

Innovation and Research and Development Important Factors Related to The Nations Competitiveness: The Case of European Economies

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Abstract

This article attempts to verify empirically the argument that innovation capabilities and research and development activities are important in explaining the discrepancies registered between the nations, in terms of competitiveness. In order to approach in an explicit manner the relation between innovation and competitiveness, it uses a panel of representative data, set for European countries, including the member states (EU-27). The findings show that innovative capabilities and R&D activities sustained mostly by the business enterprise sector are very important factors influencing the nations competitiveness. Furthermore, the results suggest that policy changes, targeting the improvement of the human capital and technological capabilities, are needed for the emergent economies in order to improve their economic performance and to converge faster towards meeting the European standards.

Keywords: innovation, research and development, competitiveness, policies, and stimulation

1. Introduction

Specialists agree that technological innovation is essential for the economic development and growth. In this respect, John Dunning, achieving an adaptation of Michel Porter's diamond (*the diamond of the competitive advantage*), has demonstrated that during *the stage of competitive advantage triggered by innovation* (the third stage), the competitive advantages of an economy are mainly generated by the capacity of the local companies to sustain technological, managerial and organizational innovation. Also, in the fourth stage, *the informational (or post-industrial) phase*, considered by Dunning to be the most advanced stage of economic development, the success of the home economies regarding the accumulation of productive assets depends on the ability of the transnational corporations to coordinate resources placed within a regional or global environment. Thus, one can register an unprecedented intensification of the relationships between companies sustained by the development of informational processes (Porter, 1992 and Dunning, 1992).

Therefore, during the technological innovation process, private companies, and particularly transnational corporations (TNC) hold a significant role as the globalization and production internationalization processes deepen (Dunning, 1993, p.274). In this respect the empiric evidence

shows that over 50% of the research development - related expenses spent at a global scale are focused inside the TNC complex. Besides, last decade evolutions proved that, following the reinforcement of the global competitive pressure and the rapid technological development, more and more transnational companies permanently increase their research-development related expenses in order to preserve their competitive advantages generated by the technological innovation (Ivan, Iacovoiu and Buruiană, 2008). Consequently, transnational companies with different structures and global action control the supply and use of the major part of the high-tech advanced technologies engendered within the private sector.

As for the host countries, the internationalization of the research-development (R&D) activities represents an opportunity not only for the technology transfer created somewhere else, but also for the development of technological innovation own capabilities, as long as the particular economy has managed to connect to the innovating and technological global research network (Mazilu, 1999).

The setting up and development of the own capabilities of technological innovation are not only slow, but very expensive processes that require a constant technical effort, the existence of a developed infrastructure, mainly an informational and communicational one, and some powerful and lasting institutions, such as universities and research centres (Angelescu and Stănescu, 2005; Roșca, 2006; Cowan, 2005; Furman, Porter and Stern, 2002). In this respect, a recent research conducted for 102 regions of the 14 developed European economies has suggested that "backward regions cannot improve fast in terms of innovation..., because the shaping of social capital is crucial and takes long to develop". Using the regression analysis, the two researchers underlined the fact that social capital (its current level is "formed by historical institutions and investments, such as early literacy, past political institutions and universities") "has a positive effect on the investment in innovation", influencing directly the innovation process (Akçomak and Bas, 2008, pp.1, 26). Therefore, any sustainable economic development requires more than a "receptive" economy to technological inputs (Iacovoiu, 2007).

Starting from the above mentioned facts as well as Dunning's assertion regarding "the origin" of the competitive advantage that "is likely to be determined by a combination of factors, including

the amount of resources the company allocates to innovatory activities, the quality and motivation of R&D personnel, the organization and technical efficiency of the R&D department” (Dunning, 1992, pp.136-137), in order to approach in an explicit manner the relation between innovation and competitiveness we are going to analyze some of the most representative indicators, in respect to European countries, including the European Union member states (EU-27).

2. Innovation

In order to emphasize the main aspects regarding the European countries innovation activities we will focus on the following representative indicators: Innovative enterprises, as a percentage of all enterprises (IER); Innovative enterprises that co-operate (any form of co-operation), as a percentage of innovative enterprises (CIER);

Innovative enterprises receiving public funding (from local or regional authorities, from central government, from the EU) of innovation, as a percentage of innovative enterprises (PFIER); Innovative enterprises that introduced organizational and/or marketing innovations, as a percentage of all enterprises (OMIER); Highly important hampering effect (innovation costs are too high), as a percentage of innovative enterprises (HIHE); Turnover related to new or significantly improved products which are new to the market, as a percentage of the total turnover of innovative enterprises (TPNM). Data regarding the level of the above mentioned indicators, during the period 2002-2004, emphasizes the existing accentuated discrepancies between the European countries (table 1).

Table 1: Innovation activities, European countries - 2004

Countries	IER		CIER		PFIER (%)	OMIER (%)	HIHE		TPNM	
	%	Rank	%	Rank			%	Rank*	%	Rank
EU-27	39	-	27	-	8.9	26.2	24	-	8	-
Germany	65	1	15	28	14.1	47.0	19	11	9	12
Austria	53	2	17	27	33.9	39.9	19	12	7	20
Luxembourg	52	3	30	20	24.8	42.7	10	2	9	13
Ireland	52	4	32	17	N/A	36.3	19	13	8	15
Denmark	52	5	42	5	15.0	42.1	13	5	8	16
Iceland	51	6	29	21	N/A	N/A	19	14	7	21
Belgium	51	7	35	14	22.8	35.1	19	15	7	22
Sweden	50	8	42	4	N/A	N/A	14	6	12	9
Estonia	49	9	34	15	9.7	35.1	22	16	7	23
Cyprus	47	10	36	12	35.5	34.5	31	26	3	29
Finland	43	11	43	3	35.1	N/A	11	3	13	8
United Kingdom	42	12	30	19	N/A	N/A	23	19	8	17
Portugal	41	13	19	24	11.1	29.7	9	1	6	25
Czech Republic	38	14	38	10	15.9	26.6	18	9	13	7
Norway	38	15	33	16	43.5	24.4	16	7	4	28
Italy	37	16	11	29	38.6	21.3	26	21	10	10
Greece	36	17	23	22	29.0	25.8	39	28	10	11
Spain	35	18	18	25	25.9	20.9	40	29	6	26
Netherlands	34	19	38	8	37.5	19.5	12	4	6	27
France	32	20	39	7	20.4	23.1	28	24	9	14
Lithuania	29	21	55	1	12.7	19.9	22	17	7	24
Slovenia	27	22	46	2	N/A	N/A	24	20	13	5
Poland	25	23	41	6	12.4	17.3	32	27	13	6
Slovakia	23	24	37	11	12.1	14.1	22	18	21	3
Hungary	21	25	36	13	27.3	12.7	27	23	8	18
Malta	21	26	31	18	16.7	14.4	18	10	22	2
Romania	20	27	17	26	10.8	13.8	30	25	16	4

Latvia	18	28	38	9	N/A	N/A	17	8	8	19
Bulgaria	16	29	21	23	4.9	8.4	26	22	24	1

**rank is given from 1 to 29, starting with the best position; N/A – no data available*

Source: Eurostat, EC report “Science, technology and innovation in Europe”, pp.58-75

In respect to the innovation activity of the enterprises, the above findings show that, during 2002-2004, 39% of the enterprises that work in the production and services sector within the 27 EU current member countries reported the development of some innovating activities. Within the analyzed countries one can notice severe disparities regarding the percentage of the enterprises that achieved innovative activities from the total of the enterprises. Thus, the highest values registered in Germany (65% of the overall enterprises), Austria (53%), followed by Denmark, Ireland, Luxembourg (52%), Belgium and Iceland (51%) and Sweden (50%). At the opposite pole, are ranked the countries with the lowest rates, namely Bulgaria (16% of the overall enterprises), Latvia (18%), Romania (20%), Hungary and Malta (21%). We have to underline the cases of two emergent economies, Estonia (49%) and the Czech Republic (38%), that occupy quite promising positions, overtaking developed countries such as Finland, United Kingdom, France, Italy, Norway and Netherlands.

In what concerns the co-operation partners, in view of developing the innovative activities, it has been ascertained that they occur more frequent in countries like Lithuania, Slovenia, Finland, Sweden, Denmark, Poland, France, Netherlands, Latvia and the Czech Republic, and less frequent in Italy, Germany, Austria, Romania, Spain, Portugal and Bulgaria.

At European Union level, less than 9% of innovative enterprises received any public funding, whereas at national level this percentage varied between 4.9% in Bulgaria and 38.6% in Italy. One can notice the differences registered by traditionally developed European economies, where the range of the PFIER was between 11% (Portugal) and 43.5% (Norway), as well as the ones registered by emergent economies, respectively 11 points between Bulgaria (4.9%) and the Czech Republic (16%).

About 26% of European Union enterprises declared that they have introduced organizational and/or marketing innovations. Comparatively, most of the traditionally developed European economies

registered higher levels of OMIER, as for example Germany (47%), Luxembourg (43%), Denmark (42%), Austria (40%), Ireland (36%) and Belgium (35%), whereas emergent economies registered mostly lower levels, exception made by Estonia (35.1%) and the Czech Republic (26.6%).

In respect to the hampering factor “innovation costs are to high” empirical data shows that 24% of EU-27 innovative enterprises considered this factor to be highly important. Similar to the above mentioned indicators, there are disparities between analyzed countries. Thus, most of the traditionally developed European economies registered lower levels of HIHE, exception made by Spain (40%), France (28%) and Italy (26%). As compared to EU level, in the emergent economies this hampering factor accounted for 32% of responses in Poland, 30% in Romania, 27% in Hungary, 26% in Bulgaria. The lowest levels were registered in Latvia (17%), followed by the Czech Republic (18%) and Estonia, Slovakia and Lithuania (22%).

Only 8% of the turnover of European Union innovative enterprises was related to new or significantly improved products which are new to the market. Higher levels were registered mostly in the emergent economies, as for example in Bulgaria (24%), Slovakia (21%), Romania (16), the Czech Republic, Slovenia and Poland (13%).

3. R&D expenditure

The main aspects regarding the European countries research and development expenditure will be emphasized by analysis of R&D intensity (R&D expenditure as a percentage of GDP), R&D evolution (annual average growth rate, AAGR, for the period 2000-2005) and R&D expenditure by source of funds as a percentage of total.

We have selected these indicators starting from the EU goals in Research and Development, as set by the Lisbon strategy, respectively to achieve by 2010 an R&D intensity of at least 3%, and to have two thirds of the R&D expenditure financed by the business enterprise sector (BES). The empirical data regarding the level of the selected indicators emphasizes the existing discrepancies between the European economies as well as the level of fulfilling the European Union goals (table 2).

Table 2: R&D expenditure, European countries

Countries	Intensity (% of GDP) 2005		AAGR 2000-2005		Source of funds (percentage of total) 2004		
	%	Rank	%	Rank	BES	Government	Abroad
<i>EU-27</i>	1.84	-	3.33	-	55	35	8
Germany	2.51	4	2.17	26	67	30	2
Austria	2.36	6	7.50	12	47	33	19
Luxembourg	1.56	11	4.71	18	80	11	8
Ireland	1.25	14	9.48	10	57	32	9
Iceland	2.83	3	4.23	21	44	40	14
Denmark	2.44	5	5.54	15	60	27	10
Belgium	1.82	8	1.80	27	60	24	13
Sweden	3.86	1	1.39	28	65	23	7
Estonia	0.94	18	22.96	2	36	44	17
Cyprus	0.40	28	17.30	3	19	64	12
Finland	3.48	2	4.36	19	69	26	3
United Kingdom	1.73	10	0.75	29	44	33	17
Portugal	0.81	20	5.11	17	32	60	5
Czech Republic	1.42	13	13.75	7	53	42	4
Norway	1.51	12	4.33	20	49	42	7
Italy	1.10	17	5.19	16	N/A	N/A	N/A
Greece	0.61	22	6.90	13	28	46	22
Spain	1.12	16	12.05	9	48	41	6
Netherlands	1.78	9	3.42	22	51	36	11
France	2.13	7	3.29	23	52	38	9
Lithuania	0.76	21	16.53	4	20	63	11
Slovenia	1.22	15	2.62	25	58	30	11
Poland	0.57	24	2.98	24	27	65	5
Slovakia	0.51	26	6.35	14	38	57	4
Hungary	0.94	19	15.63	5	37	52	10
Malta	0.61	23	32.30	1	19	60	22
Romania	0.39	29	12.15	8	44	49	5
Latvia	0.57	25	14.13	6	46	31	23
Bulgaria	0.50	27	8.33	11	28	66	5

Source: Eurostat, EC report "Science, technology and innovation in Europe", p.10-18

N/A – no data available

In 2005, at European Union level, R&D intensity stood at 1.84%. Only two Member States exceeded the first EU goal, registering an R&D intensity of over 3% of GDP, respectively Sweden (3.86%) and Finland (3.48%). Whereas traditionally developed European economies registered levels over or closed to 2%, in most of the emergent economies R&D intensity stood under 1%. Higher levels were

registered only in the Czech Republic (1.42%) and Slovenia (1.22%), followed by Estonia and Hungary (0.94%). Comparatively, in countries such as Romania (0.39%), Bulgaria (0.50%), Slovakia (0.51%), Latvia and Poland (0.57%) R&D intensity was significantly lower.

In respect to R&D expenditure dynamic, data regarding the AAGR shows that, as compared with

EU-27 level (3.33%), most of the emergent economies (exception made by Poland and Slovenia) registered significantly higher rhythms, as for example Estonia (23%), Lithuania (17%), Hungary (16%), Latvia and the Czech Republic (14%), and Romania (12%). Comparatively, the traditionally developed European economies (EU-15) registered mostly lower rhythms, as for

example United Kingdom (0.75%), Sweden (1.39%), Belgium (1.80%) and Germany (2.17%).

At European Union level, 55% of R&D expenditure was financed by the business enterprise sector. At national level only seven traditionally developed countries registered higher values. Out of these seven states, three fulfilled and even surpassed the second EU goal, respectively Luxembourg (80%), Finland (69%) and Germany (67%). In what concern the emergent economies, only in Slovenia (58%) and the Czech Republic (53%) R&D expenditure was mainly financed by the business enterprise sector, whereas in states such as Estonia, Lithuania, Poland, Hungary, Romania and Bulgaria the main source of funds has been the government.

According to the above empirical data, there are some European countries where the abroad sources accounted for an important percentage of the total funds. This is the case for states such as Latvia, Malta and Greece (over 22%) and also Austria, Estonia, United Kingdom, Cyprus, Iceland, Belgium, Lithuania, Slovenia, Hungary, Netherlands and Denmark (over 10%).

In what concerns the internationalization of R&D activities, a survey conducted by UNCTAD (WIR 2005, p.26) shows that some of the European countries, as for example United Kingdom (13.2 percentage of response), France (8.8%), Germany (5.9%), Netherlands (4.4%), Belgium and Italy (2.9%), Romania, the Czech Republic, Poland, Ireland and Sweden (1.5%) are placed among the countries with the most attractive perspectives regarding the relocation of the research-development activities of the transnational companies during 2005-2009. In the extent that these forecasts shall become true, positive effects of the technological progress upon the involved sectors competitiveness and productivity may take place, by means of the R&D investments made by the foreign companies that relocate these activities.

4. Competitiveness

In order to evaluate the competitiveness of nations, World Economic Forum is using the Global Competitiveness Index (GCI), which grants an overall image, by using a set of parameters considered to be essential for the competitiveness of any given economy. These parameters are grouped in nine categories, respectively: institutions; infrastructure; macro-economy; health and basic education; secondary education and continuous learning; market efficiency; technological training; the degree of sophistication in business; the capacity of innovation. The World Economic Forum 2007/2008 report emphasises certain changes in what concerns European countries competitiveness (table 3).

Table 3: Global Competitiveness Index 2006 – 2008, European countries - comparisons

Rank at European level (2007-2008)	Abbreviations	Countries	GCI 2007-2008		GCI 2006-07	Evolution
			Rank	Score	Rank	
1	DK	Denmark	3	5.55	3	0
2	SE	Sweden	4	5.54	9	+ 5
3	DE	Germany	5	5.51	7	+ 2
4	FI	Finland	6	5.49	6	0
5	UK	United Kingdom	9	5.41	2	- 7
6	NL	Netherlands	10	5.40	11	+ 1
7	AT	Austria	15	5.23	18	+ 3
8	NO	Norway	16	5.20	17	+ 1
9	FR	France	18	5.18	15	- 3
10	BE	Belgium	20	5.10	24	+ 4
11	IE	Ireland	22	5.03	22	0
12	IS	Iceland	23	5.02	20	- 3
13	LU	Luxembourg	25	4.88	25	0
14	EE	Estonia	27	4.74	26	- 1
15	ES	Spain	29	4.66	29	0
16	CZ	Czech Republic	33	4.58	31	- 2
17	LT	Lithuania	38	4.49	39	+ 1
18	SI	Slovenia	39	4.48	40	+ 1
19	PT	Portugal	40	4.48	43	+ 3
20	SK	Slovakia	41	4.45	37	- 4

21	LV	Latvia	45	4.41	44	- 1
22	IT	Italy	46	4.36	47	+ 1
23	HU	Hungary	47	4.35	38	- 9
24	PL	Poland	51	4.28	45	- 6
25	CY	Cyprus	55	4.23	49	- 6
26	MT	Malta	56	4.21	51	- 5
27	EL	Greece	65	4.08	61	- 4
28	RO	Romania	74	3.97	73	- 1
29	BG	Bulgaria	79	3.93	74	- 5

Source: World Economic Forum, Report 2008, www.weforum.org

It is important to underline the fact that both in 2006/2007 and in 2007/2008, regardless of the registered changes, the countries that mainly rank first in the world are the ones traditionally developed and industrialised. The same situation was registered at European level too. Thus, the leading countries in terms of competitiveness were Denmark, Sweden, Germany and Finland that occupy the third, the fourth, the fifth and the sixth position in world hierarchy, followed by United Kingdom, Netherlands, Austria, Norway, France, Belgium, Ireland and Iceland (GCI was above 5.00) and, at some distance by Luxembourg (4.88). We consider it important to mention the fact that according to M. Porter's model and opinion, views generally shared by other specialists as well, these states are facing the final stages of the development of the competitive advantages (Iacovoiu, 2007).

By way of comparison, GCI score was below 5.00 in all the emergent economies. Even so, one can notice that Estonia and the Czech Republic occupied quite promising positions, overtaking countries such as Spain, Portugal, Italy, Cyprus, Malta and Greece. Also, Lithuania and Slovenia, the only emergent economies on a positive slope, were placed on honourable positions, respectively 17th and 18th at European level. We have to underline the fact that, according to the Dunning and Porter model, Central and East European countries, new members of EU, faced at the beginning of the last decade (the '90s) their first stage regarding the development of the competitive advantages based on the instrumentation with production factors and on their lower cost (Mazilu, 1999). The WEF report have shown the fact that, at the level of year 2007, some of these countries, as for example Estonia, the Czech Republic, Lithuania and Slovenia passed from the stage of innovation through import to that of own innovation, which requires the allocation of substantial funds to the Research and Development activity.

Another important aspect emphasized by the WEF report is that, as compared with 2006, in year 2007, some of the traditionally developed European countries (as for example United Kingdom and France) and most of the emergent economies

(exception made by Slovenia and Lithuania) were on a negative slope. According to the above mentioned empirical data, the negative evolution of GCI was accentuated in Hungary (went down 9 positions), United Kingdom (7 positions), Poland (6 positions), Cyprus (6 positions), Malta (5 positions), Bulgaria (5 positions), Greece (4 positions) and Slovakia (4 positions).

5. Innovation, R&D and Competitiveness

In order to approach in an explicit manner the relation between innovation and competitiveness we are going to group the analyzed European countries, according to GCI score, in four categories (table 4), respectively: countries with GCI score over 5.00 (12 countries); countries with GCI score between 4.50 and 5.00 (4 countries); countries with GCI score between 4.00 and 4.50 (11 countries); countries with GCI score below 4.00 (2 countries).

The main conclusion that can be inferred from the above presented data is that, the IER, OMIER, R&D intensity and R&D expenditure financed by the BES are highly significant in relation with GCI. Thus, the states that have benefited of a more advanced innovation system, namely the traditionally developed countries, have also registered the highest levels of competitiveness (DK, SE, DE, FI, UK, NL, AT, NO, FR, BE, IE). Even more suggestive is the example of emergent economies. As we mentioned before, at the level of year 1990, in all these countries the competitive advantages were generated by the instrumentation with production factors. According to the presented analysis, 15 years later, some of these, namely Estonia and the Czech Republic, countries in which innovation and R&D activities conducted by BES developed substantially, have managed, in our opinion, to move towards the stage of competitive advantages based on innovation, registering levels of competitiveness which are very close to those of the traditionally developed and highly industrialized countries. As compared with these two states, the countries disfavoured in what concerns the innovation system development, as for example Romania and Bulgaria, rank the last regarding their economic competitiveness as well.

Therefore, the results confirm the theories and verify the previous findings in the literature that innovative

capabilities and R&D activities sustained mostly by the business enterprise sector are very important factors influencing nations competitiveness.

The results also suggest that some variables, namely the CIER, HIHE, TPNM and PFIER are less significant in respect to nation competitiveness. However, the results do not imply

that there is no relation between these parameters and GCI, but only underline the greater influence of the previous mentioned category, respectively the IER, OMIER, R&D intensity and R&D expenditure financed by the BES.

Table 4: Correlation between innovation, R&D and competitiveness – European economies

PARAMETERS	GCI SCORE 2007-2008			
	over 5.00	4.50 – 5.00	4.00 – 4.50	below 4.00
	DK, SE, DE, FI, UK, NL, AT, NO, FR, BE, IE, IS	LU, EE, ES, CZ	LT, SI, PT, SK, LV, IT, HU, PL, CY, MT, EL	RO, BG
1. Innovative enterprises (IER):				
High (over 50%)	DE, AT, IE, IS, DK, BE, SE	LU		
Medium (30 – 50%)	FI, UK, NO, NL, FR	EE, CZ, ES,	CY, PT, IT, EL	
Low (below 30%)			LT, SI, PL, SK, HU, MT, LV	RO, BG
2. IER that co-operate (CIER):				
High (over 40%)	FI, SE, DK		LT, SI, PL	
Medium (20 – 40%)	FR, NL, BE, NO, IE, UK, IS	CZ, EE, LU	LV, SK, CY, HU, MT, EL	BG
Low (below 20%)	AT, DE	ES	PT, IT	RO
3. IER that introduced organisational and/or marketing innovations (OMIER)				
High (over 35%)	DE, AT, IE, DK, BE	LU, EE		
Medium (20 – 35%)	NO, FR	CZ, ES	CY, PT, IT, EL	
Low (below 20%)	NL		LT, PL, SK, HU, MT	RO, BG
4. Hampering effect “Innovation costs are to high” - highly important (HIHE)				
Low (below 20%)	FI, NL, DK, SE, NO, DE, AT, IE, IS, BE	LU, CZ	PT, LV, MT	
Medium (20 – 30%)	UK, FR	EE	LT, SK, SI, IT, HU	BG, RO
High (over 30%)		ES	CY, PL, EL	
5. Turnover related to products which are new to the market (TPNM)				
High (over 10%)	FI, SE	CZ	MT, SK, SI, PL, IT, EL	BG, RO
Medium (7 – 10%)	DE, FR, IE, DK, UK, AT, IS, BE	LU, EE	HU, LV, LT	
Low (below 7%)	NL, NO	ES	PT, CY	
6. IER that received any public funding (PFIER)				
High (over 30%)	AT, FI, NO, NL		CY, IT	
Medium (15 – 30%)	DK, BE, FR	LU, CZ, ES	EL, HU, MT	
Low (below 15%)	DE	EE	PT, LT, PL, SK	RO, BG
7. R&D intensity				
High (over 2%)	SE, FI, DE, AT, IS, DK, FR			
Medium (1 – 2%)	IE, BE, UK, NO, NL	LU, CZ, ES	IT, SI	
Low (below 1%)		EE	CY, PT, EL, LT, PL, SK, HU, MT, LV	BG, RO
8. R&D expenditure financed by the business enterprise sector				
High (over 60%)	DE, DK, BE, SE, FI,	LU		
Medium (30 – 60%)	IE, NL, FR, AT, IS, UK, NO	CZ, EE, ES	SI, PT, SK, HU, LV	RO
Low (below 30%)			CY, EL, LT, PL, MT	BG

Furthermore, in what concern the emergent economies, the above results put into limelight one of the most important hampering effect, respectively the fact that innovation costs are too high. Also, taking into consideration the low implication of BES in financing R&D activities in most of these economies, the presented analysis suggest the importance of government policies targeting the stimulation of the innovative activities conducted by the business enterprise sector. Another aspect that we would like to pointed out regards the annual average growth rate of R&D expenditure, as a percentage of GDP (tab.2). The presented data show that, even if the AAGR in most of the emergent economies was much higher as compared with the one registered by UE-15, at the level of year 2005, R&D intensity has been situated at a very low level, especially in Romania, Bulgaria, Slovakia and Poland.

In respect to the public investments in R&D we have to pointed out the fact that, according to Akçomak and Bas (2008, p.26), these “might not be beneficial because ...the private sector has trouble investing money efficiently.” The findings of the study conducted by these two researchers have suggested that the analyzed European regions “would benefit probably more from investments in education”.

Taking into consideration the results of the study conducted by Akçomak and Bas as well as the findings presented above we appreciate that policy changes are needed for the emergent economies in order to catch up with traditionally developed European countries. In this respect, the best example is given by Estonia and the Czech Republic as compared with Romania and Bulgaria. Therefore, in our opinion, the long-term development strategy of these countries has to be oriented toward the improvement of the human and technological capabilities, through application of suitable measures, such us: the increase of the investments targeting educational activities; the stimulation of local initiative; the stimulation of local companies to invest in innovative activities (products or services oriented).

6. Conclusion

This article, using a data set for a sample of European economies, namely EU-27, Norway and Iceland, has verified empirically that there is a direct and powerful relation between the innovation activities and capabilities of the economies and their competitiveness. Consequently, technological capabilities in the domestic enterprise sector and technology institutions are necessary in order to improve the innovation system and to benefit from its spillovers.

Taking into consideration the results of the above presented analysis, that prove undoubtedly the fact that the more advanced the country's national innovation system, the greater the likelihood of positive effects on the economy, in terms of competitiveness, we appreciate that, the own innovation capabilities development becomes imperative for any given economy which targets the competitiveness increase.

The above discussion also suggests that policy changes, targeting the improvement of the human capital and technological capabilities, are needed for the emergent economies in order to improve their economic performance and to converge faster towards meeting the European standards. In this respect, the European Union could also help its new members, especially those with lower innovation capabilities, as for example Romania, Bulgaria, Poland, Hungary or Slovakia. As far as these countries are concerned, the EU should focus mainly on policies that will help them to substantially improve their innovation system, including through the stimulation of business enterprise sector to invest more in R&D activities.

Given the fact that the conclusions only consider the comparative of statistical data, we appreciate that further studies are needed, based on regression analysis and a larger sample of data, especially in what concerns the main factors related to the development of the national innovation system. In our opinion, the above mentioned findings suggest that research into this direction is promising.

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