Data Article

Data for absorption, evaluation and effectiveness of R&D projects in Greece

Evangelos Makryvelios*, George Mavrotas*

Laboratory of Industrial & Energy Economics, School of Chemical Engineering, National Technical University of Athens, Zografou Campus, Athens 15780, Greece

A R T I C L E    I N F O

Article history:
Received 17 May 2021
Revised 18 July 2021
Accepted 5 August 2021
Available online 9 August 2021

Keywords:
R&D funding
Absorption
Ex-ante evaluation
Effectiveness

A B S T R A C T

This data article presents primary data for the absorption, evaluation, and effectiveness of 1949 research projects implemented by 3259 research institutions in the framework of funding actions of the operational programmes of the Partnership Agreement for the Development Framework for the 2007–2013 programming period [1,2]. The authors collected the data in the period 2009–2017, after the study and processing of 37 national funding actions [2–5] managed during the same period by the General Secretariat for Research and Technology (G.S.R.T.) and the Special Managing and Implementation Service in the areas of Research, Technological Development and Innovation (R.T.D.I.). The presented data can be used by researchers and research project management bodies studying the absorption, management and distribution of research resources and the design and implementation of multi-criteria project evaluation methods.

© 2021 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

* Data availability: National Strategic Reference Framework (N.S.R.F.) 2007-2013, Greece Data for R&D projects: Indicators of absorption, evaluation and effectiveness (Original data) (Mendeley data)
DOI of original article: 10.1016/j.ejor.2020.09.051
* Corresponding authors.
E-mail addresses: evmakriv@mail.ntua.gr (E. Makryvelios), mavrotas@chemeng.ntua.gr (G. Mavrotas).

https://doi.org/10.1016/j.ejor.2020.09.051
https://doi.org/10.1016/j.dib.2021.107273

2352-3409/© 2021 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)
### Specifications Table

| Subject | Economics, Econometrics and Finance |
|---------|-------------------------------------|
| Specific subject area | R & D finance, evaluation and effectiveness |
| Type of data | .xls files, Tables in the article and supplementary data files |
| How data were acquired | The primary data came from: (a) the study of research proposals submitted for evaluation and funding, (b) the expert evaluation reports and (c) the processing of physical and financial certification reports of all research and technology projects of the research population |
| Data format | Raw, analyzed |
| Parameters for data collection | The data relates to the total of research projects (1949) financed from National Strategic Reference Framework (N.S.R.F.) resources and implemented in the programming period 2007–2013. The data concern the budget of the projects, the required public expenditure for their implementation, as well as data for their effectiveness [2]. For 293 projects from the total of the projects, we had at our disposal data on the absorption of resources, their ex-ante evaluation, and measurement values of the efficiency from their implementation. [6,7]. |
| Description of data collection | The data were collected during the period 2009–2017. They were collected in two phases. In the first phase, data were obtained mainly on the content of the research proposals claiming funding from N.S.R.F. resources, more specific the research project planned and expected to be funded by N.S.R.F. resources. In the first phase, data were also collected regarding the scores of evaluations of research proposals by experts for their inclusion in the financing actions. In the second phase which is related to the implementation of research projects, data were collected on the absorption of resources and the effectiveness of research projects in their implementation. The data were selected with the aim of recording: (a) investment interest in R & D projects, (b) the absorption of public expenditure from the implementation of R & D projects, and (c) the effectiveness of R & D projects funded and carried out during the 2007–2013 programming period. |
| Data source location | Ministry of Development and Investments |
| | General Secretariat for Research and Innovation |
| | 14–18, Mesogeoion Av.,11527 Athens, Greece |
| Data accessibility | Repository name: Mendeley data |
| | Data identification number: 10.17632/ckrbcfmmbw.1 |
| | Direct URL to data https://data.mendeley.com/datasets/ckrbcfmmbw/1 |
| Related research articles | Makryvelios, E., Mavrotas, G., Analysis of the Research & Development funding in Greece under EU programs. Journal of Public Administration and Governance, Volume 11, Issue 1, (2021) 223–250 [1]. |
| | https://doi.org/10.5296/jpag.v11i1.18179 |
| | Mavrotas, G., Makryvelios, E., Combining multiple criteria analysis, mathematical programming and Monte Carlo simulation to tackle uncertainty in Research and Development project portfolio selection: A case study from Greece. European Journal of Operational Research, Volume 291, Issue 2, (2021) 794–806 [8]. |
| | https://doi.org/10.1016/j.ejor.2020.09.051 |

### Value of the Data

- The data for absorption can be used in case studies involving problems in allocating research resources. The data for absorption, evaluation and efficiency can be used to create multi-criteria evaluation methods and selection of projects for funding [8].
- Management bodies of research funding programmes can utilise the data for absorption, evaluation, and effectiveness by beneficiary type, scientific field, and implementation region to make more rational allocations of public resources [1].
- Absorption and effectiveness indicators can be used in the future to design new research funding programmes by Research Policy Makers, Managing Authorities and Intermediate Bodies managing funding actions [1].
• Effectiveness indicators can facilitate evaluators of research proposals to assess the realism and feasibility of the implementation of a research project. In addition, such indicators can reduce the subjectivity and uncertainty of decision-makers [1,8].
• All primary data can be used by researchers in case studies, as they help formulate more scenarios for the allocation of public resources and the creation and implementation of methods of evaluation and selection and funding of research proposals [8].
• The set of initial data from the two funding actions, (“Cooperation 2009” & “Cooperation 2011”) depicting % absorption, values in the evaluation criteria and values in the efficiency indicators can be used to make a series of correlations between the absorption, evaluation and efficiency values [1].

1. Data Description

This article first introduces some of the key features of the data. Specifically, Table 1 presents information on the research projects funded in the period 2007–2013 from N.S.R.F. resources in Greece. Information is provided about the research bodies that implemented them, the Research Technological Development and Innovation (R.T.D.I.) sector and the scientific field to which the objects of the funded research projects belonged as well as the region of their implementation. Table 2 presents the evaluation criteria for the selection of research projects to finance two funding actions: the funding action “Cooperation 2009” [6] and the funding action “Cooperation 2011” [7], together with their respective weighting factors. Table 3 presents the effectiveness measurement indicators [9] from the implementation of the research projects funded by these two funding actions, while Table 4 shows the total values of the effectiveness indicators from the implementation of the 1,949 research projects.

The primary data file published on the Mendeley Data presents the characteristics of the research projects of the funding actions “Cooperation 2009” and “Cooperation 2011”. Specifically: (i) the project code (ii) the approved budget and the corresponding approved public expenditure of the project at its inclusion, (iii) the budget and the corresponding public expenditure at the completion of the project, (iv) the budget absorption % and public expenditure of each research project, (v) the scores of each research project on each evaluation criterion separately and its

| Table 1 | Description of key characteristics of research projects. |
|---------|----------------------------------------------------------|
| **Type of Data** | Description |
| General | 1,949 R&D projects |
| | 3,259 Research entities |
| | 37 National R&D projects funding actions [1–7] |
| | Implementation period: 2007–2016 |
| | Country: Greece |
| | Operators of funding actions: General Secretariat for Research and Innovation and Authority for Research, Technological Development and Innovation Actions (MIA-R.T.D.I.) |
| **Type of Beneficiary** | Research Institution, business, other research institutions |
| R.T.D.I. Sector | Agriculture-Fisheries-Livestock, Farming-Food and Biotechnology, Energy, Social and Economic, Development Dimension, Transportation, Nanotechnology – Nanoscience and Microelectronics, Cultural Heritage, Environment, Health, High-Value Added Products and Production, Technologies focusing on Traditional Industries, Information and Communication Technologies, Space and Security Technologies |
| Scientific field | Sciences, Agricultural Sciences, Engineering Sciences, Human Sciences, Science, Medical Sciences and Social Sciences |
| Regions of implementation | Attica, Eastern Macedonia & Thrace, Western Greece, North Aegean, Epirus, Western Macedonia, Crete, Peloponnese, Central Greece and South Aegean |
Table 2
Evaluation criteria for Actions “Cooperation 2009” and “Cooperation 2011”.

| Action “Cooperation 2009” | Description |
|---------------------------|-------------|
| Criteria A: Scientific and technical excellence of the proposed project | Min. acceptable score 20 points |
| Criteria B: Experience and credibility of the partnership, and quality, ability of the project implementation | Max. acceptable score 35 points |
| Criteria C: Results of the proposed project | Min. acceptable score 20 points |
| Total score of each project | Max. acceptable score 30 points |

| Action “Cooperation 2011” | Description |
|---------------------------|-------------|
| Criteria A: Quality – credibility of the partnership | weighting factor of 30% |
| Criteria B: Scientific and technical excellence of the proposal | weighting factor of 30% |
| Criteria C: Contribution to the country’s economy and productivity and impact on the operation and progress of the participating enterprises | weighting factor of 40% |
| Total score of each project | The sum of the scores of the three criteria, multiplied by the corresponding weighting factor. |

Table 3
Effectiveness indicators for each project for Actions “Cooperation 2009” and “Cooperation 2011”.

| Effectiveness indicators | Description |
|--------------------------|-------------|
| New jobs created during project operation | measured in full-time equivalent (FTE), and is defined as the ratio of working hours actually spent on R&D during a specific reference period divided by the total number of hours conventionally worked in the same period by an individual or by a group |
| Number of research and technological development projects | measured in numbers |
| Number of projects of cooperation between enterprises and research institutes | measured in numbers |
| Number of research jobs created | measured in full-time equivalent |
| Induced Investments (private) | measured in million euros |
| Jobs created during project implementation | measured in equivalent man-years |

overall score (vi) the values for each research project in each of the five indicators to measure its effectiveness. The same file presents data on the budget and the public expenditure paid to the beneficiaries of the research projects at the completion of the projects. The data are presented by operational programme, regional operational programme, type of beneficiary, region of implementation, scientific field and R.T.D.I. sector.

2. Materials and Methods

The interest of the entities implementing research and development projects for the funding actions of NSRF 2007–2013 was particularly high. 11,217 funding beneficiaries submitted 11,018 research funding proposals to raise funding amounting to €2.7 billion. Approximately 18.7% of the proposed projects (2064) and 30.2% (3386) of funding beneficiaries claiming public funding of €546.3 million were approved. In the end, 1949 projects were successfully implemented from those that initially received approval (94.4%) with a public expenditure of 405.7 million euros. The particular projects implemented by 3259 research entities as well as their specific characteristics constitute our primary data.
1949 research proposals were funded by the operational programmes “Competitiveness and Entrepreneurship”, “Human Resources Development” and “Education and Life Long Learning” of the Partnership Agreement for the Development Framework (NSRF), for the 2007–2013 programming period. These particular operational programmes were managed by the General Secretariat of Research and Technology (G.S.R.T.) and the Special Managing and Implementation Service in the areas of Research, Technological Development and Innovation (R.T.D.I.). During this period, there were 37 calls for actions regarding R&D activities.

The primary data presented in this data article were collected in two main phases in the period 2009–2019. The first phase refers to the evaluation of research proposals and their approval of funding, while the second phase refers to the implementation of research projects.

During the first phase, all research proposals (1,949) were evaluated by experts with specific knowledge experience by means of several evaluation criteria, different in each funding action. The evaluation of the research proposals was carried out following the study of their technical annexes presenting (a) the subject of the survey (R.T.D.I. sector, R.T.D.I subsector, scientific

Table 4
Descriptive data of result indicators for the implemented research projects of the programming period 2007–2013.

| Indicator Code | Indicator name                                                                 | Unit of measurement | N   | Total | mean | min | max |
|----------------|--------------------------------------------------------------------------------|---------------------|-----|-------|------|-----|-----|
| 1              | New jobs created during project cooperation                                    | F.T.E.              | 1.572| 2.401 | 1.54 | 0.00| 13.90 |
| 3              | Number of jobs created for women                                                | F.T.E.              | 56  | 101   | 1.83 | 0.00| 4.00 |
| 4              | Number of research and technological development projects                       | Number              | 1.466| 632   | 0.43 | 0.00| 1.71 |
| 5              | Number of projects of cooperation between enterprises and research institutes    | Number              | 929 | 242   | 0.26 | 0.00| 1.00 |
| 6              | Number of research and technological development projects                       | F.T.E.              | 1.465| 4.663 | 3.19 | 0.00| 36.62 |
| 9              | Number of jobs created                                                          | F.T.E.              | 31  | 102   | 3.39 | 1.00| 8.00 |
| 10             | Induced Investments (private)                                                   | Million €           | 801 | 134   | 0.16 | 0.00| 1.14 |
| 501            | Jobs created during project implementation                                       | F.T.E.              | 1.459| 4.664 | 3.20 | 0.00| 36.62 |
| 3103           | Number of enterprises participating in projects of cooperation between enterprises and research institutes | Number              | 416 | 416   | 1.00 | 0.00| 1.00 |
| 3104           | Number of new enterprises supported for RTD from the action of new and small and medium enterprises | Number              | 55  | 55    | 1.00 | 1.00| 1.00 |
| 3106           | Number of new enterprises supported for E.T.A. from the action of young and small and medium enterprises | Number              | 55  | 55    | 1.00 | 1.00| 1.00 |
| 3110           | Number of companies benefiting from Innovation research and development actions | Number              | 288 | 288   | 1.00 | 0.00| 1.00 |
| 3111           | Number of new/supported knowledge-intensive businesses (spin-off & spin-out)    | Number              | 30  | 30    | 1.00 | 0.00| 0.00 |
| 3112           | Number of joint projects with S&T bodies in other countries                     | Number              | 409 | 250   | 0.61 | 0.00| 1.00 |
| 3115           | Number of patent applications by researchers                                    | Number              | 276 | 137   | 0.50 | 0.00| 7.00 |
| 3121           | Number of laboratories supported                                                | Number              | 282 | 286   | 1.02 | 0.00| 7.00 |
| 6913           | Number of researchers participating in supported research projects              | Number              | 313 | 1.647 | 5.18 | 0.00| 19.00 |
| 8004           | Studies, expert opinions, researches, evaluations                               | Number              | 32  | 142   | 4.58 | 0.00| 20.00 |
| 8009           | Number of events and information and awareness actions                           | Number              | 30  | 48    | 1.66 | 1.00| 2.00 |

*pFull time equivalent unit.
field), (b) the objectives and results pursued (effectiveness indicators) (c) data for the beneficiaries (type of beneficiary, synergies, region of implementation) and (d) financial elements of the project (budget, public expenditure, eligible expenditure).

In the first phase, the authors, having studied the technical annexes of all the projects, recorded the above data in the information systems of the General Secretariat of Research and Technology (G.S.R.T.) and the Ministry of Development and Investment. The former system was used to monitor and assess the progress of the projects and the latter to determine the financing of the actions and the absorption of public expenditure for each project separately.

The scores received by each research proposal on each criterion separately and its overall score were delivered by the experts to the authors who in turn entered them in the General Secretariat of Research and Technology (G.S.R.T.) information system in order to identify in descending order the beneficiaries of funding by sector and region of implementation.

The purpose of recording the above data was to: (a) identify the investment interest in the implementation of R&D projects, (b) identify the main features of research proposals and implementing bodies and (c) evaluate research proposals.

During the second phase, the authors, as members of a five-member group of consultants, were involved in monitoring the implementation of research projects and in identifying and recording the absorption of public expenditure from the implementation of projects and effectiveness indicators.

Authors with the help of a group of physical and economic certifiers monitored the progress of each project separately reflected in specific certification reports. These reports confirm the progress of each project over a period of time (six months or a year), the costs incurred in implementing it and the effectiveness indicators which were certified. The data were then entered in the information systems of both the General Secretariat of Research and Technology and the Ministry of Development and Investment.

The objectives of recording the second phase data were to: (a) record the absorption of research and development resources; (b) measure the effectiveness of research projects and (c) implement all funding actions and operational programmes with a view to drawing useful conclusions for the design of future actions and operational programmes.

Ethics Statement

- The authors have the right to redistribute the primary data and they have the permission to post the Primary data on Mendeley Data by General Secretariat for Research and Innovation of the Greek Government's Ministry of Development and Investment.
- The authors did not submit this paper for other publication elsewhere.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

Acknowledgments

The authors would like to thank the Authority for Research, Technological Development and Innovation Actions (MIA-R.T.D.I.) and the General Secretariat for Research and Technology for the disposal of data for all R&D project financing actions carried out under the Partnership Agreement for the Development Framework, for the 2007–2013 programming period.
Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.107273.

References

[1] E. Makryvelios, G. Mavrotas, Analysis of the research & development funding in Greece under EU programs, J. Public Admin. Gov. 11 (1) (2021) 223–250, doi:10.5296/jpag.v11i1.18179.

[2] Total R.T.D.I actions 2007-2013. http://www.gsrt.gr/central.aspx?sid=10814711140216461448725&olID=771&neID=761&neTa=51_1&nclID=0&neHC=0&tbid=0&lrid=2&oldUID=a17710f10814711140210l2&actionID=load, General Secretariat for Research and Technology, Athens, 2017. Accessed February 1, 2019.

[3] Implementation guide for actions of operational programme “human resources development” http://www.gsrt.gr/central.aspx?sid=10814711140216461448725&olID=790&neID=771&neTa=14_1_0&nclID=0&neHC=0&tbid=0&lrid=2&oldUID=a17900f10814711140210l2&actionID=load, General Secretariat for Research and Technology, Athens, 2013. Accessed February 1, 2019.

[4] Implementation guide for actions of operational programme “competitiveness and entrepreneurship” http://www.gsrt.gr/central.aspx?sid=10814711140216461448725&olID=790&neID=771&neTa=1_1_0&nclID=0&neHC=0&tbid=0&lrid=2&oldUID=a17900f10814711140210l2&actionID=load, General Secretariat for Research and Technology, Athens, 2009. Accessed February 9, 2019.

[5] Implementation guide for actions of operational programme “education and lifelong learning” http://www.gsrt.gr/central.aspx?sid=10814711140216461448725&olID=790&neID=771&neTa=60_1_0&nclID=0&neHC=0&tbid=0&lrid=2&oldUID=a17900f10814711140210l2&actionID=load, General Secretariat for Research and Technology, Athens, 2010. Accessed February 22, 2019.

[6] Implementation guide for action “cooperation 2009”. http://www.eyde-etak.gr/central.aspx?sid=11914901265646491142, Authority for Research, Technological Development and Innovation Actions, Athens, 2009. Accessed February 1, 2019.

[7] Implementation guide for action “cooperation 2011”. http://www.eyde-etak.gr/central.aspx?sid=11914901266646491153, Authority for Research, Technological Development and Innovation Actions, Athens, 2011. Accessed February 1, 2019.

[8] G. Mavrotas, E. Makryvelios, Combining multiple criteria analysis, mathematical programming and Monte Carlo simulation to tackle uncertainty in research and development project portfolio selection: a case study from Greece, Eur. J. Oper. Res. 291 (2) (2021) 794–806, doi:10.1016/j.ejor.2020.09.051.

[9] NSRF Integrated monitoring system for indicators and in fact for the NSRF 2014-2020 programming period https://www.espa.gr/elibrary/Enialo_Syistma_Parakolouthisis_Deiktwn_2014-2020_July2017.pdf, Ministry of Development and Investments, Athens, 2017. Accessed February 2, 2019.