

## RESEARCH AND DEVELOPMENT IN THE EUROPEAN UNION

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### **Abstract:**

*In the aftermath of the economic crisis, measures have been taken in order to set the paths towards a sustainable growth in the European Union. One of these measures was objectified through Europe 2020 Strategy that was meant to ensure a smart, sustainable and inclusive growth. The smart growth was expected to be achieved through improvements in research and development, innovation and education. In this paper we decided to address Europe's smart growth, taking into consideration one of its main pillars: research and development. We have taken into consideration data for the 28 European Union member states and applied a comparative analysis of the dynamics of research and development expenditures for the last ten years, analyzing data from Eurostat database. Our results highlighted the increasing interest in the research and development activities in the last years. For a better understanding of the dynamics, we analyzed also the structure of the R&D expenditure, by the following four institutional sectors: business enterprise, government, higher education, private non-profit with the total of sectors. In most of the European Union member states the main sector of performance in R&D expenditures is the business sector, followed by higher education sector. However, this is not the cases in all countries, some of them having a different structure in this respect. In some countries, as Latvia and Lithuania, the higher education sector is the main funder of R&D activities, while in other countries, as Romania, R&D activities are conducting with the support of both private and public funding, in almost equal contribution. However, despite the differences in structure, the general trend is of increasing R&D funding, highlighting the increasing interest for innovation and more knowledge intensive outcomes. Even if progress has been registered, in most European Union member states efforts should be made in order to support R&D activities, as to meet the Europe 2020 target, but primarily for boosting innovation.*

**Keywords:** research and development, European Union, business enterprise, government expenditure, higher education

**JEL classification:** H52, I23, O30, Q01

## 1. Introduction

In the aftermath of the economic crisis, measures have been taken in order to set the paths towards a sustainable growth in the European Union (EU). One of these measures was objectified through Europe 2020 Strategy that was meant to ensure a smart, sustainable and inclusive growth. The smart growth was expected to be achieved through improvements in research and development, innovation and education. The sustainable growth should be met when tackling aspects regarding resource efficiency, while the inclusive growth should be achieved when problems regarding high unemployment and poverty rates will be reduced. In order to achieve this goal, targets had been set, as to be able to set the paths towards the sustainable, smart and inclusive growth which is the overall objective that should help the European Union recover and prosper.

## 2. Europe's Smart Growth

Europe's smart growth is meant to be achieved through improvements in research and development and education. As to be able to monitor and assess the progress registered in this respect, certain indicators are kept under observation and used for analysis, for the main purpose of emboldening progress in meeting the targets. The indicator for R&D activities is Gross domestic expenditure on R&D (% of GDP), with the specific target of 3%GDP.

Enhancement in education is translated in reducing the percent of total early leavers from education and training (% of population aged 18–24) to below 10% and increasing the percent of total tertiary educational attainment (% of population aged 30–34) to above 40%.

**Table 1:** Smart growth indicators and specific target according to Europe 2020 Strategy

Topic	Indicator	Target
R&D	R&D Gross domestic expenditure on R&D (% of GDP)	3%
Education	Early leavers from education and training, total (% of population aged 18–24)	<10%
	Tertiary educational attainment, total (% of population aged 30–34)	>40%

Source: European Commission

In respect to progress registered regarding education, "there has been significant improvement regarding these dynamics, in 17 out the 28 European Union member states, this objective being in 2014 already achieved. Italy, Malta, Romania, Slovakia and Czech Republic should increase their efforts, as the share of people aged 30 to 34 year old to have completed tertiary or equivalent education was in 2014 of less than 30%. Except from Germany, in all the other European countries, women are more educated than men (taking into consideration tertiary educational attainment by sex, age group 30-34, year 2014). Important gaps in this respect can be seen in Bulgaria, Estonia, Slovenia and Latvia" (Hurduzeu, Lazar, 2015).

In this paper we decided to address Europe's smart growth, taking into consideration one of its main pillars: research and development. We have taken into consideration data for the 28 European Union member states and applied a comparative analysis of the dynamics and the structure of research and

development expenditures for the last ten years, analyzing data from Eurostat database.

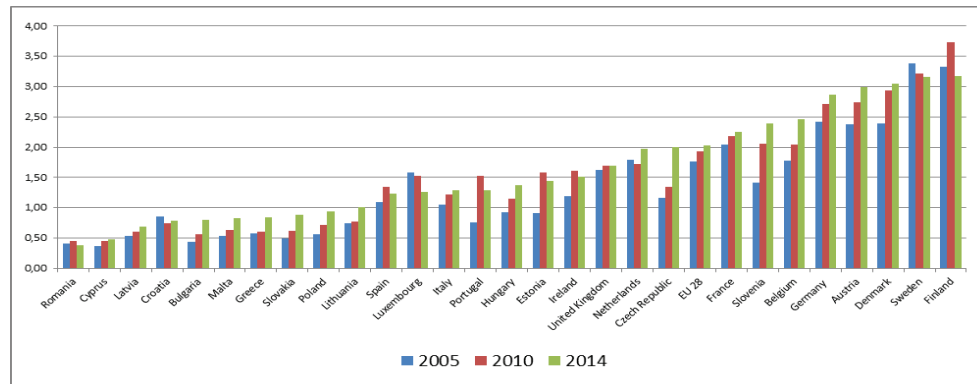
„Research and experimental development comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications" (Eurostat, from Frascati Manual, 2002 edition). As per Europe 2020 Strategy, European Union member states should increase their R&D expenditures up to or above 3%GDP. This should ensure a smarter growth of the European space and therefore, will help solve other related problems, as high unemployment, through the rationale that more research and development will lead to better, more diverse, products, increased productivity, higher demand and more jobs. However, although the rationale is correct, estimating the exact impact on jobs is difficult to assess with high accuracy: „this assessment is completely 'neutral' to which particular technologies (with the accompanying benefits and risks) will eventually hit the market and which technologies are specifically associated with the increase of jobs. The positive impacts of research and innovation are generally couched in terms of fostering the prosperity and wealth of nations and the availability of finance for research and innovation in general is seen as a condition to achieve this prosperity" (Von Schomberg, 2013). In their study based on the construction and the analysis of the Europe 2020 index Pasimeni (2013) specified that "the internal analysis of the index shows that the Smart and the Inclusive growth dimensions of the strategy are strictly correlated and that the trade-offs between each of these two dimensions and the Sustainable models of development is occurring in Europe. The external analysis of the index shows that it can be a valid measure to assess the overall competitiveness of countries and that the most critical factors for this strategy to be successful are good governance and social capital".

Although the impact of the R&D target achievement on the labour market and other economic indicators is difficult to quantify, previous studies had shown that "efforts have been made by all European Union countries in meeting the Europe 2020 Strategy targets. In this respect, the strategy can be considered a success, by setting thresholds that were set as national objectives. However, the results are very diverse between the European countries, reaching the targets by 2020 by all member states being a very ambitious objective, even impossible for some countries regarding one aspect or another, considering the path they are in" (Hurduzeu, Lazar, 2015). Dynamics in the research and development sector had been previously studied by Ulnicane (2016) that had highlighted the fact that, after the crisis, "EU research and innovation policy has focused on two main issues. Firstly, it has aimed to facilitate structural reforms and to increase the level, quality and efficiency of public and private investments in research and innovation at the national level. Secondly, the EU has increased its own research and innovation funding".

On this topic, some authors justifiable plead for responsibility in research and innovation Owen, Macnaghten, and Stilgoe (2012), others draw attention to the fact that "the target of spending 3% of GDP in research and development must either be replaced, or at least complemented by output indicators representing the level of innovation taking place in a given portion of territory. In this respect, the indicators used in the innovation scoreboard of the European Commission appear

more meaningful and useful" Renda (2014).

As mentioned, this paper will address research and development, taking into consideration data for the 28 European Union member states and applying a comparative analysis of the dynamics and the structure of research and development expenditures for the last ten years, analyzing data from Eurostat database.

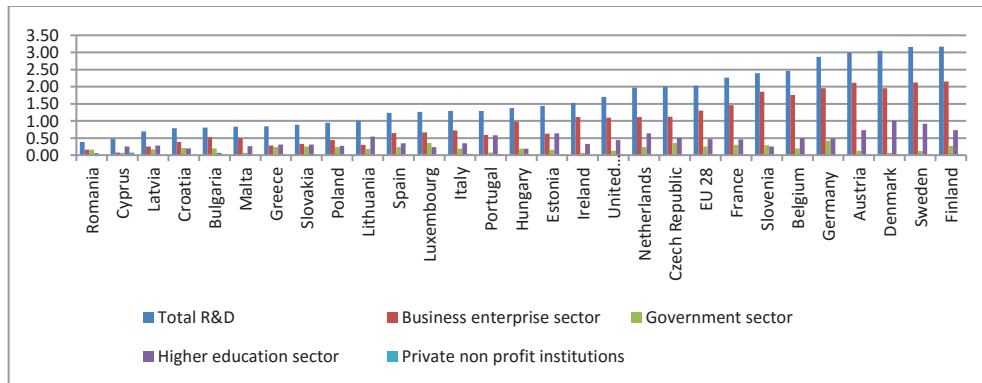


**Figure 1:** Total R&D expenditure (percentage of gross domestic product)  
Source: Eurostat

Europe 2020 target for R&D expenditure is set at 3%GDP. It can be seen (Figure 1) that had been improvements in this respect in most of the European countries since 2005. Moreover, the average for the European Union in this respect has also improved from 1.76 %GDP in 2005 to 2.03%GDP in 2014. Exceptions had been registered by Romania in which R%D expenditure was of 0.41%GDP in 2005, 0.45%GDP in 2010 and only 0.38%GDP in 2014. This is not the only case, however. The situation is similar in Spain, Luxemburg, Portugal, Estonia and Ireland. In some of these countries, cutting expenditures can be explained by the difficult times of the last years and the need for fiscal consolidation. R&D expenditures had also fallen since 2010 in Sweden and in Finland, but their situation is somewhat different, considering that in 2014, the R&D expenditures in still above the 3%GDP threshold. Next to these two countries, Austria and Denmark are the other two European Union member states in which the target in met in 2014. France, Slovenia, Belgium and Germany are above the EU average, but still have to register progress in order to meet the Europe 2020 target in this respect. The total R&D expenditures as %GDP had been accounted from Eurostat as Intramural R&D expenditures that are „all expenditures for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds" (Frascati Manual, OECD 2002, from Eurostat).

For a better understanding of the dynamics, we analyzed also the structure of the R&D expenditure, by the following four institutional sectors: business enterprise, government, higher education, private non-profit with the total of sectors. In most European Union countries, the main sector of performance is the business sectors that accounts for the highest percentage of total R&D expenditure. There are, however, exceptions. In Lithuania the higher education sector accounted for most

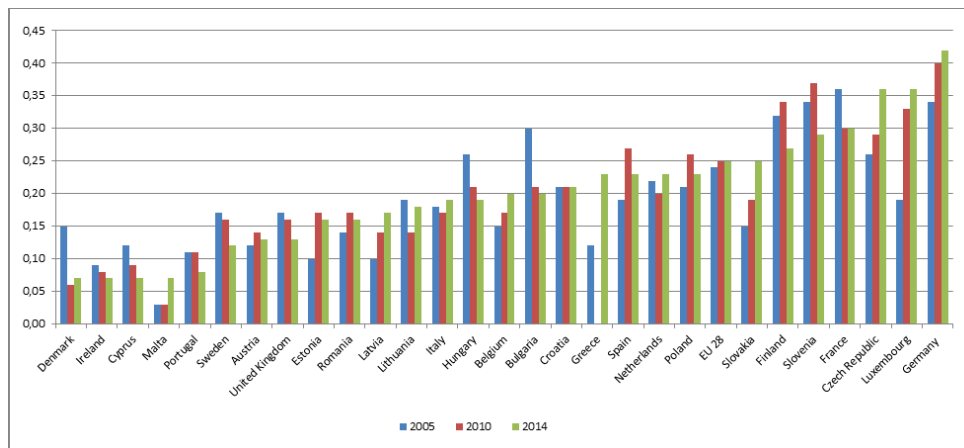
of the R&D expenditure (0.54%GDP), compared to the government sector (0.18%GDP) and the business sector (0.30%GDP). The situation is similar in Greece, 0.31%GDP being the R&D expenditure of higher education, 0.28%GDP of the business sector and of only 0.23%GDP of the government. Also in Latvia and Cyprus, the higher education sector is the main sector of performance regarding R&D expenditure, followed by the business sector and the government. Only in Romania the main funding is assured by the government sector, of 0.16%GDP and by the business sector, of also 0.16%GDP.



**Figure 2:** Total intramural R&D expenditure (GERD) by sectors of performance in 2014, percentage of gross domestic product  
Source: Eurostat

The fourth sector of performance, this being the private nonprofit institutions is present in some countries, but accounts of less than 0.05%GDP. Cyprus is highlighted in this respect, as in this country the private nonprofit institutions are very active in R&D activities, as R&D expenditure accounts for 0.08%GDP, equal to the participation of the business sector and more than of the government sector. The dynamics of the government sector R&D expenditure highlight the decreasing interest of the government sector in providing research funding in many countries, as Denmark, Sweden, Ireland, Cyprus, Portugal, United Kingdom, Lithuania, Italy, Hungary, Bulgaria and France.

In other countries, as Romania, public funding has increased since 2005, showing the concentrated interest in enhancing innovation and setting the path towards a more sustainable growth.



**Figure 3:** Government sector R&D expenditure (percentage of gross domestic product)

Source: Eurostat

However, in many countries, perhaps also due to unfavorable economic dynamics of the last years (Hurduzeu, Lazar, 2015), since 2010 government expenditure on R%D decreased. On the more fortunate side, in countries as Denmark and Sweden, the decrease in the public funding had been surpassed by the increase in private funding. The increase in private sector highlights the fact that the business sector is interested in investing in innovation, being therefore an indicator of the structural features of that economy.

## 5. In conclusion

In the aftermath of the economic crisis, measures have been taken in order to set the paths towards a sustainable growth in the European Union. One of these measures was objectified through Europe 2020 Strategy that was meant to ensure a smart, sustainable and inclusive growth. The smart growth was expected to be achieved through improvements in research and development, innovation and education. In this paper we decided to address Europe's smart growth, taking into consideration one of its main pillars: research and development. We have taken into consideration data for the 28 European Union member states and applied a comparative analysis of the dynamics and the structure of research and development expenditures for the last ten years, analyzing data from Eurostat database. Our results highlighted the increasing interest in the research and development activities in the last years. Moreover, the average for the European Union in this respect has also improved from 1.76 %GDP in 2005 to 2.03%GDP in 2014. Exceptions had been registered by Romania, Spain, Luxemburg, Portugal, Estonia and Ireland. In some of these countries, cutting expenditures can be explained by the difficult times of the last years and the need for fiscal consolidation. R&D expenditures had also fallen since 2010 in Sweden and in Finland, but their situation is somewhat different, considering that in 2014, the R&D

expenditures in still above the 3%GDP threshold. Next to these two countries, Austria and Denmark are the other two European Union member states in which the target was met in 2014.

For a better understanding of the topic, we analyzed also the structure of the R&D expenditure, by the following four institutional sectors: business enterprise, government, higher education, private non-profit with the total of sectors. In most of the European Union member states the main sector of performance in R&D expenditures is the business sector, followed by higher education sector. However, this is not the cases in all countries, some of them having a different structure in this respect. These are the cases of Lithuania, Latvia, Cyprus and Greece. In other countries, as Romania, R&D activities are conducting with the support of both private and public funding, in almost equal contribution.

However, despite the differences in structure, the general trend is of increasing R&D funding, highlighting the increasing interest for innovation and more knowledge intensive outcomes. Even if progress has been registered, in most European Union member states efforts should be made in order to support R&D activities, as to meet the Europe 2020 target, but primarily for boosting innovation.

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