

STRUCTURE AND DYNAMICS RESEARCH AND DEVELOPMENT EXPENSES IN ROMANIA

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Abstract:

Scientific research is a systematic and creative activity aimed to increase the volume of knowledge, including knowledge of man, culture and use this knowledge for new applications.

The concept of research is known and used today under the name of research and development. Engine development for any country, whether economic or social, is the research, development and innovation. The common concern of all countries for science and scientific research appears in recognition of their role in ensuring the welfare and human civilization.

Research and development in Romania over the last 20 years could be considered a true „Cinderella” of the national economy because either they have been allocated insufficient funds or when receiving a larger amount of funds, budgetary rectifications were taken large sums of money from the research budget.

1. Introduction

In Romania there are priority three systems research, development and innovation:

- The academic system (Romanian Academy and academies branch);
- The system of public institutions (subordinate / coordination of ministries);
- University system.

Also, in the current national system of research, development and innovation are other structures with research, development and innovation, such as:

- State-owned companies, institutes from former branch;
- Companies with private capital;
- Foundations and private associations.

Total research and development expenses consist of: current expenditure and capital expenditure. Current expenditures include all payments made during a period when the units toward the cost of labor, materials and other current expenditure. Capital expenditures (investments) include payments made during a period for carrying out construction works, purchase of equipment, tools, machinery and equipment and other expenses of this nature, designed to contribute to the volume of assets of the unit.

2. The structure of research and development expenditure in 2015 in Romania

Research and development in 2015 was conducted in 65 units, including 40 institutes and research centers, higher education institutions 15 10 - other units. Of the total units with research and development, 51 units or 78% belong to the public sector. On 31 December 2015, establishments with research and development activating 5033, of which 51.8% are women. Of the total number of employees, 70% worked full time. After the vocational training of all employees, 3990 persons had higher education (79.3%), 392 people - specialized secondary education (7.8%), and 651 persons - another level of education (12.9%) . Of employees in this area the largest share is held by scientists (66.9%), followed by support staff (13.9%), employees who perform tasks related institution's work constitutes 13.7% and 5.5% technicians . Compared with 2014, the total number of employees remained virtually the same, although the occupational categories there were differences, with more than 53 people where 57 researchers and people less if personnel.

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Table 1

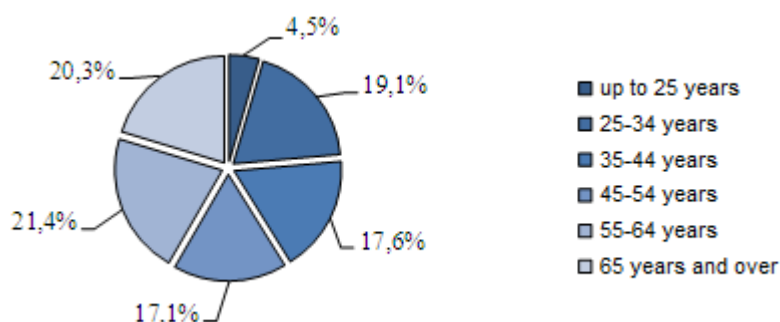
Employees from research and development by type of occupation, 2014-2015

	Persons				Structure - % -			
	2014		2015		2014		2015	
	Total	including women	Total	including women	Total	including women	Total	including women
Employees total	5038	2588	5033	2607	100,0	100,0	100,0	100,0
researchers	3315	1586	3368	1655	65,8	61,3	66,9	63,5
technicians	282	205	275	183	5,6	7,9	5,5	7,0
support staff	758	402	701	403	15,0	15,5	13,9	15,5
other categories	683	395	689	366	13,6	15,3	13,7	14,0

In 2015, research and development, the researchers came back 97 100 men women researchers, representing a 5% increase compared to last year.

Structure of researchers by age shows that the researchers aged 55-64 years (21.4%) and those over the age of 64 years (20.3%).

Figure 1. Structure of researchers by age group, 2015



Distribution of researchers by scientific areas reveals a predominance of natural sciences (34.6% of total researchers), followed by that of engineering and technological sciences with 16.4%. Women are underrepresented in the sciences researchers of natural and engineering and technological respectively as a share of 49.2% and 29.0%, while 61.4% were in the social sciences.

Table 2

Researchers scientific fields, 2014-2015

	Persons				Structure - % -			
	2014		2015		2014		2015	
	Total	including women	Total	including women	Total	including women	Total	including women
Researchers - total	3315	1586	3368	1655	100,0	100,0	100,0	100,0
natural sciences	1196	564	1165	573	36,1	35,6	34,6	34,6
engineering and technological sciences	443	125	552	160	13,4	7,9	16,4	9,7
medical sciences	453	244	442	242	13,7	15,4	13,1	14,6
agricultural sciences	411	183	411	212	12,4	11,5	12,2	12,8
social sciences	496	308	472	290	15,0	19,4	14,0	17,5
humanities	316	162	326	178	9,5	10,2	9,7	10,8

Compared to 2014, the share of researchers in the natural sciences was reduced by 1.5 percentage points, while those in engineering and technological sciences was increased by 2.0 p.p. Every second researcher holds doctorates (PhD and PhD). Also in medical sciences and humanities than 60% of researchers are scientific degree, while in engineering sciences and technological only 26%.

Table 3

Researchers with doctorates in scientific fields, 2014-2015

	2014				2015			
	PhD Hab.		PhD		PhD Hab.		PhD	
	Total	including women	Total	including women	Total	including women	Total	including women
Researchers - total	384	73	1314	614	387	78	1327	645
natural sciences	143	24	509	226	133	22	514	244
engineering and technological sciences	22	–	91	13	31	1	114	27
medical sciences	77	20	193	103	86	23	185	102
agricultural sciences	32	2	133	39	36	2	133	44
social sciences	58	14	230	144	55	18	220	139
humanities	52	13	158	89	46	12	161	89
Structure -% -	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
natural sciences	37,2	32,9	38,7	36,8	34,4	28,2	38,7	37,8
engineering and technological sciences	5,7	–	6,9	2,1	8,0	1,3	8,6	4,2
medical sciences	20,1	27,4	14,7	16,8	22,2	29,5	13,9	15,8
agricultural sciences	8,3	2,7	10,1	6,4	9,3	2,6	10,0	6,8
social sciences	15,1	19,2	17,5	23,4	14,2	23,1	16,6	21,6
humanities	13,5	17,8	12,0	14,5	11,9	15,4	12,1	13,8

In 2015, the number of researchers with PhDs was up 1.0% overall, while for women the increase was 5.0%. The gender distribution of researchers with PhDs, reflecting a slight imbalance between the share of women - and men 48.6% - 51.4%.

At the same time, the number of researchers with scientific degree PhD women represent 20%. In 2015 expenses for research and development activities carried out by units in this area totaled 451.0 million lei, of which 424.3 million lei, or 94.1% is 26.7 million lei expenses and costs capital (5.9%). About 85% of the total units were made in the form of state property. Compared to 2014 were spent on research and development by 8.6% more.

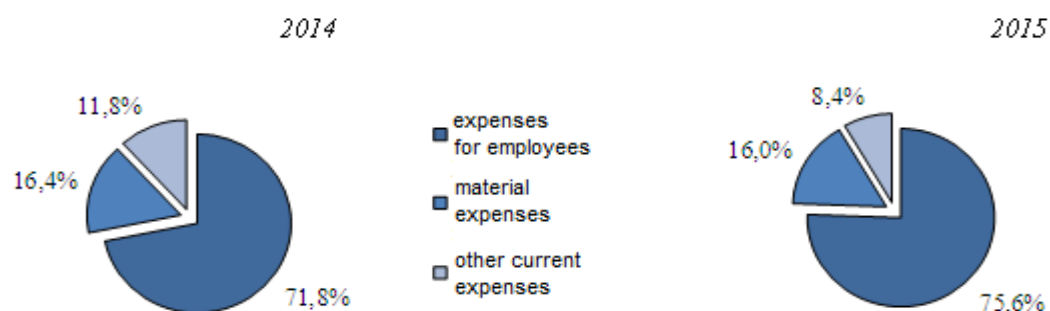
Table 4

Expenses for research and development, 2014-2015 (mil.lei)

	2014	2015	2014	2015
	Total	including state units	Total	including state units
Research and Development expenses	415,2	370,0	451,0	381,4
current expenditure	388,3	344,5	424,3	355,5
capital expenditures	26,9	25,5	26,7	25,9

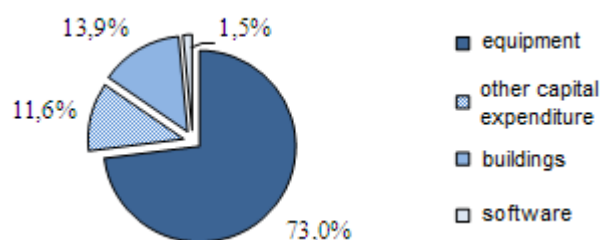
Total current expenditure predominates in staff costs - 320.6 million lei (41.8 million or 15% compared with 2014). Also, material costs totaled 4.3 million and amounted to more than 68.0 million. Other current expenditure amounted to 35.8 million lei or 10.0 million less than in 2014.

Figure 2. Structure of current expenditure component, 2014-2015



In 2015, expenditures for equipping units / institutions which conducted research and development amounted to 19.5 million lei (73.0%), expenditures for capital repairs of buildings were 3.7 million lei (13, 9%), the category other capital expenditures - 3.1 million lei (11.6%) and 0.4 million (1.5%) representing the costs for a new category 'software procurement'.

Figure 3. Structure component of capital expenditures in 2015



Of the total current expenditure on R & D activity, 52.0% were intended for research applicative (4.2 percentage points less than in 2014), 27.5% of basic research (+1.1 pp) and 20.6% were destined technological development (+3.2 pp).

Table 5

Current expenditure on scientific, 2015 (mil.lei)

		inclusiv:					
		natural sciences	engineering and technological sciences	medical sciences	agricultural sciences	social sciences	humanities
Current expenditure	424,3	144,2	108,0	42,4	63,2	37,3	29,2
including:							
fundamental research	116,6	59,5	13,7	5,1	2,3	13,7	22,3
applied research	220,5	76,5	16,9	37,4	59,4	23,4	7,0
technological development	87,3	8,2	77,4	–	1,5	0,2	–

Depending on the scientific structure of current expenditure is as follows: natural sciences - 34.0%, engineering and technological - 25.5%, agriculture - 14.9%, health - 10.0%, social - 8.8% and humanities - 6.9%.

3. Funding research and development in Romania

The first system of financing research projects and not institutions, was not introduced until 1997 and was named National Plan for Research, Development and Innovation. There was then „program Horizon 2000“, extended until 2002.

National Plan for R & D and innovation included 14 complex programs, 4 of which occurred at the beginning of the plan and 10 occurred in 2001, grouped in two major goals of development: one economic support through research and a development of new technologies, biotechnology and information society. The National Plan is the main instrument for the implementation of the National Strategy.

It was approved by Government Decision no. 475/2007, law setting out rules and principles of implementation, the component programs, model and investment budget - 15 billion. Lei 2007-2013, the procedure for monitoring and evaluation and impact indicators. With the launch of this program for funding research terminology „R & D“(CD) will be replaced with the terminology „research, development and innovation“(CDI) as funding programs will be included and innovation.

National Plan for Research, Development and Innovation for 2007-2013, hereinafter - the National Plan II - NP II is the main instrument through which the National Authority for Scientific Research (NASR) is implementing the National Strategy for Research, Development and Innovation. (Www. ancs.ro)

Sectoral Plan for Research and Development is a tool through which central and local government bodies and the branch academies policy of the research that he coordinates. Funding for these programs is provided by sources from the state budget for scientific research funds sectoral plans are accessible only establishments or institutions that are part of the sector. It is important to note that the award of projects in the sectoral plans is via auction and on "expression of interest" that may be submitted by a single participant or a grouping (consortium participants associates, natural or legal persons who are considered as partners the project) and in case of legal persons, participation should fall within the categories of establishments or institutions accredited for this purpose.

On 30 November 2011 the European Commission presented a package of measures to stimulate research innovation and competitiveness in Europe. Thus was launched the Horizon 2020 program for investment in research and innovation, with a budget of over 80 billion euros.

Funding of research and development is provided under the Structural Funds Programme for Increasing Economic Competitiveness (SOP IEC), Priority Axis 2, and financing of lesser value were made through Priority Axes 1 and 3.

Absorption of structural funds registered an upward slope from a value of 3.52% in late 2008 to a value of 17.5% at the end of 2013. Even if the increase is more than 5 times, it still Romania the second worst among EU countries in the extent of absorption of funds. The amount allocated to Romania for the period 2007-2013 was 19.213 million Euro¹ but all efforts will be submitted by the end of 2015 to access these funds absorption will get somewhere between 60% -70%, which is less if we refer to Poland, which has accessed these structural funds, so managing an absorption rate of 100%.

4. Conclusions

In 2015, research and development, the researchers came back 97 100 men women researchers, representing a 5% increase YoY. Distribution of researchers by scientific areas reveals a predominance of natural sciences (34.6% of total researchers), followed by that of engineering and technological sciences with 16.4%. Compared to 2014, the share of researchers in the natural sciences was reduced by 1.5 percentage points, while those in engineering and technological sciences was increased by 2.0 p.p. In 2015 expenses for research and development activities carried out by units in this area totaled 451.0 million lei, of which 424.3 million lei, or 94.1% is 26.7 million lei expenses and costs capital (5.9%). About 85% of the total units were made in the form of state property. Compared to 2014 were spent on research and development by 8.6% more. In 2015, expenditures for equipping units / institutions which conducted research and development amounted to 19.5 million lei (73.0%), expenditures for capital repairs of buildings were 3.7 million lei (13, 9%), the category other capital expenditures - 3.1 million lei (11.6%) and 0.4 million (1.5%) representing the costs for a new category 'software procurement'.

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