

STATISTICAL ANALYSIS OF THE EVOLUTION OF RESEARCH-DEVELOPMENT ACTIVITY IN SOUTH-WEST OLTENIA DEVELOPMENT REGION IN 2002-2010

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Abstract:

The importance of research and development activity is undeniable in supporting economic competitiveness on medium and long term. The evolution of research development activities differs from one region to another, Southwest Oltenia Region recorded a low level of them.

The evolution of the structure of employees in research and development in the South-West Oltenia Region on counties highlights that in Dolj county is the largest part of the employees in this activity. Places 2 and 3 were alternating counties Valcea and Gorj with a number of employees between 126 and 190 people in Gorj County and between 185 and 219 people in Valcea County.

In terms of expenditure for research-development activity, South-West Oltenia Region ranks sixth among the regions, and in the region Dolj holds the first position.

Key words: statistical analysis, research-development activity, regional level

JEL classification: C10, C22, O32

Introduction

Research-development activity is one of the most important factors of increasing competitiveness, even more so as it will orient more toward the economic environment and its needs. At the same time, the regions should provide an environment that has the most efficient structure, institutions and policies that encourage the development of such activities.

For statistical evaluation of the research and development activity main indicators used are: the number of employees in research and development activity, current and capital expenditures.

Research-development activity has suffered over the past 10 years the oscillating developments with downtrend towards the end of the period considered. In the South-West Oltenia Region, 2009 has brought a drop in the number of employees and although during 2010 there has been a slight increase, it hasn't reached the level registered at the end of 2008. Decrease in the number of employees in research was recorded simultaneously with the decrease in the share of current and capital expenditures.

Aspects of development research-development activity from Macro region 4 in relation with development macro regions from Romania in the period 2002-2010

In the analyzed period, national employment from research-development (R & D) activity had a fluctuating trend (Figure 1) with relatively small amplitude around an upward trend until 2008, during which the number of employees increased from 38,433 people in 2002 to 43,502 people in 2008 (13.19%), and strong downward in 2009-2010, during which the number of employees in research and development decreased by 4437

persons, which represents an 10.2% decrease compared to the number of employees end of 2008.

Number of employees in R & D activities in Macro region 4, during the period analyzed, evolved from 4682 people in 2002 to 6370 people at the end of 2010 with a minimum of 4078 people in 2006, a trend that has placed Macro region 4 and Macro region 2 alternatively the 3rd and the 4th

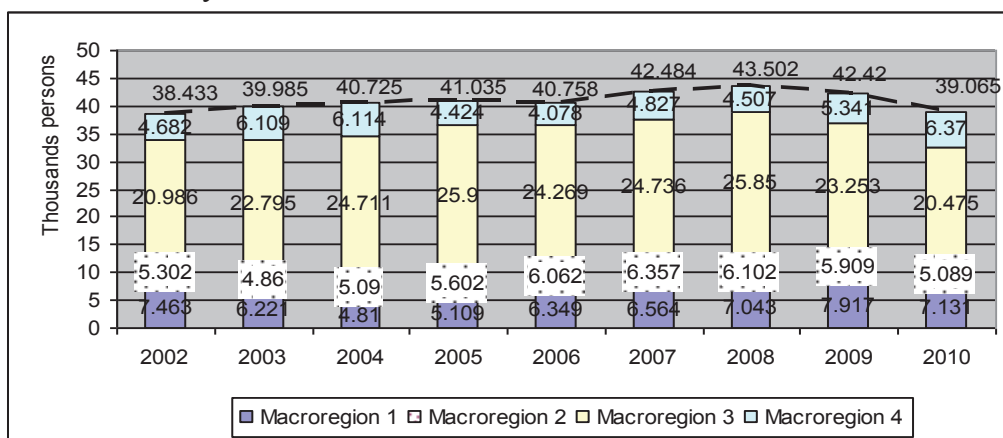


Figure 1 *Employees from research-development activity -end of year-*

Given that the number of civil employed population differs from a macro region to another, a more conclusive analysis offers the evolution of employed number from research-development to 1000 civil employed persons, shown in Figure 2; we stopped only to macro regions 1, 3 and 4. The evolution of this indicator, at the Macro region 2 level, ahead significantly the values recorded in other development macro regions, through the research activity from Bucharest-Ilfov Region which gives it a special dynamic.

As you can see, the number of employees from R & D activity per 1000 civil employed persons in Macro region 4 has been significant fluctuations. If in 2002-2003 there was a significant increase, from 27.6 to 36.3 employees in research-development per 1000 civil employed persons, Macro region 4 being, from this point of view, first in relation to the values recorded in the Macro region 1 and Macro region 3, the period 2004-2006 is characterized by a significant decrease from 26.1 at the end of 2005, respectively to 24.1 at the end of 2006 year.

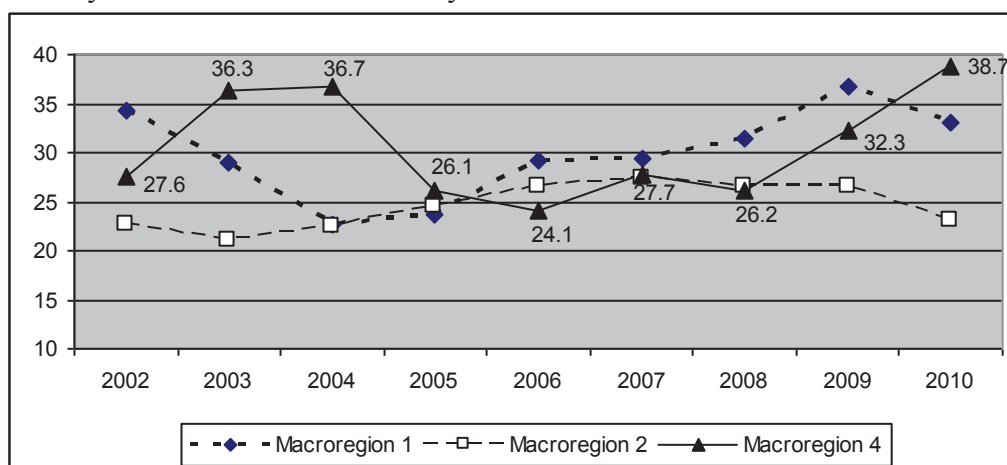


Figure 2. *Employees from R & D activity per 1000 civil employed persons*

It should be noted that reducing the number of employees from R & D activities per 1000 civil employed persons was not due to significant increase in civilian employment, which was a positive fact, but was due to the reduction of research

activity, the number of employees in this sector, in Macro region 4, down from 6114 employees at the end of 2004 to 4424 employees at the end of 2005, representing a decrease of 27.64%.

End of period brings a significant improvement in the number of employees from R & D activity per 1000 civil employed persons in Macro region 4. Thus, from 26.2 employees at the end of 2008, their number increased to 32.3 employees in 2009 respectively to 38.7 employees per 1000 civil employed persons at the end of 2010 year. Note that this is due to the effective increase of the number of employees in the analyzed branch, from 4507 people at the end of 2008 to 3670 people at the end of 2010.

Evolution of the number of employees in R & D activities in Macro region 4 by development regions

In the previous chapter we presented aspects of evolution of R & D activity in Macro 4 in its entirety. As can be seen in Figures 1 and 2, the evolution of the number of employees from this activity (Figure 1) and their number per 1000 civil employed persons, in the period under review, recorded oscillations with significant amplitudes.

Analyzing the evolution of the number of employees in this branch on the two development regions of Macro region 4 (Figure 3), we see that its shape is given by the dynamic evolution recorded in the West Region. Thus, in the analyzed period, the number of employees in research and development in the West Region evolved between a minimum of 1585 people at the end of 2006 and a maximum of 4,055 people at the end of 2010. It should be noted that, unlike other development regions, research development in the West, at least until early 2011, was not affected by the economic crisis; the number of employees grew from 2186 in 2008 to 4055 persons at the end of 2010, representing an increase of 85.49%.

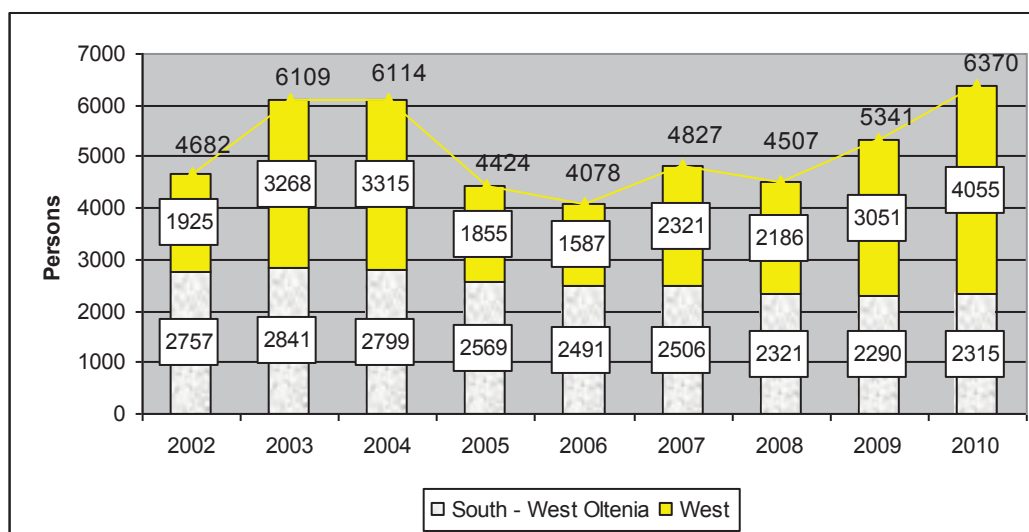


Figure 3. Employees from R & D activity from Macro region 4

On the other hand, analyzing the evolution of the number of employees in this branch in South West Oltenia Region, we find that, compared with West Region, it has evolved almost constant; the values of chain based indices was ranging between 98.34 % and 103.04%. Also, unlike R & D employees from West Region, in South West Oltenia Region, the year 2009 brought a decline in the number of employees, and although there was an increase at the end of 2010, it not reached the level from the end of 2008.

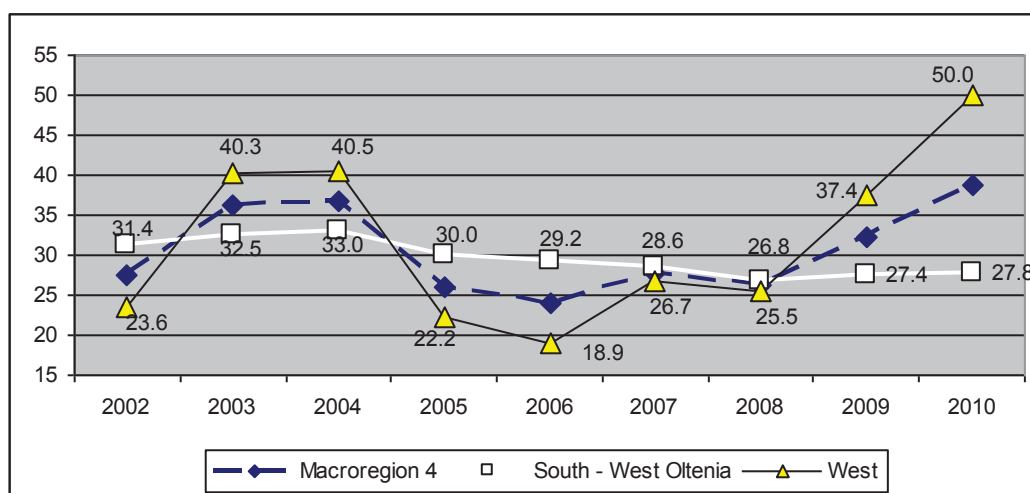


Figure 4. *Employees from R & D activity per 1000 civil employed persons in Macro region 4*

Regarding the number of employees from research-development activity per 1000 civil employed persons (Figure 4), the situation is similar. If West Region there were significant increases and decreases between 18.9 employees in 2006 and 50 employees per 1000 civil employed persons at the end of 2010, in the development South West Oltenia Region, their number changed very little between a maximum of 31.4 employees in 2003 and a minimum of 25.5 employees per 1000 civil employed persons at the end 2008.

These issues strengthen the conclusion drawn above, namely that the evolution of the number of employees to 1,000 civil employed persons, at least in the last years of the period analyzed, it has been determined significant by the evolution of R & D branch and very little by the change in the number of civil active population in Macro region 4.

Dynamics of employees structure from R & D activity from South-West Oltenia Region by counties and occupations

In the five counties of South-West Region the research-development activity is unevenly distributed. This is primarily due to the different levels of development in those areas and secondly, central and local policy, on development directions of counties Dolj, Gorj, Mehedinți, Olt and Valcea, applied both before on and after 1990.

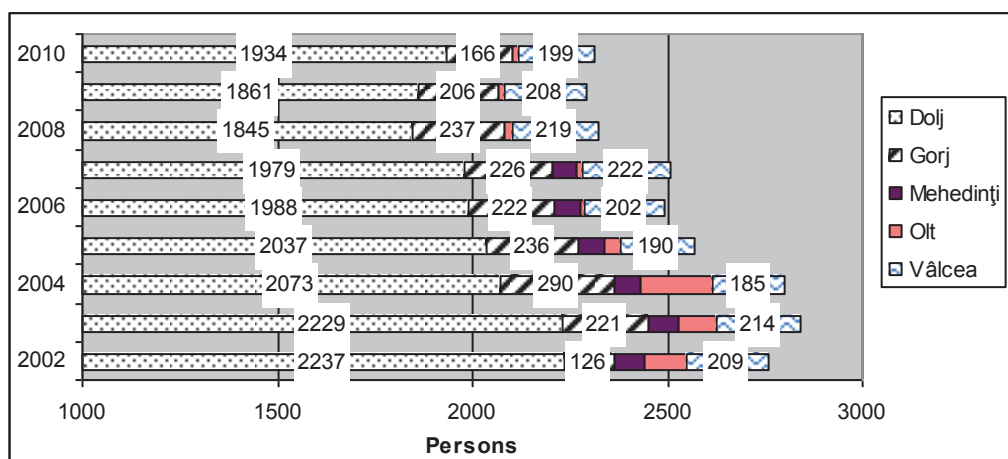


Figure 5. *Employees from research-development activity in South-West Oltenia Region (End of year)*

The evolution of the number of employees in R & D activity structured by county is shown in Figure 5. The county with most of the employees in this activity is Dolj. Their number varies between a maximum of 2237 people in 2002 and a minimum of 1845 people at the end of 2008. Even though at the end of 2010 there is a slight increase of employees over the 2008 minimum, in the analyzed period there is a setback. Share of employees from research-development activity in Dolj, in total employment from this branch in South West Oltenia Region ranged between a minimum of 74.06% in 2004 and 83% in late 2010.

On the second and third places in terms of number of employees from R & D activity were alternately Valcea and Gorj with a number between 126 and 190 employees, in Gorj County and between 185 and 219 employees in Valcea County.

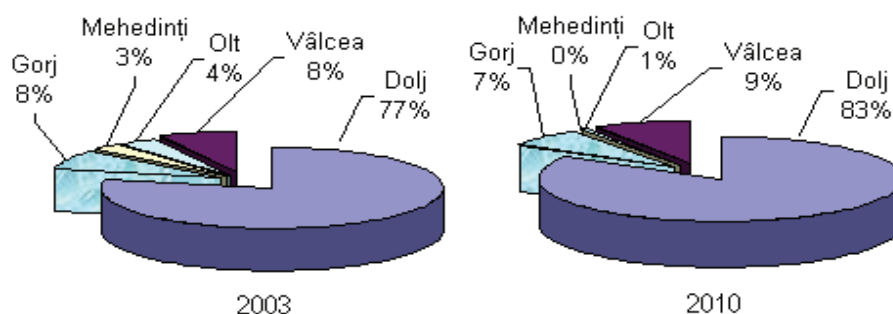


Figure 5 The structure by counties of employees from R & D activity from South West Oltenia Region in 2003-2010.

Regarding Mehedinți and Olt counties the research-development activity showed a strong decrease, reaching dissolution. So, at the end of 2010 there were only 16 employees in the sector, in Olt County, and in Mehedinți County exists none. To highlight structural developments on the number of employees in the branch, in the five counties, in Figure 6 are shown comparative the situations at the end of 2003 and 2010 respectively. This confirms the above conclusions.

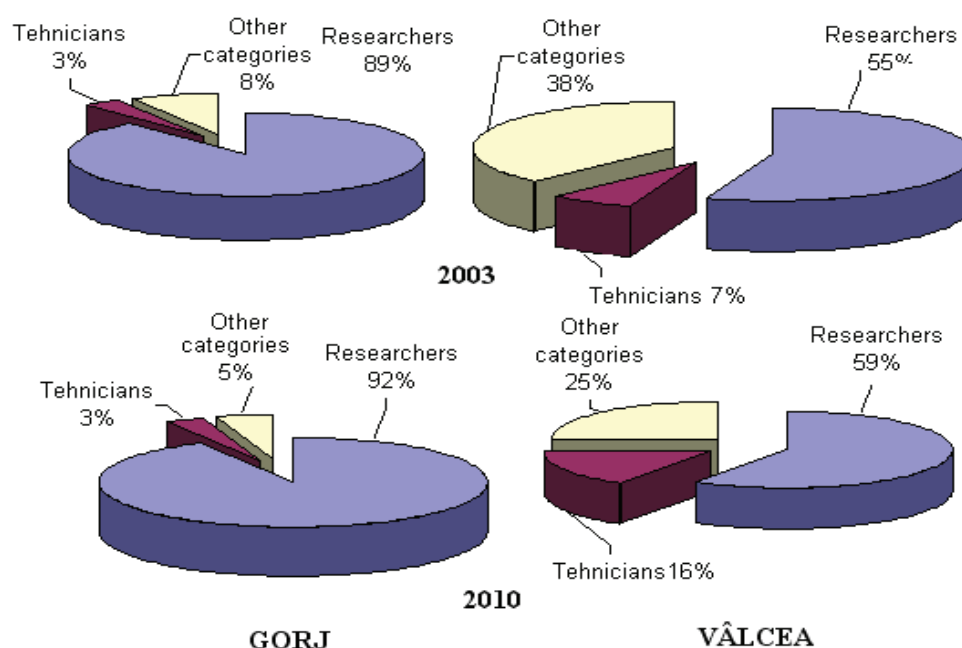


Figure 6 The structure by occupations of employees from R & D activity from Gorj and Valcea counties in 2003 and 2010

If we analyze the structure of employees by occupations and county, it finds that there are significant differences. Of Dolj, Gorj and Valcea counties, in which, at the end of period, the number of employees there was more than 160 persons, we find that Valcea County represents a particularity.

Since research-development activity, in terms of number of employees, Gorj and Valcea counties are similar, for a comparative presentation, we have summarized only to them.

As can be seen from Figure 6, in late 2003 the structure of the employees from research-development by occupations differs significantly in the two counties. If researchers in the Gorj County accounted for 89% of total employees, in Valcea County their share was only 55% while 38% of the total was other categories of employees, compared to only 8% in the Gorj County.

In 2010 compared to 2003, as positive aspect, the share of researchers increase from 89% to 92% in Gorj County, and from 55% to 59% in Valcea County. In the same time, the share of other categories of employees decreases. In Valcea County this decrease is relevant, from 38% to 25%, with an increasing of technicians share from 7% to 16%.

The evolution of the expenditure from R & D activity in South-West Oltenia Region by county and by category of expenditure

In this chapter, for better evaluation, presentation of the evolution and structure of total expenditure and category of expenditure we not expressed it in current prices. We used comparable prices. For this, we have made two changes: the expenditures from 2002 and 2003 expressed in ROL, were converted into lei (RON), after which corrections were made taking into account the inflation rate, the base year being 2002.

The evolution and structure by counties of total expenditure for these activities are presented in Figure 7. The first place is still Dolj County, for which, during the analyzed period were allocated amounts between 10.87 and 35.053 million lei. On the second place there is Valcea County with a volume of expenditure between 4.38 and 15.816 million lei, the maximum being reached in 2007 for Valcea County, respectively in 2008 for Dolj County.

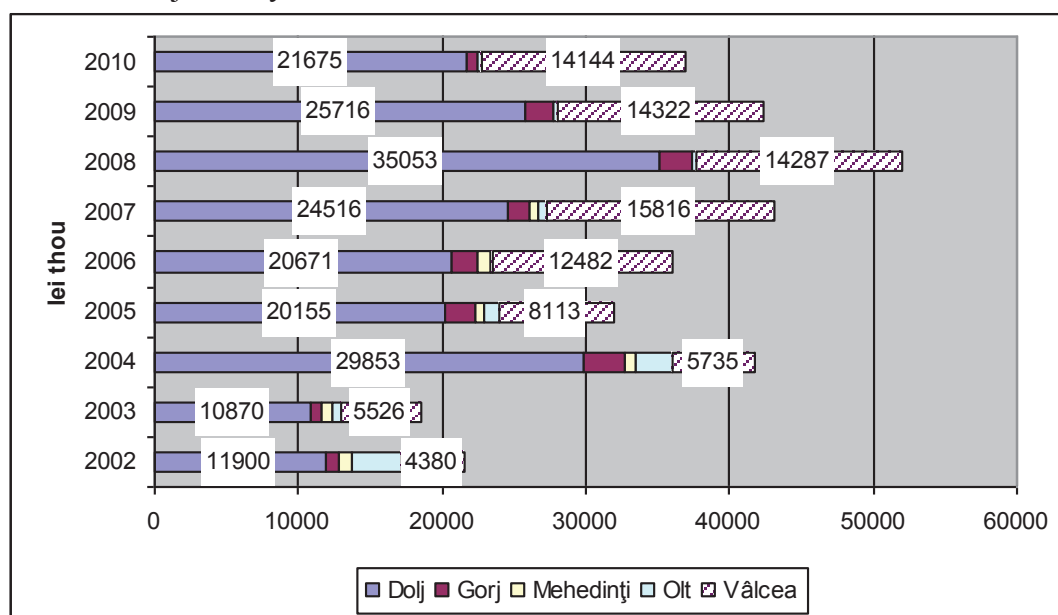


Figure 7. Expenditure from R & D activity in South-West Oltenia Region
(Comparable prices, base year 2002)

If we analyze the situations shown in Figure 7 and in Figure 5 we see that in the period under review, the structure of volume of expenditures by counties the differ significantly from the structure of employees from research-development activity. Thus, whether in terms of number of employees in this branch, in Gorj and Valcea Counties the situations are similar (see Figure 5), in terms of volume and share of total expenditures are significant differences.

Thus, in 2003 their share in total expenditure from research-development of the South-West Oltenia was 13.73% in Valcea County and 6.76% in the Gorj County, and in 2010 were 38.28% in Valcea and only 2.19% in Gorj.

On the other hand, are of interest and how they allocate funds by expenditure categories. As can be seen from Figure 8, the proportion of allocation of funds by category of expenditure in the South-West Oltenia Region, in the period 2003-2010, are not equal.

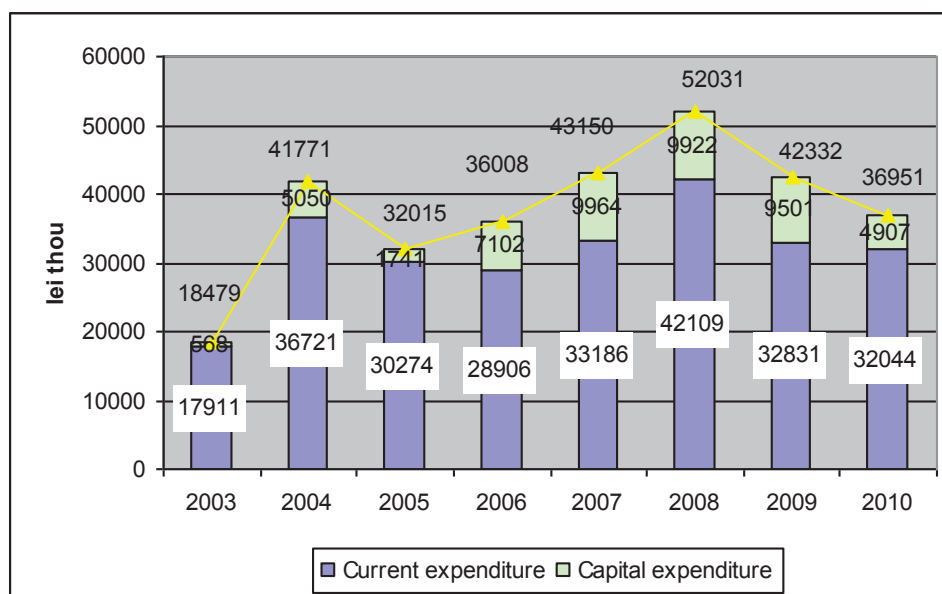


Figure 8. Total expenditure from R & D activity, in Region South-West Oltenia by expenditure category (comparable prices, base year 2002)

In 2003-2005 the share of capital expenditures, except for the year 2004 with 13.75%, was all too small (3.17% in 2003 and 5.75% in 2005). The situation has changed significantly in the period 2004-2009, the share of capital expenditure ranging between 25% and 30.2%, value achieved in 2007. Between 2009 and 2010 feel the effects of crisis on research-development activity, the share of total capital expenditures decreasing, in 2010, to only 15.31%. Note that in 2010 compared with 2009, capital expenditures decrease from 9.501 million lei to 4.907 million lei (a decrease of 48.35%), while current expenditure declined only 2.39%.

Conclusions

Statistical analysis of the evolution of research and development activities in the period 2002-2010 highlights the fact that both at national and regional levels the number of employees in research and development activity had an oscillating evolution with relatively small amplitude around a slightly upward trend until 2008 and the strong downturn in the period 2009-2010.

In Macro region 4 the number of employees in research and development activities to 1 000 civil employed persons registered significant oscillations, so the period 2002-2003 has seen a significant increase, in the period 2004-2006 is

characterized by a significant reduction (27,64%) due to the reduction of the research activity. End of period brings a significant improvement in the number of employees from R & D activity per 1000 civil employed persons in Macro region 4. Thus, from 26.2 employees at the end of 2008, their number increased to 32.3 employees in 2009 respectively to 38.7 employees per 1000 civil employed persons at the end of 2010 year.

Analyzing the evolution of the number of employees in this sector on the two development regions of Macro 4, we observe that shape of its evolution is given by the dynamics recorded in the West Region. In the South West Oltenia Region 2009 brought a decline in the number of employees and although in 2010 there was a slight increase, never reached the level recorded at the end of 2008.

Evolution of the number of employees per 1000 civil employed persons, at least in the last years of the analysis period, was significantly determined by the evolution of the research and development sector and very little by the change of number of civil employed persons.

Dolj County there is the most part of the employees in this activity. Places 2 and 3 were alternating counties Vâlcea, Gorj with a number of employees between 126 and 190 people in Gorj County and between 185 and 219 people in Vâlcea County. Regarding the Mehedinți and Olt counties the research development activity recorded a strong decline, reaching up to the abolition. At the end of the year 2010 in the Olt County there were only 16 employees in this sector, and in Mehedinți County no longer exists either.

Regarding the evolution and structure of total expenditure of these activities by the counties in the first place is Dolj and the second is Valcea. It can be seen that if in terms of number of employees in this sector Gorj and Valcea situations are similar, in terms of volume and share of total expenditures are significant differences.

The proportions of the allocation of funds by categories of expenditure at the level of the South-West Oltenia, in the period 2003-2010 are not equal. Thus, the period 2003-2005 is characterized by a share of the capital expenditures very small (3.17% in 2003 and 5.75% in 2005), the 2004-2009 period is characterized by a share of the capital expenditure between 25% and 30.2% value achieved in 2007, and the last years of the period considered felt the effects of the crisis, the share of capital expenditure in total decreasing in 2010 at only 15.31%.

For reasons of space, we not allocated a chapter for patent applications submitted by Romanian applicants and for designs and models registration applications, by Romanian applicants, in the South West Oltenia Region. With this and with other aspects of R & D activity in Macro region 4, we will return in a future work.

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