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**An analysis of the state of research and development
co-operation between Greece and France**

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Introductory note

In what follows, an analysis of the Research and Development (R&D) cooperation between Greece and France is presented. To accomplish such a feat in a comprehensive manner, the availability and up-to-date character of the relevant data needed to be taken into consideration.

Given the prime networking effect of European R&D competitive funds, in addition to them being a main funding source for the Greek science and technology base, weighted towards encompassing an analysis of the 7th Framework Programme.

Examining the scientific 'output' in terms of publications, and more specifically of co-publications by Greek and French authors in acclaimed science and technology journals stands as the second pillar of this analysis.

Lastly, the bilateral R&D program, given its explicit and direct aim towards enhancing the R&D cooperation between the two countries is also included.

1. 7th FRAMEWORK PROGRAMME 2007-2013¹

As the following table (1) indicates, the absolute number of FP7 projects populated by at least one French and one Greek legal entity is 1.231. In the Greek case, this amounts to almost 50% (49,7%) of the total Greek participation in the FP, standing as a significant indicator of the bilateral research collaboration. In matters of net value creation, Greek participants managed to attract EU funds amounting to almost 500 million €, whereas French ones almost 1 billion €, indicating a country-to-country ration of 1:2. Typically for EU projects, coordination from the Greek legal entities amounted to 10% of the total participating population – slightly less for French ones. Overall, the total number of collaborative links created between Greece and French in the 7th FP amounted to 4.042.

No of projects with FR–GR participation	1.231
% in total GR projects	49,7%
Total EC funding for GR participants (million Euros)	482,82
Total EC funding for FR participants (million Euros)	915,24
No of GR participations	1.869
<i>Of which GR as coordinators</i>	<i>184</i>
No of FR participations	2.547
<i>Of which FR as coordinators</i>	<i>180</i>
No of collaborative links ²	4.042

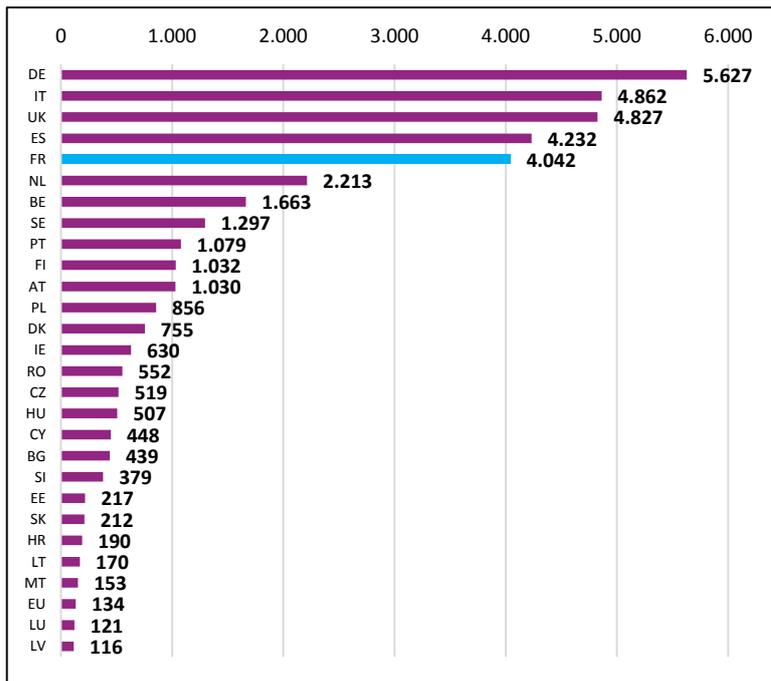
¹ Data were extracted from ecorda database (European Commission): 30.10.2015.

² A collaborative link is assumed to exist between each pair of participants in each project / contract. The number of collaborative links created by a project is calculated in the following way: When there are m participants from one country and p from another country in a project, the number of collaborative links created between the two countries as a result of the project is assumed to be m*p.

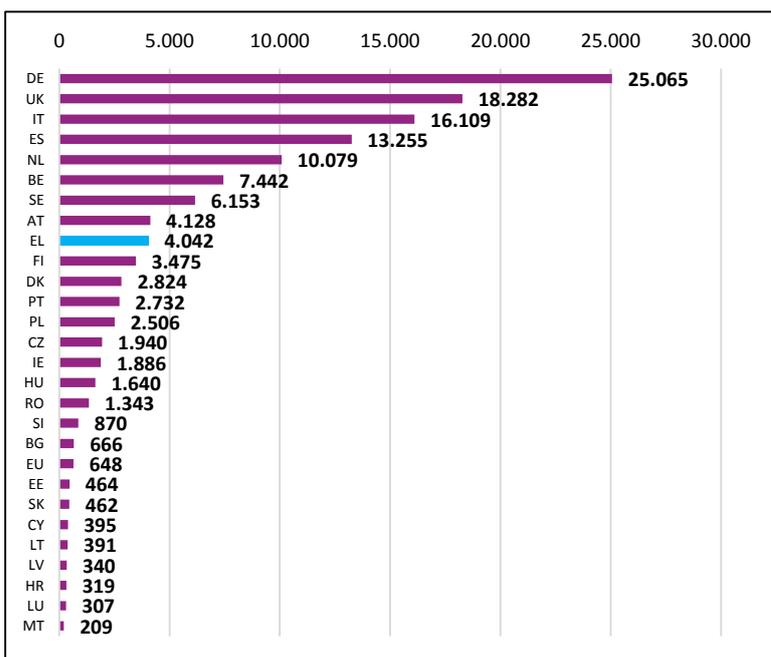
Performing a basic network analysis on the basis of the number of collaborative links, both the quality and quantity of the research partnership of the legal entities of both countries becomes evident. As the following graphs (1) indicate, French entities are the international entities with which Greek ones have established the fifth highest number of collaborative links (1.a.), whereas Greek entities outperform Danish, Finnish and Portuguese partners in establishing collaborative links with their French counterparts (1.b).

The importance of cooperation for both countries, Graph 1.

1.a. Collaborative links of EU28 countries with Greece, 2007-2013.



1.b. Collaborative links of EU28 countries with France, 2007-2013.



Analyzing the cooperating legal entities, in the following table (2), it appears that whereas Greek participations are evenly divided amongst Greek academic and research institutions, the bulk of French participations are positively attributed to a much smaller segment of legal entities, foremost of which is CNRS and CEA. Interestingly, Thales Communication and Security, a subsidiary of Thales Group, is positioned fourth with 50 participations, indicating a solid understanding of the domestic technological and industrial base. In addition to the established academic and research institutes, the composition of its Greek partners consists of R&D-intensive major defence industries as well as small, promising ones.

Cooperating organizations, Table. 2

2.a. Top GR organizations:

GR PARTICIPANT	No of Participations
FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	125
CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS CERTH	117
NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA	98
INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	75
NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	84
NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS	88
UNIVERSITY OF PATRAS	78
ARISTOTLE UNIVERSITY OF THESSALONIKI	75
HELLENIC CENTRE FOR MARINE RESEARCH	55
ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION COMMUNICATION & KNOWLEDGE TECHNOLOGIES	29
NATIONAL HELLENIC RESEARCH FOUNDATION	29

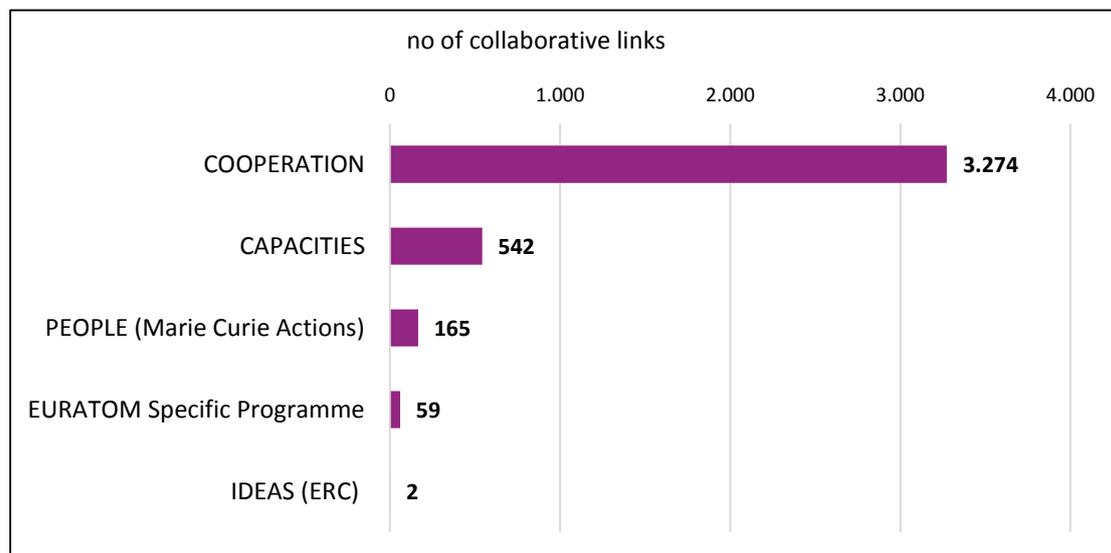
2.b. Top FR organizations:

FR PARTICIPANT	No of Participations
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	215
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	118
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE	58
THALES COMMUNICATIONS & SECURITY SAS	50
INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	48
UNIVERSITE PIERRE ET MARIE CURIE - PARIS 6	43
INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE (INSERM)	38
INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER	37
INSTITUT FRANCAIS DES SCIENCES ET TECHNOLOGIES DES TRANSPORTS, DE L'AMENAGEMENT ET DES RESEAUX	29
OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES	27

Performing an analysis of the collaborative linkages between the two countries per Programme of FP7, as the following graph (2) and tables (3a, b) indicate, out of 4.042 links almost 81% (3.274) of those can be found in the ‘cooperation’ programme. Zooming in into the programme, most take place in the thematic areas of ICT, Transport (incl. Aeronautics), Food, Agriculture, Fisheries and Biotechnology and Joint Technology Initiatives. In line with the previous finding concerning the links established by cooperating legal entities, attention should be given to the fields of Security and Space where a vibrant relation seems evident, since cooperation in these areas outperform the Energy, and even Health areas. Focusing on the ‘capacities’ programme, a programme accounting for 13% of the total collaborative links, the bulk of those links are attributed to the Research Infrastructure and the Research for the Benefit of SMEs’ programmes.

Thematic areas of cooperation, Graph 2.

Collaborative links between GR and FR per Programme, 2007-2013.



3.a. Collaborative links between GR and FR in COOPERATION specific programmes, 2007-2013.

COOPERATION	No of Collaborative links
Information and Communication Technologies Programme	1.005
Transport (including Aeronautics) Programme	507
Food, Agriculture and Fisheries, and Biotechnology Programme	295
Joint Technology Initiatives (Annex IV-SP1) Programme	294
Nanosciences, Nanotechnologies, Materials and new Production Technologies - NMP Programme	255
Environment (including Climate Change) Programme	236
Security Programme	215
Health	168
Space Programme	148
Energy Programme	107
Socio-economic sciences and Humanities Programme	29
General Activities	15
COOPERATION -total	3.274

3.b. Collaborative links between GR and FR in CAPACITIES specific programmes, 2007-2013.

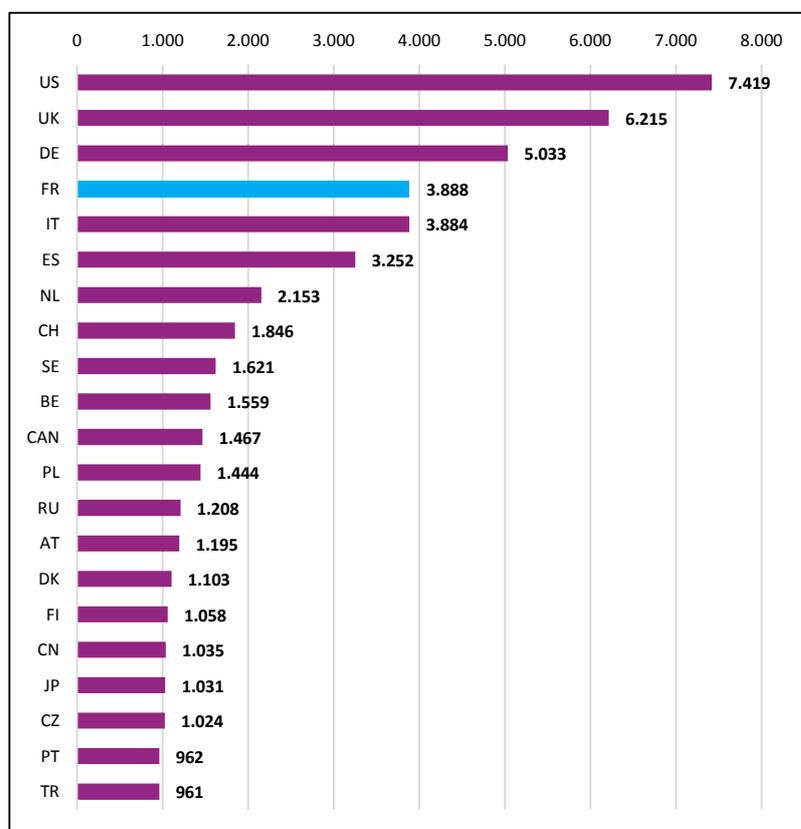
CAPACITIES	No of Collaborative links
Research Infrastructures Programme	252
Research for the benefit of SMEs Programme	193
Activities of International Cooperation Programme	50
Science in Society Programme	44
Research Potential Programme	2
Regions of Knowledge Programme	1
Support for the coherent development of research policies Programme	0
CAPACITIES - total	690

2. SCIENTIFIC PUBLICATIONS, 2008-2012³

Turning our attention to the degree of bilateral research collaboration, as measured by scientific publications, the absolute number of such publications co-authored by at least one French and one Greek author amounts to 3.888 (Table 4). This not only stands for 7,3% of the total Greek publications, but, more importantly, amounts to 17,1 of Greek publications co-authored with a non-Greek author; again, indicating that French authors are among the most preferred authors of international lineage. This bears evidence of the centrality of the bilateral research collaboration, given that co-publications with French authors rank fourth, following only those co-publications performed together with US-, UK-, and Germany-based authors (Graph 3).

Scientific co-publications, 2008-2012, Table 4.	
No of scientific publications with GR-FR cooperation	3.888
% in total GR publications	7,3%
% in total GR publications with international cooperation	17,1%

The importance of cooperation for Greece, Top 20 countries, 2008-2012, Graph 3.



³ Bibliometric data are based on the Web of Science database, and refer to the time period 2008-2012. For a comprehensive account of Greek publications, refer to: National Documentation Centre, 2014, *Greek Scientific Publications 1998-2012; Bibliometric Analysis of Greek Publications in International Scientific Journals*, National Documentation Centre (<http://metrics.ekt.gr/el/node/176>).

Analyzing the institutions under the auspices of which the Greek co-author is based, the great majority is attributed to only one academic institution, that of University of Athens with more than 30%. It is followed by the University of Thessaloniki with 13% (Table 5).

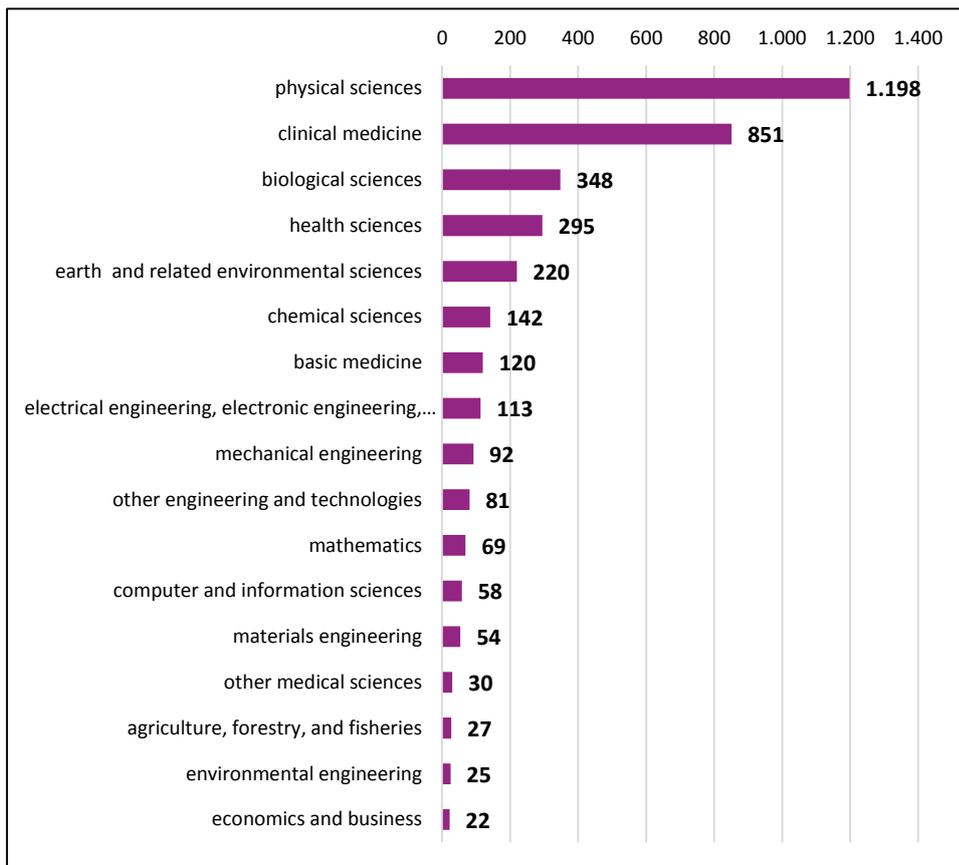
Cooperating organizations, Table 5.

GR ORGANIZATION	No of Publications
NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS	1.451
ARISTOTLE UNIVERSITY OF THESSALONIKI	618
NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA	460
NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	389
UNIVERSITY OF CRETE	376
UNIVERSITY OF IOANNINA	375
FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	224
UNIVERSITY OF PATRAS	220
ACADEMY OF ATHENS	99
HAROKOPIO UNIVERSITY OF ATHENS	88
HELLENIC CENTRE FOR MARINE RESEARCH	87
NATIONAL OBSERVATORY OF ATHENS	68
UNIVERSITY OF THESSALY	64
NATIONAL HELLENIC RESEARCH FOUNDATION	61
UNIVERSITY OF THE AEGEAN	58

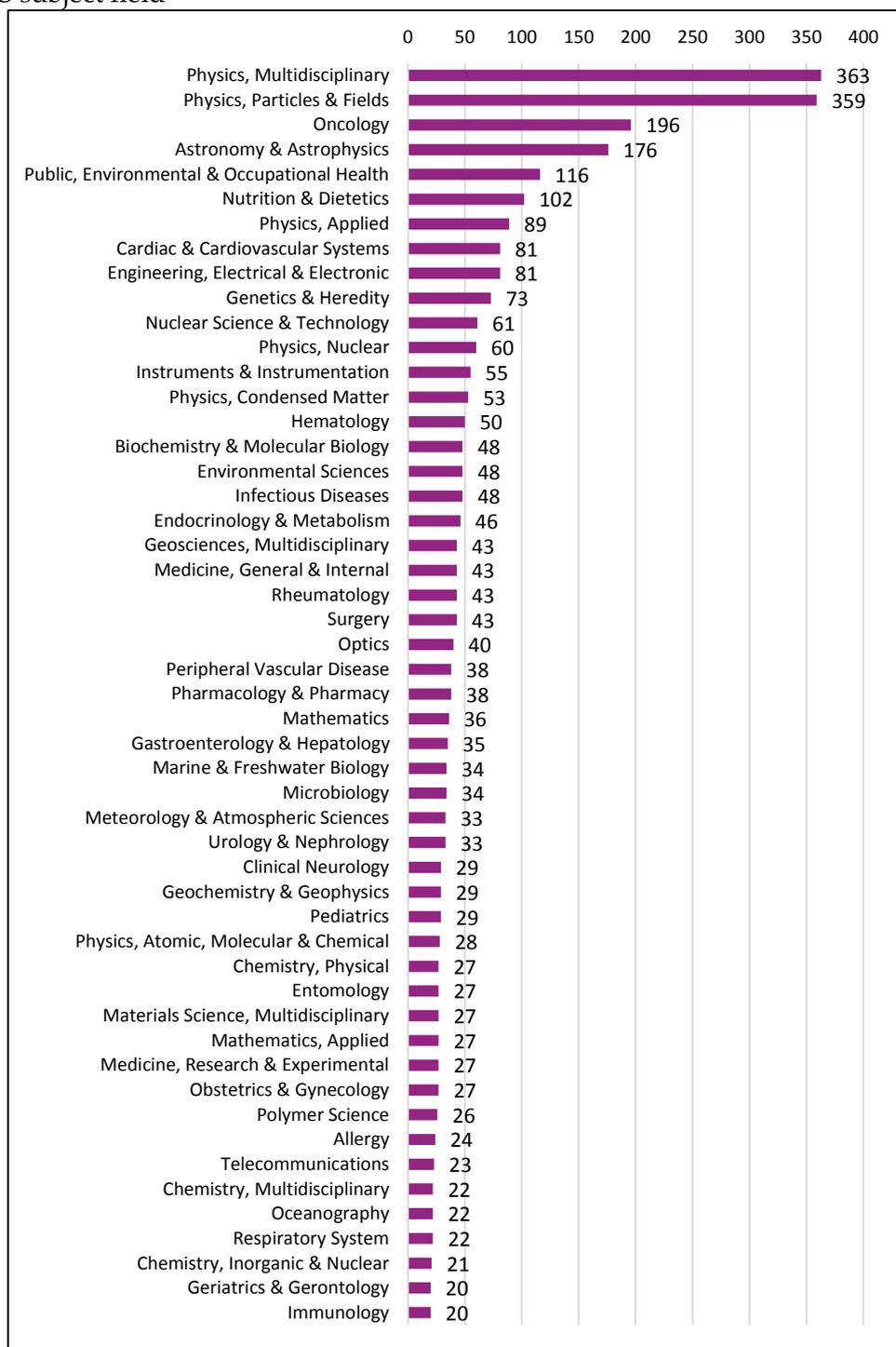
Analyzing the co-publication trend between the two countries taking into account the scientific fields of collaboration, it is evident that most of the co-publications take place in the so-called 'hard sciences', and more specific in the physical sciences and clinical medicine with a number of 1.198 and 851 respectively. This is the case making use of both the Frascati classification (as above noted) and the Web of Science subject field index.

Scientific fields of cooperation, 2008-2012, Graph 4.

4.a. Frascati classification.



4.b. WoS subject field



3. BILATERAL R&D COOPERATION, 2013⁴

Following the 1960 agreement for Scientific and Technological Collaboration between the French Republic and the Hellenic Republic, the General Secretariat for Research and Technology (GSRT) of the Ministry of Research, Education and Religious Affairs of the Hellenic Republic issued in 2013 a call for funding bilateral R&D projects. The following table (6) presents a complete picture in terms of R&D fields, number of projects and funds involved.

Performing an analysis of the results, it is obvious that the field of Health has been the prime source of cooperation having attracted a quarter (7 out of 28) of the total population of the projects. It is followed by the Fields of Energy and Space and Security Technologies with 5 and 3 projects (respectively). Lastly, all the Greek participants in this bilateral cooperation are academic and research institutes.

Results of the bilateral R&D Cooperation, Table 6.

R&D Field	No. of projects	Funding through Greek government investment budget
Health	7	210.000 €
Energy	5	150.000 €
Space and Security Technologies	3	90.000 €
Environment	3	90.000 €
Societal and Economic Aspect of Development	2	60.000 €
Agriculture. Fisheries, Food and Biotechnology	1	30.000 €
Total	28	630.000 €

⁴ Data provided to the National Documentation Centre by GSRT.