

ANALYSIS OF THE POTENTIAL OF THE R & D SECTOR TO GENERATE A COMPETITIVE ADVANTAGE ON A NATIONAL LEVEL

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***Abstract.** Even though globalization tends to minimize the importance of national borders, there is yet a strong competition ongoing between nations. In this competition, it's those countries that manage create and develop a series of long-term competitive advantages that eventually thrive. In the case of Romania, the R & D sector could represent a real „engine” of economic development, particularly at this stage where we can no longer rely on being competitive in terms of low labor cost. We have to focus on creating and delivering products and services of high added value which, obviously, implies having a high throughput from the R&D sector. Starting from these premises, this paper seeks to identify the impact of increasing the R&D expenses on the gross domestic product, in order to understand if this sector can truly generate a series of competitive advantages on a regional level. This link was analyzed based on the correlation factor between the two variables and the identification of the regression function. Several countries and regions have been referred to, for an increased degree of relevance of the study.*

Keywords: creativity, competitive advantage, GDP, research and development.

1. Introduction

The globalization of economies generates new challenges concerning the application of the governments' policies, such as the identification and stimulation of the most competitive sectors of the economy, capable of generating long term competitive advantages for the respective countries.

The unprecedented movements of capital and material resources (Gilpin, 2000), and development of the organizational intellectual capital and knowledge (Brătianu, 2008; Brătianu & Bălănescu, 2008) are the direct effects of globalization. In turns, they lead to an increased competition between nations, directly influencing the economical and social development rate (Porter, 1990).

It is well known that Romania has one of the least developed economies, compared to the countries of the European Union. Therefore, it is a must that solutions are found that accelerate the rate of economic development. It is also desired, of course, that this increase is sustainable, that it does not generate macroeconomic imbalances and that it is long lasting, meaning that it should not negatively impact the future generations.

2. Competitiveness and competitive advantage

Making a correlation with competitive advantage at a company level (Nicolescu, Bărbulescu et al, 1998), a competitive advantage on a national level implies surpassing the competition from at least one customer-relevant point of view, so that the products and services provided by that country's economy should be preferred in spite of the ones provided by other countries. By having a competitive advantage, that country's economy would occupy a clearly determined place in the world's economy, creating loyal markets for its products and services and the country would have a unique identity. Thus, the country would be recognized through its competitive advantage:

- Low prices (such as China);
- High quality (Switzerland, Japan, Germany);
- Zero deliveries delay, trust, credibility (such as the Just-in-time delivery system used in Japan by most companies);
- Innovation-a high capacity to generate new products and services or improve the existing ones (such as Sweden, Norway, Netherlands, USA, Japan, Germany).

Creativity is seen in modern management as being one of the best sources of generating long-term competitive advantages. Creativity can, on one hand, generate all of the previously mentioned advantages, and on the other hand ensures a large degree of flexibility and adaptability, basic requirements in a globalize economy in which the environment changes at an ever accelerated rate. For sure the first two advantages mentioned previously, if not sustained by creativity, cannot be maintained over long periods of time, as the competitors can invest in new technologies, therefore lowering the costs and/or improving the quality. Also, the countries relying on the cheap labor force will in time annihilate this advantage by themselves, since, as an effect of economic development, salary increases will unavoidably appear.

The third competitive advantage, on one hand assumes a highly efficient micromanagement, and on the other hand, a well developed on a national level transportation infrastructure that would minimize the time required by the deliveries. While management can be improved by means of benchmarking, or individual/organizational learning, or consulting, the transportation infrastructure, requires a longer period for modernization and considerable investments on a macroeconomic level.

The fourth competitive advantage relies solely on creativity. Developing this advantage is a time consuming and costly process. Increasing the creativity on a national level implies important investments in the educational and research and development sector. These investments seek to facilitate the passing of that knowledge that transforms the human being from a simple labor force to a person capable of combining the available knowledge and information in order to create new products and services or to improve the existing ones. At the same time, an advanced technical

and material basis needs to be built up so that an advanced and internationally competitive research can be carried out.

3. The impact of the research on gross domestic product

Starting from the importance of creativity in the process of generating and developing national competitive advantages, we shall attempt to represent this statement using statistical and econometrical tools. The starting hypothesis was that investments done in the research and development sector carry a strong impact on the increase of the gross domestic product (GDP) (Jaruzelski & Dekoff, 2008). Furthermore, we wanted to see if it is possible for Romania to create a competitive advantage for itself by stimulating this particular sector.

In order to analyze these hypotheses we have used data from Eurostat (<http://epp.eurostat.ec.europa.eu>) related to the GDP and the expenses for research and development within the extended European Union (EU27), the European Union of 15 countries (EU15), Netherlands, Hungary, Bulgaria and Romania.

Romania had ups and downs in the evolution of its GDP (figure 1) in the analyzed period. As of the year 2000 though, we can say the economy has stabilized, and the GDP has increased continuously at various rates. On top of that, as of the year 2003, our country had the largest annual growth compared to the analyzed countries and regions.

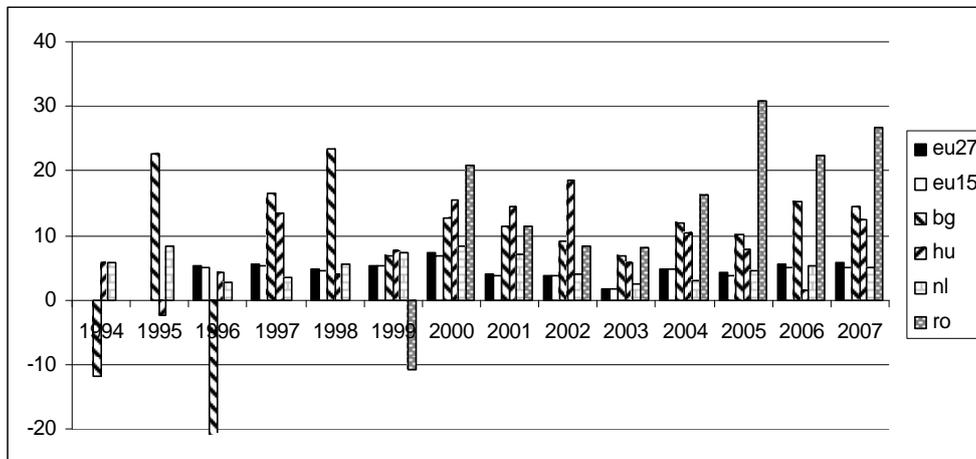


Figure 1. Annual modification of the GDP [%]

Regarding the evolution of the research and development expenses, for Romania, a high degree of correlation with the GDP's growth rate can be seen from the graph below (figure 2).

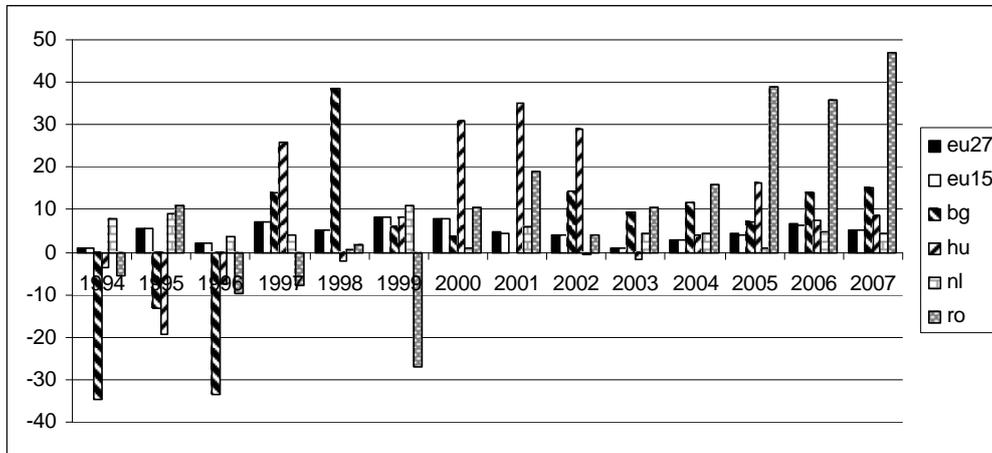


Figure 2. Annual modification of the R&D expenses [%]

In order to analyze the degree of influence of the R&D expenses on the GDP for the analyzed countries and regions, we have tested first if between the two variables there is a linear dependency. The test was done based on the graphic representation of the variables (figures 3-8).

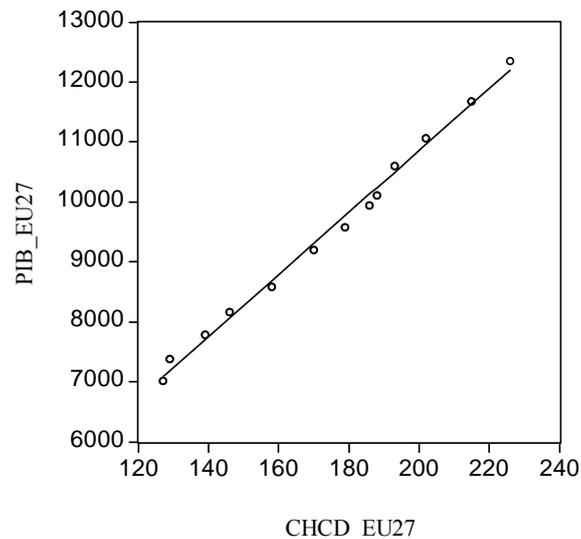


Figure 3. Evolution of GDP and R&D expenses for EU27 (bill. EUR)

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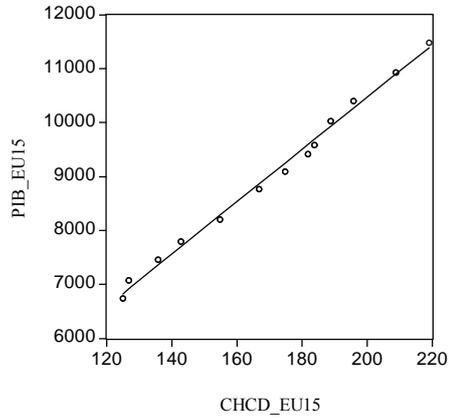


Figure 4. Evolution of GDP and R&D expenses for EU15 (bill. EUR)

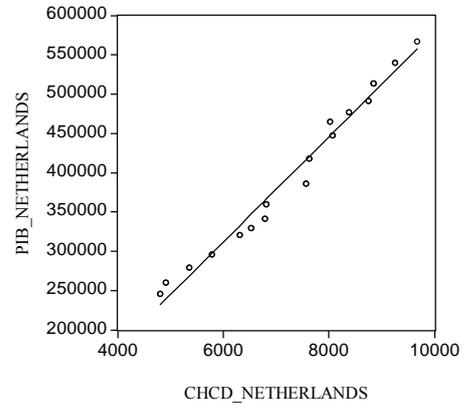


Figure 5. Evolution of GDP and R&D expenses for Netherlands (mill. EUR)

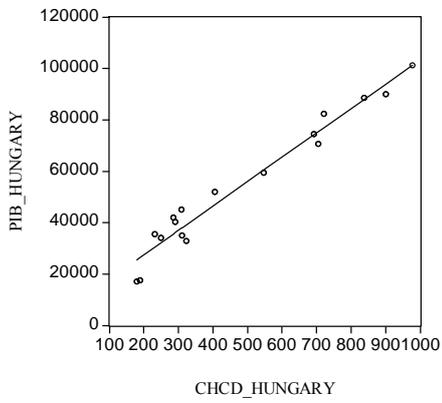


Figure 6. Evolution of GDP and R&D expenses for Hungary (mill. EUR)

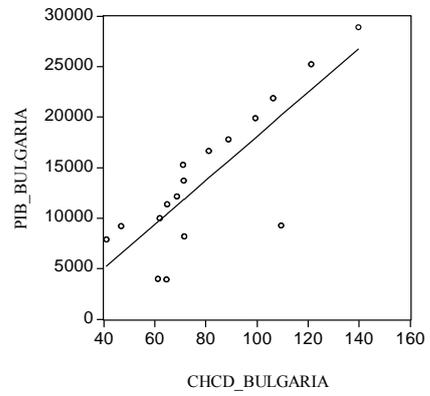


Figure 7. Evolution of GDP and R&D expenses for Bulgaria (mill. EUR)

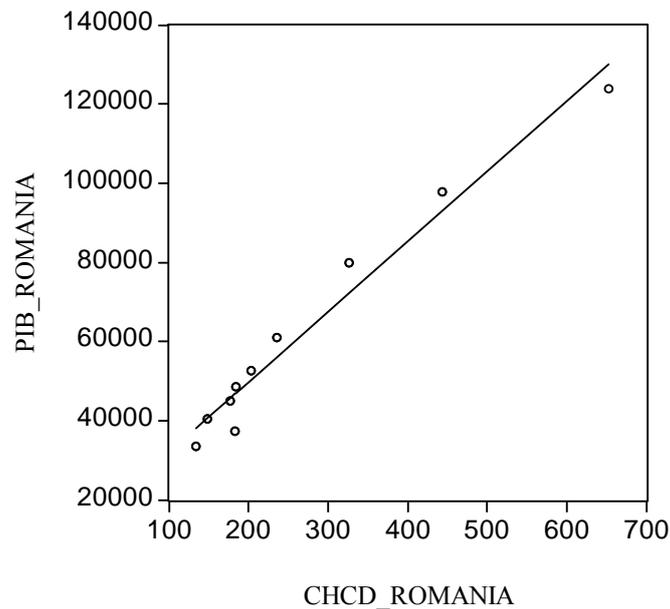


Figure 8. Evolution of GDP and R&D expenses for Romania (mill. EUR)

It is easily noticeable that in all cases the dependency of the two variables is linear, without the need of any further investigation or supplementary tests to represent this.

Before determining the regression function for the two variables, for each of the analyzed regions and countries we have determined the correlation coefficient (Tudorel & Regis, 2008). After calculation, the following coefficients of correlation were determined:

- for EU27: 0,997028;
- for EU15: 0,997203;
- for Netherlands: 0,989607;
- for Hungary: 0,980073;
- for Bulgaria: 0,816946;
- for Romania: 0,983077.

These results confirm that in all cases the degree of correlation between the two variables is quite high.

Through the regression function the dependency of the gross domestic product to the research and development expenses is described. After calculating the coefficients of the regression function for each country and region, the following functions have resulted:

- for EU27: $GDP = 51,69843 \times CH_CD + 520965,9967$;

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- for EU15: $GDP = 48,4127375 \times CH_CD + 773592,1956$;
- for Netherlands: $GDP = 66,97061 \times CH_CD - 90156,55579$;
- for Hungary: $GDP = 94,8693967 \times CH_CD + 8494,050326$;
- for Bulgaria: $GDP = 218,0614169 \times CH_CD - 3722,804374$;
- for Romania: $GDP = 176,9720924 \times CH_CD + 14377,64534$.

From the respective functions it is easily noticeable that the influence of the research and development expenses on the gross domestic product is higher for those countries less developed. This can be explained through the fact that in the case of the developed countries there are also other factors of significant influence on the gross domestic product.

4. Conclusions

Globalization leads to an increased level of competition between the economies of various countries and regions. In order to ensure a high quality of life to the people of those countries, the authorities must take an interest in the identification of those sectors of the economy with an increased impact on the long term development that can generate a series of regional competitive advantages. From the analysis made on the impact of the research and development expenses on the gross domestic product, it came out that there is a strong correlation between the two variables. Also, it is easily noticeable that one Euro invested in research and development has an effect of multiplication on the gross domestic product. This effect is stronger in the case of less developed countries.

In Romania the effect of multiplication is one of the most intense, compared to the analyzed regions and countries. Also, the correlation coefficient between the two countries is considerably high. Therefore, we consider that for our country the research and development sector is a true engine of economic development and a source of competitive advantages on a regional level. In the context of the world economic and financial crisis, when there is a strong reduction in demand and private investments, we consider that the public investments in the research and development sector represent a priority for our country, given the positive effect on the economy. Such investments can create jobs, with increased added value and high regional competitiveness. Also, we consider it appropriate to adopt a series of economical and fiscal measures to stimulate the research and development activities of the private enterprises and an increase of the collaboration between the enterprises, universities and research institutes.

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