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R&D ACTIVITY AS A SOURCE OF COMPETITIVENESS. ROMANIA'S STATUS

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Abstract: *There are multiple sources of competitive advantage for companies and, by extension to the national economy, more or less applicable depending on the nature of their activity, as well as on the sector as on the costs of their implementation. In the present paper, we intend to explore Romania's position in terms of investments in Research and Development (R&D) activity, both in the corporate and the public sector, as compared to the other new member states and in comparison with the European average. We will then compare further the EU state's position in the global economy, from the same angle as in investment in R&D for future returns in a global competition.*

Key words: *R&D, performance indicators, R&D intensity, competitive advantage.*

1. Introduction

One of the most beneficial in terms of duration of the competitive advantage thus created, and as an expression of the overall progress of society is the advantage derived from the innovation process. This comes evidently with costs and investments in the Research and Development (R&D) activity, at the corporate level.

At the rate supposed by the above mentioned activity, budgeting such costs in the company means implementing a strategy (therefore an entire process) that supports innovation and seeks competitive advantage through research.

Aside from the private sector, there are the public policies regarding the research, as one of the components of the national resource for a competitive economy.

The magnitude of these expenditures at the national level implies public outflow and joined efforts put into the R&D activity and shows the rank of each state in comparison with similar economies. We intend to present the evolution of the R&D activity and its consequences in terms of competitiveness, going from the big picture to the smaller one, from the global competition (and the titans at global level) to the EU level, the new member states and Romania's rank in this classification.

We will make a departing point from the statement on one of the rapporteurs (Montalvo, 2007) of the EU Joint Research Centre: "as R&D and innovation become more critical for the competitiveness of Europe in the coming decades, the need for better monitoring becomes more urgent in terms of strategy, policy analysis and design".

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2. Measuring the R&D Activity

We find that there are difficulties in measuring the R&D activity, both in completion and in the possible impact on the performance indicators.

An accurate evaluation of R&D activity and of the policies promoting R&D requires series of reliable data, issued from a valid measurement. There are a few limitations to which we would like to draw attention, both in the data gathering process and in data comparability. Such limitations occur generally from matters such as lack of clarity of the nature of R&D in relation to the competitive strategies of companies, also from the different interpretation of R&D across firms and national authorities and the lack of significant example and standardization. Another limitation factor is the cost itself of data gathering and the sustainment of the infrastructures that collect data over decades in order to enable longitudinal studies.

3. R&D Activity Data. The Broad Picture

Looking at the global level, we find the following results and trends of the R&D activity at a corporate echelon, as shown in Figure 1.

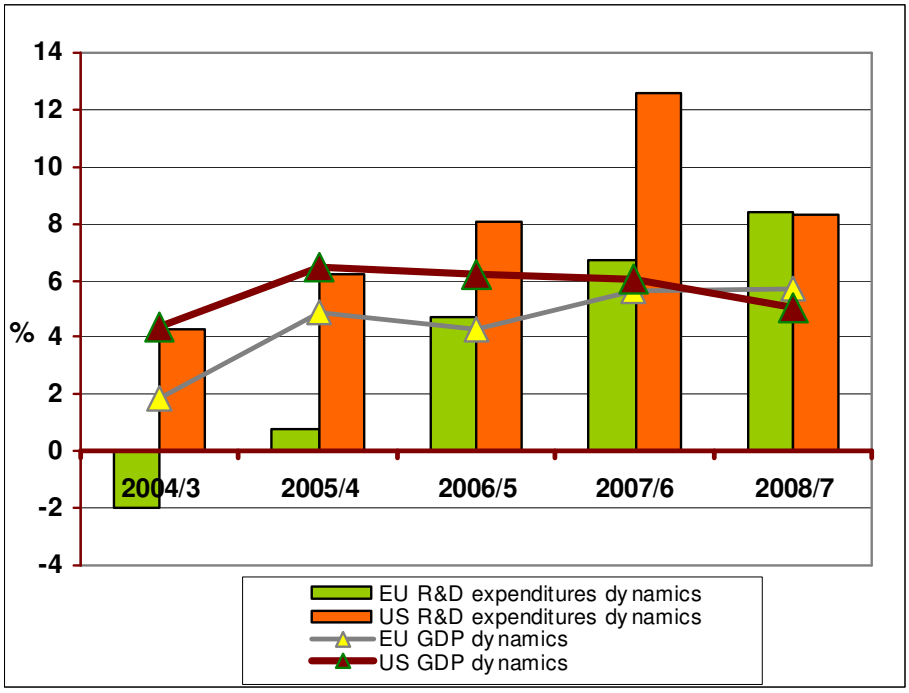

Fig 1 *R&D expenditures and GDP dynamics in EU and US*

We find that after years in which the increase of R&D investment made by the EU companies fell behind US companies, the 2008 Scoreboard illustrates that the R&D investment growth of EU companies has been higher than that of US companies. It also surpasses the one of Japanese companies for the third year along. Also,

the statistics show that this is the fifth year running in which the growth rate by EU companies has been higher than the previous year of observation (note: figures are nominal and expressed in Euros with all foreign currencies having been converted at the exchange rate prevailing on 31 December 2007, which slightly affects comparability through the exchange rate differences between the two currencies throughout the observation period)

The source of the aggregated data is the 2008 EU Industrial R&D Investment Report [1], issued by the European Joint Research Centre and Institute for Prospective Technological Studies, which also presents information on the top 1000 EU companies and 1000 non-EU companies investing the largest amounts in R&D. A prime conclusion to be drawn from the statistical observation is that all companies taken into consideration increased their R&D investments by 9% in 2008 as compared to 2007, weighed against 10% in past year's Scoreboard and 7% in the year before.

4. R&D in the EU New Member States

Generally, the examined data suggests that the existing increase in the new member states seems to refer mainly to succeeding structural changes, emerging sectors, increase of the solvable demand and also to a progressively more efficient allotment of production and manufacturing factors rather than to a speed-up in terms of R&D activity and getting nearer the technological borderline of the EU.

Looking at the data, we see that even if the investment in R&D may currently appear to be only an insignificant source of economic development in the new member states, we consider that in the long run and judging by the experience of the developed states, the importance of this particular activity as a factor of growth is supposed to intensify.

Given the obvious distance between the new member states and the technological borderline, as well as the gap in terms of R&D intensity (see Barcelona target, as in increasing general expenditure on R&D to 3% of GDP within the European Union) compared to the remainder of the EU, political efforts should strive to promote easy access to funds and knowledge created. Also, a more refined plan for improving the existing R&D intervention should increase the innovation capacities systematically.

A valid policy in insuring the gap filling between the new member states and the EU borderline should include studying the private R&D patterns and trends in the R&D activities and consequences, as well as the evaluation and comparison of R&D performance in some selected sectors in order to identify the good practices in this respect.

Figure 2 shows the total R&D intensity in 2005, the main changes between 2000 and 2005, as well as the major (%) sources of funds for R&D expenditure per country in 2005. The image as presented by Report [3] is varied. In general, we notice large disparities within the EU-15 and the newly joined.

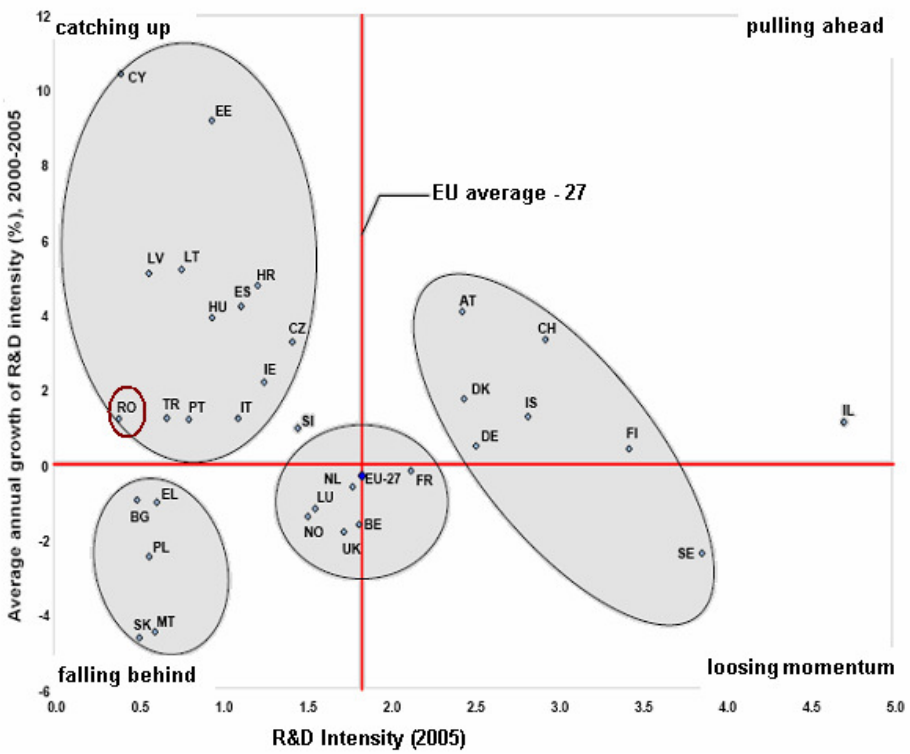

Fig. 2 *R&D intensity in the EU between 2000 and 2005 (source: [3])*

All the new member states can be constantly found below the average of EU-27 R&D intensity (1.84% GERD - Gross Expenditure on R&D as % of GDP in 2005); the report states the Czech Republic as the highest (1.42%) and merely 0.39% in Romania. As a corollary of these evolutions, the technological output of R&D activities, which is the main indicator of performance (approximated for example by the EPO –European Patent Office as number of patent applications per capita) the same picture comes forward: all new member states are below the EU-27 average (2003, EUROSTAT).

The same report [3] shows that the member states can be gathered in four categories: catching up, falling further behind, losing momentum, and pulling further ahead. As an apparent paradox, the new member states can be found in different parts of the graph, meaning that there is no common pattern in terms of R&D trajectories aside from the fact that, as stated before, the R&D intensity is low for all new members.

The report comments also on the sources of the R&D expenditures per sector, saying that the government sector still accounts for a very large share of the entire R&D funding. In other words, it would seem that

the pre-accession situation has not changed significantly and that R&D sectors are dominated by the state sector. We can contradict this statement by analyzing the situation of the Romanian R&D dynamics and sources of expenditure.

5. Evolution of R&D in Romania

In order to achieve that we have used as a data source statistical Reports issued by the Romanian institute (INSSE) in 2007 (Table 1), which show indeed constant increases in terms of R&D expenditures starting 2000. We see that the expenditures rise in total by 26.8% in 2001 as compared to the previous year, up to 52.9% in 2006 as compared to 2005.

However, from Table 1 we can easily depict that the business sector is largely exceeding government expenditure in R&D all along the frame data, from 3.49 times in 2000 decreasingly to 1.43 in 2005 and 1.49 in 2006.

The most important increase in R&D expenditure (Figure 4) can be found in the Fundamental Research, 106.3% higher in 2006 as compared to the previous year, this sector amounting in 2006 to 38.8% out of the total yearly expenditure.

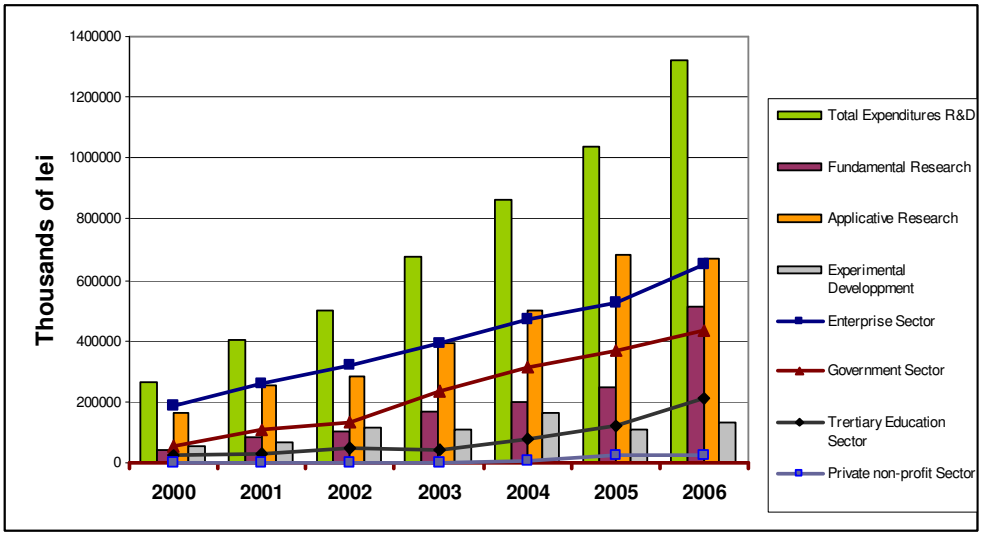

Fig. 3 *Current expenditures in R&D activity, by execution sector and type of research (source INSSE Romania)*

The Government sector proposes a significant dynamics in 2001 as per the previous year, with an increase of 105.16%, unattained further (75.16% in 2003 and only 18.16% in 2006 as compared to 2005).

In terms of percentage of the R&D expenditure in the GDP, we find a significant gap between Romania and the EU-15 and quite far from the Barcelona target.

Table 1

	2000	2001	2002	2003	2004	2005	2006
Fundamental Research	45083	83644	103213	170755	200083	248578	512842
Applicative Research	163622	252400	281282	391634	499687	680300	672793
Experimental Developpment	56063	68797	114550	110822	161486	111489	133612
TOTAL, of which, per sector	**264768**	**404841**	**499045**	**673211**	**861256**	**1040367**	**1319247**
Enterprise Sector	187521	262314	317213	394137	470284	525019	649238
Government Sector	53627	110024	134061	234820	310930	368150	435009
Tertiary Education Sector	23620	32503	47771	42310	76146	120751	212373
Private (non-profit) Sector	0	0	0	1944	3896	26447	22627

However, Romania's trend in respect of the R&D expenditures, as a percentage of the GDP (Figure 4) shows an almost constant increase of the total expenditures for the R&D area, from 0.37% in 2000 up to 0.45% of the GDP in 2006.

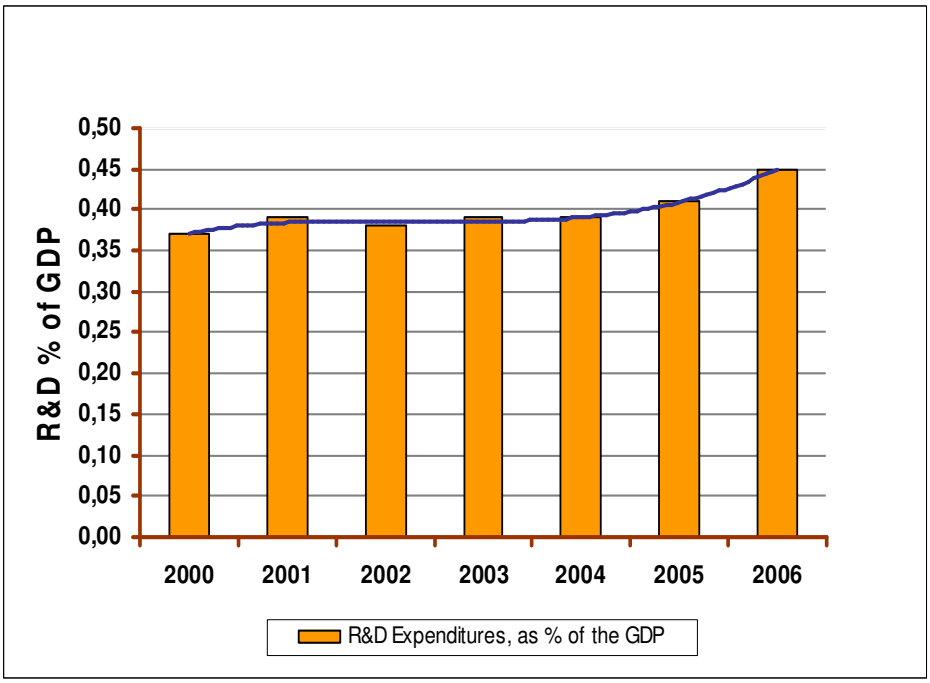

Fig. 4 *R&D expenditures, as % of GDP in Romania(source INSSE)*

As for the net revenues claimable from the innovation process, we find an ascendant trend of the indicator (Figure 5), showing and increase of 70.9% of the

revenues obtained through innovation in total revenues in 2006.

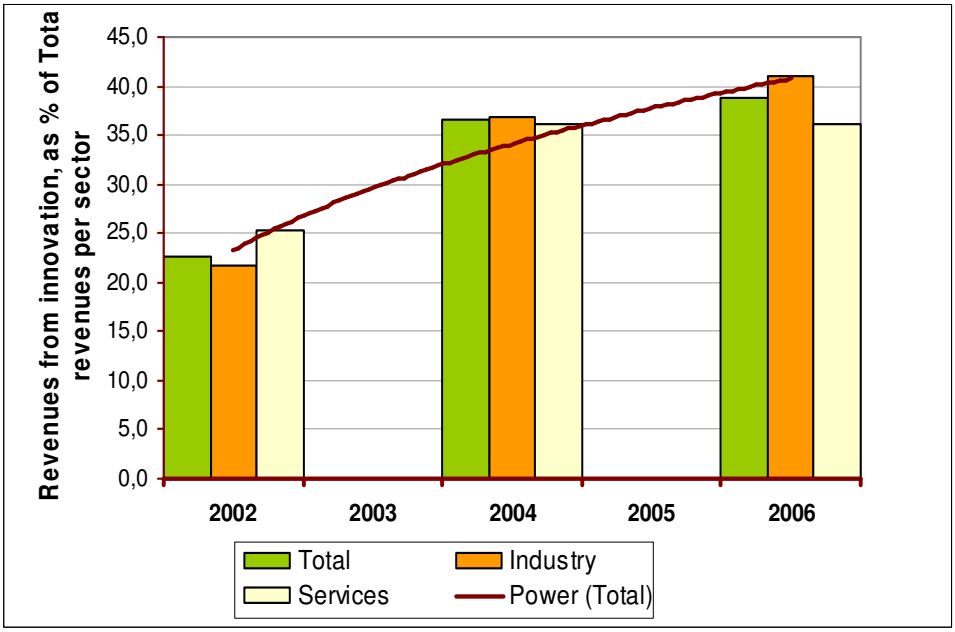

Fig. 5 *Revenues from innovation as % of total revenues per sectors (source INSSE)*

Similar patterns are followed by the main sectors, showing an increase of 88.42% for the industry in 2006 as compared to 2004 and 43.10% for the services in the same period.

6. Conclusion

Back to the place of the Government's expenditures in the R&D activities as compared to the business' impact in the same area, we tend to agree with the fact that the latter is more inclined to become the locomotive of development and convergence of the new member states to the common policy regarding innovation and research. Also, in order to achieve a more rapid alignment of the R&D potential and implicit competitiveness as compared to the EU average, Romania should intensify its efforts both on the government side and in the private sector; the latter can auspiciously be amplified by competition and future returns, while the first one can only be accomplished by joint effort and political will.

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