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The analysis of the Romanian global competitiveness international ranking. The impact of the IEC Program

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Abstract

The economy's growth potential is determined by the country's ability to sustain the level of income and returns to investments. A country's wealth depends on the competitiveness of firms and on the capabilities of its entrepreneurs and managers. Companies achieve competitive advantage through acts of innovation. Although innovation is the engine of growth, it does not create economic benefits until it is incorporated into actual products, services and processes, which are commercialized. National and European investments in R&D are not always strongly correlated with average incomes. According to the Global Competitiveness Report 2015-2016, Romania together with Croatia and Hungary was in the transition from stage 2 (efficiency-driven stage of development) to stage 3 (innovation-driven stage). A year later Romania went back to the stage 2, in spite of Croatia and Hungary which kept their positions. Regarding the competitiveness international ranking, according to the Global Competitiveness Report, Romania ranked 53th in 2015, while in 2016 Romania ranked 62th. In order for Romania to reach 3 stage of development (innovation-driven stage) it has to improve the activity of the innovative firms. Did the EU funds accessed between 2007-2013 had a real impact on the global competitiveness of Romania? Will Romania reach the stage 3 innovation-driven stage, by 2020? This article analysis the impact of the IEC Program (2007-2013) on the Romanian global competitiveness index and 12th pillar innovation and tries to answer those questions mentioned above.

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1. Introduction

Improving the countries competitiveness is a central issue. It is essential to rise the prosperity and welfare of

* Corresponding author. Tel.:+40757039166; fax: -*E-mail address:* cernescu.lavinia@yahoo.com inhabitants and companies. It is imperative to increase the understanding of economic growth prospects in all cities of a country. However, several signals indicate competitiveness as emerging from successful collaboration among economic actors who form innovative facilities of companies and other organizations (Corsi, 2016). The pursuit of competitiveness through innovation is a praiseworthy objective of local and national policy, since innovation is a key function in the current modern knowledge-driven economy, mainly for urban/metro areas that start behind and wish to catch up (Cantwell, 2005). Approaching the frontiers of knowledge through innovation, companies must design and develop cutting-edge products, services and processes to maintain a competitive edge and move toward even higher value-added activities. This endeavour requires sufficient investment in research and development (R&D), with the involvement of high-quality scientific research institutions (which generate the fundamental knowledge needed to build the new technologies, products and services), extensive collaboration in research and technological developments between universities and industry and the protection of intellectual property, as the main drivers among others. The innovative entrepreneurship plays an important role in the growth of the economic competitiveness and in assuring the sustainability. In 2002 in Romania, the Government introduced the knowledge of science and technology parks. In 2004, the National Programme "Development of TT&I Infrastructure -INFRATECH", approved by GD No.128/2004, also provided financial and logistical support to set-up and develop specialized TT&I institutions: TT centers, technological information centers, liaison offices, technological incubators, science and technology parks. Next, in 2007 the European program, Sectorial Operational Program "Increase of Economic Competitiveness" was launched, in order to improve the overall performance with regard to RDI along with the productivity of enterprises through increasing the rate of innovation and the economic benefits from the exploitation of knowledge. According to the main IEC Program Guide (2007), the IEC Program had to generate a 5.5% average annual increase in GDP per population employed and, by 2013 to allow Romania to reach a GDP per employee level of about 55% of the EU average.

First the paper presents some specific characteristics of competitiveness, innovation, entrepreneurship (Section 2). Relying on public data available regarding the Global Competitiveness index of Romania, the annual monitoring reports of the IEC program (Section 3), we analyze the Romanian competitiveness rank during 2007-2016, and also the influence of the main components of the 12th pillar Innovation, correlated with the impact of European funds 2007-2013 through the Sectorial Operational Program "INCREASE OF ECONOMIC COMPETITIVENESS" (IEC Program) (Section 4). In the final (Section 5) concussions are provided explaining the added value of IEC Program and also the weakness of the program.

2. Theoretical background

For the OECD (1992), "competitiveness is the degree to which a nation can, under free trade and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously expanding the real income of its people over the long-term." The Global Competitiveness Report 2006-2007 defines "competitiveness as the set of institutions, policies and factors that determine the level of productivity of a country. Competitiveness is generated at the microeconomic level, and consolidated is the macroeconomic one – a country will maintain and improve its strong points on a global scale when it will decide to implement that set of economic policies that leads to the achievement of the environment necessary for the microeconomic expansion (Mereuta, 2007). Storper (1997) outlined that competitiveness is achieved by territorialised sets of relations that can learn faster or better than others the knowledge that furnishes them with the regionally-specific advantages to outrun the inevitable forces of imitation and standardisation in the capitalist economy.

In Schumpeter vision, *innovation* has constantly been at the core of competitiveness. Schumpeter (1934, 1942) was focusing in describing the process of economic development in western economies. From Schumpeter (1965) point of view, entrepreneurs are "individuals who exploit market opportunity through technical and/or organizational innovation". Also, Schumpeter (1934) argues that an entrepreneur, as an innovator, creates profit opportunities by devising a new product, a production process, or a marketing strategy. In Theory of economic development (Schumpeter, 1934), Schumpeter describes development as substantially driven by innovation and identifies 5 types: launch of a new product of already known product; application of new methods of production or sales of a product; opening of a new market; acquiring of new sources of supply of raw material or semi-finished goods; new industry structure such as the creation or destruction of a monopoly position. In other words profit comes only with innovation. Also, Solow (1994) argues that innovative firms are considered the driver of the economic growth. Policy makers and the society are very interested and opened to support and increase the

performances of the innovative firms. According to Navi Radjou, an analyst at Forrester Research, the 4 important pillars in an innovation network are: the inventor, transformer, broker and financier. Their roles are the following (The World Economics Forum's Technology Pioneers, 2007): the inventor discovers new intellectual property in an academic environment or a research institute; the financier provides funding: internal funding, or external funding; transformers transforms the idea of the inventor into a commercial product; the broker connects all of them.

Inventors are represented by academic institutions, research arms of large corporations, consultancies, research institutes. From Cooke (2004), we find that the innovation system described as being a network where economic performance benefits significantly from incremental not only radical innovation.

In an economy based on a rapid change, the foundation of innovative firms is the way to commercialize research results. Along the history the interest in *entrepreneurship* and small firms had an impact on the academic world. Firms are collections of resources and capabilities, which convert this resources into products or services for which revenue can be obtained. Capabilities are based on developing, carrying, and exchanging information through the firm's human capital. Teece et al. (1997) underlined the fact that dynamic capabilities are in fact the way in which the firm using innovative processes sustain competitive advantage. The dynamic capabilities are defined as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. A key step in building a conceptual framework related to dynamic capabilities is to identify the foundations upon which distinctive and difficult-to-replicate advantages can be built, maintained, and enhanced. Amit defined capabilities as the firm's capacity to deploy resources, usually in combination, using organizational processes, to affect a desired result (Amit, 1993). A useful way to vector in on the strategic elements of the business enterprise is first to identify what is not strategic. Capabilities are often developed in functional areas (e.g., brand management in marketing) or by combining physical, human, and technological elements.

3. Research methodology

The objectives of this study are: *first*, to find the trend of the stages of development of Romania by assessing the Romanian global competitiveness index and the trend of GDP; *second* to assess the trend of 12th innovation during the period 2007-2016, and the factor influencing the Romanian entrepreneurship during 2007-2016; *third* to assess the impact of the European funds (IEC Program) on the global competitiveness rank.

In this study, we used public data available regarding the Global Competitiveness index of Romania during the period 2007-2016, and the monitoring reports of the IEC program during the period 2007-2014, available from the Romanian authorities responsible for the implementation of programs and policies. Analyzing to the highest values of the GDP, and the best rank of GCI, we tried to find out what were the stages of development of Romania and what were the factors influencing this positions. According to the Global Competitiveness Report 2015-2016, one of the conditions for each country to reach the stage 3: Innovation driven, the weight for innovation and sophistication factors (Key pillars: 11. Business sophistication and 12.Innovation) has to be 30%. From the two pillars, we will further analyse only the 12th pillar, because of it has a big influence on the IEC Program. The quantitative results of the research concerning the absorption of IEC Program were correlated with the levels and variations of the global competitiveness index and 12th pillar innovation. Also there was made a correlation of the decreased number of innovative firms opened using European funds, with the most difficult obstacles in doing a business in Romania, identified by the Global Competitiveness Report (between 2007-2016).

4. Research results

4.1. The Competitiveness of the Romanian Economy

According to Porter et al. (2002) the economic theory of stages of development, economies have three stages of development: factor-driven economy (input cost), investment-driven economy (efficiency), innovation-driven economy (unique value). At first, a country is *factor-driven stage*, which uses as a competitive advantage the nation's factor endowments: low-cost labor and access to natural resources. Firms produce simple products designed for other countries. As the productivity increases, a country becomes more competitive and moves to the second stage- *investment-driven stage*. Now the nation's industry must invest in modern technology and increase product quality, existing technology dominates. Firms produce more sophisticated, but technology and designs still largely

come from abroad. The third stage, *innovation-driven stage*, is characterised by the creation of new technology or (production) methods. Institutions and incentives supporting innovation are well developed.

In the determination of national development of a country's stage, The World Economic Forum (World Economic Forum, 2016) uses two variables: GDP per capita according to Table 1 bellow and prosperity based on the extraction of resources. The pillars are organized into three subindexes, each having a main role to a particular stage of development: the *basic requirements subindex* groups those pillars most critical for countries in the factor-driven stage; the *efficiency enhancers subindex* includes those pillars critical for countries in the efficiency-driven stage; the *innovation and sophistication factors subindex* includes the pillars critical to countries in the innovation driven stage. As are described in Table 1, in the Global Competitiveness Index framework, the key pillars for stage 2 of development efficiency-driven economies are: 5, 6, 7, 8, 9, 10 in comparison with stage 3 innovation-driven economies are considered the pillars: 11, 12.

Table 1. The determination method for the stages of development

Subindex weights and income thresholds for stages of development								
	Stage 1	Transition from	Stage 2:	Transition from	Stage 3:			
	Factor driven	stage 1 to 2	Efficiency driven	stage 2 to 3	Innovation driven			
GDP per capita (US\$)thresholds	<2000	2000-2999	3000-8999	9000-170000	>170000			
Weight for basic requirements	60%	40-60%	40%	20-40%	20%			
Key pillars: 1. Institutions; 2. Infrastructure; 3.								
Macroeconomic Environment; 4. Health and								
primary Education								
Weight for efficiency enhancers	35%	35-50%	50%	50%	50%			
Key pillars: 5. Higher education and training;6.								
Goods market efficiency;7. Labour market								
efficiency;8. Financial market development;9.								
Technological readiness; 10. Market size								
Weight for innovation and sophistication factors	5%	5-10%	10%	10-30%	30%			
Key pillars: 11. Business sophistication;								
12. Innovation								

Source: adapted after Global Competitiveness Report 2015-2016

The GDP is the summary measure of competitiveness performance available across all countries (The Global Competitiveness Report 2008-2009). According to the Global Competitiveness Report 2009-2010, in 2008, Romania registered a GDP (US\$) per capita of 9 291.7. Due to this value, the year 2009 marks the entry of Romania in the transition from stage 2 to stage 3. The same situation we identify in 2015 (Global Competitiveness Report 2015-2016), when Romania registered in 2014 a GDP (US\$) per capita of 10035.

As is described in Table 2, it seems that 2008 and 2014 were the years in which Romania made a huge progress moving on to other stage of development, because the GDP per capita (US\$) thresholds of Romania had value between 9000-170000.

Table 2. The GDP per capita ((US\$) thresholds of Romania
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No	Year	GDP
1.	2007	7697.21
2.	2008	9291.70
3.	2009	7542.47
4.	2010	7542.25
5.	2011	8863.00
6.	2012	7935.00
7.	2013	8910.00
8.	2014	10035.00
9.	2015	8906.00
10.	2016	9474.00



Fig. 1. The GDP per capita (US\$) thresholds of Romania Source: https://www.weforum.org

Romania does not do well in the most widely known competitiveness benchmarking exercises. In 2016, the Global Competitiveness Report elaborated by the World Economic Forum ranked Romania 62 out of 138 countries down from 53th in 2015. Bulgaria recorded an increase in rank from 54 in 2015 up to 50 in 2016. From Table 2 we conclude that Romania in terms of GDP per capita (US\$) thresholds had a fluctuant trend of, after 2013 with values around 9000. According to the Global Competitiveness Report 2015-2016, Romania together with Croatia and

Hungary was in the transition from stage 2 (efficiency-driven stage of development) to stage 3 (innovation-driven stage), a year later, Romania went back to the stage 2, in spite of Croatia and Hungary, which keep their positions. If in 2015 Romania was in transition from stage 2 to stage 3, like Hungary and Croatia, followed by an unpredictable change to go back to stage 2 in 2016 in comparison with Hungary and Croatia, which keep their firm position.

Table 3. The Global Competitiveness Index for Romania



In the tables above, we have presented the comparative analyses of competitiveness in Romania during the period 2007-2016, where we indicated number 6 as very weak and number 9 as very strong situation. Data from the period 2007-2016 suggest that among EU 27, in 2015, Romania reached the best global competitiveness rank (53th). In the same year, 2015, Romania moved to the transition from stage 2 to stage 3. Over the last few years, Romania has remarkably improved its competitiveness, after finding itself close to financial crisis in 2008-2009. This explains the growth of GCI during 2008-2009. Due to the global economic crisis effects, the global competitiveness index registered increases till 2013, which corresponds to decreases of competitiveness. From Figure 2, we found that Romania was in the transition from stage 2 to stage 3 only in 2009 and 2015, due to the highest values of the GDP and the best rank of GCI. According to Table 1, the condition for each country to reach the Stage 3: Innovation driven, the weight for innovation and sophistication factors (Key pillars: 11. Business sophistication and 12.Innovation) have to be 30%. From the 2 pillars, we will further analyse only the 12th pillar, because of its influence on the IEC Program.

4.2. The 12th pillar Innovation

From 2006, Innovation and sophistication factors pillar has been introduced as a concept in the methodology for measuring competitiveness to keep pace with the changing international environment. In the analysed period 2007-2016, we can observe that from the innovation perspective, the weakest rank is reached in 2012 and the strongest rank in 2014. The 12th pillar focuses on innovation, which is important for an economy, generating a competitive advantage. Innovative activities need to be supported by both the public and the private sectors. According to the Global Competitiveness Report it refers to: sufficient investment in research and development (R&D); the presence of high-quality scientific research institutions that can generate the basic knowledge needed to build the new technologies; extensive collaboration in research and technological developments between universities and industry; the protection of intellectual property.

12th Pillar. Innovation	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Capacity for innovation	63	58	64	72	78	77	90	68	63	80
Quality of the scientific research institutions	72	84	82	83	91	84	64	55	70	71
Company spending on R&D	89	74	74	103	87	87	104	65	94	111
University-industry collaboration on R&D	90	72	73	103	115	113	88	71	71	80
Gov't procurement of advanced tech. products	82	73	75	105	111	114	99	75	105	134
Availability of scientist and engineers	47	60	56	55	69	82	99	72	57	60
PCT patents, applications	75	64	57	62	62	56	55	56	54	52

Table 4. The 12th pillar: INNOVATION for Romania

In Figure 3, we analyze during the period 2007-2016, the most relevant components (1-indicates the smallest rank reached and 7- indicates the biggest rank reached), which influences the rank of 12th pillar INNOVATION, and we found out that the most three important components, which have a huge influence on 12th pillar are: PCT patent

applications (5 times was considered on the first place), availability of scientist and engineers, capacity for innovation.



Fig. 3. The position of the 12th pillars components

Among the analysed determinants of Romania's competitiveness, PCT patent applications had a decreased trend until the 2009, following by an increased trend during 2010-2011, and constant increased trend until 2016. Regarding the availability of scientist and engineers had a fluctuant trend with an increase until the crisis (2009), followed by decrease during the crisis period, and a new increase until 2013, and another decrease. The capacity for innovation and has a decreased trend until the crisis (2008), following by an increased trend during 2009-2013, and another decreased trend.

The most problematic factors for doing										
business/ Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Access to financing	11.13	6.8	14.2	15.9	10.8	12.1	10.5	16.6	14	16.6
Inefficient government bureaucracy	14.86	10.8	9.3	12.2	13	12.8	10.2	9.9	14.7	15.9
Tax rates	12.92	12.8	12.5	11.6	15.5	13.9	17.8	15.6	15.8	14.7
Inadequately educated workforce	4.8	9.2	4.7	4.7	3.6	4.2	5.7	1.6	6.8	10.4
Corruption	12.92	8.4	7.3	6.9	9.7	17.4	13.4	11	8.7	10.1
Tax regulations	11.86	11.2	15.7	11.2	8.7	7.6	11.8	9.9	7.4	7.4
Inadequate supply of infrastructure	8.39	9.7	6.7	13.9	8.9	7.1	6.2	12.8	12.6	7.3
Poor work ethic in national labour force	4.6	6.2	3.9	2.5	4.4	3.3	3.3	1	4.3	4.7
Policy instability	9.93	13.2	15.1	8.6	11.9	5.4	7.3	4.7	3.3	3.5
Restrictive labour regulations	2.93	3.4	2.8	5.2	2.8	3.3	2.8	4.9	4.7	2.6
Insufficient capacity to innovate						1.9	0.4	9.9	2.5	2.4
Government instability	0.73	0.5	0.8	0.4	2.3	1.2	2.3	2.5	0.6	1.5
Inflation	2.73	5.5	4.7	3.5	5.5	7.1	6.2	4.7	1.3	1.1
Crime and theft	1.33	0.1	0	0.6	0.5	1.2	0.2	2	0.8	0.8
Poor public health		0.9	1.1	0.1	0.5	1	0.9	0.1	1.3	0.6
Foreign currency regulations	0.87	1.3	1.2	2.5	1.8	0.4	1.3	2.4	1.2	0.3

Table 5. The most problematic factors for doing business during 2007-2016 in Romania

According to the World Economic Forum's Executive Opinion Survey in 2016, the most problematic for doing business in Romania was access to financing 16.6% argued, followed by 15.9% represented by inefficient government bureaucracy. The factors pulling down Romania in the rankings (innovation pillar) were: government procurement of advanced technological products, followed by university-industry collaboration on R&D and company spending on R&D.

These preliminary remarks, based on both qualitative and quantitative indicators, suggest the necessity of the public interventions for enhancing the competitiveness of the Romanian economy. There is a real need in accessing funds for government procurement of advanced technological products and a better collaboration between academic environment and industry environment. The share of innovative companies in Romania are less than EU average, the main disparities here consisting in the low level of property rights implementation and in the absence of structures supporting innovative firms.



Fig. 4. The trend of the factors pulling down Romania in the rankings (innovation pillar) Source: authors

4.3. *The impact of the Sectorial Operational Program "INCREASE OF ECONOMIC COMPETITIVENESS" (IEC Program)*

The Sectorial Operational Program "Increase of Economic Competitiveness" (IEC) is one of the seven instruments, which have the purpose to increase of Romanian companies' productivity, in compliance with the principle of sustainable development, and reducing the disparities compared to the average productivity of EU. The program IEC (2007-2013) has been structured on 5 axis, having a budget of 2. 554 milliard Euro.

Sectorial Operational Program "INCREASE OF ECONOMIC COMPETITIVENESS"	Amount of money allocated EURO				
Priority Axis 1: An innovative and eco-efficient productive system	928 651 290				
Priority Axis 2: Research, Technological Development and Innovation for competitiveness	536 395 116				
Priority Axis 3: ICT for private and public sectors	383 170 104				
Priority Axis 4: Increasing energy efficiency and security of supply, in the context of combating climate change	638 475 370				
Priority Axis 5: Technical Assistance	67 530 229				
Total	2 536 646 054 EURO				

Table 6. Allocation of European funds (2007-2013) to the main axis of IEC Program

Source: www.fonduri-ue.ro

The effects of the IEC Program, started from 2008, and the disappearances of the crisis effects determined a decrease of the Romanian competitiveness rank, which in other words signifies that Romania reached a considerable competitiveness increase.

Priority Axis 1 promoted high value added innovative activities using advanced technologies and equipment. The aim of this axis was the consolidation and sustainable growth of the Romanian productive sector and the establishment of a favourable environment for enterprises' development.

Priority Axis 2 had the aim to increase of R&D capacity, stimulation of cooperation between RDI institutions and enterprises, and increase of enterprises' access to RDI.

Priority Axis 3 aimed to support the economic competitiveness through increasing the interactions between the public sector and enterprises/citizens by fully exploiting the ICT potential.

Priority Axis 4 purpose was the valorisation of renewable energy resources for producing green energy.

According to the Annual Implementation IEC Report 2014, the descriptive and comparative analysis of IEC Program 2007-2013 highlighted a number of interesting aspects, such as: projects with large budgets (over 1.6 million) account for 90.5% of the 2009 cumulative budget; in the South and South-West REGIONS, funding was

2.5 times higher than small projects; The South-West region records the lowest number of projects (6.5% of the total); Bucharest-Ilfov leads the rankings as a number of projects, but especially as cumulative and attracted non-reimbursable funds (2-5 times more than other regions); at national level, IEC projects had a total per capita budget of about 750 RON.

Indicator	Target	Achieved					
Joint projects realized by R&D institutions and	200	41					
enterprises"							
Public expenditures in assisted RDI projects	703	289,67					
Total of supported R&D projects	600	569					
Public expenditures in assisted RDI projects	2705	1.961,09					
Spin-offs	21	19					
G I							

Table 7. The unachieved indicators of IEC Program 2007-2013

Source: authors

In Table 7 are presented the unachieved indicators of IEC Program 2007-2013. The "Joint projects realized by R&D institutions and enterprises" indicator has the biggest unachieved one. The reason the target has not been reached is the impossibility of enterprises to support research in the absence of funds, which is largely due to the recession. The "Public expenditures in assisted RDI projects" indicator was not reached as a result of termination. Out of 670 projects contracted, during the implementation, 97 projects were canceled.

In September 2016, a report shows that the absorption rate was 98.41% (The declaration payment of the Authority of Payment and Certification 35/04.08.2016 to the European Commission). The expected impact of the investment of the program was to increase the private expenditures in that sector, by \in 270 million in 2015, but also allow further patent applications to be issued. The added value of the program consists in the fact that Romania registered an improvement of productivity from 49.1% in 2008 to 55% in 2015.



Fig. 5. The distribution of financial absorption of the IEC program Source: authors

In 2008, Romania received only the money for the pre-financing of the allocation of 2.536.646.054 EURO.

In 2009, according to the Annual Implementation Report for 2009 of SOP "Increase of Economic Competitiveness", compared to December 31, 2008, payments to beneficiaries increased by 21%. Also the number of projects contracted increased 10 times more (1.264 vs. 116 in 2008). The absorption rate was 5.07% from the UE allocation 2007-2013. As presented in the Figure 5, in 2010, compared to 2008, payments to beneficiaries increased by 222.7%, the number of approved projects was 55.6% higher, the total value of projects was 85% higher.

In 2011, according to the Annual Implementation Report for 2011 of SOP "Increase of Economic Competitiveness", compared to December 31, 2010, payments to beneficiaries increased by 72%.

In 2012, according to the Annual Implementation Report for 2012 of SOP "Increase of Economic Competitiveness", compared to December 31, 2011, payments to beneficiaries increased by 36.79%.

In 2013, according to the Annual Implementation Report for 2012 of SOP "Increase of Economic Competitiveness", compared to December 31, 2012, payments to beneficiaries increased by 43%.

In 2014 compared to December 31, 2013, the total volume of payments to beneficiaries increased by 50.84%, which shows the sustained effort of the institutions involved in the management program to accelerate the absorption of funds.

5. Discussions and conclusion

First of all, economic growth means investment. Romania has insufficient internal funds to sustain investments, reason which leads to the necessity of attracting external funds, external credits, EU structural funds, foreign direct investment or other portfolio investment. According to the IEC Program 2007-2013, one of the main directions of action was to shift public investment spending towards a gradual shift from fully funded investments from national sources to investments co-financed by EU funds. IEC Program supplemented the funds allocated to research from the state budget, with an amount equivalent to approx. 40% of the PNII (The National Plan for R&D 2007-2013) during the period 2007-2013 (Alexe D, 2017). Over the last few years, Romania has remarkably improved its macroeconomic framework after finding itself close to financial crisis in 2009. In the period 2009-2011, the European funds, which were available to the Romanian entrepreneurship through IEC Program, was a concrete way of offsetting the negative effects of the crisis. The financial allocation resources for investment provided through the program were considered a chance that can offset the effects of the crisis and can contribute to economic recovery.

Second of all, at the microeconomic level, the added value of the IEC Program is reflected in the increase of the indicators registered by the economic agents benefiting from the financing between 2009 - 2014, from which we mention: the growth number of employees with 0.71 employees / year; the growth of the labour productivity by 2930 RON per employee for 50%; the growth of the turnover with 159 RON regarding the growth of the financial allocation with 1000 RON. Although, in 2007, in Romania the GDP per capita, expressed in purchasing power parity (PPS) was 43% of the EU average by the end of 2015, GDP per capita reached 57% of the EU average, thus the objective of IEC Program was achieved. The evolution of the real economy in 2009 was strongly affected by the economic financial crisis impact: the negative impact of the crisis reflected in the GDP decline, in percentage terms, with 7.1% compared to 2008, driven by the diminishing of both domestic and foreign demand. In 2010 the GDP registered a decrease up to 1.3%, compared to 2009. The negative impact of the crisis was reflected in the GDP decline, as determined by the austerity measures that led to a further drop in demand, with a negative impact of 1% on GDP. The annual inflation rate increased more than at the end of the fourth quarter of the previous year (7.96% in December 2010, compared with 4.74% in December 2008), Romania's competitiveness started to grow again in 2011, after the downturn produced in 2009 and 2010. Due to the allocation of IEC Program in 2011 the GDP increased with 2.5% compared to 2010 (Annual Implementation Report for 2011 of SOP "Increase of Economic Competitiveness). The fall of the inflation rate, at the end of December 2011 reached the historical level of 3.14%. In 2012 the GDP registered an increase of 0.3%, while the inflation rate was 3.33%, and investments increased with 12.3% compared to past year.

Yet, according to the IEC Program proposal in 2007, one of the main weaknesses pointed out referred to poor level of cooperation/partnership between research centers, universities and companies.

In 2014 after the implementation of the program as indicated in table 7, one of the unachieved indicators of IEC Program 2007-2013, was joint projects realized by R&D institutions and enterprises (41 out of 200). It seems that the program didn't t solve the problem concerning the collaboration between R&D institutions and enterprises in order to ensure the knowledge transfer from R&D institutions to the personnel applying the research results in enterprises. This is strengthening by another indicator unachieved, number of spin-offs set up (19 out of 21).

Despite the developments at policy level making use of European funds, the R&D system is still confronted with weaknesses regarding its performance and the governance of research activity. According to table 7 we can conclude that 5 indicator of IEC Program weren't achieved.

Leaving aside the specific characteristics of IEC Program, we find that the new program Competitiveness Operational Program 2014-2020, established as a main condition: the R&D investment projects of public institutions will be financed only on the basis of a partnership agreement with an economic enterprise, which has expressed interest in research results obtained by those investments.

Third of all, is necessary to improve the national competitiveness of Romania, with the implications of the local government and industry system, important facilitators of knowledge and technology, by creating a unique, innovative network. According to Figure 1 and Figure 2, Romania was in 2009 and 2015 in the transition from stage 2 to 3, registering the highest GDP per capita (US\$) thresholds, and GCI. According to Table 1, the condition for each country to reach the Stage 3: Innovation driven, the weight for innovation and sophistication factors (Key pillars: 11. Business sophistication and 12.Innovation) have to be 30%. The most three important components, which have a huge influence on 12th pillar: Innovation are: PCT patent applications, availability of scientist and engineers, capacity for innovation. In order for Romania to reach stage 3 of development Stage 3: Innovation driven,

it the European funds should focus their attention also on the 3 components of the 12th pillar, with the highest influence, described above (figure 3). Science-based innovations are the key elements for international competitiveness, wealth and economic growth. The more inventors are linked with the private sector the more their interest in creation of spinoffs raises. Science based entrepreneurship is vital in a modern economy. Universities stimulate economies by spurring product development, by creating new industries, and by contributing to employment and wealth creation.

Nowadays, entrepreneurship plays a very important role in the universities to shift their focus from teaching and research to entrepreneurship, necessary to transfer knowledge and drive local economies.

In order to increase the economical rate, universities have to prepare the graduates, the future managers, to develop the right competences in order to create spin-offs and start-ups.

In addition to all considerations on the impact of structural funds, there are two conclusions that worth being mentioned: a) it is necessary that the local authorities to encourage the more strong collaboration between universities with enterprises, promoting different innovative networks; and b) the implementation of EU financed projects will increase the competitiveness of Romania by 2020, influencing the stage of development. Still, in our opinion, Romania will not reach stage 3 of development by 2020.

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