Management of Financial Resources for Scientific Research in Universities in Romania

Margareta Stela FLORESCU[1]
Alina Ştefania CREŢU

Abstract

Scientific research financing becomes extremely important if research is one of the main fields that allow the reduction of gaps between international economies. The competitiveness of a country becomes a general objective, which can be accomplished by following two fundamental objectives: generating and exploiting knowledge.

The paper deals with management approaches that can be used in order to support the scientific research in universities, having in mind the impact of academic research on economic and social life of a country.

Keywords: *Management, financing, strategies, scientific research*

JEL classification: E62, F62, F65, I22, I23.

Introduction

In the context of globalization, an international consolidated scientific community is created through cooperation and knowledge exchange between countries. In this context, it is important to transpose the measures for generating and exploiting knowledge differently, according to the respective country and influence factors. Universities are among the significant actors with regard to this matter. Higher education is considered a performance sector active on this market in order to attract financing sources. From this perspective, universities must focus their objectives and resources on research, development and innovation, as vectors of a competitive economy.

Considering the mentioned aspects, regarding the importance and role of research, this work aims to analyze the extent to which research in Romania is regarded as a strategic objective, in relation to the financing level of this field.

The impact of research financing through public funds on society and the economy has become a main preoccupation of institutions that elaborate policies in these fields, as changes in the roles of governments and public research institutions have led to an increased demand for policies based on the proven practice and for an evaluation of the results of public investments. (OECD, 2008)

[1] **Margareta Stela FLORESCU**[1]**,** The Bucharest University of Economic Studies,
E-mail: icefaceus@yahoo.com, Telephone/Fax: +40.21.335.46.53 int. 101/+40.21.335.02.53
Alina Ştefania CREŢU, The Bucharest University of Economic Studies,
E-mail: chenicalina@yahoo.com, Telephone/Fax: +40.3.19.19.00/int 293/: +40.3.19.19.01

1. The research methodology

The issue to be analyzed focuses on the importance of financing and access to financing sources for scientific research in universities in Romania.

For the research, the following methods and tools were used:

- Methods of collecting data: a structured questionnaire, analysis of institutional databases, analysis of the documents;
- Tools: support for systematization, analysis and interpretation of the results: Microsoft Office Excel 2010, IMB SPSS Statistics V20.

The main tool used to collect data was the questionnaire, which contained 7 questions and was administered through Google Drive platform. The sample group is formed of the 19 public universities in Romania and 179 respondents. The latter are divided according to their professional level as follows: 31% were 3rd degree Scientific Researchers/Assistant professors, 30% were 1st degree Scientific Researchers/Professors, 29% were 2nd degree Scientific Researchers/Associate Professors, 7% were Scientific Researchers/Assistants and 3% were PhD students. The answers were featured in databases, avoiding manual data input.

In 2012, according to data published by the National Institute of Statistics[2], Romania had 57 public (state-owned) universities and 51 private universities, accredited or authorized to function temporarily, with 28,365 professors, representing approximately 55% of all the employees in the system. The analysis was targeted at public universities, with a sample group of 179 education professionals[3] from 19 public universities in Romania, namely 33.33% of the total number of state-owned universities in Romania. The reason why the sample group was limited to public universities is that according to the classification of universities, made by the Ministry of Education, no private university in Romania primarily focuses on research. All private universities are focused on education, being regarded as inferior in terms of quality. For this reason, a comparison in terms of research activity could not be performed.

The beneficiaries of the research are mainly the participants in this research, because by expressing their own points of view, they contributed to and influenced the results of this research. However, since this research involved the national research system, the main beneficiaries of the results are all the institutions from the academic field and even other important factors regarding research: Institutes and research centers, as well as actors from the private environment.

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[2] Higher Education. The beginning of academic year 2011-2012. Statistics book, the National Institute of Statistics, 2012.

[3] The information was taken from UEFISCDI database. Source: http://www.cercetatori-romani.ro/search_operator.php

Alpha coefficient, commonly known as Cronbach's alpha (α), was proposed by American psychometrician Lee J. Cronbach in 1951, as a generalization of Kuder-Richardson (KR) coefficient, for dichotomous items. The importance of Cronbach's alpha coefficient can be better understood when taking into account the relation between validity and fidelity (Cronbach, 1963, p. 137).

The equation for Cronbach's alpha is the following:

$$\alpha = \frac{N * r_m}{1 + (N - 1) * r_m}$$

(1)

where:

N = the number of items

rm = the average of the correlation coefficients between the items

After the questionnaire was originally applied to 179 respondents, the items from the questionnaire were analyzed by calculating Cronbach's alpha coefficient. The original value of this coefficient, calculated through SPSS program, was α = 0.576. Although the literature does not contain any absolute standard regarding the value Cronbach's alpha coefficient should have to indicate a corresponding fidelity, generally, values of approximately 0.90 are considered "excellent", values around 0.80 are "very good", while values around 0.70 are "good" (Kline, 2005). There are, however, authors who will accept a value of 0.60 as well, but only for exploratory studies (Garson, 2010). Given that this coefficient is important for verifying the research tool, since the consistency and safety of the items from the questionnaire are practically verified, in order to correlate the items, we also took into account the necessity of adjusting this indicator, by removing the items that established negative values, reaching a final value of α = 0.690, namely an acceptable value of the coefficient.

IMB SPSS Statistics and Microsoft Excel were used for:

- editing the data (building the database by inputting the results obtained from the questionnaire, codifying the variables);
- the statistical processing of the data (descriptive statistics, testing the fidelity of the items by calculating Cronbach's alpha indicator);
- presenting and interpreting the results in a tabular or a graphic form.

As for the main characteristics of the sample group, the following are mentioned, based on the next graphic and tabular representations:

Of the 19 public universities that participated in the research, the respondents are predominantly from advanced research and education universities (61%), followed by scientific research and education universities (31%) and only 8% of the respondents are predominantly from education universities.

Table 1. The division of the respondents according to the category of their university

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Preponderantly education university	15	8.4	8.4	8.4
	Scientific research and education university	55	30.7	30.7	39.1
	Advanced research and education university	109	60.9	60.9	100.0
	Total	179	100.0	100.0	

1.2 Analysis of the research results

The following aspects resulted from the first question, regarding the creation of specialized research structures: in only 4% of the universities that participated in the research, no type of specialized research structure was created, while in 43% of the universities, specialized research structures were created in faculties, in 33%, in departments, and in 20%, in chairs. The preoccupation of Romanian universities for specialized research structures is, therefore, noticeable. Determining this aspect, however, is not relevant because it only shows a tendency, which is why it is much more important to see whether this aspect influences the access to funds for scientific research to any extent.

The access rate for various financing sources for research is very high, because only 1% of the respondents mentioned that they had not accessed any financing source for scientific research. Regarding the accessed financing sources, 44% of the respondents benefited from national public financing, 34% benefited from European financing, 18% benefited from financing through contracts with the private environment and 3% from other sources. As for "Other financing sources", the respondents mentioned the following: international financing, civil conventions, service contracts, consultancy contracts, internal grants from the Department for stimulating youth. To verify the correlation between the two nominal variables, Phi coefficient was calculated in SPSS program. This coefficient is calculated for two dichotomous nominal variables, that especially registers the presence or absence of a characteristic.

The values of Phi coefficient, for the analyzed variables, are the following:

Table 2. The values of Phi coefficient

Symmetric Measures: No financing source * The existence of research-development units in universities		
	Value	Approx. Sig.
Nominal by Nominal Phi	.840	.010
N of Valid Cases	179	
Symmetric Measures: National public financing * The existence of research-development units in universities		
	Value	Approx. Sig.
Nominal by Phi Nominal	.413	.020
N of Valid Cases	179	
Symmetric Measures: European financing * The existence of research-development units in universities		
	Value	Approx. Sig.
Nominal by Nominal Phi	.209	.050
N of Valid Cases	179	
Symmetric Measures: Contracts with the private environment * The existence of research-development units in universities		
	Value	Approx. Sig.
Nominal by Phi Nominal	.159	.050
N of Valid Cases	179	
Symmetric Measures: Other financing sources * The existence of research-development units in universities		
	Value	Approx. Sig.
Nominal by Nominal Phi	.177	.132
N of Valid Cases	179	

According to the table above, the following interpretations can be made, depending on the values of Phi coefficient: the value of Phi coefficient is higher than 0,8 for the first association, which determines a strong association between the first two variables that can be generalized as follows: the lack of research units is associated with the lack of access to financing for research. On the other hand, the intensity of the association for the next two correlations is much lower, but it can be considered valid, because the existence of research units in universities facilitates access to financing through national and European programs. However, the last two associations, according to Phi coefficient, are not valid. The correlation

of the answers to the two questions regarding the two variables (the existence of the structures and the financing sources that were attracted) was made.

The graphic below reveals that there is a significant association between accessing various types of financing and the existence of specialized research structures in universities.
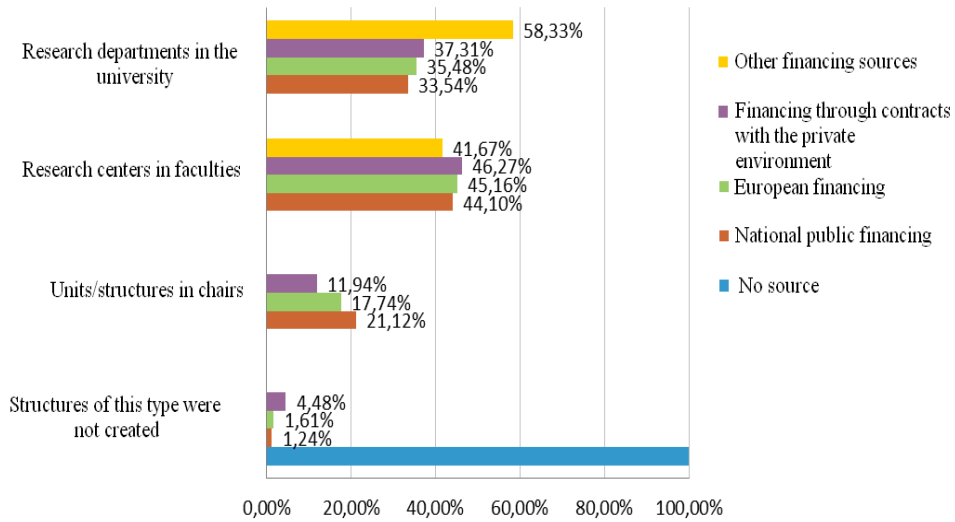
Graphic 1: The correlation between the types of financing attracted and the existence of specialized research structures in Universities

The next graphic features the influence factors for research, measured through the intensity granted by the respondents to every factor.
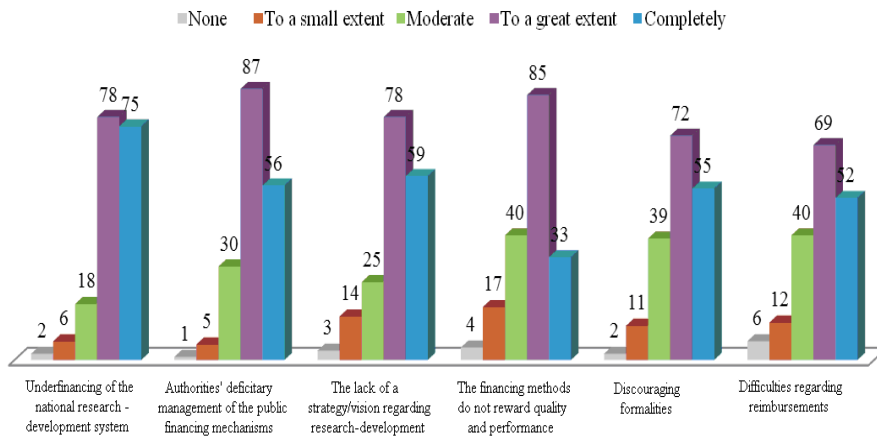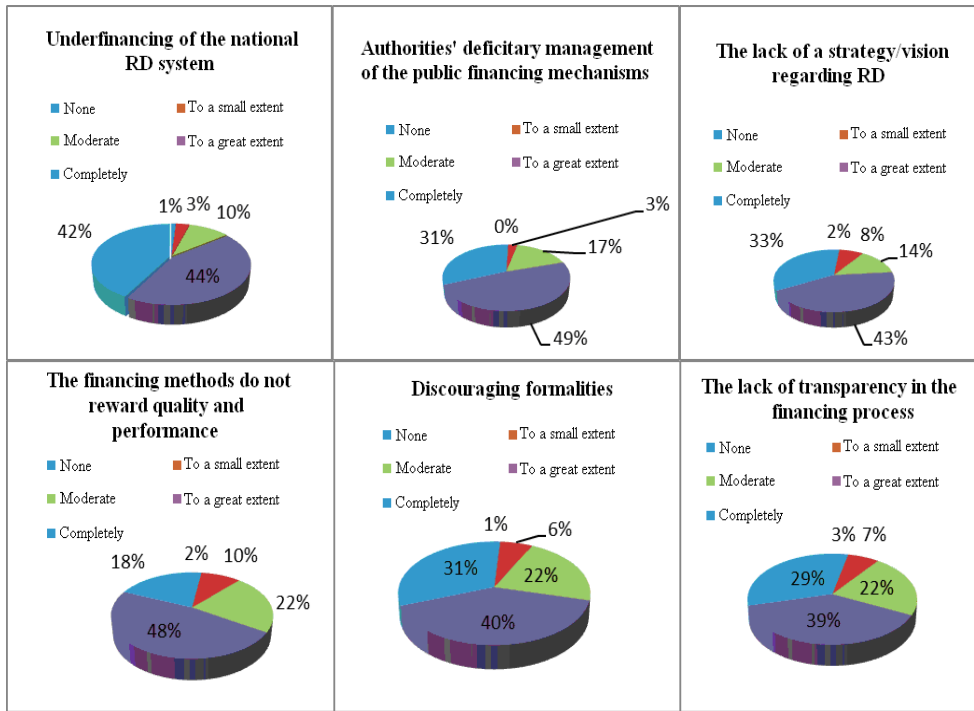
Graphic 2. To what extent do you think the following aspects have influenced/ can influence your research projects?

The following are among the factors that influence research the most: *authorities' deficitary management of the public financing mechanisms and the financing methods that do not involve performance and quality.*

Other important factors were: the underfinancing of the national research system and the lack of a strategy in the field. Nevertheless, according to the graphics above, only one separate analysis was made for every single factor. A comparison between the factors is difficult. In the table below, in order to highlight the tendencies regarding the factors that influence the research, the average for every factor was calculated, which allows a comparison between the results.

Table 3. To what extent do you think the following aspects have influenced/can influence your research projects?

Item	N	Min.	Max.	Mean	Std. Deviation
Underfinancing of the national system	179	1	5	4.22	.843
The deficitary management of public financing mechanisms	179	1	5	4.07	.800
The lack of a coherent strategy in the field	179	1	5	3.98	.968
Financing criteria	179	1	5	3.70	.952
Accessing formalities	179	1	5	3.93	.934
Aspects regarding reimbursements	179	1	5	3.83	1.030
The transparency level in the financing	179	1	5	3.65	1.062
Valid N (listwise)	179				

The research revealed the following tendencies:
- increasing the number of articles and studies published overseas was the first priority (24.02% mentioned that the obtained financing sources were used completely for this activity, while 40.78% mentioned that they were used for this purpose to a great extent);
- the development of the research infrastructure was the second priority (16.20% mentioned that the obtained financing sources were used completely for this activity, while 42.46% mentioned that they were used to a great extent);
- the development of human resources for research was the third field for which the financing sources were granted; 32.96% think it was used completely for this activity and 10.06% think it was used to a great extent;
- the last two activities, for which the respondents say the financing was granted to a smaller extent, were: the organization of national and international scientific activities and the modernization of management in order to increase the institutional capacity to develop the research.
- to the greatest extent (29% of the respondents), the results of the research were used in universities and, secondly, a significant percentage of the respondents (22%) stated that the results of the research were not applied in any field. This may have taken place because not all the research was practical; on the contrary, much of the research was just fundamental.
- an interesting aspect of the research was that a lot of the results of the research were taken by the private environment (15% - SMEs and 2% - multinational companies)
- for the financing sources through contracts with the private environment, the results of the research are used to a great extent in universities (30.99%) as well as in research institutes (30.99%) and the private environment (31.69%). A similar tendency is noticed in national financing: over 70% of the results of

the research are implemented in universities and national research institutes, while approximately 22% is granted to the private environment.

Conclusions

Scientific research is an important vector of the economic competitiveness of a country. The results of the scientific research will significantly depend on the way the activities of this field are managed and financed nationally, and the innovation, quality and way these will be used will significantly influence the international hierarchy of the strongest and most competitive economies, in a knowledge-based society.

As for the analysis of the results of research made in universities in Romania, it has allowed the determination of multiple factors that hinder access to scientific financing sources, especially nationally. The most significant are: the underfinancing of the national research system, authorities' deficitary management of public financing mechanisms, financing methods that do not involve performance or quality, the lack of a coherent vision or strategy in the field.

Another important aspect, determined after the research, is that scientific research in universities in Romania is profoundly theoretical, most of the research being fundamental. The lack of practical research is an aspect that requires special attention because promoting such research can lead to financing, private actors benefiting from the results of the research. In Romania, according to the study, the results of research are mainly applicable in universities, followed by institutes and research and development centers, as well as the private environment.

There are limits to research as well, namely:

➤ The lack of a complete and adapted database that includes every researcher from the Romanian academic environment made the use of statistical methods for sample groups impossible; the method was random, which led to a differentiated representation of the respondents for universities;

➤ Not every possible variable of the research was covered and observed through the main tool used to collect the data (the questionnaire); some of them led to incomplete analyses, but they may be subject to future research;

➤ The analysis is limited to a study of research in universities, without comparisons to other important actors in Romania: the academic environment, national research institutes. This type of analysis could have revealed a general situation of the research activity in Romania.

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