Internet connection of schools, health institutions, libraries, the introduction of ICT in school curriculum.

At the same time, ICT is also considered as an important factor in view to accomplish the Millennium Development Goals especially in the following fields: health, education, promotion of gender equality.

On one hand, Berndt et al. (1992) analysed the contribution of ICT capital to US productivity growth and presented a negative relation. Parsons et al. (1990) stated that the banks in Canada did not have good benefits further their ICT capital investments. Also Morrison (1997) described a weak relation between ICT and the economic growth in US.

On the other hand, other studies in the field literature described a positive and important relation between ICT and economic growth. Lau and Tokutsu (1992) analysed the contribution of ICT investment on economic growth in the US for 1960-1990 period, revealing that half of the economic growth in the US was due to ICT investment. Schreyer (2000) achieved an analysis concerning the impact of ICT on labor productivity in the G7

nations, stating that countries as Germany, France, Italy, UK, Japan, US and Canada, had important benefits from ICT investment, mentioning the average annual labour productivity growth during 1990 - 1996. Daveri (2000) extended Schreyer's (2000) study to other eleven OECD countries, concluding that ICT contribution to the economic growth was significant. Poh (2001) analysed the impact of ICT investment on productivity in Singapore during 1977 – 1997, revealing that ICT capital triggered an important contribution to the economy. Kim (2003) investigated the impact of ICT on productivity and economic growth in Korea during 1971-2000, revealing the significant contribution of ICT to the economic growth and labor productivity growth. Kuppusamy and Santhapparaj (2005) investigated ICT impact in Malaysia during 1975 – 2002 while Kuppusamy and Shanmugam (2007) analysed ICT development during 1983 – 2004, concluding that ICT investment had an important role in the country's economic growth. Also Kuppusamy investigated the impact of ICT investment achieved by the private and public sector on the economic growth in Malaysia during 1992 – 2006.

Various studies have analysed the effects of ICT investments on the economic performance worldwide. The „Socio-economic Impact of Internet in Emerging and Developing Economies” study (Boston Consulting Group, 2009), estimates that the Internet penetration increase by 10% in emergent economies leads to a GDP incremental increase by 1% or 2%. Similarly, the GDP growth rate in a developing country may reach 0.59% annually, corresponding to an increase of 10 mobile telephones/100 inhabitants.

”ICT is an essential factor for productivity and economic growth” highlights Leonard Waverman (2010), the dean of Haskayne School of Business, Calgary University. “ICT should be used in view to accelerate the global development, as it represents the essential infrastructure of the 21st century”.

For the developed countries, the impact of the broadband penetration is very important for their economic growth. According to “Economic Impacts of Broadband, Information and Communications for Development, 2009”, the increase of the broadband access in developed countries by 10 subscribers/100 inhabitants corresponds to an increase by 1.2% of GDP per capita.

Europe 2020 Strategy emphasises Information and Communication Technologies (ICT) as an important factor in light to overcome the financial and economic crisis and to enhance the EU economic growth and competitiveness.

Based on the wide range and intensive use of ICT, the economies are transforming into knowledge economies, where the activities concerning the generation, diffusion and application of knowledge represent a key aspect for the economic growth and development.

The EU Member States are facing significant challenges concerning the adaptation of their economies and the increase of their competitiveness both on the European and international market.

Taking into consideration the need of the EU Member States to increase the productivity, to increase the components of knowledge for goods and services, to enhance the capacity of businesses in view to respond to changing demands, to facilitate the innovation of goods and services, to improve the skills and adaptability of labour force, ICT can bring a relevant contribution.

1. ICT sector size in the EU area

The complexity of the actual global economic environment acknowledges and fosters the qualitative and quantitative aspects of growth, triggering the integration of ICT.

As specified in the field literature (Mansel et al., 2009), as well as in the recent academic researches, ICT represents a *General Purpose Technology*, revealing the following characteristics:

- “it has a powerful impact on competitiveness as it constitutes an *enabling technology*;
- it leads to process and product *innovations*;
- it improves the *business processes* along the whole value chain”.

ICT represents “a collection of technologies and applications, enabling electronic processing, storing, retrieval and transfer of information to a wide variety of users or clients” (Matei and Savulescu, 2012).

According to Cohen, Salomon and Nijkamp (2002), the main features of ICT are as follows:

- “very dynamic technological changes, with rapid penetration and adoption rates;
- decreasing costs for new equipment;
- a rapidly increasing range of applications and penetration in an increasing number of realms of professional and personal life;

- an intertwined institutional market place, with the private sector acting in a decreasingly regulated environment (in most countries);
- a production and services package dependent on a range of qualities of skilled human resources, and
- a convergence of technologies”.

As defined by OECD, ICT sector comprises ICT manufacturing and ICT services (OECD, 2011).

The most important benefits of ICT derive from their effective and efficient use. At the same time, ICT investments are enhancing the labour productivity. The use of ICT allows the companies to enhance their efficiency and to make them more competitive. Making efficient the channels of distribution, intensifying the collaboration and partnerships, by a rapid pace of financial transactions, by achieving more dynamic and transparent processes, ICT can speed up the flow of products and services.

It is worth to remark that ICT constitutes one of the leading sectors in the EU, influencing powerfully the economic growth. In this respect, it is worth to mention:

- For the EU as a whole, the percentage of the ICT sector on GDP, in other words the value added at factor cost in the ICT sector as percentage of Total value added at factor cost represents 4.74% as average for the 2006 – 2010 period (Table 1).
- In 2011, above three quarters of 16-74 aged persons have used the computer in the EU Member States. The highest weight of the 16-74 aged persons who have used the computer is in Sweden (96%), Denmark, Luxembourg and the Netherlands (94%), and the lowest is in Romania (50%), Bulgaria (55%) and Greece (59%). In most EU Member States the share of young people who used a computer was above 95%. The weight of individuals in the EU who designed a computer software was 10% among the 16-74 aged persons (Eurostat, News release 47/2012).

Table 1 GDP, ICT sector size and the share of ICT sector in national economies in the EU Member States during 2006-2010 period

Country	GDP 2006*	ICT 2006*	%ICT on GDP. 2006	GDP 2007*	ICT 2007*	%ICT on GDP. 2007	GDP 2008*	ICT 2008*	%ICT on GDP. 2008	GDP 2009*	ICT 2009*	%ICT on GDP. 2009	GDP 2010*	ICT 2010*	%ICT on GDP. 2010	Ave. GDP*	Ave. ICT*	Ave. %ICT on GDP
Austria	259.00	11.42	4.41	274.00	10.30	3.76	282.70	9.07	3.21	274.80	9.21	3.35	286.20	9.99	3.49	275.34	10.03	3.64
Belgium	318.70	15.94	5.00	335.60	16.38	4.88	346.10	16.82	4.86	340.40	16.27	4.78	354.40	16.98	4.79	339.04	16.48	4.86
Bulgaria	26.50	1.54	5.81	30.70	1.84	5.98	35.40	1.90	5.36	34.90	1.98	5.67	36.00	1.99	5.52	32.70	1.85	5.67
Cyprus	14.70	0.66	4.50	15.90	0.63	3.97	17.20	0.60	3.48	16.80	0.63	3.73	17.30	0.62	3.60	16.38	0.63	3.86
Czech Rep	118.30	5.68	4.80	131.90	6.11	4.63	154.30	7.07	4.58	141.50	6.52	4.61	149.30	6.86	4.59	139.06	6.45	4.64
Denmark	218.70	11.13	5.09	227.50	11.92	5.24	235.10	12.30	5.23	223.90	11.72	5.24	235.60	12.33	5.23	228.16	11.88	5.21
Estonia	13.40	0.62	4.64	16.10	0.74	4.57	16.30	0.74	4.52	13.90	0.63	4.55	14.30	0.65	4.53	14.80	0.68	4.56
Finland	165.70	13.60	8.21	179.80	16.42	9.13	185.60	13.10	7.06	172.50	13.96	8.10	179.70	14.52	8.08	176.66	14.34	8.12
France	1798.10	79.84	4.44	1886.80	83.40	4.42	1933.20	80.03	4.14	1889.20	79.54	4.21	1932.80	82.72	4.28	1888.02	81.15	4.30
Germany	2313.90	107.60	4.65	2428.50	114.63	4.72	2473.80	103.16	4.17	2374.50	98.78	4.16	2476.80	106.75	4.31	2413.50	106.24	4.40
Greece	208.80	5.72	2.74	222.70	6.04	2.71	232.90	5.87	2.52	231.60	6.06	2.62	227.30	5.84	2.57	224.66	5.91	2.63
Hungary	89.60	5.74	6.41	99.40	5.80	5.84	105.50	6.24	5.91	91.40	5.37	5.88	97.10	5.72	5.89	96.60	5.78	5.99
Ireland	178.30	12.55	7.04	189.90	12.00	6.32	179.90	11.10	6.17	160.60	10.03	6.25	155.90	9.68	6.21	172.92	11.06	6.40
Italy	1493.00	58.82	3.94	1554.20	59.99	3.86	1575.10	56.07	3.56	1519.70	55.32	3.64	1553.20	57.62	3.71	1539.04	57.59	3.74
Latvia	15.90	0.49	3.11	21.00	0.65	3.09	22.80	0.66	2.89	18.50	0.51	2.78	17.90	0.49	2.76	19.22	0.56	2.93
Lithuania	24.10	0.78	3.22	28.70	0.77	2.70	32.50	0.71	2.19	26.60	0.65	2.43	27.50	0.76	2.78	27.88	0.74	2.66
Luxemb.	33.90	1.80	5.31	37.40	1.93	5.17	39.40	1.98	5.03	37.40	1.91	5.10	40.30	2.04	5.07	37.68	1.93	5.14

Malta	5.00	0.24	4.70	5.40	0.25	4.60	5.80	0.26	4.56	5.80	0.27	4.58	6.10	0.28	4.57	5.62	0.26	4.60
Netherlands	540.20	36.73	6.80	571.70	36.59	6.40	594.50	36.92	6.21	571.10	38.89	6.81	588.40	36.83	6.26	573.18	37.23	6.50
Poland	272.10	10.34	3.80	311.00	10.64	3.42	363.20	11.95	3.29	310.40	10.31	3.32	354.30	11.90	3.36	322.20	11.08	3.44
Portugal	160.80	6.42	3.99	169.30	6.74	3.98	171.90	6.58	3.83	168.50	6.50	3.86	172.60	6.77	3.92	168.62	6.60	3.92
Romania	97.70	3.51	3.59	124.70	4.31	3.46	139.70	4.67	3.34	118.20	4.02	3.40	124.00	4.18	3.37	120.86	4.15	3.43
Slovakia	44.50	2.11	4.74	54.80	2.64	4.81	64.40	2.90	4.51	62.80	2.88	4.59	65.70	3.06	4.66	58.44	2.72	4.66
Slovenia	31.00	1.27	4.11	34.50	1.41	4.08	37.20	1.27	3.41	35.30	1.32	3.75	35.40	1.27	3.58	34.68	1.31	3.78
Spain	985.50	37.45	3.80	1053.10	40.65	3.86	1087.70	40.79	3.75	1047.80	38.04	3.63	1051.30	38.79	3.69	1045.08	39.15	3.75
Sweden	318.10	21.92	6.89	337.90	22.10	6.54	333.20	21.52	6.46	292.40	18.63	6.37	349.20	22.38	6.41	326.16	21.31	6.53
UK	1943.80	162.70	8.37	2054.20	181.80	8.85	1008.70	84.23	8.35	1564.50	132.67	8.48	1706.30	146.74	8.60	1655.50	141.21	8.53
EU 15	729.10	39.23	5.38	768.17	40.87	5.32	711.99	35.39	4.97	724.59	37.03	5.11	754.00	38.53	5.11	737.57	38.19	5.18
EU 25	462.60	23.08	4.99	489.65	23.80	4.86	459.96	20.97	4.56	463.68	21.65	4.67	483.80	22.64	4.68	471.94	22.43	4.75
EU 27	432.94	21.52	4.97	459.14	22.27	4.85	432.37	19.63	4.54	435.00	20.27	4.66	453.89	21.15	4.66	442.67	20.96	4.74

* The data are in billion of euro.

Source: Matei and Savulescu, ICT Market in the EU Member States – key factor for the knowledge economy, IAPNM 2012, based on data from Eurostat

According to Table 1, the national trends concerning the dynamics of ICT sector are quite different in comparison with the national economic performance. For example, in 2006 the ICT sector contributed with 4.97% to the EU GDP, in 2007 with 4.85%, in 2008 with 4.54%, in 2009 with 4.66% and in 2010 with 4.66%.

In fact, if we accomplish a correlation analysis between the variables described in Table 1, we obtain:

Table 2 Correlations on the evolution and contribution of ICT sector related to the economic growth

		mean GDP	mean ICT	mean W_ICT
mean GDP	Pearson Correlation	1	.928(**)	.129
	Sig. (2-tailed)		.000	.496
	N	30	30	30
mean ICT	Pearson Correlation	.928(**)	1	.366(*)
	Sig. (2-tailed)	.000		.046
	N	30	30	30
mean W_ICT	Pearson Correlation	.129	.366(*)	1
	Sig. (2-tailed)	.496	.046	
	N	30	30	30

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Source: the authors

From Table 2 we obtain a powerful correlation between the size of ICT sector and GDP evolution (average 2006 – 2010). Simultaneously, the correlation between ICT contribution (mean ICT) to GDP is very small (0.129) and at the same time, between ICT and its contribution to GDP (mean W_ICT) (0.366). The explanations derive both from the methodology in view to determine ICT contribution to GDP and the influence of the economic and financial crisis which have determined constraints to ICT potential in GDP evolution.

In 2008, the economic and financial crisis has diminished the European economy and the same trend is valid for the ICT sector. During 2006-2010 period, the average of ICT sector size is higher in UK, Germany, France, Italy, Spain, Netherlands and lower in Malta, Latvia, Cyprus.

As shown in Table 1, the highest average share of ICT sector in economy is recorded in UK (8.53%), Finland (8.12%), Sweden (6.53%), Netherlands (6.50%), while the lowest average

value is registered in Greece (2.63%), Lithuania (2.66%), Latvia (2.93%), Romania (3.43%), Poland (3.44%). The average share of ICT sector in national economies in EU15 is 5.18%, in EU25 is 4.75% and in EU27 is 4.74%.

According to Professor Baltac, President of CEPIS and Vice-Chairman of WITSA, nowadays, ICT development is shaped by several trends: spread of mobile applications, communication in broadband, increase of content in networks and Internet, web services represent platform of transactions (Baltac, 2011).

2. Empirical comparative analysis

2.1 Competitiveness

According to the European Commission (1999), the competitiveness represents “the ability to produce goods and services which meet the test of international markets, while at the same time maintaining high and sustainable levels of income”. Porter (2007) sustains that “the most intuitive definition of competitiveness is a country’s share of world markets for its products”.

The annual *Global Competitiveness Reports of World Economic Forum* accomplish an analysis concerning the factors highlighting the national competitiveness. The World Economic Forum has substantiated its competitiveness analysis on the Global Competitiveness Index (GCI), which measures the microeconomic and macroeconomic fundamental elements of national competitiveness.

GCI comprises 12 key elements: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, innovation. They are powerfully interrelated and tend to reinforce each other, and a weakness in one area often has a negative impact on other areas. For example, a strong innovation capacity will be very difficult to achieve without a healthy, well-educated and trained workforce, which is keen to assimilate new technologies, and without sufficient financing for R&D or an efficient goods market that makes possible to undertake new innovations to market.

Table 3 Global Competitiveness Index (GCI) in the EU Member States during 2006-2011 period

Country	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Average	Country	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	Average
Austria	5.3	5.2	5.2	5.1	5.1	5.18	Lithuania	4.5	4.5	4.4	4.3	4.4	4.42
Belgium	5.3	5.1	5.1	5.1	5.1	5.14	Luxembourg	5.2	4.9	4.9	5	5	5.00
Bulgaria	3.9	3.9	4	4	4.1	3.98	Malta	4.5	4.2	4.3	4.3	4.3	4.32
Cyprus	4.4	4.2	4.5	4.6	4.5	4.44	Netherlands	5.6	5.4	5.4	5.3	5.3	5.40
Czech Rep	4.7	4.6	4.6	4.7	4.6	4.64	Poland	4.3	4.3	4.3	4.3	4.5	4.34
Denmark	5.7	5.6	5.6	5.5	5.3	5.54	Portugal	4.6	4.5	4.5	4.4	4.4	4.48
Estonia	5.1	4.7	4.7	4.6	4.6	4.74	Romania	4	4	4.1	4.1	4.2	4.08
Finland	5.8	5.5	5.5	5.4	5.4	5.52	Slovakia	4.5	4.4	4.4	4.3	4.2	4.36
France	5.3	5.2	5.2	5.1	5.1	5.18	Slovenia	4.7	4.5	4.5	4.6	4.4	4.54
Germany	5.6	5.5	5.5	5.4	5.4	5.48	Spain	4.8	4.7	4.7	4.6	4.5	4.66
Greece	4.3	4.1	4.1	4	4	4.10	Sweden	5.7	5.5	5.5	5.5	5.6	5.56
Hungary	4.5	4.3	4.2	4.2	4.3	4.30	UK	5.5	5.4	5.3	5.2	5.3	5.34
Ireland	5.2	5	5	4.8	4.7	4.94	EU 15	5.2	5.1	5.1	5.0	5.0	5.0
Italy	4.5	4.4	4.4	4.3	4.4	4.40	EU 25	5.0	4.8	4.8	4.7	4.7	4.8
Latvia	4.6	4.4	4.3	4.1	4.1	4.30	EU 27	4.9	4.7	4.7	4.7	4.7	4.7

Source: Matei and Savulescu, ICT Market in the EU Member States – key factor for the knowledge economy, IAPNM 2012, based on Global Competitiveness Reports 2006–2011

As revealed by Table 3, the top performers are Sweden (5.56), Denmark (5.54), Finland (5.52), followed by Germany (5.48), Netherlands (5.40), UK (5.34), Austria (5.18), acknowledging that they are the most competitive economies in the EU. At the other extreme, the weak performers are Bulgaria (3.98), Romania (4.08), Greece (4.10), Latvia (4.30), Hungary (4.30). As indicated by Table 3, the values for the average of GCI in the EU emerging countries, i.e. Bulgaria, Romania, Latvia, Hungary, Poland, Lithuania show their last positions concerning the global competitiveness in the EU ranking.

It is worth to mention that Estonia (4.74) is the best competitive economy among the EU accession 12.

2.2 Comparative analysis of share of ICT sector in national economy and competitiveness

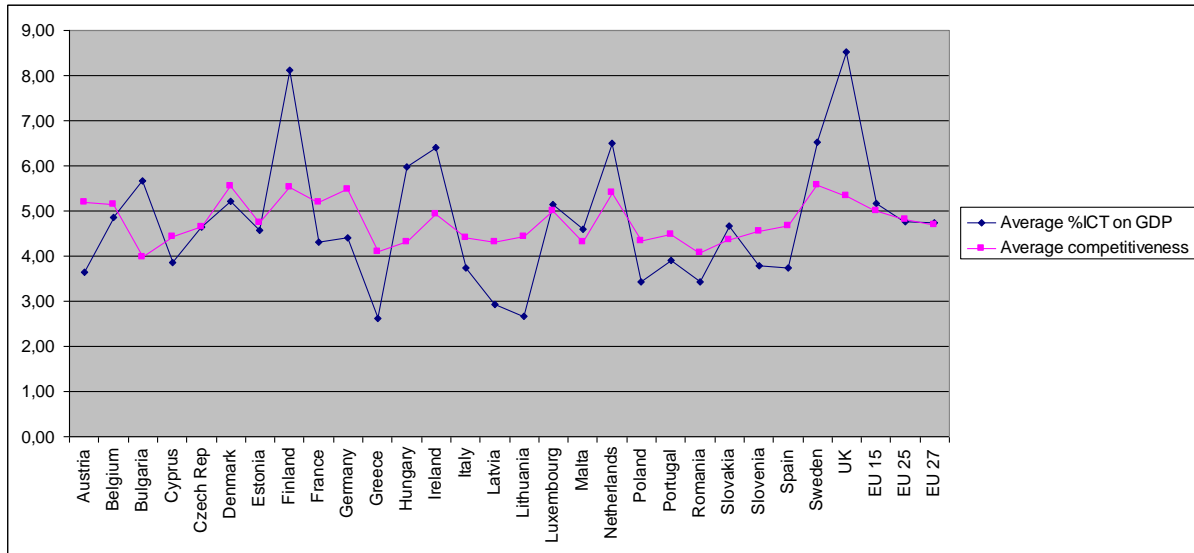
We accomplish a comparative analysis concerning the share of ICT sector in national economy and competitiveness in the EU 27 during 2006-2010 period.

Table 4 Averages for share of ICT sector in national economy and competitiveness
in the EU 27 during 2006-2010

Country	Average %ICT on GDP	Average Competitiveness	Country	Average %ICT on GDP	Average Competitiveness
Austria	3.64	5.18	Lithuania	2.66	4.42
Belgium	4.86	5.14	Luxembourg	5.14	5.00
Bulgaria	5.67	3.98	Malta	4.60	4.32
Cyprus	3.86	4.44	Netherlands	6.50	5.40
Czech Rep	4.64	4.64	Poland	3.44	4.34
Denmark	5.21	5.54	Portugal	3.92	4.48
Estonia	4.56	4.74	Romania	3.43	4.08
Finland	8.12	5.52	Slovakia	4.66	4.36
France	4.30	5.18	Slovenia	3.78	4.54
Germany	4.40	5.48	Spain	3.75	4.66
Greece	2.63	4.10	Sweden	6.53	5.56
Hungary	5.99	4.30	UK	8.53	5.34
Ireland	6.40	4.94	EU 15	5.18	5.0
Italy	3.74	4.40	EU 25	4.75	4.8
Latvia	2.93	4.30	EU 27	4.74	4.7

Source: Matei and Savulescu, ICT Market in the EU Member States – key factor for the knowledge economy, IAPNM 2012

Figure 1 Representation of the averages for share of ICT sector in national economy and competitiveness in the EU 27 during 2006-2010



Source: the authors

Analysing the averages for the share of ICT sector in national economy and competitiveness (Table 4, Figure 1), Finland and UK are the countries that have a much higher value for share of ICT sector in national economy in comparison with GCI. At the other extreme, Greece, Lithuania represent the countries recording a lower value for the share of ICT sector in national economy in comparison with GCI.

It is worth to mention that Estonia is the best performer among EU accession 12 at both competitiveness and ICT sector share in GDP.

Table 5 presents the correlation analysis between competitiveness (mean GCI) and ICT sector contribution to GDP.

Table 5 Correlation competitiveness/weight ICT/GDP

		mean W_ICT	mean GCI
mean W_ICT	Pearson Correlation	1	.588(**)
	Sig. (2-tailed)		.001
	N	30	30
mean GCI	Pearson Correlation	.588(**)	1
	Sig. (2-tailed)	.001	
	N	30	30

** Correlation is significant at the 0.01 level (2-tailed).

Source: the authors

We remark a positive correlation of average size (0.588), justified by the complex methodology in order to determine GCI, as well as different standard deviations (1.43 for mean W_ICT and 0.48 for mean GCI) under the terms of approximately equal means (4.75, respectively 4.76) of the two variables. The direct dependency between the two variables is also obtained from the following equation of linear regression:

$$\text{mean GCI} = 3.824 + 0.198 \text{ mean W_ICT}$$

(0.255) (0.051)

In a concrete situation, one may estimate that an increase by 1% of ICT contribution to GDP could lead to an increase by 4.2% of competitiveness, precisely by a percentage comprised in the interval (3.27, 5.28).

Conclusions

As revealed by the paper, ICT are playing a significant role in the economic growth and competitiveness.

The ICT social and economic benefits are not confined by national borders as the latest technologies enable to the best and brightest people in each country to have access worldwide.

Governments, which once focused on the concrete issues of building infrastructure and providing access to citizens, are beginning to recognize that technology itself is not as important as the socio-economic achievements it can engender— for example e-health programs, e-government services. Both public and private organisations have also recognized that ICT is not just a factor for cost-cutting and more efficient activities, but it represents an essential factor in view to open the dialogue with consumers and other stakeholders through various types of digital communication: digital marketing, mobile advertising, social networks, e-commerce.

ICT in the knowledge economy will be successful through the huge joint efforts of all stakeholders in the EU countries: parliaments, governments, ministries, agencies, universities, industry, private sector, political parties, NGOs, media, individuals.

In this context, concerning Romania, Professor Baltac stated: “Romania should do efforts in light to increase its IT readiness, which refers to connectivity, information security, improvement of e-business environment and development of human potential. Thus,

Romania should encourage large-scale access to Internet and ICT in general on an affordable geographical and social base. Also it is important to improve the access and use of Internet for business and education, to develop the business environment through a better legislation, to speed-up the development of digital infrastructure, Internet, telecommunications, including e-commerce infrastructure, large scale investment in training and educating people, to promote digital literacy and e-education, to improve security of information and databases. The Government should continue to provide incentives for investments in the IT infrastructure, to make investments in the public education and continue e-government projects”.

In Romania, the most successful e-government projects comprise the national system of electronic payments, single electronic contact point, electronic system of public procurement, e-job, e-tax, info kiosks, computerised system for high-schools, computerised system for transport authorisations.

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