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IMPROVEMENT OF THE ASSESSMENT CRITERIA FOR SCIENTIFIC RESEARCH PROJECTS - A PREMISE OF INCREASING THE UNIVERSITY SCIENTIFIC RESEARCH PERFORMANCE

Case study

Keywords

Assessment criteria
University scientific research
NP II
IDEAS Programme
Exploratory Research Projects

J.E.L. classification

I23, O32

Abstract

The National Plan for Research, Development and Innovation 2007 – 2013, called herein the National Plan II, represents the main instrument used to implement the National Strategy for Research, Development and Innovation.

Universities play a unique role in the development of the knowledge-based society, through its contribution to knowledge generation, transmission, dissemination and utilization. The essential role of the university is to shape the highly qualified human resource, a process that implies a symbiosis between the education and research, the education system performances contributing in this way to a great extent to the society development. The highly qualified human resource represents an important asset of a nation.

*This study is dedicated to the analysis of the assessment criteria for the **Exploratory Research Projects (ERP)** handed in the competitions in 2007, 2008, 2011 and 2012 and to highlight the importance of improving the assessment criteria in order to improve their quality.*

1. Introduction

One can appreciate that science and technology will dominate the human being existence at this start of millennium, knowledge representing a strategic element. The access to resources will depend on the capacity to produce and use the knowledge for a sustainable economical growth, better jobs and social cohesion. The passage to a knowledge based economy represents a basic strategic option and it will have a special impact on the durable global development of humanity.

The knowledge-based society implies a higher and higher preparation level of the society members, as well as their straightforward involvement in the creation of goods and products to satisfy the more and more diversified necessities of the society members, for delivering services which provide a better life standard day by day.

The beginning of a new millennium finds the high school system and the scientific research activity in a process of search and transformations meant to face the challenges of knowledge-based economy and society. States like the United States of America, Germany, Japan, England and others have launched restructuring programs for high school and scientific research systems which should respond to the challenges of a society based on knowledge and competitiveness.

Universities play a unique role in the development of the knowledge-based society, through its contribution to knowledge generation, transmission, dissemination and utilization. The essential role of the university is to shape the highly qualified human resource, a process that implies a symbiosis between the education and research, the education system performances contributing in this way to a great extent to the society development. The highly qualified

human resource represents an important asset of a nation.

The universities have been deeply modified within the last 50 years. They have suffered several mutations, being converted from elite institutions into leading actors within a knowledge-based society. They are playing three interconnected roles: knowledge generation, especially through research, knowledge transmission through education and formation, and knowledge dissemination and application through innovation [1].

The National Strategy for Research, Development and Innovation (RDI) for the period 2007-2013 is based on the vision of the Romanian society on the role of science, technology and innovation for the development of the knowledge society in Romania, for the economical and social progress [2]. The strategy has the objective to catch up on the gaps in comparison to the level of the European countries and it prepares the RDI system in Romania in order to identify and consolidate, in international partnership and competition, those unique areas in which Romania could excel [2].

The National Plan for Research, Development and Innovation 2007 – 2013, called herein the National Plan II – NP II – represents the main instrument used to implement the National Strategy for Research, Development and Innovation.

NP II aims to accomplish three strategical objectives of the national system of RDI, namely [2]:

1. Create knowledge, respectively obtain certain top scientific and technological results with the purpose of increasing international visibility for the Romanian research followed by a transfer of these results into the social-economical practical activity.
2. Increase the competitiveness of the Romanian economy through

innovation, having an impact on the level of the economical agents and transfer of knowledge in economic practice.

3. Increase social quality, respectively find technical and scientific solutions to support social development and improve its human condition.

The basic scientific research, through its significant impact on knowledge development and formation of the future knowledge creators, plays an essential part in the evolution of the knowledge-based society and economy.

Through the specific of the functions assumed in the society, the universities are called to develop scientific research programs oriented toward new directions and priorities in the science, to master research teams and schools of excellence, optimizing the resources through an advanced management of knowledge and resources.

The **IDEAS** financing program has as target the generation of top scientific and technological results, comparable with those at the European level, reflected in the increase of visibility and international recognition of the Romanian research [3].

Objectives pursued within the IDEAS Program [3]:

1. Continuous improvement of the worldwide visible performances in areas in which Romania has a research potential and in which results comparable to those from the EU countries were obtained.
2. Development of the areas in which Romania is interested to carry out scientific research activities with real contributions to the increase of knowledge quality, to technical and technological development and life quality improvement.

The **Exploratory Research Projects (ERP)** aim to support and promote the basic, interdisciplinary and /

or exploratory scientific research from Romania. The program is addressed to the researchers with performances proved by the quality and international recognition of the scientific publications, including those of the researchers working abroad (Romanian or foreign citizens), willing to lead high level scientific research projects in the institutions from Romania [4].

Target Objectives of ERP [4]:

1. Affirm the prestige of the Romanian scientific research, quantified through scientific results of international level
2. Identify, support and develop the research teams, in order to permit them to reach, maintain and consolidate the critical mass necessary for their competitiveness at the international level;
3. Attract high quality national and international human resources for the development of the scientific research in Romania;
4. Implement the “financing follows performance” principle in scientific research.

2. Material and Method

This study is dedicated to the analysis of the assessment criteria for the Exploratory Research Projects (ERP) handed in the competitions in 2007, 2008, 2011 and 2012 and to highlight the importance of improving the assessment criteria in order to improve their quality.

2.1 Criteria of Assessment and Decision used in Research Projects Assessment

Two types of criteria are used in order to make financing decisions: criteria of eligibility and assessment criteria. Ideally, these need to be selected and specified such that to exempt the applicants from the detailed understanding of the national strategies, research policies, strategic orientations and thematic priorities. They need to hand in proposals for research projects

compliant as much as possible with the two sets of criteria, but not, for instance, with political objectives, strategic orientations or thematic priorities. The conversion of the strategies, research policies or programs' objectives into financing criteria is one of the main characteristics of the financing policies.

One of the questions which is often asked in the project competitions is the following: Which projects should be supported in order to apply the research rules and programme implementation rules and which should be not?

The assessment and decision criteria and the processes related to them certainly hold a key position in the frame policies which are based exclusively on financing. The assessment criteria create the bond between the project aim, programme objectives and the individual projects. The decision-makers for research policies, the programme managers face the fact that they have to correlate the purposes of the research policies with the programmes objectives and the latter with the assessment and selection criteria of the research projects. This means that the applicants are allowed to assess the projects and the criteria (with the meaning of consulting them in order to elaborate these assessment criteria) without understanding the policies which form the starting point of research strategies and financing programmes. Keeping these aspects in mind, there should be considered a number of practical issues when establishing the criteria:

- the criteria should be as complete as possible (to cover all the relevant aspects of the programmes);
- the assessment criteria should be in a small number (so as to take into consideration the project and its performance in the assessment process);
- the assessment criteria should be independent in order to avoid

prejudices, their fraudulent use and false interpretation;

- the assessment criteria should be easily measured and applied.

There are many possible traps which appear in practical work in the conceiving and elaboration of the assessment criteria. The most frequent ones are the following:

- too many assessment criteria (often as a result of poor management of the assessment criteria elaboration process);
- assessment criteria which are not adapted to the objectives of the policy / programme;
- criteria which are interconnected (thus altered by uncontrollable prejudices);
- changing the assessment criteria from one call to the other (often as a result of the learning process, mostly ambivalent, hence the applicants tend to perceive the change in criteria as an additional source of uncertainty).

Experience shows that the assessors tend to use a complex set of criteria, as complex as possible, in the process of project assessment.

2.2. Criteria of eligibility and assessment for Exploratory Research Projects

Within the competitions from 2007 and 2008, the assessment criteria for Exploratory Research Projects were [5]:

1. *Scientific quality of the project proposal (35%)*
 - a. Knowledge and adequate presentation of the state of art in the area;
 - b. Scientific objectives of the research projects and their relevance in the context of the research in the area at the international level;
 - c. Inter-disciplinary degree (if adequate);
 - d. Originality and innovatory aspect of the research project, including the

- choice and adequate sizing of the equipments and infrastructure;
- e. Concordance between the chosen research methodology and project objectives.
2. *Quality of human resources (40%)*
- a. Scientific competence of the project manager, measured mainly in the number of works published in ISI quoted journals and/or worldwide recognized databases during the last 5 years;
- b. Managerial expertise of the project manager;
- c. Quality and expertise of the research team members in the area of the proposed theme, measured mainly in the works published in ISI quoted journals and/or worldwide recognized databases during the last 5 years;
- d. Clear and credible description of the role of junior researchers within the project.
2. *Project implementation (10%)*
- a. Quality of the project management: coherence of the working plan and the associated activities;
- b. Manner of results dissemination based on previously proved capacities;
- c. Project feasibility and credibility, taking into account the human resource expertise and material resources involved in the project;
- d. The applicative research activities predicted in the project (if any) do not exceed 10% of the total budget;
- e. Manner to approach the ethics problems.
3. *Manner to use the resources (10%)*
- a. Adequacy of equipments and facilities for experimentation to the project objectives, as well as the possibility to cover the project necessities with the equipments and facilities existing at the host institution;
- b. Adequate sizing of the budget chapters.

4. *Conformity with the requirements of the program "Research of Excellence" – (5%) (0-5 points)-only for the competition of 2007.*

- a. Was the project manager also the project manager within the program "Research of Excellence"? If NOT, the project receives 5 points ex officio.
- b. If YES, has the project manager applied within the FP7 Program? If YES, the project receives 5 points. If NOT, the project loses 5 points.

Within the first two competitions (2007 and 2008 respectively), the eligibility criteria for project manager were as follows:

1. Project manager is PhD.
2. Project manager has a full time labour contract during the entire period of project development, in a high education or research institution, without any constraints concerning the age.

Within the competition from 2011, the assessment criteria for Exploratory Research Projects were [6]:

1. *Project Manager (PM) (60%)*
 - a. How would you rate the PM's professional prestige and international visibility in his/her research field? (20%)
 - b. How do you assess the quality of the PM's publications in his/her field of research? (15%).
 - c. How relevant is the PM's expertise, as derived from his/her publications and background, for the proposed objectives? (15%).
 - d. How would you rate the level of originality and creativity of the previous results of the PM? (10%)
2. *Proposal and budget (40%)*
 - a. Significance (10%). How would you rate the level of importance of the specific problem studied and the potential impact of the proposed objectives for science, society or technology?

- b. Approach (10%). To what extent are the methods, design and investigation tools adequately selected and/or developed, well integrated, well reasoned, and appropriate to the aims of the project? Does the applicant acknowledge potential problem areas and consider alternative approaches?
- c. Innovation (10%). Is the project original and innovative? For example: Does the project challenge existing paradigms or address an innovative hypothesis or critical barrier to progress in the field? Does the project develop new methods/technologies or significantly extend/improve previous ones? Does the project employ novel concepts, approaches, tools, or technologies within the specific area?
- d. Work plan and resources (5%). How appropriate and well adapted is the work plan for achieving the goals of this project, and how likely is it that the goals be achieved within the proposed timescale and resources, taking into account the existing and newly acquired resources and infrastructure?
- e. How adequate is the proposed budget, based on (5%): a) the type of research activities envisioned (theoretical research, experimental research)? b) The proposed expenditure on personal mobility related to the project (conferences, networking activities, visits to other labs, etc.)? c) The aim of expanding the research infrastructure in the PM's laboratory?

Within the competition from 2012, the assessment criteria for Exploratory Research Projects were [7]:

1. Project Manager (PM) (50%)

- a. Assess the excellence of the PM's research results, as demonstrated by the list of publications and patents.

Assess the originality of the PM's results, on their impact on the state of the art, and on their relevance for the present project (40%).

- b. Assess the PM's capacity to autonomously manage scientific activities as a researcher and/or research group leader, as well as the visibility and prestige in her/his international peer group. Assess the PM's leadership abilities, the ability to attract international funding, and his/her level of international recognition (awards, invited talks and doctoral committees in prestigious universities). Take into account only those facts that you consider relevant for the current proposal (10%).
- 2. Proposal (50%)*
- a. Assess the overall solution described in the proposal in the context of the current state-of-the-art and its potential future impact. Comment on the following aspects: (1) significance and the difficulty of the problem being addressed; (2) the originality of the proposed solution and the appropriateness of the objectives; (3) the potential to advance knowledge in the field and to influence the direction of thought and activity (30%).
 - b. Assess the method and work plan as defined by the proposal as a concrete approach to reach the envisioned solution. Comment on how well selected are the methods, design and investigation tools and on the effectiveness of the work-plan within the proposed timescale and resources. Have potential problem areas been appropriately discussed, and have alternative approaches been mentioned? (20%)
 - c. Assess the adequacy of the proposed budget and suggest possible corrections. Comment on the match between the work-plan and the budget, as well as on the

appropriateness of the mobility (conferences, work-visits) and infrastructure acquisitions included in the budget. (There will be no score associated with this item, but the expert opinion will be useful to the funding agency in negotiating the precise financial award.)

Within the two competitions from 2011 and 2012 respectively, the eligibility criteria for the project manager were as follows [8]:

1. Project manager is PhD. In case that the doctor degree diploma is not recognized in Romania, its recognition must be obtained before signing the financing contract.
2. The project manager is employed full time in the host institution for an indefinite period or for a finite period which covers at least the research contract period, or he has a full time employment agreement from the host institution at least for the contract period. In the case of the decision to award the financing, the full-time employment agreement must be concluded by the project manager with the host institution at the latest the date when the financing contract is signed, and it comes into effect at the date of project kick off;
3. For natural, exact and engineering sciences:
 - a. Publication, during the last 10 years, as a leading author, of articles in journals that has each a relative score of influence of at least 0.5 and whose cumulative score of influence is at least 2. These works must be published in journals indexed in the Web of Science, strictly classified with *document type, article or review*. Articles pertaining to two classes: “*article; proceedings papers*” are not taken into account.
 - b. Alternatively, for computer science domain (sub-domain PE6), a project manager is considered as eligible based on the quotations which his

publications during the last 10 years, as a leading author, has obtained in the in ISI Web of Science indexed journals, under the condition that the journals quoting them has each a relative score of influence of 0.5, while the relative score of influence of the journals that quoted them, cumulated for all the considered quotations, equals at least 6. The self-quotations are not taken into account.

4. For the social sciences - accumulation of at least 100 points from the works published during the last 10 years, from the following categories:
 - a. Books published as author or co-author: 60 points for each book.
 - b. Chapter published as author or co-author in collective volumes: 30 points for each chapter;
 - c. Articles published as leading author in journals that has each a relative score of influence of 0.25. These articles must be published in journals indexed in Web of Science, strictly classified with the document type: *article or review or proceeding paper*. Each such an article is awarded the following score: 50 points x relative score of influence.

3. Results and Discussions

In assessment practice – an assessor works in front of a computer, makes his assessment, fills in all the forms, including all the comments for each criterion and then discusses in the panel with the other assessors and a consensus there should be reached – we notice that such a complex system is difficult to handle. In situations like these, the assessors have the tendency to use their own criteria.

As compared to the competitions from 2007 and 2008, mainly foreign appraisers were used during the years 2011 and 2012, and when the Romanian appraisers were also used, only one of

the 3 appraisers was a Romanian. This was a benefit, due to the diminution of the suspicions concerning the evaluation objectivity and the fact that the scientists from other countries came to know the research system of Romania.

The novelty at the competitions from 2011 and 2012 was that the scientists from abroad/diaspora had the possibility to conduct research projects in Romania, under the condition that they have a consistent presence within the host institution where the research project is developed.

In the competitions from 2011 and 2012, the contracting authority permitted the project manager to transfer the grant to another host institution from the country at most once for a certain project, and only during the first 12 months from the period of project development. The purpose of offering this freedom of option to the project manager was to optimize the chances of project success.

Still another novelty at the competition from 2012 was the existence of the “*rebuttal*” phase (namely, the applicant replay to the appraisers’ observations) and its occurrence prior to drawing up the consensual report of the panel. The project managers received a sheet with the assessment of the submitted projects (without receiving any mark) and the appraisers’ observations, having the possibility to shape an answer. After this, the final assessment report was drawn up in the panel.

Within the calls from 2007 and 2008, one can notice a big number (18) of assessment criteria. This big number of criteria can generate overlapping and misunderstandings within the evaluation process.

Instead, in the case of the calls from 2011 and 2012, one can notice a much smaller number of assessment criteria (9- 2011 and 5- 2012), grouped in two series of criteria: criteria for

project manager assessment (weight 60% in 2011 and 50% in 2012) and criteria for project proposal assessment (weight 40% in 2011 and 50% in 2012).

Within the competitions of 2011 and 2012, new standards of eligibility were introduced, as compared to the competitions from 2007 and 2008. For example, in order to be eligible, the project managers must accumulate a certain score (from published articles and books). Satisfying this criterion permitted the managers to submit research projects. This resulted in the diminution of the applications’ number, simultaneously with the increase of their quality.

4. Conclusions

1. From a practical standpoint, the number of assessment criteria was too big during the calls from 2007 and 2008.
2. A benefic element for project assessment was to diminish the number of assessment criteria at the competitions from 2011 and 2012 (9 and 5 respectively), as compared to the competitions from 2007 and 2008 (18).
3. An important thing resulting from the development of the competitions of 2011 and 2012 is the encouragement of a publication strategy which sets the accent on quality (impact) and not on quantity, taking into account the compliance with the eligibility criteria by those who want to forward research projects.
4. The existence of the “*rebuttal*” phase at the competitions of 2012 gave the project managers the possibility to shape an answer to the appraisers’ assessment and observations before the project appraisal is finished. In this way, some errors/omissions of the appraisers could be avoided.
5. The most significant aspect missing from the appraisal criteria is sending to the organization which

accomplishes the research project. The most relevant question in this case is if the considered project will contribute or not to the increase of the institution's performance.

6. A benefic measure to increase the quality of the results of *Exploratory Research Projects* (ERP) would be the implication of the foreign experts, both in the project monitoring and finishing phases.
7. The introduction of the new eligibility criteria permitted only to those researchers who satisfied these criteria to hand in applications at the competitions from 2011 and 2012.
8. The possibility to transfer the research project from one institution to another will optimize the chances of project success.
9. The possibility given also to the foreign researchers, to participate in the competitions in 2011 and 2012 will result in a wider view of the research system from Romania.
10. By improving the assessment criteria of the university scientific research projects handed in within the competitions of *Exploratory Research Projects* (ERP), the performances of the university scientific research will improve, this consisting in the increase of the number of articles published in the main international journals, the number of scientific works quoted and of the number of works presented at the top scientific conferences.
11. The **IDEAS** program is the main promoter of the increase of the quality of papers published by the Romanian scientists, and of the number of ISI quoted Romanian publications and journals (from 7 to 50).

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