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The contribution of research and innovation to increase European economic competitiveness

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Abstract.

To meet the challenges of globalization, the EU Member States have to put into practice the creative and innovative capacity, the research representing a source of competitiveness and the main generator of knowledge. The purpose of the paper is to examine how European cohesion policy, through its financial instruments, are a source of competitiveness by implementation of anticipating strategies as regards research - development, innovation, human capital involved, leading to results that contribute to improving the competitiveness of firms, economic restructuring in ensuring the social composition by creating new jobs. Regarding the research methodology, the content analysis was used to highlight both the efforts and effects of R & D in the EU Member States, the data were analyzed both in structure and in dynamics. The research results highlight the existing gaps at the Romanian level comparing with EU 15, respectively EU 27.

Keywords: efforts; effects; member states; disparities; knowledge economy**.**

1. Introduction

Once with the adoption of the Lisbon Agenda, the EU Member States are increasingly focusing on innovation, employment and social integration. European competitiveness and innovation depends on new products, services, production processes and new forms of organization which are of greater importance.

In this context the paper deals with the effort of Member States for European innovation policy conditions fulfillment for the reform of the Lisbon Strategy as well as the effects of research and innovation, highlighting the dynamic analysis indicators of Romania compared to other EU countries.

2. Research and innovation - engines of competitiveness in the knowledge economy

The role of innovation in supporting of the European economy and sustainable growth of the investment in knowledge-based economy has led Member States to aim at a 3% allocation of GDP for 2010, and launching of some initiatives to contribute to the emergence of the European Research Area, while ensuring greater mobility of researchers and scientific cooperation across borders. The present crisis highlighted the need to guide the efforts to increase the economic competitiveness, able to assure sustainable the renewed growth and creating new jobs while restructuring employees regarding professional qualifications and activity sectors. In the new knowledge economy the success of the transition to new occupations by avoiding skills shortages are affecting the competitiveness objective desired.

Meanwhile, the competitiveness and dynamism of the European Union economy depends on creation of a favorable environment for all entities that create added value, regardless of their size, increasing of the investments in education and training, creation of incentives for innovation and eco-innovation, improving competitiveness of European advocacy and fostering entrepreneurial initiatives, widespread use of new information technologies, sustainable use of resources in an open competitive environment to meet new challenges and pressures from Asian and American firms. To become a dynamic environment, conducive to development of innovative processes, it is necessary the prioritary funding of education and research in sciences and technology. During the crisis, the funding reduction facing these two priority areas affects seriously the future technological performance, eliminates the states from the global competition and destroys the basic foundation of economic and social prosperity.

The literature approaches both at national and international level the implications of the research and development process on competitiveness stimulation. Thus, the study of M. Boldea et. al, 2009, shows that in Romania the research-development-innovation have to faces both internal and external challenges. The problems that are felt at the level of research and development system are limited, mainly by financial support from public funds (Romanian Government's financial efforts to support this sector is 80 times lower than in Western Europe), the problem of aging infrastructure, the lack of human resources. Other problems are the limited capacity of absorption of research results to economic entities and their limited involvement in research, development and innovation.

The international literature (Macpherson and Holt 2007, Cantwell and Iammarino 2003) highlights the relationship between certain mechanisms that take into account both relational learning and other cumulative links regarding innovation and dynamic context of human, economic and social development. The first issue concerns the sharing of knowledge which is very important in learning process. The second aspect concerns the fact that human capital skills and specialization of labor are important sources of innovation (Isaksen 2001).

The capacity of the firms to become competitive depends on its effort with the creation of a favorable economic environment and institutional competition among firms that are not distorted by arbitrary policy, but rather the policies pursued by companies, governments from EU level should be geared towards creating comparative advantages arising from research, innovation, new technology, diversification and quality assortment of products and services. The crucial and decisive factor in achieving competitive advantage is the human capital that has the ability to engage and use the

remaining available financial resources, information, technology, materials, management in research and innovation. Although the ability to innovate is influenced by human, financial and technology available resources, however, the decisive factor is the creative capacity of human capital that firms have, the research activities, the existing technological capital and the way of exploitation of the external knowledge resources.

Member States' economic future depends on creating and taking the necessary measures to stimulate scientific research, inventions and innovations through public-private partnership. Since research activities are expensive and involves a high risk of failure, the old laboratories of companies, universities and public research institutes should be redesigned and introduced in a matrix holding together the networks of specialized research areas, efforts to specialist's implementation of joint projects. The partnerships between researchers and business people require the creation of incubators to facilitate the creation of new techniques, products and services.

3. Territorial dimension of research and innovation

Along with funding to support technological innovation activities in areas such as information technology, biotechnology and nanotechnology, some governments work towards decentralization of decision making by transferring public funds administered by regional governments. They must aim to attract researchers, managers, business people to be involved in creation of new business incubators as well as in research and technology. Along with the training of human capital available there are important also the immaterial labor market flexibility, the ease with which firms can enter and leave the technology market, the near to the consumer to adapt quickly to changes in demand patterns.

To the inability of States to exploit human and financial resources available to attract new resources, there are authors (Ohmae, 1995) who argue that regions with a strong economic autonomy and strategic capacity to adapt to rapid globalization policies may apply more effective politics regarding support research and innovation. Regions are interested in creating competitive clusters of dynamic synergies between applications to foster economic entities and research centers to ensure better alignment of economic developments in the region. Moreover, EU policy focuses on improving the competitiveness of regions and provides resources for action on areas of structural adjustment, supporting the development of companies through research and innovation.

4. Analysis indicators of research - developing efforts and effects in the knowledge based economy

Innovation capacity stimulation by strengthening the business climate requires fast access to funding sources and improving credit conditions, capital markets involved in funding research projects, orientation training of human capital to meet the labor market, as well as rapidly increasing adaptability and risks undertaken by rewarding business. Traditional community rules represented by the Structural Funds or the new actions complement the national strategies to create a knowledge-based economy, competitive and dynamic. For achieving competitiveness objective, a part of the structural funds were directed towards research, innovation and development of new technologies,

upgrading existing structures, infrastructure development specific to the information society and SME sector development.

Competitiveness objective funded by European Regional Development Fund (ERDF) help to anticipate the economic and social changes through the funding of research, innovation, environmental protection and risk prevention, access to the transport and telecommunication services of general interest through regional operational programs. The competitiveness increasing is subject to knowledge-based economy developing through research and innovation process development together with investments in human capital. In turn, the European Social Fund (ESF) funds the training, the integration and the use increasing in order to growth the competitiveness and use according to the Lisbon strategy. In addition to structural interventions designed to achieve the objective of regional competitiveness and use funded by ERDF and ESF from the EU budget, the activities are co-financed up to 50% from public expenditure.

The expenditure allocated from the European Union budget to the old Member States during 2000-2006 shows that the main recipient countries were Spain, Germany, Italy, followed by Britain and Portugal. At the opposite end stood Luxembourg and Denmark. These differences are determined by the performance criteria for funding and absorptive capacity, and to a certain extent, by their size.

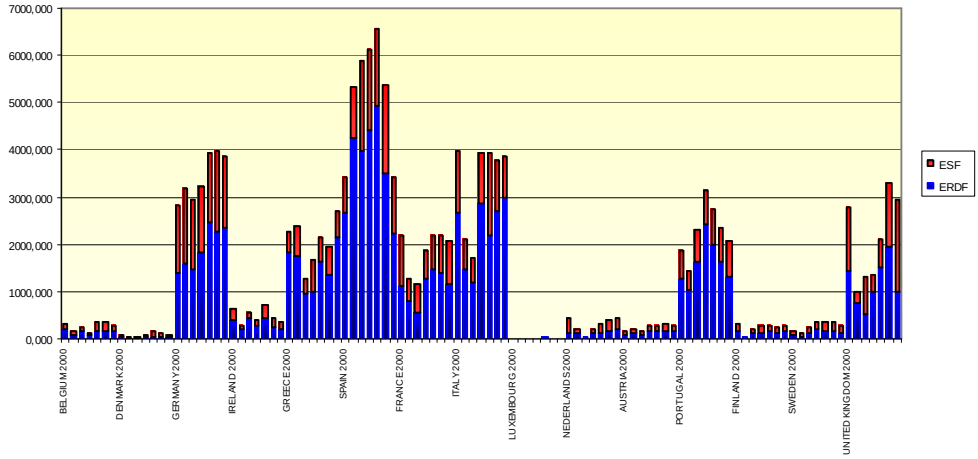

Figure 1. EU 15 Community budget effort by the ERDF and ESF in 2000-2006, 1:7:1 scale

Source: data processed by Eurostat

After the accession of some Member States, Poland, Hungary and Czech Republic have managed to improve its capacity to absorb EU grant funds. Although the trend is upwards in the rest of the states considered there are still lagging behind those recorded by countries of first echelon.

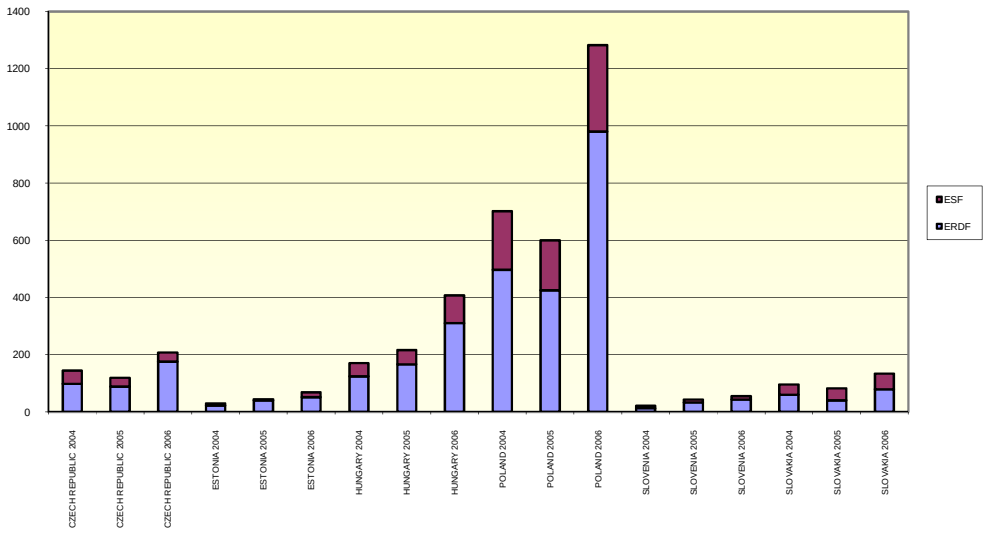

Figure 2. Community budget effort by the ERDF and ESF at the level of some new member states in 2004-2006, 1:1:1 scale

Source: data processed by Eurostat

Member States' effort directed towards competitiveness increasing is more important in the old Member States. In this regard it is noted that significant funds allocated during 2007-2008 for countries like France, Germany, United Kingdom, followed by Italy, Spain and the Netherlands and far away from the group of old Member States. New Member States facing a shortage of domestic capital were directed their efforts primarily towards attracting foreign direct investment for expanding the resources necessary for growth. They have remained poor in the financial support of strategies for funding of the new technologies generating added value.

The analysis sketched a picture at all favorable to the proposed growth competitiveness objective. It appears to be necessary to review the priorities for financial support of EU policies and their harmonization at EU level.

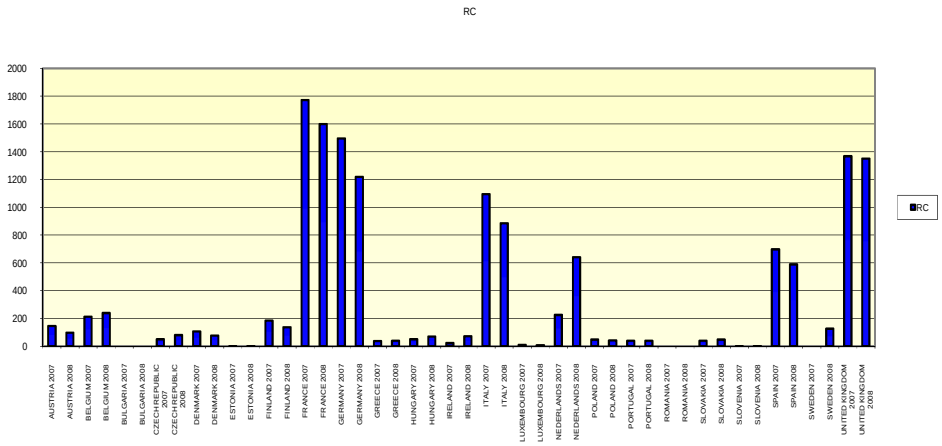

Figure 3. Member States effort to achieve

Objective 2. Regional Competitiveness and Employment in 2007-2008, 1:1:1 scale

Source: data processed by Eurostat

Although the state aid is prohibited in the European Union, since the funds allocated for investment in research, development and innovation are insufficient for Member States to face global competition, it was created a new Framework for Research, Development and Innovation which allows governments to grant aids targeted to correct market failures that inhibit innovation, development of innovation clusters, support for new and innovative enterprises, support innovation advisory services and innovation support services, aids for innovation in service organization, contracting aids qualified personnel, support for feasibility studies. Practically, it is aimed to use efficiently the budget allocations by their orientation on the basis of economic analysis to competitive projects to stimulate and ensure optimal investment in innovation when the market fails to allocate resources effectively.

For 2007-2013 the Commission approved for Romania to grant state aids to fund research, development and innovation projects, in amount of 1.444 million euros, the equivalent of EUR 4.825 million RON, of which the Partnership Programme, designed to increase the competitiveness in R & D fostering partnerships in science and technology priorities, embodied in technologies, products and services to solve complex problems and creating mechanisms for implementing 838 million euros and Innovation Programme designed to increase capacity for innovation and technological development capacity and assimilation in the production of research results to improve economic competitiveness and quality of life in amount of 606 million euros.

Table 1

State Aids approved to Romania

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Partnerships (complex projects)	29	125	201	210	84	97	93	838
Inovation (CDI oriented projects)	21	91	147	154	61	66	66	606
Total	50	216	348	364	145	163	159	1.444

European Commission – Bruxelles 12.XII.2007, State Aids no. 542/2007 for Romania

Through these issues the Romanian Government seeks:

- Obtaining advanced scientific and technological results, globally competitive, to increase international visibility of Romanian research and of practical application of socio-economic results;

- Romanian economy's competitiveness through innovation, with impact on businesses, and transferring knowledge in economic practice;

- Increasing the quality of social, technical and scientific solutions supporting social development and improve its human condition.

Innovation is difficult to analyze and fully expected, since it is not always reflected in the patent as to services. In sectors with low technological content, innovation could be materialized in quality increased of some hard to measure services.

The research methodology have used the content analysis to investigate how European cohesion policy, through its financial instruments, is a source of competitiveness by implementing anticipation strategies regarding the research - development, innovation, human capital involved, leading to results that help to improve the competitiveness of firms, economic restructuring in terms of ensuring social composition by creating new jobs. Eurostat data have been processed, the sample is composed of Member States, grouped into categories EU25, EU15, and comparing them with the Romanian situation.

To highlight the public and private efforts of Member States and the level of existing gaps, it was realised a dynamic analysis of expenditure on R & D, as factors that contribute to the welfare and competitiveness.

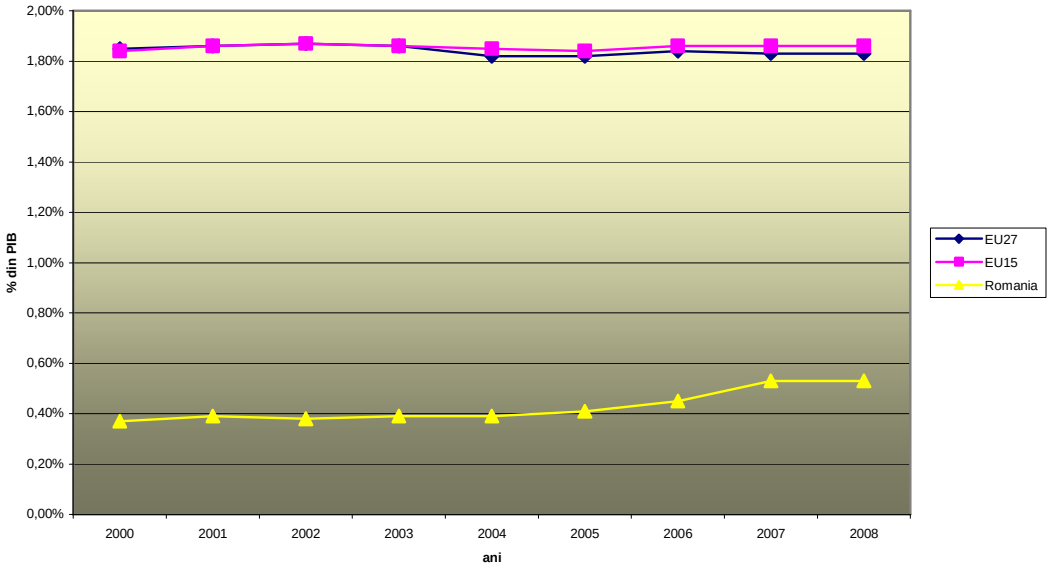

Figure 4. Gross domestic expenditure ratio with research & experimental development in GDP

Source: data processed by Eurostat

The analysis shows a large gap regarding the share of internal gross expenditure with research and experimental development in GDP compared with the average of Romania.

It should indicate that similar levels between EU15 and EU27 hide disparities because of the compensation effect and, in addition, appears the effect of differential reporting base represented by GDP. Public funding for R & D in Romania has made a change process since 2005, with the first increase in the share of gross expenditure in Gross Domestic Product (GDP). During eight years the gross internal expenditure on research and experimental development in GDP increased from 0.37% in 2000 to 0.53% in 2008, the trend is of growth, the target is to achieve a level of 1% of GDP by 2013.

The CEEX Excellence Research Program launched in 2005 by the National Authority for Scientific Research has contributed to public expenditure on research orientation in order to realize the Romanian Area of Research. In CEEX program the priorities of public funding of research-development were the same as the ones estimates for FP7, and projects have focused on creating powerful consortia, promoting interdisciplinary research, human resource development, promoting international system of Romanian R & D and the strengthening and development of certification.

Along with the public effort, the percentage of R & D expenditure financed by companies is another important indicator which highlights the private efforts directed towards increasing competitiveness. High effort of the private sector in new Member States is higher than those of old member states, demonstrating awareness of the importance of research and development and innovation to eliminate economic disparities and to improve the quality of life.

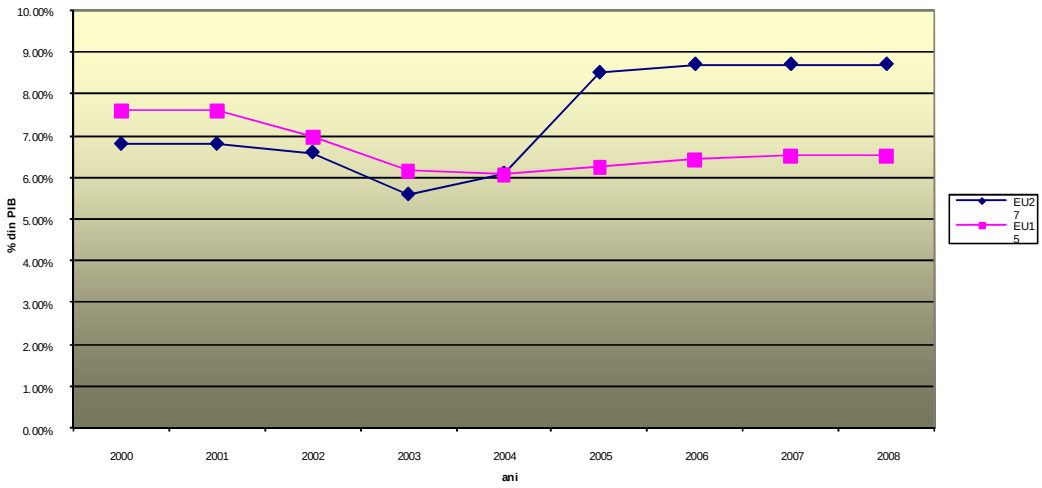

Figure 5. Percentage of R & D expenditure financed by business sector

Source: data processed by Eurostat

Human capital involved in research development and innovation activities reveals a substantial gap between the researchers available in Romania comparing with EU 15average, respectively EU 27, this gap being attenuated by the distorted report between the active and passive population from our country.

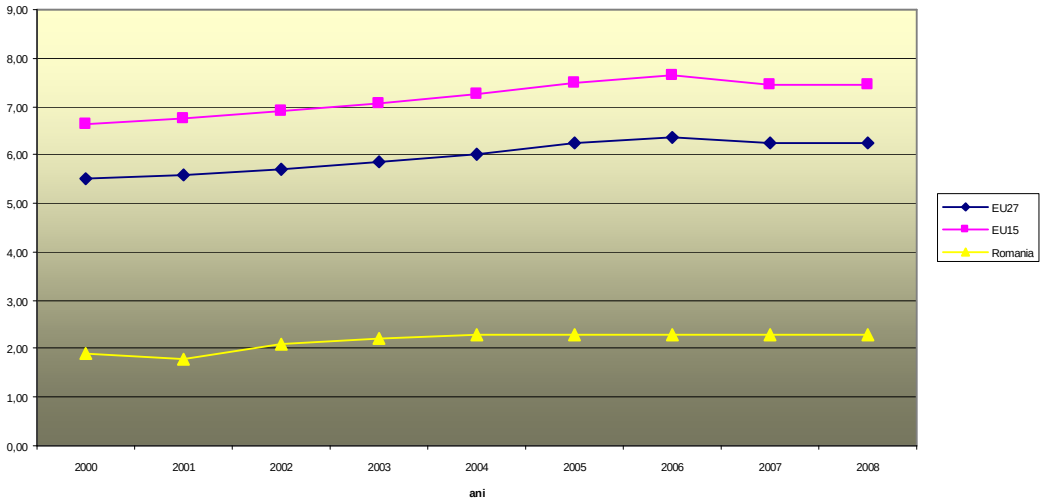

Figure 6. Number of researchers per 1000 active persons reported

Source: data processed by Eurostat

The analysis reveals that creative potential is stored at the level of the old Member States, deviating significantly from the average EU-27 and the low level, but also stagnant of human capital engaged in research and development in Romania. Structural analysis reflects the significant increase in the number of researchers in Finland of 15,10 in 2000 to 17,30 - in 2008, followed by Sweden with 10, 60 in 2000, respectively 9,80 in 2008. By contrast, Romania recorded an increasing share, but much lower, from 1,90 in 2000 to 2,30 in 2008.

The research results embodied in UPSTO (United States Patent and Trademark Office) patents and patents granted by European Patent Office shows the gap between Romania and EU-15 average, respectively EU-27.

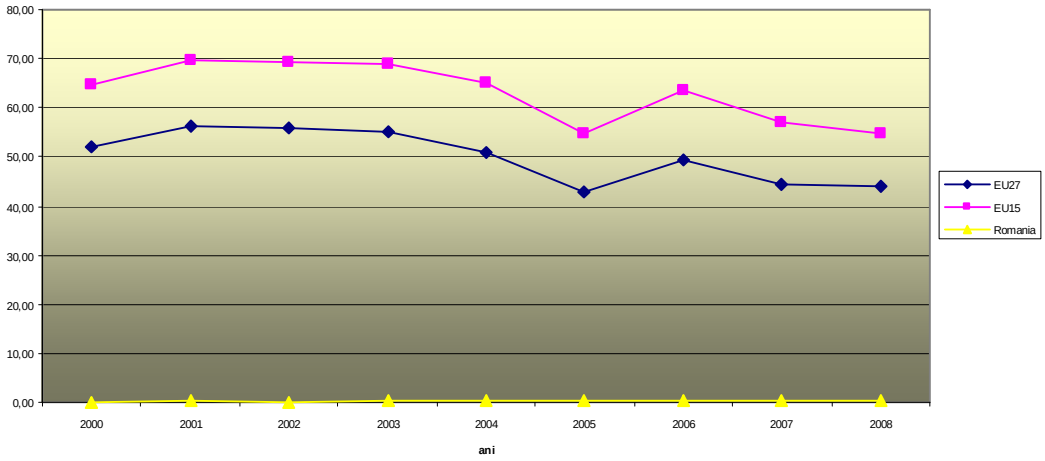

Figure 7. Number of patents UPSTO (United States Patent and Trademark Office) to 1 million inhabitants

Source: data processed by Eurostat

In both cases the analysis reveals higher efficiency of human capital involved in research in the group of most developed European countries.

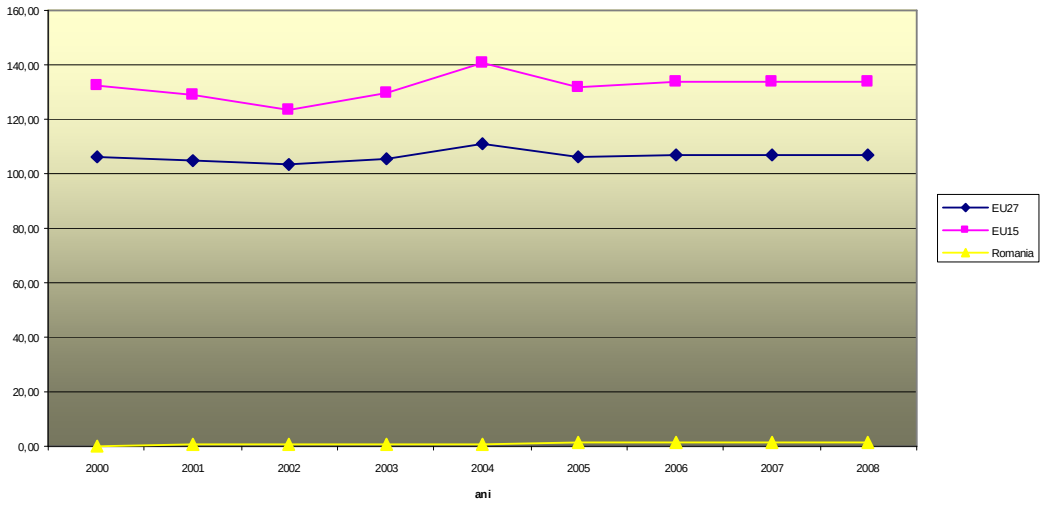

Figure 8. Number of patents granted by European Patent Office to 1 million inhabitants

Source: data processed by Eurostat

The lower efficiency of Romanian specialists with less number constitutes elements that are leading to a low volume of recognized scientific journals. If Romania register values of around 40-45 articles to 1 million inhabitants, in contrast to Sweden, which is on the first place, the number of publications is over 1100.

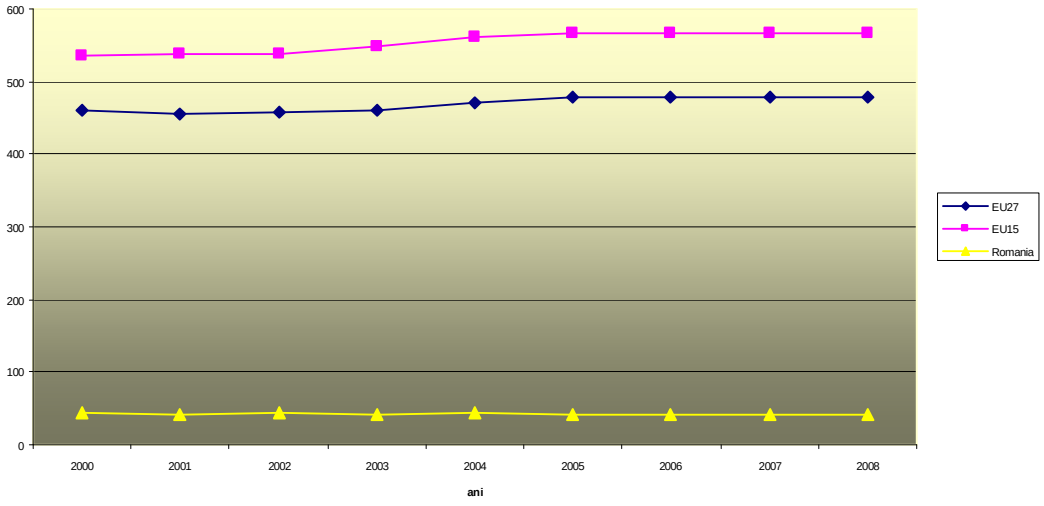

Figure 9. Number of scientific publications to 1 million inhabitants

Source: data processed by Eurostat

The increased economic competitiveness and development of knowledge-based economy to recover economic gaps and develop competitive advantages, is reflected in increased productivity and turnover.

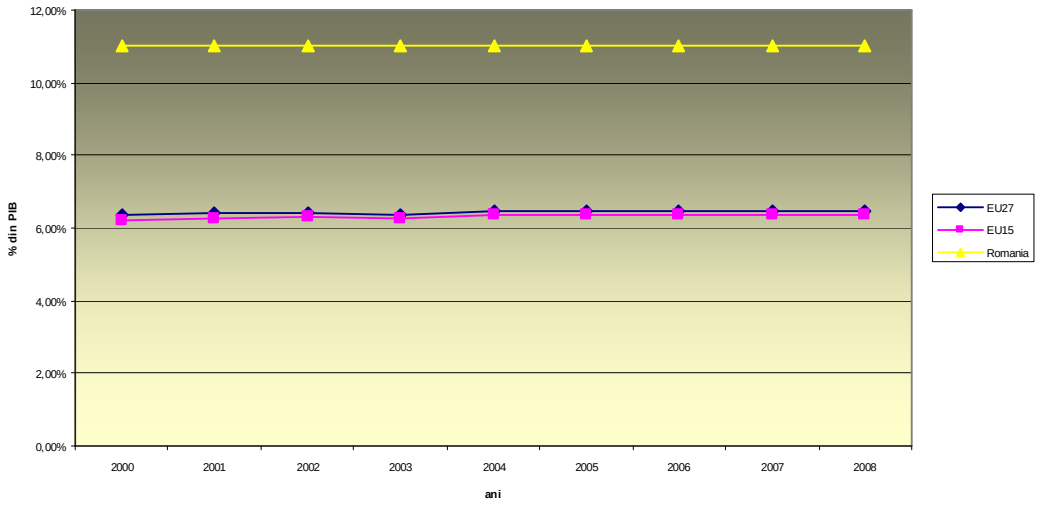

Figure 10. Percentage of the turnover represented by new innovative products

Source: data processed by Eurostat

The new innovative products that have an important share in turnover, according to Eurostat, is a strength of Romania, values of 11% of GDP is hovering above the average of EU 27, respectively EU 15. Analyzing in structure, it is noted that the highest percentage is achieved by Slovakia with 19%, followed by Italy, Finland, Denmark and Austria.

5.Conclusions

The survey reveals that progress in recent years shows that the EU has identified innovation as a key to a prosperous future. According to the Lisbon Strategy the competitiveness objective can be achieved by supporting research and innovation in all economic and social fields.

In Romania, research and development are low, with no significant contribution to economic development. Although there is an increased potential for more active support of research and development it is necessary to take appropriate measures to raise awareness of regional actors (companies, public authorities, educational and applied research, human resources involved) in order to revitalize this sector.

The knowledge-based economy, industrial clusters and research oriented clusters together with technology transfer can revitalize new products and services with high added value. The increased competitiveness makes a favorable climate in legislative and organizational aspect, capable of supporting the public - private partnership oriented toward research and innovation.

6.References

Boldea M., Otil M., Drăgoi I. (2009), *European Perspectives On Competitiveness And Research In A Knowledge-Based Economy. Where Does Romania Stand?, available at* http://oeconomica.uab.ro/upload/lucrari/1120092/06.pdf

Cantwell J., Iammarino S. (2003), *Multinational Corporations and European Regional System of Innovation*. Routledge, London.

Isaksen A. (2001), Building regional innovation systems: Is endogenous industrial development possible in the global economy?, *Canadian Journal of Regional Science*, 24, 1: 101–20.

Macpherson A., Holt R. (2007), *Knowledge, learning and small firm growth: A systematic review of the evidence*, Research Policy 36: 172-192.

Ohmae K. (1995), *The End of the Nation State*, Free Press Publication, London.

Seravalli G. (2009), *Competitive European regions through research and innovation, Different theoretical approaches to innovation policies, available at* http://ec.europa.eu/regional_policy/policy/future/pdf/5_seravalli_final_formatted.pdf