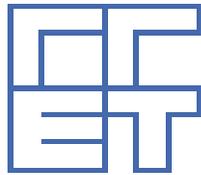




**HELLENIC REPUBLIC
MINISTRY OF DEVELOPMENT
GENERAL SECRETARIAT FOR RESEARCH
AND TECHNOLOGY
DIRECTORATE FOR PLANNING & PROGRAMMING
Programming Department**

**STRATEGIC PLAN FOR THE DEVELOPMENT OF
RESEARCH, TECHNOLOGY AND INNOVATION
UNDER THE NSRF 2007-13**



Athens, October 2007

INTRODUCTION

This strategic plan presents the strategy for the development of research, technology and innovation under the NSRF 2007-13. The key objective of the development strategy for research, technology and innovation during the 2007-13 period is to restructure the Greek economy, gearing it towards high value added products and services, and achieve the transition to the knowledge economy and society. In formulating this strategy, consideration was given to the revised Lisbon strategy and the need for convergence with the European Union, as well as to globalisation and open innovation. The country's performance indicators in the areas of research, technology and innovations were also taken into account, together with the respective strengths and weaknesses.

The strategic plan for the development of research, technology and innovation (NSRF-RTDI) begins by presenting a description of the current situation in the area in both the public and the private sector, and identifying strengths and weaknesses on the basis of performance in research, technology and innovation, including regional disparities. The development strategy for the 2007-13 period is then presented (organised in terms of objectives, key principles, and priority areas), followed by the contents of the Plan, which includes the overall and individual objectives by axis and the actions to be implemented under each priority axis towards attainment of the objectives. A key aim of all actions is the achievement of economies of scale and scope at the regional, national and European level, and participation in international networks. Enterprises will continue to be the primary beneficiaries of the proposed actions; however the focus of the actions will be on groups and networks of enterprises and on their cooperation with Universities and research centres. International cooperation will be eligible under all actions.

Implementation of the Strategic Plan (NSRF-RTDI) will take place through the Sectoral and Regional Operational Programmes of the National Strategic Reference Framework (NSRF) 2007-13. The most important Operational Programmes are the Operational Programme "Entrepreneurship and Competitiveness", the Regional Programmes of the five regions in transition (primarily the Regional Operational Programmes (ROPs) for Attica and Macedonia-Thrace), and the Operational Programmes "Education and Lifelong Learning" and "Digital Convergence". Public expenditure for research, technology and innovation actions through the various Sectoral and Regional Programmes under the NSRF 2007-13 shall exceed €1,300 million (with Community contribution exceeding €1,000 million, representing nearly 5% of total Community contribution). These funds are commensurate with the GSRT estimates of the funds required in order for the gross R&D expenditure (GERD) to approach 1.5% of the country's revised GDP by the year 2015, of which 40% will be contributed by the private sector.

The decision by the Ministry of Development – GSRT concerning the preparation of the NSRF-RTDI was taken immediately after the 3rd Circular of the Ministry of Economy and Finance (June 2006), which finalised the structure of the Programmes under the NSRF. The decision was influenced by the fact that the actions promoting research, technology and innovation, which form the backbone of the national development strategy in the new programming period, would be eligible to receive funding –to a greater or lesser extent– from all Programmes under the NSRF. On the

one hand, the preparation of the Strategic Plan was aiming at the coordination of planning and implementation of research, technology and innovation activities under the NSRF Programmes on the base of common objectives. On the other hand, it was aiming at the promotion of research, technology and innovation actions at the national level and at their coordination with the European Union policy in the context of the European Research and Innovation Area and of attaining the objectives of the attaining of National Reform Programme.

In particular, the following are pointed out:

The first (summary) Strategic Plan for the Development of research, technology and innovation was formulated in July 2006, after the 3rd Circular of the Ministry of Economy and Finance concerning the preparation of the operational programmes of the 2007-13 programming period. The objective was to assist in the formulation and coordination of the research, technology and innovation actions under all regional and sectoral operational programmes on the basis of common national targets. Furthermore it was aiming at the formulation of the national development strategy and the allocation of the required funds from the various R&D-related programmes under the NSRF. The proposal by GSRT on the required funds took also into account the regional distribution of GERD, and the fact that 58% of GERD is concentrated in the Attica Region.

The second Strategic Plan (January 2007) was drafted after the completion of the national development strategy document (NSRF) by the Ministry of Economy and Finance, the 4th Circular, and the consultations with the Regions in transition and the Ministries for Education and Employment. It also contributed to the finalisation of the RTDI actions of the sectoral programmes. The present final Plan includes, in addition to the second draft, the priority areas and the method for implementation of the related actions, together with data on the funds made available for RTDI actions under the approved Operational Programmes.

Thus, the present Strategic Plan shall serve as the key tool of the General Secretariat for Research and Technology (GSRT) for coordinating the research and technology actions and interventions in the new programming period, at the national and/or regional level. In line with the provisions on implementation, GSRT is the body responsible for policy formulation and implementation in these areas.

CONTENTS

SECTION 1: CURRENT SITUATION ANALYSIS

The National Innovation, Research and Technology System

- § General
- § The Business Sector
- § Regional Disparities
- § Human Resources

The National Policy for Research, Technology and Innovation

Strengths and Weaknesses

The 2007-13 Programming Period

SECTION 2: THE DEVELOPMENT STRATEGY FOR THE 2007-2013 PERIOD

1.1 Objective, Key Principles, Priority Areas

1.2 Science and technology priority areas (Thematic Priorities) – Objectives

1.3 Barcelona Target and National Target for increasing Investments in Research and Development; National Reform Programme; NSRF Contribution – Budget

SECTION 3: CONTENTS OF THE RESEARCH, TECHNOLOGY AND INNOVATION STRATEGIC PLAN 2007-13

1.1 Axes – Actions by Axis

I. “KNOWLEDGE AND EXCELLENCE” Axis

I.1 “EXCELLENCE” Sub-axis

- § Creation of Physical and/or Networked Centres of Excellence (RDTNs / RETNs)
- § Creation of (a) Knowledge-Intensive Clusters and (b) Innovation Clusters

I.2 “KNOWLEDGE” Sub-axis

- § Cooperation between Business and S&T Organisations
- § Strengthening New Enterprises and SMEs
- § Support of Policies and Coverage of Future Needs
- § European S&T Cooperation
- § Bilateral, Multilateral and Regional S&T Cooperations

I.3 Horizontal Actions

- § Creation of National Sectoral R&D Poles

- § Technical Feasibility Studies and Studies in Support of Preparations for the Submission of Proposals
- § People
- II. “VALUE” Axis**
 - Sub-axis II.1: “Strengthening Innovation and Exploitation of Research Results”**
 - § Creation/Strengthening of Regional Innovation Poles
 - § Reward (BONUS)
 - § Strengthening Supply and Demand for Research, Technology and Innovation Services
 - § Supporting patenting with commercial potential
 - § Pilot Technological Innovation Actions
 - Sub-Axis II.2: “Supporting the Creation and Growth of Innovative Enterprises”**
 - § Strengthening/Creation of Highly Knowledge-Intensive Innovative Enterprises (Spin-off & Spin-out)
 - § Creation of High-Risk Venture Capital (Pre-seed & Seed Capital)
 - § Support of Business Incubators
 - Sub-Axis II.3: Horizontal Actions**
 - § Innovation and Technology Transfer Offices in Universities, Higher Technological Education Institutions and Public Research Centres
 - § Creation of One-stop Shop for the Provision of Information and Support services – Support of Network Participant Organisations
 - § Science and Society
 - § People
- III. Globalisation – Open Innovation**
- IV. Special Actions at the Regional Level**

1.2 Justification of Choices – Performance Indicators

- § Justification of Choices
- § General Performance Indicators

SECTION 4: Provisions on Implementation– Funding

Section 1: Current Situation Analysis

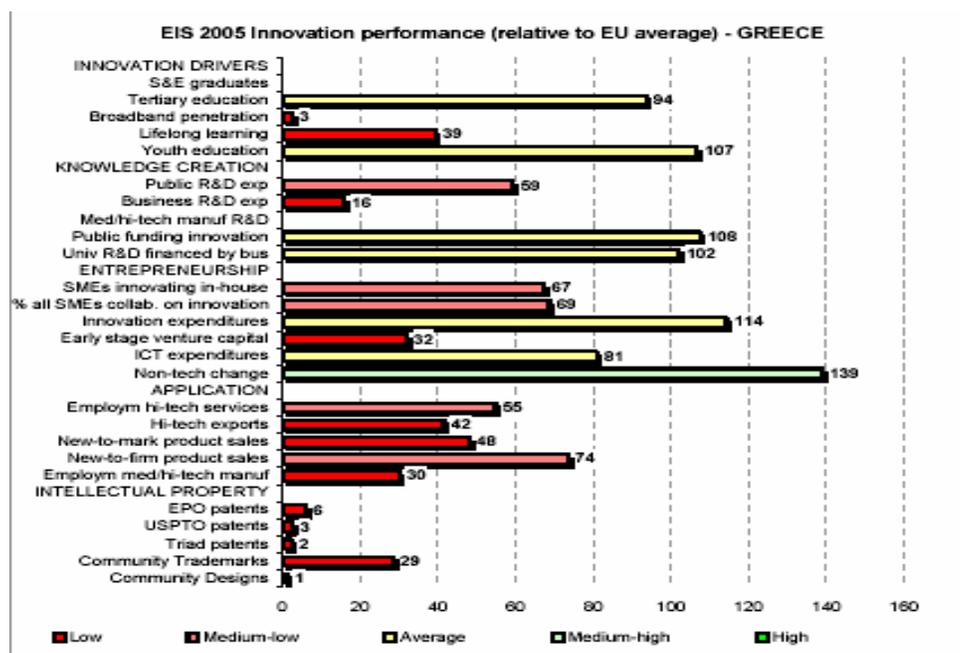
1.1 The National Innovation, Research and Technology System

General

The acceleration of the transition to the knowledge economy, an objective fully aligned not only with the Lisbon strategy but also with the requirements of the new cohesion policy, is a core development choice for Greece in the current, increasingly demanding European and international environment. In this effort, the role of innovation, research and technology is crucial.

Our country's performance in these areas is poor. According to the "European Innovation Scoreboard" data for 2005, Greece is ranked 23rd among the EU-25 countries (ahead of Malta and Latvia only) and 15th among the EU-15 ones in terms of its innovation performance¹. In absolute values, the current situation is composed by 17 indicators in which Greece's performance is poor or average, and 6 in which its performance approaches the EU average, out of a total of 24 indicators for which data for Greece are available (Chart 1). In contrast, our country does well only in the area of non-technological change.

Chart 1: Greece's innovation performance relative to the EU average



The weakest points of our system refer to broadband penetration, lifelong learning, investments in research by enterprises, venture capital, exports of high-tech products, employment in medium- and high-tech manufacturing, production of new products and registration of patents.

¹ Total performance in innovation is calculated by way of the SII composite indicator, which measures performance and trends over the previous three years for 26 indicators that quantify the key innovation components.

At the same time, Gross Domestic Expenditure in Research and Technological Development (GERD) as a percentage of the country's Gross Domestic Product (GDP) stood at a mere 0.62% in 2003 (falling to 0.61% of GDP in 2004, based on provisional data), while from 1999 to this day it has been showing a slight but steady decline (Chart 2). This decline, however, does not correspond to an actual decrease in expenditure (in absolute values GERD is increasing, as shown in Table 1), but to the fact that the increase of expenditure in research could not keep up with the consistently high GDP growth rates of the last decade², as the sectors responsible for this impressive increase of GDP do not comprise knowledge-intensive activities.

Chart 2: Evolution of GERD as a percentage of GDP, 1999-2005

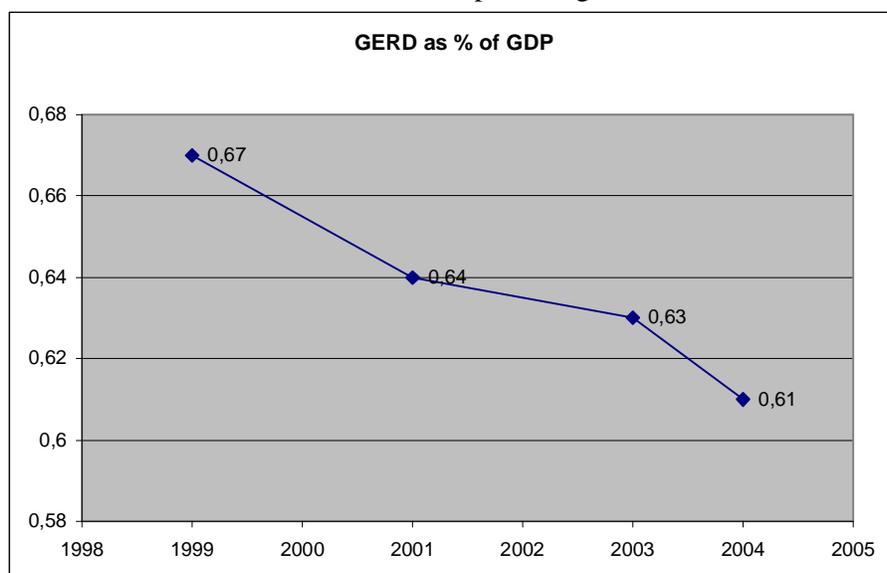


Table 1: GERD evolution, 1999-2005

Year	GERD (in mil. €)
1999	760.20
2001	851.50
2003	977.78
2004 (provisional)	1,021.47
2005	1,153.00

About half of our country's research activities are carried out by Higher Education Institutions (Table 2). The business sector's participation is low and seems to have stabilised around 30% in recent years. The contribution of public research centres and institutes is around 20%, whereas the contribution of Non-Profit Organisations is almost negligible.

Table 2: Main organisations conducting research – 2003

Organisations conducting research	% of GERD
Public Research Centres	20.29
Enterprises	32.06
Higher Education Institutions	46.72
Non-Profit Organisations	0.93

² Greece enjoys a steady economic growth, with GDP growth rates that are among the highest in EU-15 (real GDP growth was +4.7% in 2003, +4.2% in 2004 and +3.7% in 2005).

The low participation of small enterprises in the country's research effort is also reflected in the breakdown of research expenditure by source of funding (Table 3). More specifically, in 2003 the industry funded only 28.23% of investments in research and development, with around 70.55% coming from public sources (domestic or foreign). It should be pointed out that these percentages are reversed in the technologically advanced countries.

Table 3: Sources of funding of research – 2003

Funding Sector of Research Activity	% of GERD
Public Sector	48.97
Enterprises	28.23
Sources from abroad (mainly EU)	21.58
Non-Profit Organisations	1.22

As far as the Government Funding for research (Government Budget Appropriations or Outlays for R&D – GBAORD) is concerned, Table 4 presents its evolution since 1999 and Table 5 its breakdown by scientific field.

Table 4: Evolution of GBAORD, 1999-2005

GBAORD	1999	2000	2001	2002	2003	2004	2005
(in MEuro)	349.45	420.1	416.4	406.9	456.37	528.3	558.1

From the data presented in the Tables, the following remarks can be made:

- § GBAORD has been steadily increasing in the period from 1999 to 2005.
- § The breakdown of GBAORD by scientific field using the NABS classification is rather stable during the last 6 years (Table 5). However, we should point out the impressive peak of the funds directed to the space sector in 2005 (a six-fold increase between 2000 and 2005), a result of Greece joining the European Space Agency as a full member³. The largest GBOARD share is allocated to the General Funds of Universities (47.5% in 2005), with 9% allocated to “non-oriented research”, 23% to “economic development” objectives, and around 17% to the health, social structures and the environment.
- § A large share of GBAORD is allocated to areas relating mainly to basic research, such as “non-oriented research”, which also includes our country's contribution to CERN.

Table 5: GBAORD breakdown by scientific field (in MEuro)

	2000	2001	2002	2003	2004	2005
SCIENTIFIC FIELD						
* 1. Land exploration and exploitation	15.30	17.50	14.49	14.85	18.41	19.85
* 2. Infrastructures and general land use planning	14.40	12.80	10.78	14.47	18.43	16.21
* 3. Control and protection of the environment	20.80	17.00	13.48	18.00	22.82	22.29
* 4. Protection and improvement of human health	34.60	27.30	24.11	30.76	39.08	38.25
* 5. Production, distribution and rational use of energy	7.80	6.60	6.13	9.74	12.57	11.97
* 6. Agricultural production and technology	25.70	30.30	26.49	22.73	27.99	30.5
* 7. Industrial production and technology	39.00	36.30	25.75	34.69	48.11	51.51
* 8. Social structures and relations	27.20	21.70	15.90	23.84	27.46	31.94
* 9. Space exploration and exploitation	2.10	1.00	1.11	1.23	2.98	11.57

³ The relevant Agreement was signed in the summer of 2004 and was ratified in early 2005.

	2000	2001	2002	2003	2004	2005
SCIENTIFIC FIELD						
*10.General Funds of Universities	180.60	188.70	216.34	224.73	252.47	265.55
*11.Non-oriented research	47.60	52.77	48.43	57.26	49.91	51.37
12. Other research (excluding the defence sector)	3.20	0.99	0.90	1.14	5.19	4.14
*13.Defence	1.80	3.45	2.98	2.93	2.89	2.95
*14.TOTAL	420.10	416.40	406.90	456.37	528.31	558.1

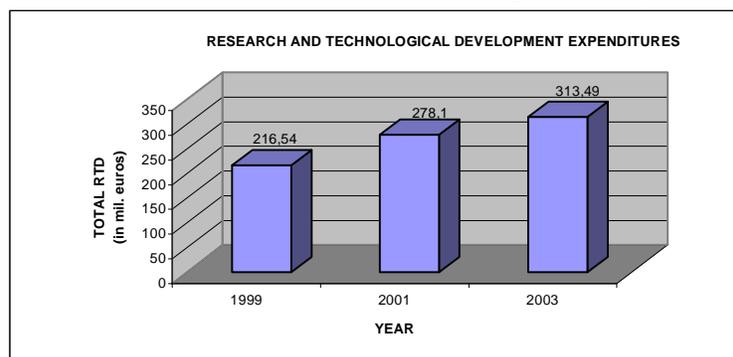
The Business Sector

The low mobilisation of enterprises is one of the weakest points in the Greek innovation, research and technology system, and thus it requires further analysis. The low contribution of the business sector in research activities may be attributed to the overall structural weaknesses of the Greek productive base (many small enterprises; traditional activity sectors; very low potential in sectors generating technological innovation, such as medicines etc.; “turnkey” transfer of off-the-shelf, mature technology, rather than development of in-house RTD activities in enterprises; personnel with low scientific qualifications; “risk avoidance” attitudes, etc.).

However, based on the findings of a recent study titled “Measurement of Research and Technological Development activities in Enterprises – 2003”, the trends are encouraging:

Business RTD expenditures increased from €16.54 million in 1999 to €78.10 million in 2001 (up by 28.4%), and from there to €13.49 million in 2003 (up by another 16.3%). The total increase between 1999 and 2003 was 44.8% (Chart 3).

Chart 3: Evolution of Greek Business RTD Expenditures (1999-2003)



Although RTD indicators as a percentage of GDP exhibit a slightly decreasing trend during between 1999 and 2003, the participation of enterprises appears to be steady and even slightly increasing (Table 6).

Table 6

RESEARCH AND TECHNOLOGICAL DEVELOPMENT INDICATORS			
	GERD/GDP	BERD/GDP	BERD/GERD
1999	0.67%	0.18%	27.23%
2001	0.63%	0.21%	33.05%
2003	0.63%	0.20%	32.16%

It is also useful to point out the following:

In terms of the geographical distribution of the enterprises carrying out research, in their overwhelming majority (75.41%) these are located in Attica, with enterprises located in Northern Greece⁴ also having a substantial participation (18.06%). Enterprises located in other regions (NUTS 1 level) have a participation ranging from low (Central Greece⁵ 5.14%) to insignificant (Aegean Islands – Crete 1.39%) (Table 7).

In terms of the number of enterprises grouped by economic activity sector using the two-digit classification of economic activity sectors (Chart 4), Sector 72 (“IT and related activities”) has by far the highest participation (23.56%), followed by:

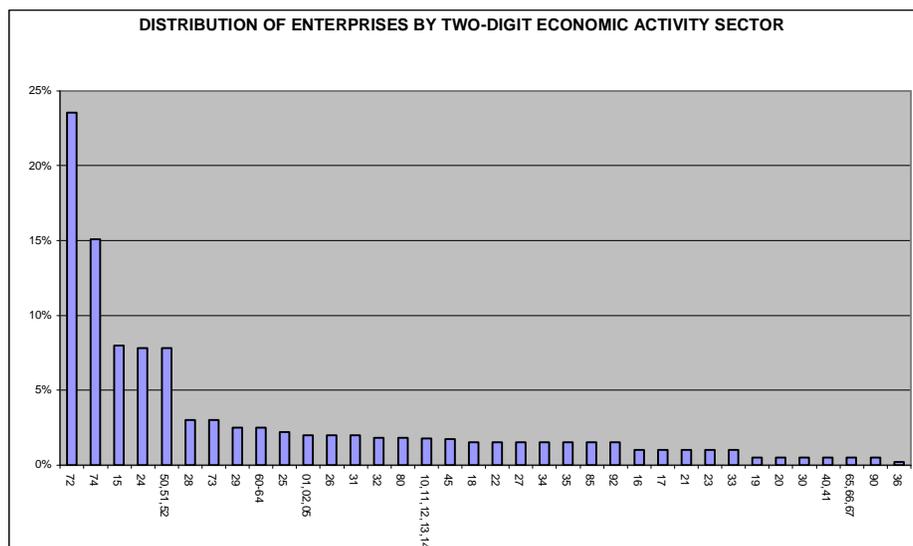
- Ø Sector 74: Other Business activities (services), with 15.23%.
- Ø Sector 15: Food and Beverages Industry, with 8.33%.
- Ø Sector 24: Chemical substances and products, with 7.47%.
- Ø Sectors 50, 51, 52: Wholesale and Retail Commerce – Car Repairs etc., with 7.47%.

The participation percentage of the other sectors is below 5%.

Table 7

DISTRIBUTION OF ENTERPRISES BY NUTS1 REGION (4 REGIONS)	
NUTS1 REGION	PERCENTAGE
ATTICA	75.41%
NORTHERN GREECE	18.06%
CENTRAL GREECE	5.14%
AEGEAN ISLANDS – CRETE	1.39%

Chart 4



Correspondingly, Chart 5 presents the distribution of business expenditures by economic activity sector. The telecommunications sector is characterised by the highest business expenditures followed by the IT, chemical industry and food & beverages sectors.

⁴ W. Macedonia, Central Macedonia, E. Macedonia - Thrace, Thessaly.

⁵ Epirus, Ionian Islands, W. Greece, Central Greece, Peloponnesus.

Furthermore, the following should be pointed out:

- § Of the total number of enterprises that stated expenditures for research, 73.51% are small ones with less than 50 employees. Large enterprises represented 10% and medium-sized ones 16.64% of the total number of enterprises.

Chart 5

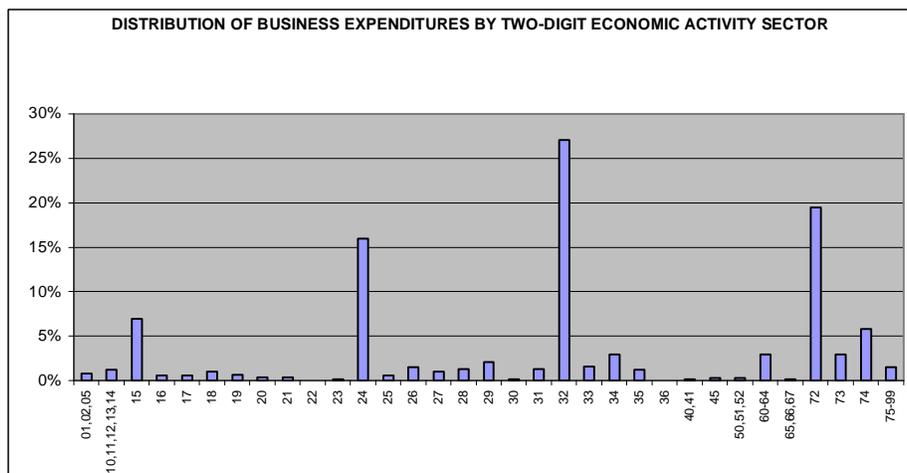


Table 8

DISTRIBUTION OF RTD EXPENDITURES BY ENTERPRISE SIZE		
TOTAL NUMBER OF EMPLOYEES (PERSONS)	RTD (in MEuro)	DISTRIBUTION OF RTD EXPENDITURES BY ENTERPRISE SIZE
Up to 49 people	59.94	19.13%
50-249 people	104.97	33.48%
More than 250 people	148.56	47.39%
TOTAL	313.48	100.00%

- § It is estimated, however, that medium-sized and large enterprises account for the largest share of in-house RTD expenditures (Table 8). More specifically, of the €13.49 million spent on RTD in 2003, around 50% came from enterprises with more than 249 employees. Furthermore, for medium-sized enterprises, i.e. those employing between 50 and 249 persons, the amount allocated to in-house RTD in 2003 reached €104.97 million. This amount represents 33.48% of the total in-house RTD expenditures for 2003. Finally, small enterprises account for the lowest share of in-house RTD expenditures (19.13%).
- § Of the total number of enterprises carrying out research, 45% operate dedicated RTD departments.
- § Of the total number of enterprises carrying out research, 40.33% are relatively new ones (established after 1990).
- § In terms of funding sources for RTD, self-financing appears to be the main source. However, a steady and substantial increase of the public funds available for this purpose is observed over the years (Table 9).
- § Personnel fees represent the largest part of RTD expenditures, followed by capital expenditures and other current expenditures (with almost the same weight).

Table 9

FUNDING SOURCES FOR BUSINESS RTD		
FUNDING SOURCE	AMOUNT (in MEuro)	PERCENTAGE
Self-financing	236.45	75.43%
CSF programmes co-financed by the Greek government ("COMPETITIVENESS" OPERATIONAL PROGRAMME, LAW 2601/98 and others)	45.93	14.65%
Other Domestic Sources		
Domestic Public Enterprises	1.05	0.34%
Domestic Private Enterprises	0.35	0.11%
Other domestic sources	0.66	0.21%
Greek Higher Education Institutions	0.41	0.13%
Sources from Abroad		
EU Framework Programme (competitive programmes)	23.36	7.45%
Foreign Enterprises	2.65	0.85%
Foreign Governments	0.00	0.00%
Foreign Higher Education Institutions	0.10	0.03%
Non-Profit Foreign Legal Persons under Private Law	0.00	0.00%
International Organisations	0.17	0.05%
Other sources from abroad	2.35	0.75%
TOTAL	313.49	100.00%

Regional Disparities

The regional dimension is one of the most important parameters in formulating the present Strategic Plan, because for the first time in Greece there are five Regions that do not clearly belong under Objective 1. At the same time, two of these Regions (Attica and Central Macedonia) are characterised by their overwhelming predominance in all areas of research activity (Tables 10 and 11).

Table 10: Regional distribution of GERD, in total and by sector – 2003

	GERD	Businesses	Public Research Centres	Higher Education Institutions	Non-Profit Organisations
Greece	100.00%	100.00%	100.00%	100.00%	100.00%
East Macedonia - Thrace	2.57%	1.22%	1.41%	4.04%	0.00%
Central Macedonia	14.52%	10.53%	10.98%	18.78%	15.44%
Western Macedonia	0.58%	0.00%	0.76%	0.91%	0.00%
Thessaly	2.32%	0.52%	1.05%	4.15%	0.00%
Epirus	2.47%	0.04%	0.82%	4.91%	0.00%
Ionian Islands	0.29%	0.00%	0.11%	0.58%	0.00%
Western Greece	6.94%	2.48%	2.84%	11.92%	0.00%
Central Greece	1.15%	3.15%	0.58%	0.04%	0.00%
Peloponnese	1.87%	5.07%	0.74%	0.09%	6.24%
Attica	58.21%	76.16%	62.39%	43.66%	78.31%
North Aegean	0.99%	0.00%	0.23%	2.01%	0.00%
South Aegean	0.53%	0.18%	0.33%	0.87%	0.00%
Crete	7.58%	0.66%	17.75%	8.06%	0.00%

In particular, as shown in Table 10, the Attica Region accounts for around 58% of total GERD, 76% of RTD expenditures by businesses, 62% of RTD expenditures by public research centres, and 44% of those by Higher Education Institutions. Central Macedonia follows, with 15.5% of total GERD, 14% of RTD expenditures by businesses, 11% of RTD expenditures by public research centres, and almost 19% of those by Higher Educational Institutions.

The other Regions of the country present the following characteristics:

- § Crete accounts for almost 18% of RTD expenditures by public research centres and 8% of RTD expenditures by Higher Educational Institutions, reflecting the strong concentration of research centres in the Region. Crete, however, lags behind considerably in terms of its business sector (0.66%).
- § In terms of Higher Education Institutions and public research centres, Western Greece shows considerable activity, whereas Epirus, Eastern Macedonia – Thrace and Thessaly are still developing. In the sector of Higher Education Institutions, the North Aegean Region should also be mentioned.
- § In contrast, the businesses sector, with the exception of Attica and Central Macedonia, shows research activities in Central Greece and the Peloponnese, which act as a broader industrial zone around Attica.
- § The Western Macedonia, South Aegean and Ionian Islands Regions present performances below 1% across all sectors.

More information about the regional expenditure for research and development in relation to the regional GDP is presented in Table 11. From this Table, it follows that for the Attica Region GERD/GDP is close to 1%, of which 40% is contributed by the private sector.

Table 11: Regional R&D expenditures as a share of regional GDP – 2003 (in MEuro)

		GERD	BERD	Regional GDP	GERD/GDP	BERD/GDP	GERD/Population (Euro per capita)	BERD/Population (Euro per capita)
GR	GREECE	977.78	313.49	155427	0.629%	0.202%	88.84	28.48
GR11	Eastern Macedonia – Thrace	28.09	6.84	6570	0.428%	0.104%	7.93	1.93
GR12	Central Macedonia	151.95	43	26070	0.583%	0.165%	79.89	22.61
GR13	Western Macedonia	8.4	2.74	4136	0.203%	0.066%	28.49	9.29
GR14	Thessaly	26.66	5.64	9386	0.284%	0.060%	36.11	7.64
GR21	Epirus	24.17	0.11	3919	0.617%	0.003%	71.50	0.33
GR22	Ionian Islands	2.85	0	2819	0.101%	0.000%	13.18	0.00
GR23	Western Greece	62.84	2.77	7945	0.791%	0.035%	86.31	3.80
GR24	Central Greece	6.22	4.87	11266	0.055%	0.043%	11.09	8.68
GR25	Peloponnese	9.31	6.89	8082	0.115%	0.085%	15.48	11.46
GR30	Attica	568.38	238.02	59169	0.961%	0.402%	145.15	60.78
GR41	North Aegean	9.66	0	2873	0.336%	0.000%	47.34	0.00
GR42	South Aegean	5.17	0.55	4701	0.110%	0.012%	17.13	1.82
GR43	Crete	74.08	2.06	8489	0.873%	0.024%	123.69	3.44

Innovative performance of Greek regions relative to the regions of the EU-25 Member States, according to Innovation Scoreboard 2006 data:

- § Out of a total of 203 regions, Attica has the best performance of all Greek regions and is ranked 86th, with a significant lead over the country's other regions. In particular, Central Macedonia is ranked 164th and Crete is ranked 174th, followed by Western Greece (182nd), Epirus (191st), Central Greece (192nd) and Eastern Macedonia (197th). The table's five last positions are taken up by Peloponnese

(199th), Thessaly (200th), Western Macedonia (201st), North Aegean (202nd) and, finally, South Aegean (203rd)⁶. It is noteworthy that regions of countries which are at the same level with Greece are performing better, the most typical such examples being regions of the Czech Republic, Hungary and Poland, which are ranked in the top 65 regions. Portugal is also ranked low, with the Lisbon region ranked 108th and the country's other regions ranked in the bottom 50 positions.

It is pointed out that of the top 10 regions in terms of innovative performance, four are in Sweden (with the Stockholm region ranked 1st), four in Germany, one in France and one in Finland. The EU-15 Member States have the best performances, with their regions taking 47 out of the top 50 positions, and 94 out of the top 100 ones. From the 10 new-entrant EU Members, the best performers are the Prague region (15th) and the Bratislava region (27th), together with regions of other countries such as Slovenia, Poland and Hungary.

In general, the above data reveal the over-concentration of the Greek system in the Attica Region, as well as the great differentiations characteristic of the country's regions, which (with the exception of Attica) are lagging behind the EU-25 ones. The above data will serve as a key parameter in planning the actions and allocating the necessary funds by Region.

The international experience shows that in order to be competitive in terms of its system for the production and exploitation of knowledge and the eventual transformation of that knowledge into economic and social prosperity, a region should satisfy a number of key parameters:

- § The existence of appropriate knowledge production and exploitation infrastructures, such as Universities and research and technological centres, together with intermediary mechanisms for the dissemination and uptake of research results and for supporting innovation, such as technology parks, incubators, liaison offices etc.
- § The parallel existence of effective networks promoting the increase of demand for new knowledge, i.e. promoting close synergies and cooperation with the productive fabric and with enterprises, either individually and/or in clusters.

Human Resources

In 2003, the personnel involved in RTD activities in Greece numbered a total of 57,257 individuals, of which 28,284 were researchers (headcount) (Table 12).

Table 12: Evolution of the number of researchers, 1997-2003 (Headcount and FTEs⁷)

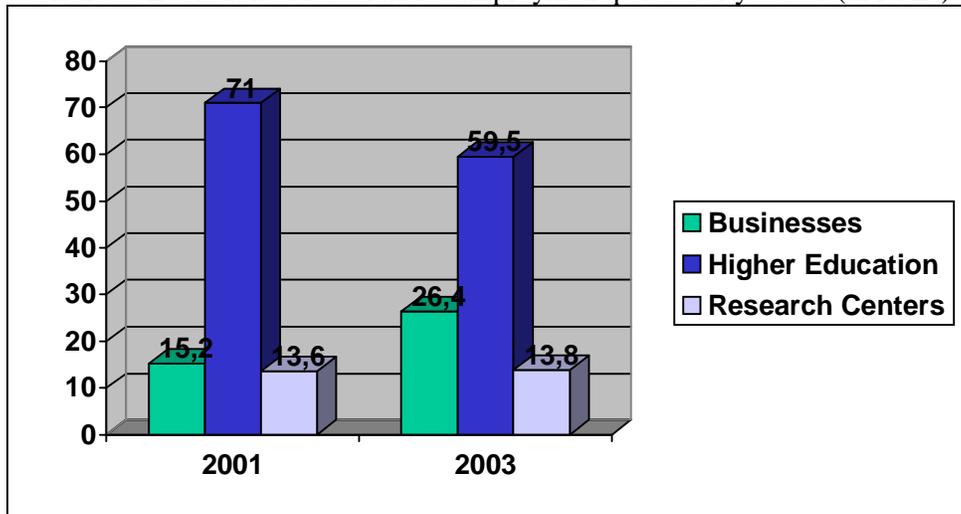
Year	Number of Researchers (Headcount)	Number of Researchers (FTEs)
1997	20,643	10,964.3
1999	29,559	14,747.6
2001	26,340	14,371.3
2003	28,058	15,631.31

⁶ There were no data for the Ionian Islands Region.

⁷ Full-Time Equivalents.

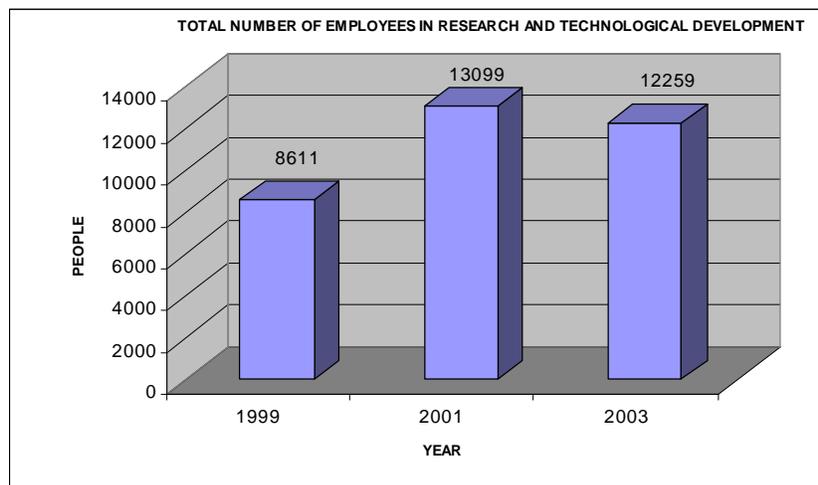
The evolution of the distribution of researchers per activity sector (Chart 6) shows that the share of researchers' employment in businesses rose from 15.2% in 2001 to 26.4% in 2003, with a corresponding drop in their share of employment in Higher Education Institutions from 71% in 2001 to almost 60% in 2003. Employment in public research centres remained stable at around 14%.

Chart 6: Evolution of researchers' employment per activity sector (in FTEs)



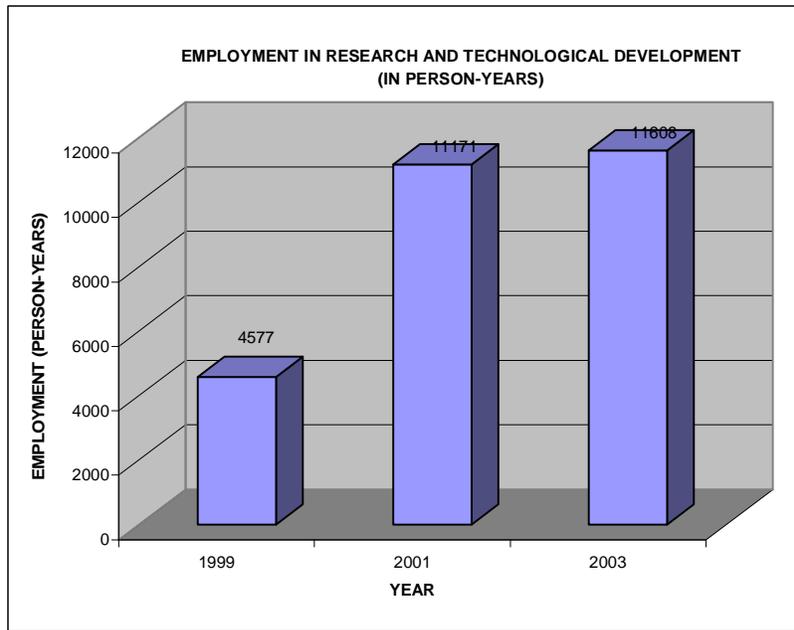
In the business sector, the total number of personnel participating in research activities grew by 52.1% between 1999 and 2001, only to decrease by 9.8% between 2001 and 2003. Overall, the number of persons whose scope of work is related to business RTD increased from 8,611 in 1999 to 12,259 in 2003 (an overall increase of 42.4%) – Chart 7.

Chart 7



Full-time employment in research activity is constantly increasing. Chart 8 below presents the upward trend established between 1999 and 2003, in person-years.

Chart 8



The scientific publications of Greek researchers represent 0.76% of global output in 2003, and had been growing at an annual rate of 5% for the period from 1995 to 1999 (Key Figures 2005). Greece is ranked 14th among the EU-25 Member States, with 525 publications per million population.

The ratio of the number of publications to the total number of researchers (in FTEs) is very high for Greece, amounting to 1.53 publications per researcher for the 5-year period from 1995 to 1999, placing the country in the 9th position globally⁸! In contrast, the output of publications of a high scientific interest is low, as estimated based on the number of references per publication (Key Figures 2002), whereas patent registrations of research results are insignificant (0.1% of European patent registrations, below 0.1% of the American ones).

The performance of Greek researchers in attracting funding from abroad, mainly from the EU's Framework Programme for Research, Technological Development and Demonstration, is satisfactory. Greece is estimated to attract around 3% of the funds under this particularly competitive programme, with annual inflows between €90 and €100 million in funds directed to Greek organisations. These funds correspond to almost 10% of research funding in Greece, one of the highest percentages in Europe. The level of success of Greek organisations, as expressed by the number of participations in the approved projects, is high, especially so in sectors such as information and communication technologies, sustainable development, global change and ecosystems, as well as nanotechnology-nanosciences, multifunctional materials and new production processes-devices. Our country has not carried out an analysis of the impact of our participation in the Framework Programme to enable an assessment of the relevant results; however, on the basis of the data available at the national and European level, it would seem that in general utilisation of Community funds does not involve a particularly high added value.

⁸ Indicative values for other countries are 0.86 for the USA, 0.46 for Japan, 1.42 for Finland, 0.99 for Germany and 0.13 for China.

Despite the relatively small number of researchers, the increasing trends in the employment of scientific personnel in the Greek research institutions and especially in businesses, the rich scientific output, the strong performance record of Greek research efforts (in terms of publications per researcher), and the success of the Greek researchers in the European competitive programmes, render the country's human resources a strong asset of the Greek innovation and research system.

1.2 The National Policy for Research, Technology and Innovation

The main objective of the national policy for the promotion of research, technology and innovation was to enhance the competitiveness of Greek enterprises and of the national economy in general. In this framework, most of the programmes promoted had as their purpose to support enterprises in the implementation of RTD projects, as well as in the networking of research with production. In parallel, actions were also promoted aimed at strengthening (a) the S&T infrastructures of the public and the private sectors, (b) human resources, and (c) entrepreneurship.

In the last years, formulation of this policy was carried with a view to contributing to the attainment of the Lisbon targets, particularly so of the increase of investments in knowledge and innovation. The national target set was for R&D expenditures to reach 1.5% of GDP by 2010, of which 40% should represent the contribution of the private sector.

The national actions for research, technology and innovation in the current Programming Period (2002-06) were implemented mainly through the Community Support Framework and especially through the Operational Programme "Competitiveness" (OPC). The budget for RTD actions amounts to €630 million, of which the Public Expenditure is €424 million⁹, accounting for 13.125% of total Public Expenditure under the OPC.

RTD actions under the OPC were aimed primary at strengthening the competitiveness of the Greek economy towards its convergence with the economies of the other European countries.

To achieve this objective, the actions promoted can be grouped in two categories:

- I. Support of RTD programmes targeted mainly at enterprises and associations of enterprises and knowledge-producing organisations. Examples of the actions in this category are the following:
 - RTD consortia in national priority areas.
 - Programmes to stimulate research and the transfer and dissemination of technology in enterprises, as well as International Scientific and Technological Cooperation programmes.
 - Awareness-raising actions targeted at the general public in connection with new technologies, S&T policy support and S&T information management.
 - Actions to enhance scientific and technological potential, including incentives to industry for recruiting researchers, employment and attraction to Greece of researchers from abroad.

It is true that to this day no assessment of the above actions has been carried out and, consequently, there is a lack of accurate data as to their impact on the Greek

⁹ ERDF: €27 million; ESF: €68 million; National participation: €19 million.

economy. It is pointed out that, inter alia, OECD has been assigned with the peer-review of our national research and innovation system.

II. Actions and Programmes to promote innovation and the creation of highly knowledge-intensive enterprises. Examples of the actions in this category are the following:

Support of Research Units for the standardisation and commercial exploitation of research results and for the creation of new enterprises (spin-offs). The action to support the creation of new, highly knowledge-intensive enterprises was launched in 2002 pursuant to Presidential Decree (PD) 17/2001, and until today the second phase has not been completed yet.

Development of S&T Parks and Business Incubators for knowledge-intensive enterprises, and development of research centres and public laboratories geared towards providing services to enterprises.

Promotion of the action for the creation of Regional Innovation Poles, with the aim of promoting an integrated innovation strategy at the regional level and at establishing development plans in priority areas for the regions with the participation of all stakeholders (Regional and National authorities, enterprises, associations businesses, consumers etc.). This action also includes the creation of regional technological plans (technology platforms) equivalent to those of the EU, in order to determine the long-term research agenda for activity sectors of the regions which present comparative technological advantages.

Creation of the Innovation Zone in Thessaloniki (initial stage).

Creation of new S&T infrastructures (new Research Centres) in Thessaly (Technological Development Centres – TDCs), Western Greece and Epirus. Regarding the last two, the PDs for their establishment are in the process of being voted by the Parliament.

Creation of a cluster in the microelectronics sector. This action is implemented as a pilot, and is expected to serve as the basis for the creation of clusters of enterprises across the country in high-tech activity sectors.

The implementation of the above actions is expected to impact positively on the production of new, high value added products and to boost entrepreneurship. However, given that implementation of these actions was launched relatively recently, it is difficult to evaluate their performance at the present stage, as their effects will be manifested on the medium-to-long term. These actions, which will continue into the new Programming Period, will nevertheless be revised based on the experience gained through their initial implementation and the developments in international level and on best practices transfer.

It is also pointed out that in the current programming period RTD actions were also funded under certain Regional Operational Programmes (C. Macedonia, Crete, N. Aegean, Central Greece and other). Management of these actions was in most cases undertaken by the GSRT.

In addition, RTD actions were also funded under the Operational Programme “Information Society” (OPIS) and the Operational Programme of the Ministry of Education. Regarding the OPIS, research and technology actions came under the axis “Development and Employment in the Digital Economy”, involving the creation, distribution and use of knowledge and information, with a total budget of €107.88 million. The key actions concerned the creation and dissemination of content

regarding research on ICT (e-learning, e-business, image, sound and language processing, new researchers in businesses, Grid applications etc.), and the development of infrastructures such as the National Research and Technology Network (GRNET), the electronic infrastructures of the National Documentation Centre etc. The GSRT was responsible for managing actions with a total budget of €58 million (Public Expenditure: €29.3 million).

In general, the absorption of RTD funds under the Operational Programme “Competitiveness” (OPC) was not satisfactory (absorption currently stands at 52.6% and is expected to reach 75% by the end of the year). This is mainly due to the following reasons:

- A. To delays in the launch of the Programmes, brought about by the problems that arose in approval of the system for State aids. The reasons that contributed to these delays were the following:
- The current rules for State aids were not favourable to innovation-related aids. As a result, a special aid system had to be approved, which however involved longer times at the national as well as at the European level. In some cases, adoption of a new institutional framework also proved necessary.
 - The possibilities for granting aids based on the respective EU Regulations were not taken into account during the planning stages of the OPC and of the proposed actions.
 - The fact that at the start of the programming period the competent authority had not paid adequate attention to the approval procedure for State aids, which subsequently was drastically changed.

We estimate that in the new programming period such problems will not arise, because: (a) The EU Regulations, including the new Regulation on Research, Technology and Innovation, which are now more favourable to innovation, will be applied; (b) the Commission’s proposals regarding the new Regulations on State Aids were taken into consideration during the planning of the actions proposed under the NSRF; and (c) the personnel of the competent authority have now considerable experience of State aids and of the relevant procedures.

- B. To the institutional framework, which presents many gaps that were not fully covered by the new institutional interventions concerning incubators, technology parks etc., in conjunction with the time-to-maturity required for promoting new actions.
- C. To the Greek research community’s lack of familiarisation with innovation- and entrepreneurship-related issues (such as intellectual property rights, cross-sectoral mobility of researchers etc.), as well as to the opposition expressed by certain research organisations to the new type of interventions.

Thus, in view of the new programming period, the institutional framework for funding research and innovation should –where required– be adjusted and supplemented in time, to prevent similar problems from arising again. The points to which more attention should be paid are the institutional framework for aids to enterprises¹⁰ and other organizations concerning RTD and innovative projects and the mobility of personnel from public R&T Centres and Universities to enterprises in Greece and abroad, together with issues concerning intellectual property rights,

¹⁰ The revision-updating of PD 274/2000 is already under way, pursuant to the Amendment of 2/4/07 to Law 1514/85 (Article 10, item 3(a) of Law 3551/2007).

the creation of networks of centres for research and/or training / post-graduate studies between Research Centres and/or Universities, etc.

- D. To management difficulties, due mainly: (a) to the new procedures under the 3rd CSF, the lack of personnel and the inadequate training of the existing GSRT personnel, combined with insufficient legal support; (b) the lack of personnel capable of managing research in all Regions, as a result of which the GSRT was further burdened with evaluating and managing the projects funded by certain ROPs; and (c) to certain ill-judged choices made in the evaluation/management of certain programmes.
- E. To the segmentation of efforts and the lack of proper focus on high-priority areas, as a result of which funding was directed to many small-scale projects (in terms of both subject scope and budget). In the new programming period, an attempt will of course be made to concentrate efforts on, and promote projects of a much larger scale. Nevertheless, funding of small-scale projects cannot be avoided: this is due on the one hand to the nature of R&D actions, and on the other hand to the political choice made to use the resources available under the Structural Funds to fund all research projects, including e.g. projects implemented in the framework of bilateral S&T Agreements between Greece and other countries.

In the next programming period, a solution for the management of projects in national and regional level must be found in time. For its part, and depending on the developments in the management of the NSRF and of the new institutional framework for research, the GSRT will examine the possibility to establish an intermediary management authority for some actions.

For promoting an integrated strategy (policy mix) aimed at increasing investments in research, the following measures to boost R&T investments have already been taken in addition to the actions under the CSF (and in particular under the Operational Programme “Competitiveness”):

- Participation of Greece in the European Space Agency as of 2005, expected to lead to the development –in the medium-to-long term– of infrastructures and entrepreneurial activities in the innovation-producing space sector.
- Application of article 9 of Law 3296/2004 concerning the deduction of scientific and technological research expenditures from the net profits of enterprises. The GSRT is currently in the process of revising and updating Law 3296/2004, with the aim of making it more attractive. We estimate that this measure will act as a key indirect incentive for boosting investments in research, given the fact that although the relevant legislation was in place since 1987, significant incentives to businesses were only granted by article 10 of Law 2992/2002.
- The Investment Incentives Law (Law 3299/2004), which gives priority to investments concerning: (a) innovative products and services, (b) high-tech products and services; (c) creation of applied industrial research laboratories; (d) development of technological and industrial plans; and (e) software development. Furthermore, during the evaluation phase a bonus is given to investment plans involving the manufacture of advanced products in horizontal thematic areas, such as medicines and bio-based compounds, and advanced or new materials for use in applications in the fields of energy, medicine (biomaterials), biomedicine, bioinformatics, bioprocessing, microelectronics, nanotechnologies, microengineering etc.

- Commencement of the use of National resources, in addition to the credits under the regular State budget used to finance research centres, for funding RTD projects, including the Thessaloniki Innovation Zone¹¹.
 - Reduction of patent registration costs, a development expected to impact positively on the number of patent applications submitted.
- F. In parallel, the reform of the National Institutional Framework for Research and Technology is under way, providing for the establishment of a National Council for Research and Technology, as well as of a corresponding Interministerial Committee and a National Organisation.

1.3 Strengths and Weaknesses

Based on the above, the key strengths and weaknesses which characterise the Greek research, technology and innovation system, and which were taken into account in developing the Strategic Development Plan for the 2007-13 Programming Period, are the following:

Weaknesses:

- Low R&D investments by the private as well as by the public sector.
- Very low investments by the private sector in R&D and innovation application. Among other reasons, this weakness is also due to the structure of the Greek economy (lack of large enterprises in innovation-producing, high-tech sectors). Business R&D expenditures are particularly low (16% of the EU average).
- Extremely low performance record in: manufacturing (the lowest in the EU); employment in medium-tech and high-tech sectors; innovative manufacturing enterprises; new-to-market product sales, added value; high-tech industries.
- Weak production base, consisting of small-sized enterprises in traditional sectors that are used to transferring mature technology from abroad rather than developing technology in-house or cooperating with research organisations.
- Low performance in venture capital, in terms of both supply (32% of the EU average) and demand.
- Low performance in exports of high-tech products and in the development of new products.
- Segmentation of public R&D efforts across many areas, organisations and groups whose size is below the critical mass required to bring results. Public research organisations are characterised by introversion and a limited capacity to respond to the needs of the economy and of society. Nevertheless, the public sector is the main driving force for innovation in Greece.
- Weak intermediary technology transfer mechanisms, combined with qualitative and quantitative deficiency of liaison. Among other reasons, this is also due to the lack of the necessary specialised personnel in these areas.
- Incompatibilities between employment supply and demand in research – technology – innovation. Although social demand for university-level education is high, new graduate scientists can not be absorbed by the country's productive fabric. Lack of specialised scientists and engineers in rapidly developing technological areas; inability of new doctoral graduates to secure employment in enterprises; low level of life-long learning and training activities; lack of suitably qualified trainers.

¹¹ Around €4,700,000 in the last two years.

- Lack of entrepreneurship in the Greek research community, and domination of “risk avoidance” attitudes, even in young people.
- Low level of recognition by the general public and by the enterprises of the importance of technology and of the possibilities it provides for restructuring economy and society. Society is wary of technological change, as a result of insufficient or distorted information. Inability to showcase social models from the research and innovation area.
- Great regional disparities. Concentration of R&D activities in the Attica Region (the only Greek Region whose innovation performance is above the EU average).
- Low performance in the registration of patents in all categories.
- Low performance in broadband penetration.
- Bureaucratic and time-consuming management system, focused on ex-ante evaluation rather than on monitoring and on detailed supervision of projects. Absence of a mechanism for systematic assessment/study of the impacts of policies/actions/funding.

Strengths:

- Strong economic growth rates, among the highest in the European Union, and improvement of competitiveness and of employment rates.
- Despite the low absolute values in most of the indicators which describe the research, technology and innovation system, their evolution trends are positive. Greece is included in the group of “catching up” countries of the European Union, along with Slovenia, Hungary, Portugal, the Czech Republic, Lithuania, Latvia, Cyprus and Malta. On the international level (Global Innovation Scoreboard 2006), Greece belongs in the fourth group of the sixteen lagging countries.
- Encouraging trends regarding the participation of enterprises in the research effort – the number of researchers employed in industry on the increase.
- High level of human resources. Rich scientific output, high mobility of Greek researchers (mainly in geographical terms). Strong Greek research community outside the Greek borders.
- Good performance in attracting funding from abroad, especially from the EU Framework Programme. Establishment of competitive research teams in areas such as Information Society.
- Good innovative performance in the services sector: sales of new-to-firm products (innovation) / sales of new-to-market products (technology transfer).
- Computer services.
- Cooperation in innovation between small and medium-sized enterprises.
- Non-technological innovation.

In general, it may be argued that Greece performs better in disseminating rather than in creating innovation, because of its improved performance in terms of indicators measuring the diffusion of innovation, such as: enterprise-financed University research and development (close to the EU average); percentage of SMEs participating in networks (69% of the EU average); tertiary education (94% of the EU average); and number of enterprises that have introduced non-technological innovation (89% of the EU average). Greece is also very close to the EU average in terms of the indicators measuring domestic demand for innovation, and it also performs better in sales of new-to-firm products than in sales of new-to-market ones – a fact suggesting that priority is given to the diffusion of innovation.¹²

¹² In the identification of the strengths and weaknesses presented, data were also drawn from the presentation of the Greek innovation system, made by Professor N. Komninou of the Aristotle

1.4 The 2007-13 Programming Period

The 2007-2013 Programming Period is extremely favourable for the transition to the knowledge economy, as it combines within the same period of time:

- The possibilities provided by the NSRF 2007-13.
- The opportunities opened up by the Seventh Framework Programme for RTD and the EU's Competitiveness & Innovation Framework Programme.
- The possibilities for our participation in the development of the European Research Area and in European Interest Organisations.
- The political commitment to the attainment of the Lisbon targets, and especially the contribution to the attainment of the Barcelona target through the deployment of an appropriate mix of policies and measures.
- The announcement of the launch of institutional and management reforms.

The present plan is focused on measures and actions to promote RTD and innovation through State aids eligible under the EU Structural Funds for the 2007-13 Programming Period. This planning also identifies the institutional interventions required to ensure the effective performance of the actions.

Thus, other measures which are equally important for promoting innovation (such as the adoption/improvement of measures in the areas of regulatory provisions, prototypes, public contracts, intellectual property etc.), do not fall within the scope of the present strategic plan. The current situation in these areas has been taken into consideration in formulating the NSRF strategy which is presented in the following sections.

Section 2: The Development Strategy for the 2007-13 Period

2.1 Objective, Key Principles, Priority Areas

Objective – Key Principles

The key objective of the development strategy is to promote innovation in all sectors as a key driver for restructuring the Greek economy and for the transition to the knowledge economy, which is a prerequisite for substantial improvement of competitiveness, development, employment and the welfare of citizens. Priority will be given to promoting innovative actions that contribute to the attainment of this objective and are environment-friendly (eco-innovation).

The key principles that will govern all research, technology and innovation actions, in the planning as well as in the implementation phase, are the following:

- Achievement of economies of scale and scope at the national and European level.
- Promotion of integrated interventions focused on high-priority sectors/areas of the Greek economy. These actions are expected to contribute to the restructuring of the Greek economy towards higher value-added and more environment-friendly sectors, products and services.
- Enterprises will remain the key beneficiaries of the proposed actions. However, the actions themselves will be focused on groups and networks of enterprises (including SMEs), as well as on the cooperation between business and S&T organisations.
- Creation of poles / centres of excellence in high-tech, knowledge-intensive areas.
- Aids to individual enterprises will be limited and will be mainly targeted at new enterprises and SMEs. Individual aids to large enterprises will be eligible only if this is judged advisable and is provided for in the relevant Call, in which full justification of this choice will be given and the corresponding terms and objectives will be presented.
- Outwardness will be a key characteristic of all proposed actions, in line with the demands of the globalised economy. International cooperation with organisations from other countries will thus be eligible under all actions, while special-purpose actions will also be promoted.
- Continuation and renewal will be ensured for RTD and Innovation Programmes and actions implemented under the 3rd CSF (and in particular under the Operational Programme “Competitiveness”).
- Synergies and complementarities with corresponding actions at the European level, especially with the 7th Framework Programme for RTD and Demonstration and EU’s new Competitiveness and Innovation Framework Programme.
- Participation in joint RTD actions with other EU countries, co-funded or not by the 7th Framework Programme for RTD and Demonstration and/or the European Investment Bank, in the framework of the coordination of national policies and the creation of the European Research and Innovation Area.
- Support to enterprises for addressing global competition and for exploiting the opportunities of globalisation and open innovation and increasing the exports of Greek “products” to the international markets.
- Contribution to the attainment of the targets of the revised Lisbon strategy and particularly of the National Reform Programme.

- Selection of the projects to be funded will take place through an open Call for Proposals. Direct award will be possible only in exceptional and fully justified cases.
- In implementing the actions, priority will be given to the following: (a) To objectives, rather than to funding instruments – i.e. a targeted call will be published, offering the possibility of using the most appropriate funding arrangements for attaining the specific project objectives. The aids by funding instrument and thematic area at the national level will be limited. These actions will be applied mainly at the level of Regions and to actions that contribute to the increase of investments in research and technology by the private sector and to strengthening innovativeness and the introduction of new technologies and knowledge in enterprises.

Priority Areas

Based on the above principles and on the strengths and weaknesses of the Greek research, technology and innovation system, and taking also into account the responsibilities of the GSRT, as well as Greece's geographic position and international obligations, the priority areas of the Strategic Plan for the Development of Research, Technology and Innovation during the 2007-13 period are the following:

I. Increase and improvement of investments in knowledge and excellence towards sustainable development

- Ø Support of RTD activities for the production knowledge in areas that will contribute to the restructuring of the Greek economy, by producing new or improved products / manufacturing processes and/or high value-added services, as well as by creating new business activities and supporting enterprises in sectors that produce innovation and high technology.
- Ø Strengthening European, Multilateral and Regional S&T cooperation for implementing RTD projects, networking and mobilising research human resources.
- Ø Creation of internationally competitive poles and excellence centres, primarily by: (a) Networking public research organisations and researchers at the national and international level, for joint implementation of RTD projects and exploitation of the knowledge produced, as well as for specialisation and training of research human resources. (b) Creating innovation clusters.
- Ø Strengthening S&T infrastructures and activities, on the basis of the following key criteria: (a) excellence; (b) creation of significant added value for the national and regional economy, for society and for the environment; and (c) the requirements at the regional level.

II. Promotion of innovation, of the dissemination of new technologies and of entrepreneurship towards generating economic and social “value” benefits

1. Support of actions (subsidisation and/or venture capital) that contribute to: the conversion of knowledge to innovative products, processes and services; the creation of new innovative enterprises; the support of technology and know-how transfer to enterprises (with emphasis on assisting SMEs in incorporating advanced S&T in their production processes and final products); and to closing the gap between technological knowledge and the market.
2. Strengthening demand by SMEs for research, technology and innovation services, and assisting access by SMEs to organisations that offer corresponding services.

- In general, strengthening demand for, and supply of, high value-added, knowledge-intensive services.
3. Provision of incentives to increase the number of patents and the commercial exploitation in Greece of patents produced in Greece and/or abroad by Greek or foreign researchers and inventors (either as individuals or in their capacity as employees of enterprises and public research organisations).
 4. Science and Society networking, and strengthening of the research and innovative culture and, more generally, of the recognised business culture.
 5. Support of research human resources and provision of incentives for attracting to Greece researchers from abroad.
 6. Provision of incentives for attracting R&D investments from abroad.

Axes

To serve the above priorities, the research, technology and innovation activities to be promoted come under the following key Axes:

§ “Knowledge and Excellence”

7. “Knowledge”: production of new knowledge through the implementation of RTD and Demonstration projects and through networking research and production.
8. “Excellence”: Creation of internationally competitive poles and excellence centres.

§ “Value”: Economic exploitation and commercialisation of knowledge.

Development of suitable human resources (from both a qualitative and a quantitative point of view) will be a key priority under all axes. The relevant requirements of the private as well as of the public sector will be addressed by special-purpose actions, either individually or in conjunction with other funding arrangements.

National and Regional level

Depending on their range and goals, the actions to be promoted will be implemented at the national and/or regional level. The first case involves actions aimed at achieving economies of scale and scope at the national and European level, whose implementation “requires” (a) cooperation and synergy between the most appropriate organisations from the private and the public sector, and (b) networking between organisations and utilisation of the best research teams and infrastructures available. The second case involves actions on a smaller scale, which focus on the needs and characteristics of each Region or group of Regions with the same characteristics. Actions aimed at creating and strengthening S&T infrastructures also belong under this second case, provided that their creation addresses primarily the aims and needs of the regional economy or of other major interventions, depending on the particular characteristics and comparative advantages of the Region concerned (e.g. Thessalonica Innovation Zone).

2.2 Scientific and Technological Priority Areas – Objectives

One of the plan's main characteristics is that R&D activities –especially those of relevance to the “Knowledge and Excellence” axis– focus on specific priority thematic areas, with clearly defined objectives and anticipated short- and long-term results.

The thematic priorities to be applied by the GSRT in the framework of the Programmes under NSRF 2007-13 are the following:

1. Information and Communication Technologies

- Communication networks and infrastructures for the development of IT services.
- Information systems, information technologies for knowledge management and communication with the surrounding environment.
- Microelectronic devices and integrated circuits and systems.
- Applications in the economy.
- Learning and content development.
- Governance, society and quality of life.
- Environment, energy, transport and geographical areas.

2. Agriculture, Fishery, Livestock Farming, Foodstuffs and Biotechnology

- Use of biotechnology for sustainable production and management of the natural, marine and animal capital.
- Improvement of sustainability in all production systems, and optimisation of the health of the natural, marine and animal capital.
- Socioeconomic research and support of policies.
- Foodstuffs.
- Utilisation of agricultural by-products, sub-products and other related raw materials for the production of high added value products.

3. High value-added products and production technologies with emphasis on traditional sectors

- Multifunctional products (textile industry, construction, furniture).
- “Smart” products (textile industry, construction).
- High-performance products (textile industry, construction).
- Product design (textile industry, construction).
- Environment-friendly products and processes (textile industry, construction).
- Environment-friendly products and processes- industrial biotechnology.
- Supply chain management (chemical industry, textile industry, clothing, leather, construction).

4. Advanced materials, Nanotechnology – Nanosciences and Microelectronics

- Nanotechnology and nanosciences.
- Advanced materials.
- Microelectronics.

5. Energy

- Electricity production from Renewable Energy Sources (RES).
- Fuel production from RES.
- Use of RES for heating and cooling.
- Hydrogen and fuel cells.
- Clean coal technologies.

- “Smart” energy networks.
- Energy efficiency and conservation.
- Support of policies.

6. Transport

Interoperability of transportation and public transport systems.
 Managing congestion in the urban and long-distance road network.
 Optimal operation and maintenance of public transport infrastructures.
 Development and exploitation of intelligent transport systems.
 Strengthening the competitiveness of fixed-rail transport systems.
 Integrated sea transport systems.
 Development of best practices for road safety.
 Support of integrated multimodal logistic chains.

7. Environment

- Climate, climatic change, natural hazards – disasters.
- Environmental intelligence.
- Sustainable development and assessment of Greece’s ecosystems and natural capital.
- Environmental technologies.

8. Health

- Nanomedicine – Nanotechnology in Health.
- Translational research in medicine: from basic to clinical research.
- Genomics – Proteomics – Systems Biology in Health
- Innovative diagnostic, imaging and treatment approaches, tools, devices and methodologies.
- Public Health, National Health System and support of policies.

9. Space and Safety Engineering

- Space technology.
- Environmental safety, management and monitoring obligations.
- Civil protection.
- Safety of critical infrastructures.
- Border security.
- Safety and Society.

10. Cultural Heritage

- Development of knowledge and understanding of cultural heritage.
- Showcasing cultural heritage and linking it to tourism.
- Restoration, preservation and management of monuments, works of art, collections and archives.
- Preserving a balanced relation between the development of cultural heritage and the conservation of the particular characteristics of the natural environment.
- Establishing the conditions for structured development of digital cultural heritage.

11. Social and Economic Dimensions of Development

- Financial dimensions
- Structural changes in the Greek economy.
- Regional development.
- Sustainable development.
- Ex-post and ex-ante analysis of the impact of research policies and programmes.
- Human and social capital.

The above 11 priority areas are described in detail in Appendix 1 of the Strategic Plan. For each priority area, its objectives and the strategy for its development are presented, together with a detailed description of the individual sub-areas.

Formulation of priority areas

In order to conclude at the 11 priority areas described in Appendix 1, a discussion paper was prepared as a result of a study¹³. Then a public consultation was organised on the base of the discussion paper. The proposals submitted during the consultation were incorporated in the results of the study, together with the remarks made by the Planning Group for future RTD actions in a meeting held on 12.11.07.

Application of priority areas

Regarding the way in which the priority areas will be applied in the framework of the NSRF 2007-13, the following were taken into account: (a) the need to focus RTDI activities and resources on certain areas, and (b) the need to achieve coordination and synergies with the Calls published by the EU as well as by the various actions under the NSRF Programmes.

In connection with the above, the following are pointed out:

- Ø Actions in priority areas other than the above shall not be promoted. An exception may be made specifically and under fully justified conditions for some action, such as for example the action concerning European Cooperations or the action concerning the support of policies and future needs which have not been identified so far.
- Ø The priority areas will be further focused also through the distribution of the funds available to the priority areas, as well as by the number of actions to which these priorities will be applied. Because of the structure of the Programmes under the NSRF, the distribution of the funds by priority area can not take place at the present stage.
- Ø A greater focus on certain priority areas will also be achieved through large-scale interventions, such as the thematic networks for R&D (RDTNs, RETNs and National Sectoral R&D Poles). These actions will be applied to specific individual sub-areas of the proposed priority areas, which the GSRT will pre-select through Calls for Expression of Interest (among other mechanisms).
- Ø For the overwhelming majority of actions, Calls will not be published simultaneously for all individual priority sub-areas, nor will Calls be published simultaneously for the same priority areas under some other action with the same characteristics and the same beneficiary target group. Efforts will be made to ensure synergies and complementarities across all actions in terms of the priority areas. Efforts will also be made to avoid publishing national Calls for areas for which a Call is published during the same period by the EU –under its 7th Framework Programme– or by the European Space Agency. Additionally, certain Calls will also be published for horizontal (cross-cutting) issues related to more than one priority area, while there will also be Calls exclusively focused on the

¹³ “Technical expertise study for investigating the priority areas (thematic areas-activities and/or economic sectors) for promoting Research and Technology during the programming period 2007-13”, which also served as the basis for the public consultation on the priority areas and is still available from the GSRT website. A brief description of the methodology is given in Appendix 1. The study was carried out by Logotech S.A. for the GSRT.

service sector. It should also be noted that the support of policies is also included as an action in the priority areas.

To achieve coordination and synergies concerning the above, in terms of selecting priority areas by Call/action as well as in terms of selecting the specific projects that will address all the objectives of the individual priority areas, the GSRT will establish a Support Committee and will set up relevant databases. The Committee will set the priorities for each Call/action (a relevant road-map will be developed) and will monitor its progress. It will also be regularly updated about the projects-areas approved under each Call, and will use this information as an input to planning the priority areas to be covered by the Calls to follow. In each Call, the objectives of the projects to be selected will be clearly presented. On its part, the GSRT will attempt to also quantify the objectives, especially in the case of large-scale interventions.

2.3 Barcelona Target and National Target for increasing Investments in Research and Development; National Reform Programme; NSRF Contribution - Budget

In the framework of the transition to the knowledge economy, the target set by the Barcelona European Council for 2010 is for the gross RTD expenditure at the aggregate EU level to increase to nearly 3% of GDP, of which 1/3 should be contributed by the private sector. This decision led to intense discussions between Members States and the EU concerning the adoption of measures that will contribute to an increase of RTD investments, while also motivating –either directly or indirectly– an increase in private sector investments. These discussions also involved the definition of national targets.

Within this framework, the national target that Greece set in 2003 was for RTD expenditures to be close to 1.5% of GDP by 2010, with a 40% participation of the private sector.

Based on the above, and following the European Council resolutions regarding the revised Lisbon strategy, the target of 1.5% of GDP in 2010 was maintained as the national target in the Greek National Reform Programme (NRP) submitted to the European Union in the autumn of 2005, which also included the measures to be taken by our country for ensuring the attainment of the Lisbon targets and the transition to the knowledge economy. It should be noted that this was done in spite of the fact that, based on the evolution of GERD, it was obvious that this target was too ambitious and that even if funds were in theory available (as presented in Table 13), its attainment would be difficult, because of the Greek economy's low absorption capacity and of the country's high economic growth rate.

Non-revision of this target in 2005 was judged necessary as a means to achieve the mobilisation and sensitisation needed for the adoption of measures at all levels. Consequently, the comments about the national target made by the European Commission in its progress report on Greece's NRM were, up to a point, only to be expected.¹⁴ It is pointed out that the reasons for which the national target was the

¹⁴ Communication from the Commission to the Spring European Council "Time to move up a gear – Country chapters (Greece)" PARTII to COM(2006)/24.1.2006, where Greece's national target is characterised as ambitious and doubts are expressed concerning its success.

same in the NRP and was not revised in the 2006 progress report, were presented¹⁵ in detail by the General Secretary of Research and Technology in a meeting with EU representatives regarding the NSRF (Athens, Zappeion Hall, 23 January 2007).

Table 13: Annual R&D Expenditure, 2003-2010 (2006 data)

Year	2003*	2004**	2005**	2006	2007	2008	2009	2010
GDP (MEuro)	156	168	181	194	207	222	237	254
GERD/GDP (%)	0.63	0.61	0.62	0.74	0.88	1.05	1.26	1.50
GERD (MEuro)	978	1022	1125	1436	1833	2339	2986	3811
Business R&D expenditure (MEuro)	314	317	326	444	604	822	1119	1523
Public R&D expenditure (MEuro)	664	705	799	992	1229	1517	1867	2288

* final data, ** provisional data

Due to the reasons mentioned above, and given that the Community Support Frameworks are the key source of funding for RTD actions, the planning for the 4th Programming Period is based on the assumption that the national target will be attained upon the completion of the projects in the new programming period (i.e. around 2015).

Table 14 presents the estimated total gross RTD expenditure (GERD) and gross private RTD expenditure, expressed as a percentage of the annual GDP, which are required in order for the national target to be attained in 2015. Table 15 presents the same data using the newly revised GDP (which was adjusted by +9.5%).

¹⁵ “There is no doubt that the national target of 1.5% is too ambitious and its attainment by 2010 is now difficult. However, although the revision of the target was considered at the stage of drafting the NRM and the progress report, ultimately the target was not revised, because it was considered that this would impact negatively on the alertness and on the overall discussion, currently in progress at the national level, concerning the adoption of measures (direct and indirect) that will contribute positively to increasing R&D investments in the Greek economy. Additionally, in reaching this decision we also considered the following:

a. It is now widely accepted that the target of 3% at the EU level is ambitious and difficult to achieve. However, it is also widely recognised that the target’s key achievements are already positive, because it prompted the adoption of measures for the increase of investments in R&D at the national and European level, and in general it contributed to establishing research and innovation issues high up in the political agenda. This is demonstrated by the undisputed fact that all Member States, including Greece, have already taken important R&D initiatives, while the funds for R&D under Community budget have increased significantly, along with the initiatives for joint R&D actions between Member States.

b. The timing (the year 2006) was not suitable for revising the target of 1.5%, as there were still many imponderable factors which did not allow a realistic estimate (revision) of the time in which the target would be attained. A key factor for the revision (postponement of the target) was the inability to determine in 2006 the total funds for research and innovation under the NSRF 2007-13 (because the Structural Funds are the key source of funding for R&D in Greece). Additionally: (a) we are currently going through a period in which are systematically considering the adoption of new measures, which also include the new governance framework for the research and innovation system, and (b) there has been interaction between the national authorities and the National Statistical Service of Greece (ESYE) for expanding the basis (total number of enterprises) used to calculate business R&D expenditures. Unofficially, the Department is developing various scenarios, taking also into account the Greek economy’s low absorption capacity. According to the prevailing scenario, attainment of the target of 1.5% (of which 40% contributed by the private sector) is postponed for the final completion stage of the projects of the new programming period.”

Table 14: Annual R&D Expenditure, 2003-2015 (using the GDP applicable so far)

Year	2003*	2004**	2005**	2006***	2007***	2008***	2009***	2010***	2011***	2012***	2013***	2014***	2015***
GDP (in BEuro)	156	168	181	194	207	222	237	254	272	291	311	333	356
GERD/GDP (%)	0.63	0.61	0.64	0.67	0.73	0.80	0.88	0.96	1.05	1.15	1.26	1.37	1.50
GERD (in MEuro)	978	1022	1153	1301	1522	1781	2084	2438	2852	3337	3905	4569	5345
Business R&D expenditure (MEuro)	314	317	357	393	475	573	692	835	1008	1217	1469	1772	2139
Public R&D expenditure (MEuro)	655	705	782	908	1047	1208	1392	1603	1844	2121	2436	2796	3206

* final data

** provisional data

*** data using the assumption of attaining the target for R&D expenditure at 1.5% of GDP in 2015, with 40% of R&D expenditures contributed by businesses

Table 15: Annual R&D Expenditure, 2003-2015 (using the revised GDP)

Year	2003*	2004**	2005**	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP (in BEuro)	171	185	199	214	229	224	262	280	300	321	344	368	393
GERD/GDP (%)	0.57	0.55	0.58	0.63	0.70	0.77	0.85	0.93	1.02	1.13	1.24	1.36	1.50
GERD (in MEuro)	978	1022	1153	1358	1598	1882	2216	2609	3072	3617	4258	5014	5903
Business RTD expenditure (MEuro)	314	317	357	431	521	629	760	918	1109	1340	1619	1956	2362
Public RTD expenditure (MEuro)	655	705	782	926	1077	1253	1456	1691	1962	2276	2639	3058	3541

* final data

** provisional data

*** data using the assumption of attaining the target for RTD expenditure at 1.5% of GDP in 2015, with 40% of RTD expenditures contributed by businesses

In order the targets of the present Strategic Plan (NSRF-RTDI 2007-13) to be achieved and the RTD expenditures to approach 1.5% of GDP in 2015, the public expenditure for research, technology and innovation under the NSRF 2007-13 should at least to be trebled compared to the current programming period. This increased expenditure shall be contributed by almost all Sectoral and Regional Operational Programmes, as discussed in the following.

In particular, in order to estimate the minimum public expenditure required and, more specifically, the need for public RTD funding under the NSRF-RTDI, the following assumptions were made:

- Ø GERD in 2015 will represent 1.5% of GDP.
- Ø 40% of GERD will be contributed by enterprises.
- Ø The nominal GDP will increase by 7% annually.
- Ø In what concerns funding from abroad, it has been assumed that the funding made available from the Structural Funds will gradually decrease, but will be counterbalanced by the increase in the share of the funds for research and innovation under the Structural Funds, as well as by the increase of the total budget of the Framework Programme for RTD and Development.

Based on the above, it was estimated that the funds (public expenditure) which must be directed to all sectoral and regional RTD programmes under the NSRF, should amount to nearly €1,650 million. If the participation of the private sector is also included, then the total budget reaches €2,750 million.

In Table 16 below, the first column presents the GSRT's proposal on the allocation of the funds to be made available under the individual NSRF Programmes for research, technology and innovation (public expenditure). The second column presents the actual allocation of the public funding, on the basis of the data available so far. In formulating its proposal, the GSRT took the following into account: (a) the geographic and sectoral coverage of the individual programmes of the NSRF, on the basis of the 4th Circular of the Ministry of Economy and Finance; (b) the regional distribution of GERD, according to which at least 50% of the total amount must be allocated to the Region of Attica (primarily from the Regional Operational Programme for Attica); and (c) the Greek economy's low absorption capacity.

Table 16: Distribution of Public Expenditure for RTD actions per O.P. of NSRF

Operational Programme	GSRT's Proposal for the allocation of Public Expenditure (in MEuro)	"Final" Allocation of Public Expenditure (in MEuro)
Competitiveness and Entrepreneurship	210-00	251 <i>(Obj. 1 Regions)</i>
Education and Lifelong Learning	100-140	433 ¹⁶ (GSRT: 140)
Human Resources		
Digital Convergence	90-120	100-120 <i>(Obj. 1 Regions)</i>
Attica ROP	400 –550	230
Macedonia-Thrace ROP	120-240	170 Central Macedonia + 20 W. Macedonia + 20 E. Macedonia-Thrace (tbd)
Western Greece – Peloponnesus – Ionian Islands ROP	25-40	Not yet determined
Crete and Aegean Islands ROP	25-40	1 S. Aegean + ? (Other regions tbd)
Thessaly – Epirus – Central Greece ROP	30-50	40 Central Greece + ? (Other regions tbd)
Ministry of the Interior, Decentralisation and Public Administration		50-60
Other Sectoral Operational Programmes (Obj. 3)		Tbd
TOTAL NSRF 2007-13	1,000 – 1,480	1,315- see below

Thus, public expenditure for RTD actions under the NSRF 2007-13 will exceed the amount of €1,315 million. This amount is far higher than the minimum threshold of €1,000 million proposed by the GSRT for the reasons already mentioned. The amount of €1,350 million is expected to be further increase, if we were to also include the amounts not yet determined under the other Operational Programmes, and especially the Operational Programme “Human Resources” and the funds to be made available for research under the ROPs of the eight (8) Objective 1 Regions. In this way, it seems that the total expenditure for research and development under the NSRF 2007-13 will most likely increase to nearly €1,650 million, an amount estimated to be in line with the attainment in 2015 of the national target of 1.5% of GDP.

In what furthermore regards the funds available under the ROPs, it is pointed out that the Regions in transition have already disbursed the funds required. We believe however that the funds from the Attica Region should be more, given the regional distribution of GERD so far. Nevertheless, this amount is higher if one considers that, on the basis of the regional distribution of GERD (Table 10), S&T organisations in Attica will be allocated –by the most conservative estimates– an additional amount of €150-200 million under the Programme of the Ministry of Education. Additional

¹⁶ These funds will be made available for research by the Ministry of Education. Of these, €140 million will be allocated to actions which have been planned by the GSRT and involve the support of basic research and research human resources in Universities, Higher Technical Education Institutions and Research Centres.

funds for organisations in Attica will also come from the Ministry of the Interior, Decentralisation and Public Administration and the “Human Resources” Programme, and –indirectly– from the other Sectoral and Regional Operational Programmes, as a result of the participation of organisations from the Attica Region in projects under the programmes of the other Regions as partners or subcontractors, depending on the terms of the relevant Calls. Finally, it should be noted that actions to strengthen innovation are also included in the Ministry of Development’s “Competitiveness and Entrepreneurship” Programme and in the other areas under the Ministry’s responsibility. For the purposes of completeness, it should also be noted that, in addition to what has been mentioned above, RTD actions in agriculture and fishery are also included in the Programmes under the National Strategic Plan for Agricultural Development and the National Strategic Plan for Fishery, both of which come under the responsibility of the Ministry of Agriculture.

Consequently, it is clear from the above that the public expenditure for research, technology and innovation will increase significantly, demonstrating the priority given by the Government to the promotion of this sector.

Section 3: Contents of the Research, Technology and Innovation Strategic Plan 2007-13

3.1 Axes –Actions by Axis

The proposed Actions by Axis, summarised in Table 16 at the end of this Section, are the following:

I. “KNOWLEDGE AND EXCELLENCE” Axis

Key Objective: *To promote RTD activities aimed at creating new knowledge, mainly through: cooperation between enterprises and between enterprises and S&T organisations from Greece and abroad; the creation of national¹⁷ sectoral R&D poles in high priority areas for the national economy; and the creation of physical or networked centres of excellence and their networking with corresponding centres abroad. The main goals of the actions included in this section are to enhance the competitiveness and strengthen the presence of Greek enterprises in the domestic and national markets, and to restructure the Greek economy through a shift to high-tech, high value-added products and services. Within this framework, priority will be given to the promotion of S&T cooperations at the regional, national and European level and to the specialisation and mobility of human resources, especially cross-border mobility.*

Because of the need to achieve economies of scale and scope in the implementation of S&T projects and infrastructures, and because of the general economic globalisation, all actions under this axis will be open to cooperations with organisations from other countries from all over the world. This will particularly apply to the creation of the European Research and Innovation Area, the transfer of technology and know-how to and from abroad, the support of cooperations with consortia from third countries, and the support of the country’s participation in international organisations and initiatives. The terms and conditions for participation and funding will be determined separately for each action/Call, depending on its individual objectives.

S&T priority areas (thematic priorities)

All actions will come under the priority areas of the present Strategic Plan (in certain cases, all 11 such priority areas will be eligible), and will be further specified in each Call on the basis of the discussion in Section 2.2. The individual priority areas to be selected under each action will be linked to the individual objectives and goals of the respective action.

¹⁷ In this action, the term “national” is used in the sense of a priority at the national level. The term “pole” is used in the sense of networking between organisations whose experience and activities correspond to the action’s objectives – in other words, the participants in a national “pole” may be organisations from all Regions or from some Regions only or even from a single Region.

I.1. “EXCELLENCE” Sub-axis

Key Objectives: *Creation of internationally competitive poles and excellence centres, and strengthening of S&T infrastructures¹⁸ and activities using as key criteria excellence and the creation of significant added value for the national and regional economy, for society and for the environment; strengthening of clusters formed by businesses and support organisations. The ultimate goal of the actions under this sub-axis is the creation of new business activities in high-tech, highly knowledge-intensive sectors.*

Proposed Actions:

- Creation of physical and/or networked centres of excellence (RDTNs/RETNs):

Advanced R&D¹⁹ Thematic Networks (RDTNs). This action aims to create physical and/or networked poles and/or Centres of Excellence.²⁰ Through this action, support will be provided for the RTD infrastructures and activities of the participating public S&T entities, as well as for attracting researchers²¹ from Greece and abroad and utilising the knowledge produced. Additionally, where considered necessary, support will be provided for creating new research facilities and/or enhancing existing ones, in order to meet the needs arising by the rapid technological developments, including participation in European-international calibre infrastructures and/or in common European facilities.

Research and Education Thematic Networks (RETNs). Additionally to the objectives and activities mentioned above for the Advanced R&D Thematic Networks (RDTNs), this action aims to support the implementation of joint postgraduate study courses, training programmes etc., especially in cooperation with respective entities from abroad.

Beneficiaries RDTNs and RETNs: In the case of RDTNs, the key beneficiaries are the public Research Centres/Institutes (laboratories, research teams, researchers – especially those meeting the criterion of excellence and/or emerging excellence in the areas mentioned above). In the case of RETNs, the beneficiaries will be the public Research Centres and Institutes, together with the country’s Universities and Higher Technical Education Institutions (participation of University laboratories / research teams is a key condition).

It is pointed out that adoption of measures through legislation may be necessary for promoting the above actions, especially if Networks / “Centres of Excellence” will be required to take on an independent legal form. Where considered necessary, research centres and research laboratories of the private sector will also be able to participate.

Priority areas: These will be pre-selected by the Ministry of Development – GSRT following the evaluation of the summary proposals to be submitted in response to a

¹⁸ This case includes electronic infrastructures and their networking with European or international networks and databases.

¹⁹ The state of the art in the respective sector at the international level, as well as the country’s starting point and strengths, should be taken into consideration.

²⁰ The concepts of excellence and emerging excellence must be defined through a series of indicators.

²¹ The aim here is to attract highly qualified as well as junior researchers.

Call for Expressions of Interest. These areas will be selected from which included in the 11 priority areas (thematic priorities) and meet the criteria and objectives of the action, the most important of which is the existence of a high level of existing or emerging excellence in cutting-edge areas in which no business activity has been developed in the country.

The detailed proposals will be submitted following the publication of a Call for Proposals for the pre-selected “priority areas”. In these cases, the preparation of the proposals will also be eligible for funding. In each proposal, the anticipated results-targets will be determined in advance, using qualitative and quantitative performance and impact indicators, at the level of the participating entities, of the corresponding economic activity sector, and of the economy in general. It will also be possible for new partners to join the project after the proposal is approved, provided that this does not alter the project’s core scope and objectives. Depending on the project’s progress, which will be monitored and evaluated by an independent external organisation to be appointed by the GSRT, the initial project budget may be increased and/or reduced.

Evaluation of the detailed proposals will be carried out primarily or exclusively by foreign experts. For each proposal, the Project Manager and the key members of the implementation team will make a detailed presentation of the proposal to the evaluation committee.

- Creation of (a) knowledge-intensive clusters, and (b) innovation clusters²² with a unidisciplinary or multidisciplinary approach. These clusters will function in cutting-edge fields with competitive advantages, with the aim of conducting research and development on innovative, particularly highly knowledge-intensive products and services, and of promoting systematic interactions through the joint use of facilities and the exchange of know-how and expertise, thus contributing decisively to the transfer of know-how, the creation of networks and the dissemination of information between enterprises. This action will be an integrated, autonomous funding instrument; however, it will also be connected to the actions for the creation of RDTNs and RETNs, where the conditions are mature enough to allow this.

Beneficiaries: Clusters, defined as an aggregations of enterprises (mainly SMEs, although this is not strict not necessarily) and other support organisations from the public or the private sector, linked along a value-adding chain and combining knowledge intensity, high-tech and a strong export orientation as their key features.

Priority will be given to the creation-expansion (after evaluation) of highly knowledge-intensive clusters. Innovation clusters will be promoted mainly in the Objective 1 Regions.

Priority areas: The 11 priority areas provided that the criteria and objections of the actions are met. The dates for the submission of proposals will be open (i.e. it will be possible to submit proposals at any time).

²² Legal basis (existing): L.1514/85, L.1783/87, L.2471/91(article 23), L.2919/2000 (article 5&8), L. 3410/06 (article 15). Where this is considered necessary, additions will be made to the existing legal basis.

I.2. “KNOWLEDGE” Sub-axis

Key Objectives: *To strengthen the competitiveness and outwardness of enterprises, of the employment and of the quality of life, through S&T projects in sectors and activities which: (a) are of interest for the country’s productive fabric and will contribute to the development of new or improved products and services; (b) support the needs of society and of the citizens in various areas such as health, energy, agricultural policy, environmental policy, radiation protection, space policy, cultural heritage; (c) create new knowledge that may be commercially exploited; (d) assist SMEs and new enterprises in meeting their S&T requirements; (e) strengthen international cooperation and mobility and the position of Greece in the European Research Area; and (f) attract S&T human resources and R&D investments to Greece.*

Proposed Actions

“Cooperation”²³ between business and S&T organisations. This action is of special significance, as on the one hand it will be the basic instrument for funding the actions involving (a) the creation of National R&D Sectoral Poles and (b) the creation/support of Regional Innovation Poles (these actions will be discussed further on), and on the other hand it will be implemented as an independent instrument (funding scheme) at the national as well as at the regional level.

The action’s objectives are to improve the competitiveness of enterprises and the quality of life, strengthening the links between research and production and promoting outwardness and a multidisciplinary approach through international S&T cooperations.

The action may be applied in all 11 priority areas (based on a top-down approach²⁴) and will be implemented through S&T projects which must be characterised by commercial potential in the short-to-medium term. These projects may involve research (industrial research and/or experimental development and/or basic research), process innovation, and diffusion activities.

The action will be implemented through S&T projects on a medium-scale, in terms of the number of participating entities (3-5 entities in average) as well as in terms of budget and anticipated results, which must have exploitation potential in the short-to-medium term. The duration of the projects may vary between 2 and 4 years. In cases of prototyping (experimental development) which requires a study to be carried out, the duration of the project may be extended to 5 years. The study will also be eligible under this action.

Beneficiaries: Cooperations between enterprises of all types and sizes, Universities, Higher Technological Education Institutions, Research Centres and Institutions of the public and the private sector, user organisations and other entities with activities and objectives related to the objectives of the Programme, from Greece and abroad.

²³ Legal basis: P.D. 274/2000 (Official Journal [OJ] 225/A/17.10.2000) & P.D. 103/2003 (OJ /96/A/23.4.2003), L.3259 (article 34), L.1514/85 & L.2919/01 (GG 128/A/25.6.2001), L.1783/1987 (GG A/171/1987). P.D. 274/2000 is currently under revision. Where this is considered necessary, additions will be made to the existing legal basis.

²⁴ A limited number of priority areas will be selected for each Call, in accordance with Section 2.2 (Application Method).

Strengthening new enterprises and SME²⁵s. The action's objective is to support the needs of SMEs and new enterprises and motivate the implementation of S&T projects by a larger number of enterprises.

Beneficiaries: (a) Groups and associations of SMEs with common problems, needs (refers mainly to SMEs in the same sector) and objectives (SMEs from various sectors, multidisciplinary approach to attaining common objectives or solving common problems and needs); (b) newly-established enterprises, in operation for six (6) years at the maximum; and (c) enterprises –irrespective of size– that have not received funding for research activities so far. It is pointed out that during the evaluation stage as well as during the funding disbursement stage, the proposals in which the participating SMEs and/or SME associations establish more permanent structures and cooperation networks will be given priority (in the form of a “bonus”).

The dates for the submission of proposals will be open (i.e. it will be possible to submit proposals at any time), and will be applied to all 11 priority areas under the NSRF-RDTI. Proposals will be evaluated every four months.

This action will be of smaller size in terms of range and budget, and will complement the “Cooperation” action. Public organisations will be able to participate only subcontracting agreements involving industrial research, experimental development and/or process and diffusion innovations.

Support of policies and coverage of future needs^{26 27}. This action concerns the support of S&T projects and/or the development of studies, and the creation of Technology Platforms aimed at supporting the formulation and evaluation of policies. The action also concerns the support of policies in their implementation phase, including EU policies and directives, implementation of the open coordination method, and cooperation policies with international organisations – especially those in which Greece participates as a member, such as the European Space Agency and OECD.

Beneficiaries: Enterprises of all types and sizes, Universities and Higher Technological Education Institutions, Research Centres, public and private sector Institutes, Ministries, Regional Authorities, Ministry bodies and organisations responsible for policy formulation and implementation, associations, consumer and user organisations, and other organisations whose activities and objectives are relevant to the objectives of the programme, from Greece and abroad²⁸. It should be noted that this programme will also provide considerable support for the activities of the GSRT and especially those of the Directorate for Planning and Programming, as – in addition to S&T projects– funding will also be directed to policy support studies and studies for the assessment and evaluation of the impact of Actions and Programmes, foresight studies, studies for strategic identification of national policies and S&T indicators, studies for the development of national and/or regional technology plans (Technology Platforms), participation in OECD studies etc.

²⁵ Legal basis: P.D. 274/2000 & P.D. 103/2003, L.3259 (article 34). P.D. 274/2000 is currently under revision. Where this is considered necessary, additions will be made to the existing legal basis.

²⁶ Legal basis: L.1514/85 & L.2919/01, P.D. 327/95, P.D. 4/2002. Where this is considered necessary, additions will be made to the existing legal basis.

²⁷ Priority sectors or actions that cannot be foreseen at the present stage.

²⁸ Individually or in cooperation between them, depending on the range and specific requirements of each action.

Priority areas: These will be determined in cooperation with the competent Ministries and the organisations in charge of each subject matter, on the basis of the priority areas of the present Strategic Plan. The inclusion of priorities which have not been foreseen so far will be possible in exceptional and urgent circumstances or as a response to unforeseen developments. The participating organisations' own contribution will be specified in the respective Call for Proposals. In certain cases (such as areas addressing social needs), where there is no private sector counterpart to participate in the implementation of the projects, funding for the corresponding projects may reach 100%.

European S&T Cooperation²⁹, which will facilitate the coordination of the national S&T policy with the S&T policies of the other Member States, the EU and International Organisations of European interest, to achieve economies of scale and scope. This will be achieved through the implementation of joint S&T actions and infrastructures in areas of national and European interest. The programme's key objective is to support and accelerate Greece's incorporation in the European Research and Innovation Area.

Field of application: Participation in R&D projects to be implemented in accordance with article 169 of the Treaty, through the creation of common structures, the participation in ERA-NET and ERA-NET Plus programmes and in Joint Technological Initiatives (JTI), the creation of joint enterprises on the basis of article 171, and generally through participation in all the actions under the 7th Framework Programme which provide for the support of joint actions at the national and European level, funded by—amongst others—the European Investment Bank. This action also includes participation in public-private partnerships which may be established at the European level for R&D projects, as well as the participation of Greek organisations in activities and projects of International Organisations of European interest, if this participation can not be covered by the organisations' own funds. Finally, Greek researchers and research teams will be supported for gaining access to European research infrastructures or to research infrastructures of European interest.

Priority areas: Due to the programme's particularities, the eligible areas and topics will be all priority areas and topics under the 7th Framework Programme and under the other activities planned to support the creation of the European Research and Innovation Area, as well as all areas and priority themes of the International Organisations of European interest. However, priority will be given to the S&T priority areas and objectives of the present Strategic Plan. The remaining cases should be fully justified and conform to the overall objectives of the Strategic Plan.

Beneficiaries: Enterprises, Universities and Higher Technological Education Institutions, Research Centres, Institutes, Associations of enterprises, researchers, teams of researchers etc. In any case, the beneficiaries will also be determined based on the respective participation rules of the corresponding European actions, such as the rules for participation in the 7th Framework Programme, in the Programmes of International Organisations of European interest etc.

Bilateral, multilateral and regional S&T co-operations.

The objectives of this action are:

²⁹ The EU Strategic Guidelines for the Cohesion Policy 2007-2013 also give priority to these actions.

To fund projects in the framework of Bilateral S&T Agreements, through the creation –amongst others– of joint Funds for the purpose of further supporting the Agreements and extending projects.

To strengthen multilateral cooperations.

To take initiatives for strengthening links with groups from third countries with political and/or economic interest, such as the Balkan countries, the Black Sea Economic Cooperation (BSEC) countries and the Mediterranean countries. These initiatives will include, among others, the provision of funding to researchers, teams of researchers and organisations from these countries through R&D programmes of national interest, with a special focus on assisting the penetration of high-tech Greek investments in these countries.

Beneficiaries: Enterprises and associations of enterprises, Research Centres, Institutes, laboratories, Universities, Higher Technological Education Institutions, researchers, teams of researchers etc. Individual entities will only participate if this is foreseen in the respective Bilateral (or Multilateral) S&T Agreement.

Emphasis will be given to the exchanges of junior researchers (doctoral and post-doctoral candidates) to and from abroad for specialisation/training in new techniques, and generally to the support of cross-border mobility of human resources.

Priority areas: All 11 priority areas under the present Strategic Plan will be eligible, together with the priorities potentially included in action plans for regional and trans-regional cooperation with target groups in third countries. A priority area that is not contained in the present Strategic Plan may be eligible only in the case of Bilateral Agreements and in fully justified cases. Further specification and focus is possible, depending on the type of the Agreement.

I.3: Horizontal Actions

Creation of R&D National Sectoral Poles (unidisciplinary or multidisciplinary).

This action refers to unidisciplinary or multidisciplinary integrated R&D interventions with a long-term horizon (e.g. 5 years) and a clear focus in terms of their field of intervention as well as in terms of the short-term and long-term results anticipated. The objective is to improve the economy's competitiveness at the international level and to restructure sectors of the Greek economy towards new sectors with high added value for the economy and for society.

The action will be implemented through wide-reaching RTD and Innovation projects, in terms of both the number of participating entities (primarily enterprises) and of the budget involved. Above all, these projects will be characterised by their ambitious targets for the production of products, services and high value-added technology and the prospect for market penetration.

The main funding schemes under this action will include the following: cooperation between enterprises and R&D knowledge-producing entities ("Cooperation" action); support and networking of SMEs; support of the creation of highly knowledge-intensive enterprises (spin-off and spin-out); exchanges of personnel between enterprises and research organisations from Greece and abroad; strengthening infrastructures, where necessary; and horizontal activities. These funding schemes under this action may be differentiated in order to ensure synergy and flexibility regarding the objectives and goals of the respective projects. Essentially, this

approach seeks to support all success factors, i.e. production of new and exploitable knowledge, infrastructure, and people (human resource training and attraction of research personnel in order to close the gap between supply and demand). In parallel, the anticipated target results for each pole will be determined in advance, using qualitative and quantitative performance and impact indicators, at the level of the participating entities, of the corresponding economic activity sector, and of the economy in general.

The preparation of detailed proposals may be funded through feasibility studies. The participation of the private sector, which will depend on the specific “area” of each Call, must be on average 35% of the proposal’s budget. The beneficiaries of this action will be associations³⁰ consisting of enterprises of all types and sizes, public S&T organisations, Universities, Higher Technological Education Institutions, associations of enterprises, Chambers, financial institutions and other entities whose activities are aligned with the objectives of the action.

Priority areas: These will be pre-selected by the Ministry of Development – GSRT following the evaluation of the summary proposals to be submitted in response to a Call for Expressions of Interest. These areas will however belong to those included in the 11 thematic priorities and will meet the criteria and objectives of the action, as these will be specified in the Call for Expressions of Interest (especially regarding the participation of the private sector).

The detailed proposals will be submitted following the publication of a Call for Proposals for the pre-selected “priority areas”. It will be possible for new partners to join the project after the proposal is approved, provided that this does not alter the project’s core scope and objectives. Depending on the project’s progress, which will be monitored and evaluated by an independent external organisation to be appointed by the GSRT, the initial project budget may be increased and/or reduced.

Evaluation of the detailed proposals will be carried out by foreign experts. For each proposal, the Project Manager and the key members of the implementation team will make a detailed presentation of the proposal to the evaluation committee.

Technical feasibility studies and studies in support of preparations for the submission of proposals:

§ **Technical feasibility studies**, which will precede certain broad-ranging Research and Innovation activities under the “KNOWLEDGE” and “VALUE” sub-axes. The key objectives these studies will be: (a) to determine market failure in connection with defective and imbalanced diffusion of information; (b) to increase the information concerning the viability of the implementation for the specific RTD project; and (c) to prepare the proposal.
Funding: 75% Public Expenditure.

§ **Studies in support of preparations for the submission of proposals** in the European RTD Programmes, aiming at increasing the participation of Greek organisations in the 7th Framework Programme and/or the Framework Programme for Competitiveness and Innovation. This action will be addressed to proposal coordinators and to organisations with a substantial participation in large-scale

³⁰ The type of association will be determined at the stage of the action’s specialisation and, in certain cases, at the Call publication stage.

interventions, while assistance to other cases is also being examined – especially SMEs, mainly in the form of low-value Vouchers. The preparation of detailed proposals for RDTNs/RETNs will also be funded.

Beneficiaries: Enterprises of all types and sizes, researchers, laboratories of Universities and Higher Technological Education Institutions, Research Centres, associations of enterprises or groups thereof, especially in cases where they wish to prepare a proposal for the implementation of a large-scale RTD project to financed their by own resources, by financial institutions or by the national or Community Programmes.

People. Actions to support RTD human resources –especially researchers – in the public and the private sector, and actions to assist the mobility of researchers and technicians between the public and the private sector in Greece and abroad.

The key actions will be the following: (a) support of enterprises for employing highly qualified research personnel; (b) support of cross-sectoral mobility (short-term exchange/loaning of researchers from Greece and abroad between research, business and user organisations; (c) attraction³¹ – exploitation of researchers from abroad – mainly highly qualified ones– in Greek S&T organisations and enterprises³²; and (d) actions for the “production” of new, specialist research human resources and for strengthening the basic research (R&D towards doctoral degrees, post-doctoral scholarships etc). Actions under this last case will be addressed to various target groups, such as small research teams of new or experienced researchers, post-doctoral researchers etc.

The human resource actions, as autonomous actions, come under the NSRF programmes which are funded by the European Social Fund.

II. “VALUE” Axis

Key Objective: *To convert knowledge to innovative products, processes and services, and to support the transfer of technology, know-how and highly intensive knowledge to enterprises. and especially to SMEs, bridging the gap between technological knowledge and the market.*

The key actions under this Axis will include the following: (a) promotion of an integrated strategy for Innovation at the regional level; (b) encouragement/support of the exploitation of research results by among others supporting experimental technological applications and the risks inherent in the development of innovative products; (c) encouragement and support of Innovation and Technology Transfer Offices; (d) support of the creation and development of highly knowledge-intensive enterprises and of new, innovative enterprises in general (up to 6 years in operation); (e) dealing with the problem of shortage of own funds (through venture/seed capital);

³¹ This action will also include, among others, funding for relocation and a bonus for the development of research activity for the highly qualified researchers who will relocate to Greece for a minimum of 3 years, irrespective of nationality. Highly qualified researchers will also be granted “autonomy” regarding their research activities in their host organisation.

³² Linkage of this scheme or development of another one must be examined if considered necessary, to ensure compliance and eligibility for funding under the action “Life-long training and career development” of the 7th Framework Programme.

(f) strengthening supply and demand for high-quality RTD services; (g) increase the number of patents and their commercial exploitation; and (h) linking innovation to society and the young people.

Proposed actions:

Sub-axis II.1: “Strengthening innovation and exploitation of research results”

Creation/strengthening of Regional Innovation Poles (RIPs) with the aim of promoting an integrated Innovation strategy at the regional level and of creating new business activities, drawing on the knowledge produced and/or accumulated. Where needed, this action will be adjusted based on the experience to be gained from its initial application. The goal is to create RIPs in all Regions and/or groups of Regions, on condition that the critical mass for their growth –especially in terms of the business community in the respective Region– is present. Assistance to existing poles will be made available after their evaluation, which must demonstrate their positive contribution to the attainment of the action’s objectives and to the regional economy in general. This action will be linked to individual actions (funding schemes) under the “KNOWLEDGE” and “VALUE” axes.

Reward (BONUS). The action is aimed at converting the research and knowledge output of national and/or Community co-funded projects into new competitive products and services, mainly by motivating researchers to produce commercially exploitable knowledge. In addition to the resources for continuation and exploitation of research, the organisations selected for funding may also receive an additional amount as a bonus³³. Priority will be given to projects belonging to the 11 priority areas of the present Strategic Plan.

Beneficiaries: Enterprises / research organisations which have been funded (a) under the EU’s Framework Programmes (6th and 7th Framework Programme for RTD, and Framework Programme for Competitiveness and Innovation – Phase A), and/or (b) under the Operational Programmes “Competitiveness” or “Information Society”, and which have produced exploitable S&T results. It should be noted that in both cases any intellectual property rights issues must have been settled in advance.

The dates for the submission of proposals under this action will be open (i.e. it will be possible to submit proposals at any time). Proposals will be evaluated every four months.

Strengthening supply and demand for research, technology and innovation services.

The key objectives of this action are:

- I. To support enterprises and SMEs technological needs, and to strengthen the service sector, through the following: (a) The action “Voucher for SMEs”, supporting the purchase by SMEs of innovative consulting and support services from intermediary innovation organisations. To this end, the Ministry may need to publish a list of intermediary organisations of the public and the private sector, in

³³ The intention of this programme is to motivate Greek researchers to give to the implementation of projects aimed at producing final products the same weight as that which they give to securing the approval of new projects. A parallel objective is to ensure continuation of funding in case of positive results.

order to inform SMEs of their existence and ensure the quality of the services provided. (b) Networking of SMEs with technology service providers. (c) A special Call at the national and/or regional level for cooperation between enterprises and research organisations, with a special focus on the service sector (of a horizontal nature, i.e. focusing on service-related issues across the 11 priority areas), including the innovation process and organisational innovation in the service sector.

- II. Upgrading and support of the laboratories of public S&T organisations (Universities, Higher Technological Education Institutions, Research Centres, Institutes) that provide high value-added and knowledge-intensive services not already offered by the private sector. Priority will be given to laboratory networks (virtual institutes) for the provision of accredited services to business and other organisations, and to services for which there is strong demand from the users' side.

Supporting patenting with commercial potential, with the following objectives: (a) to increase the number of patents; (b) to support researchers-inventors; and (c) to exploit patents whose commercialisation is considered capable of leading to sustainable, competitive innovative enterprises.

Beneficiaries: Public S&T organisations (Universities, Higher Technological Education Institutions, Research Centres, Institutes), researchers-inventors and SMEs.

This action will consist of three phases: (a) Feasibility subsidy; (b) funding for patent approval from the Hellenic Industrial Property Organisation, EPO, USTPO, JPO etc., and (c) commercialisation procedure. It should be noted that the possibility to also fund this action using Venture Capital or other financial instruments will be investigated, together with the ability to forecast pay-back in the event of successful commercialisation (for those cases which succeed in securing revenue). This action will initially be applied as a pilot and –depending on the results– will be further extended and finalised. Depending on the results and on the funds made available, the field of application of this action may also be extended to the purchase of industrial property titles in general (e.g. industrial designs or models), mainly in the Objective 1 Regions.

Pilot technological innovation actions³⁴: This action will focus on pilot projects that will explore new ways and tools to develop innovation. Interregional cooperation will be a key requirement. The main direction concerns the linkage of technological innovation and e-governance actions such as “smart” innovation systems, “smart” clusters, global technological cooperation networks in selected sectors, online innovation services, targeted knowledge transfer etc. A combination of innovation systems and Information Society applications will be sought.

Beneficiaries will be collective business entities, clusters and networks of enterprises, technology park and technology transfer centres, innovation centres, groups of S&T knowledge-producing organisations, and public-private partnerships involving knowledge-producing organisations.

³⁴ This action involves the continuation of innovative actions funded by the European Commission (DG REGIO) during the period from 2000 to 2006 (involving regional innovation, digital regions, and sustainable development). Funding for studies will no longer be eligible.

Sub-axis II.2: “Supporting the creation and growth of innovative enterprises”

Creation of new knowledge-intense enterprises (spin-off and spin-out).³⁵ This action will be modified and may be extended based on the experience from its application under the Operational Programme “Competitiveness” and the results of its assessment, currently under way. In order VC funding incentives to be given, during the evaluation phase, VC applications will be prioritised.

Beneficiaries: S&T knowledge-producing organisations, Universities / Higher Technological Education Institutions, natural persons (researchers, inventors), and SMEs.

Creation of high-risk venture capital (spin-off & spin-out). The key objectives of this action are: (a) To expand the range of funding instruments available in the implementation of the national research, technology and innovation policy; (b) to link this policy to the actions for supporting innovative enterprises, the creation of spin-offs, incubators, exploitation of patents etc.; (c) to strengthen the VC market in Greece.

This action will be planned based on a study³⁶ which was carried out on behalf of the GSRT and which: (a) presents in detail the current status of the venture capital market in Greece; (b) discusses the respective strengths and weaknesses; (c) presents best practices applied in other countries, together with the relevant initiatives of the EU; and (d) presents proposals on new measures-actions and/or on the modification of existing ones, such as funding the operation of pre-incubators, seed/start-up funding, creation of an Incubators Fund, creation and operation of a network of “business angels”, internationalisation of Greek businessmen etc.

Support of business incubators.³⁷ This action, which is partially linked to the S&T Parks, will be modified based on the experience gained so far³⁸, in order to be more

³⁵ Legal basis: L.2741/99, L.2919/01, P.D. 173/31.1.2001. Where this is considered necessary, additions will be made to the existing legal basis.

³⁶ “Technical expertise study for investigating the possibility to provide financial assistance to RTDI actions through Venture Capital, with the aim of promoting research, technology and innovation during the programming period 2007-13”, carried out by ATLANIS consultants on behalf of the GSRT. The study is available from the GSRT website.

³⁷ Legal basis: L. 2741/99, L.2919/01. Where this is considered necessary, additions will be made to the existing legal basis.

³⁸ Regulations will be foreseen on specific issues that substantially determine an incubator’s efficiency, thus contributing to maximising the capacity for the creation of new enterprises. Crucial issues are the following:

- Determination of a minimum number of hosted enterprises.
- Hosted enterprises must indeed be new ones, in operation for a specific maximum number of accounting periods.
- A significant percentage of the total budget (possibly even 50% of the eligible budget) must be committed for equity investments by the Managing Authorities in the hosted enterprises.
- The Managing Authority for the Business Incubator or Technology Park must participate in the Share Capital of all hosted enterprises.
- Determination of maximum limits for the categories of eligible expenses (Exp. Cat. 1: Buildings and Equipment; Exp. Cat. 2: Investments in hosted enterprises; Exp. Cat. 3: Consulting Services; Exp. Cat. 4: Operating Expenses).
- Presentation of business plans and preliminary agreements with specific enterprises during the evaluation procedure of a candidate Managing Authority.

A procedure for arbitration by an independent body will also be foreseen, to handle all cases of dispute between the GSRT and the Managing Authority concerning the need for a specific enterprise to be hosted in the Incubator.

effective in the next programming period. Activities under this action will include, among others, the possibility for incubators to also host new enterprises established by new and highly qualified scientists. Use will also be made of the results of the study mentioned above.

Key objectives: (a) Achievement of economies of scale and scope, among others by networking incubators and/or Technology Parks between them but also with knowledge-producing public organisations and business entities; (b) linkage of incubators to “Venture Capital”, so that VC funds may be used to fund the businesses hosted in the incubator after these reach a specific maturity level; and (c) strengthening the participation of the private sector. In this framework, 50% of the public expenditure will cover the incubator’s participation in the hosted enterprises.

Beneficiaries: This action is targeted at public enterprises and private sector corporations (S.A. companies) or associations thereof with knowledge-producing public organisations, which will take over as Managing Authority of the incubator under a corporate legal form (S.A.).

II.3 Horizontal actions

Innovation and technology transfer offices in Universities, Higher Technological Education Institutions and Public Research Centres. This action concerns supporting organisations active in the dissemination and exploitation of research results in Universities and Research Centres (replacement or modification of the institution of liaison offices under the 3rd CSF), and networking between these and a specialised unit staffed with legal and technical experts from Greece and abroad. The key beneficiaries will be Universities, Higher Technological Education Institutions, and public Research Centres/Institutes.

This action will be formulated based on a study³⁹ which was carried out on behalf of the GSRT and which presents: (a) all intermediary structures supporting innovation and the transfer of knowledge which are operating in Greece (Technology Parks, Business and Technological Development Centres [KETA], Incubators, liaison offices etc.); (b) the results of a brief evaluation of liaison offices, conducted using a structured questionnaire; (c) best practices (models of liaison offices) from other countries, and proposals (three scenarios) concerning the modification of the offices, of which the recommended one concerns the creation of Innovation and Technology Transfer Offices with central units and antennas operating within the Research and Academic organisations.

Creation of one-stop shop for the provision of information and support services – Support of network participant organisations. This concerns networking of all intermediary support structures created by the GSRT and the Ministry of Development more generally, as well as by the EU, under the Framework Programmes for RTD and the Programmes for the creation of the European Research Area, and under the Programmes of the 3rd CSF. This second case includes technology parks, Liaison Offices for Applied Industrial Research and Technological Development (EVETA Liaison Offices), Business and Technological Development

³⁹ “Technical expertise study for investigating the possibility to strengthen the organisations active in the exploitation of research results (Information and Technology Transfer Offices) mainly by Universities and Research Centres, including the possibility to introduce a new institution”, carried out by the University of W. Macedonia (Study Project Manager: Associate Professor I.L. Bakouros) on behalf of the GSRT.

Centres (KETA), etc. The first case includes networks for information provision and dissemination, technology transfer networks, know-how transfer networks etc., such as the NCPs, the Innovation Relay Centres and Euro Info Centres as recently modified under the Framework Programme for Competitiveness and Innovation, ERAMORE, the Mobility Portal etc. Support of the operation of the networks will complement the funding from the EU (7th Framework Programme and Framework Programme for Competitiveness and Innovation).

In planning this action, which is also linked to the previous action, the following will be taken into account: (a) the results of the study on the intermediary support structures (see Note 37) mentioned before, which presents all structures operating in Greece, and (b) the results of a study⁴⁰ on Entrepreneurship support structures, carried out on behalf of the GSRT.

Science and Society

The objective of this action is to integrate science into the social fibre, and to promote entrepreneurship among young people. Particular emphasis will be placed on sensitising the general public, as well as the young, to the achievements of science and to environment-friendly technologies, including innovative business activities, that promote sustainable development.

To this end, the actions to be promoted will include information actions on scientific issues targeted at the general public, and actions to stimulate entrepreneurship among young people by supporting innovative ideas in secondary and tertiary education.

People

This includes education-training actions for the human resources of the GSRT, of the entities under its responsibility, of the Regions and of other organisations responsible for managing research, development and technology transfer actions. These education-training actions will focus on issues involved in liaising between research and production, supporting innovation and the transfer of technology, intellectual/industrial property, managing Research, Technology and Innovation, exchanging personnel involved in managing research/innovation, information visits, and training abroad. In some cases, implementation of this action will require cooperation with specialised international organisations/experts.

In addition, this action will also cover the support of the newly-established “Research and Technological Specialisations Observatory”, whose purpose is to monitor S&T shortages in the labour market.

III. Globalisation – Open Innovation

In addition to the international and European cooperation actions already mentioned, special-purpose actions will be planned to assist enterprises in taking advantage of the opportunities offered by globalisation and the open economy, as well as in addressing the risks from global competition.

⁴⁰ “Business and Entrepreneurship Support Structures in the framework of the new programming period 2007-13”, carried out by Mr Chatzantonis, economist, on behalf of the Special Management Authority for the Operational Programme “Competitiveness” (June 2006).

Furthermore, in order to address global competition, the Matching Clause (item 5.1.7) of EC Regulation 2006/C323/01 will be applied. According to the Regulation, in order to address actual or potential direct or indirect distortions of international trade, higher intensities than generally permissible under the Community Framework on State Aids for Research and Development and Innovation may be authorised if – directly or indirectly– competitors located outside the Community have received (in the last three years) or are going to receive, aid of an equivalent intensity for similar projects, programmes, research, development or technology. However, where distortions of international trade are likely to occur after more than three years, given the particular nature of the sector in question, the reference period may be extended accordingly.

Where an application will be made for an aid of higher intensity than generally permissible under the Community framework, then, prior to granting the aid, we should provide the Commission with sufficient information to enable it to assess the situation, in particular regarding the need to take account of the competitive advantages enjoyed by third-country enterprises. In both cases, however, the enterprise interested in receiving such aid should submit to the Ministry adequate information substantiating the aid received by competitors from a third country.

IV. Special Actions at the Regional Level

In addition to the actions already mentioned, which will be implemented at the national and/or regional level, special actions to strengthen Research and Innovation with an exclusive regional focus will also be promoted, such as the Thessaloniki Innovation Zone and the support of the new Research Centre in Thessaly (KETEATH) and of the new research centres currently under establishment in W. Greece and Epirus. Funding for the new research centres will be approved based on the evaluation of their business growth plans.

Funding for these special actions will be provided mainly under the respective Regional Operational Programmes (ROPs), without excluding the possibility of funding some of them (primarily KETEATH) under the Operational Programme “Competitiveness and Entrepreneurship”.

Table 16: Actions by Axis

<i>“Knowledge and Excellence” Axis</i>	
<i>Sub-axis “Excellence”</i>	<i>Sub-axis “Knowledge”</i>
<p>Creation of Centres of Excellence</p> <ul style="list-style-type: none"> - Advanced Research & Development Thematic Networks (RDTNs) - Research and Education Thematic Networks (RETNs) <p>Creation of:</p> <ul style="list-style-type: none"> - Knowledge-intensive clusters - Innovation clusters 	<p>Cooperation between business and S&T organisations</p> <p>Strengthening new enterprises & SMEs</p> <p>Support of policies</p> <p>European S&T cooperation</p> <p>Bilateral, multilateral and regional S&T cooperations</p>
<i>“Knowledge and Excellence” Axis – Horizontal Actions</i>	
<ul style="list-style-type: none"> - Creation of national sectoral R&D poles - Technical feasibility studies and studies in support of preparations for the submission of proposals - Globalisation – Open innovation 	

<i>“Value” Axis</i>	
<i>Sub-axis “Strengthening innovation and exploitation of research results”</i>	<i>Sub-axis: “Supporting the creation and growth of innovative enterprises”</i>
<ul style="list-style-type: none"> • Creation – strengthening of regional innovation poles • Rewards (Bonus) • Strengthening supply and demand for Research, Technology and Innovation services • Supporting patenting with commercial potential • Pilot technological innovation actions 	<ul style="list-style-type: none"> • Creation of new, highly knowledge-intensive innovative enterprises (spin-off and spin-out) • Creation of high-risk venture capital (pre-seed & seed capital) • Support of business incubators
<i>“Value” Axis – Horizontal Actions</i>	
<ul style="list-style-type: none"> - Innovation and Technology Transfer offices - Creation of One-stop shop for the provision of information and support services <ul style="list-style-type: none"> - Science and Society - Globalisation – Open Innovation 	

PEOPLE

<p>1 Development of new and specialised research human resources. Strengthening of basic research.</p> <p>1.A: Research towards a PhD thesis</p> <p>I.A.1: Small research units consisting of 1-2 experienced researchers and 1-4 PhD candidates</p> <p>I.A.2: Junior researchers (1 Lecturer or Associate Professor or Grade C/D Researcher and 1-2 PhD candidates)</p> <p>I.A.3: Larger research teams consisting of 4-8 experienced researchers and 4-8 PhD candidates</p>	<p>2 Attraction – employment of researchers from abroad (mainly highly qualified ones) in Greek S&T organisations and enterprises</p>	<p>3 Training-specialisation of research human resources according to the needs of production. Provision of incentives to Greek enterprises for employing research human resources.</p> <p>3a: Programme for the Development of New Research Personnel in Enterprises</p> <p>3b: Provision of incentives to Greek enterprises for employing PhD graduates</p>	<p>4 Cross-sectoral mobility programme – Loaning of personnel.</p> <p>5 Education, training, participation in conferences of the personnel of the GSRT, of the S&T entities under its responsibility, and of the Regions, on issues concerning promotion, management and transfer of technology and innovation from Greece and abroad.</p> <p>6 Development of an Observatory to monitor labour supply and demand in the field of research.</p>
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3.2 Justification of choices – Performance Indicators

Justification of choices

The new large-scale, long-term interventions seek to restructure the national economy by supporting:

- a) RTD actions in sectors of national priority, with clearly defined anticipated results and objectives (creation of national sectoral RTD poles); and
- b) RTD actions that will lead to new activities in high-tech, knowledge-intensive areas, and to the creation of physical or networked Centres of Excellence as hosting organisations, which will attract highly qualified researchers from abroad, along with researchers from neighbouring countries, as well as international investments for research, development and the creation-attraction of new, knowledge-intensive enterprises (Advanced Research and Development Thematic Networks, Research and Education Thematic Networks, and Knowledge-intensive Clusters)

These interventions will be supplemented by (a) the continuation into the new Programming Period of the action “Creation of Regional Innovation Poles”, expected to support and restructure regional economies by promoting research and innovation activities in sectors of regional priority; and (b) the creation of Innovation Clusters.

The above essentially represent two large-scale interventions that complement each other at the national and the regional level. These interventions will be implemented primarily through a combination of the various funding schemes under the present Strategic Plan, with publication of the respective Calls taking place either independently or within the framework of the interventions mentioned.

In addition, the “Knowledge and Excellence” Axis attempts to promote two RTD support actions which will cover the entire range of research (basic, applied, industrial, etc) and innovation, and will interact as far as project scale, objectives and final beneficiaries are concerned (in cooperation between productive and RTD organisations / actors, and in SMEs support).

In parallel, another action is being created to support the national and EU policies. In certain cases, the participation of enterprises in this action will not be mandatory. Furthermore, to meet the requirement for cooperation with other EU Member States, a European cooperation action is created, which also includes participation in common European infrastructures. To cover funding of Bilateral S&T Agreements and to promote multilateral cooperations with groups from third countries, and especially from neighbouring countries, the creation of an action focusing on bilateral, multilateral and regional S&T cooperations⁴¹ is proposed. In the case of the West Balkan, Mediterranean and BSEC countries, for whose linkage to the European Research Area Greece plays a key part, the priority for the funds made available under specific terms and conditions from our part should be on organisations and – most importantly– researchers from these countries.

⁴¹ The objective here is to expand Greece’s national policy for supporting the neighbouring countries also to the research and technology area, through activities that do not only involve infrastructures or cultural heritage (such as building roads and pavements or restoring monasteries), but also strengthen S&T cooperation, especially the cross-border mobility of human resources.

Furthermore, the actions proposed under the “Value” Axis continue and expand the initiatives launched under the Operational Programme “Competitiveness”, aimed at motivating the creation and development of new, highly knowledge-intensive enterprises (spin-offs and spin-outs), and the creation of incubators by the public as well as by the private sector. These actions, which will be modified and enhanced based on the current experience, will be expanded with new actions aimed at increasing the number of patents and their exploitation. The funding schemes for all these actions will also be expanded with the addition of high-risk venture capital. In addition, technology/innovation brokerage and liaison mechanisms will be strengthened, in the public as well as in the private sector.

Finally, a special action (“BONUS”) has been foreseen, aimed at motivating Greek teams of researchers to give emphasis on the results of research: if their work leads to commercially exploitable results, then they will be able to secure the continuation of the funding and/or even receive a corresponding amount of money as reward. Actions will also be promoted to increase demand and supply, especially by SMEs, for high-quality hi-tech services, a sector characterised by significant and continuously increasing demand and by the need for improvements in quality.

General performance indicators (not yet finalised)

	Base Value		Target Value	
RTD expenditure as a share of GDP (%)	0.61	2004	1.5	2015
Share of RTD expenditure funded by enterprises (%)	30.7	2003	40	2015
Share of RTD expenditure funded by the public sector (%)	47.4	2003	50	2015
Share of RTD expenditure funded from abroad (%)	18.1	2003	10	2015
Research personnel (headcount)	57257	2003	127000	2015
Research personnel in Full-time Equivalents (FTEs)	31822	2003	70645	2015
Researchers (headcount)	28058	2003	62300	2015
Researchers in Full-time Equivalents (FTEs)	15390	2003	34167	2015
Employment in high- and medium-tech sectors (manufacturing) and in high-tech sectors (knowledge-intensive services), as a share of total employment (%)	3.86	2005	5	2015
Exports as a share of GDP (%)	20.8	2005	?	2015
High-tech exports as a share total exports (%)	7	2004	15	2015
Innovative businesses as a share of total businesses (%)	35.8	2004	50	2015
Sales of “new-to-market” products and services (%)	4.8	2004	10	2015
Sales of “new-to-business” products and services (%)	6.2	2004	15	2015
Patent applications submitted to the Greek Industrial Property Organisation	538	2003	1000	2015
Number of Patent applications submitted to the EPO	123	2003	300	2015
Number of Patent application submitted to the USPTO	14	2000	50	2015
Publications per 1m inhabitants	525	2003	1000	2015
References (global share of references over global share of publications)	0.42	2001	1	2015

Section 4: Implementation Provisions – Funding

The present Strategic Plan will be implemented through the individual Regional and Sectoral Programmes under the NSRF 2007-2013, and in accordance with the Regulations and provisions of the Structural Funds, the application rules of the EU, and the relevant Greek legislation.

The total public expenditure of the NSRF amounts to €30,294 million, of which €20,260.98 million are the Community's contribution⁴², and €6,105.52 million are the national contribution. The remaining €4,557.5 million are funds from other sources.

The Programmes under the NSRF, which include –to a greater or lesser extent– RTDI actions, and their geographical distribution, are as follows:

Sectoral Programme “Entrepreneurship and Competitiveness”. Coordinating Authority: Ministry of Development. This programme is funded by the ERDF with €1,291 million (total public expenditure: €1,721 million), and is addressed exclusively to the eight Objective 1 Regions: Thessaly, Epirus, W. Greece, Peloponnesus, Ionian Islands, Crete, N. Aegean, E. Macedonia – Thrace.

Sectoral Programme “Digital Convergence”. Coordinating Authority: Ministry of Economy and Finance. This programme is funded by ERDF with €360 million (total public expenditure: €1,147million), and is addressed exclusively to the eight Objective 1 Regions: Thessaly, Epirus, W. Greece, Peloponnesus, Ionian Islands, Crete, N. Aegean, E. Macedonia – Thrace.

Sectoral Programme “Education and Lifelong Learning”. Coordinating Authority: Ministry of Education. The programme is funded by the ESF with €1,440 million (total public expenditure: €2,215 million), and covers the entire country.

Sectoral Programme “Development of Human Resources”. Coordinating Authority: Ministry of Employment. The programme is funded by the ESF with €2,260 million (total public expenditure: €3,013 million, and covers the entire country.

Sectoral Programme “Improvement of Administrative Capacity”. Coordinating Authority: Ministry of Interior, Public Administration and Decentralisation. The programme is funded by the ESF with €505 million (total public expenditure: €675 million), and covers the entire country.

INTERREG Programme (Objective 3). Coordinating Authority: Ministry of Economy & Finance. The programme is funded by the ERDF with €209.52 (total public expenditure: €350 million).

Regional Operational Programme (ROP) for Attica. The programme is funded by the ERDF with €2,438 million (total public expenditure: €3,251 million), and covers the Region of Attica (phasing out).

⁴² European Regional Development Fund (ERDF): 12,358.82 MEuro; European Social Fund (ESF): 4,205 MEuro; Cohesion Fund: 3,697.16 MEuro.

ROP for Macedonia – Thrace. The programme is funded by the ERDF and consists of the following ROPs: (a) ROP for E. Macedonia – Thrace, with €480 million (total public expenditure: €738 million); (b) ROP for Central Macedonia (phasing out), with €1,774 million (total public expenditure: €2,365 million); and (c) ROP for W. Macedonia (phasing out), with €421 million (total public expenditure: €561 million).

ROP for W. Greece – Peloponnese and the Ionian Islands: The programme is funded by the ERDF and consists of the following ROPs: (a) ROP for the Ionian Islands, with €242 million (total public expenditure: €346 million); (b) ROP for W. Greece, with €359 million (total public expenditure: €552 million); and (c) ROP for the Peloponnese, with €13 million (total public expenditure: €417 million).

ROP for Crete and the Aegean Islands. The programme is funded by the ERDF and consists of the following ROPs: (a) ROP for N. Aegean, with €308 million (total public expenditure: €411 million); (b) ROP for S. Aegean (phasing in), with €40.30 million (total public expenditure: €350 million); and (c) ROP for Crete, with €23 million (total public expenditure: €64 million).

ROP for Epirus, Thessaly and Central Greece: The programme is funded by the ERDF and consists of the following ROPs: (a) ROP for Epirus, with €315 million (total public expenditure: €485 million); (b) ROP for Thessaly, with €423 million (total public expenditure: €604 million); and (c) ROP for Central Greece, with €367 million (total public expenditure: €734 million).

As the Sectoral Programmes funded by the ERDF are covering only Objective 1 Regions, the RTDI actions to be implemented at the national level will be co-funded by the Operational Programme “Competitiveness and Entrepreneurship” and/or by another Sectoral Programme (e.g. “Digital Convergence”), and by the ROPs for Attica and/or W. and Central Macedonia and/or Central Greece and/or S. Aegean, depending on the number of organisations that participate from each Region. For this reason, the objectives, directions and key actions of the present Strategic Plan are included in the ROPs for these Regions.

Thus, the key Programmes providing funding for RTDI actions are Operational Programme “Competitiveness and Entrepreneurship” and the ROPs for Attica and Central Macedonia. A significant contribution is also made, albeit at a lower scale, by the Sectoral Programmes “Development of Human Resources” and “Education and Lifelong Learning”, in what concerns the actions involving training of research human resources. However, according to the NSRF structure, the ROP for Attica is now taking on a strategic significance.

An additional goal of the Ministry of Development – GSRT, in addition to national actions and European cooperation actions, is to also publish Calls that will focus on the needs of each Region or group of Regions or of the Objective 1 Regions.

The field of application of each action will be decided by the GSRT which, according to the provisions on implementation, is the body responsible for coordinating all R&D actions and interventions in cooperation with the responsible Regions and other organisations having joint responsibility. However, all actions will be aligned with the objectives and directions of the present Strategic Plan.

With respect to funding for RTDI actions, the Objective 1 Regions will be funded mainly by the Operational Programme “Competitiveness and Entrepreneurship”. If

however this is considered necessary, these Regions may also include RTDI actions on issues of regional interest in their ROPs, in direct synergy and complementarity with the Operational Programme “Competitiveness and Entrepreneurship”.

The total public expenditure for RTDI actions under the NSRF Programmes, as mentioned in detail in Section 2.3, will exceed €1,300 (with Community contribution exceeding €1,000 million, representing nearly 4.9% of the total Community contribution under the NSRF).

It should also be noted that human resources actions which will form part of large-scale interventions, together with other funding arrangements funded by the ERDF, will be funded by the Operational Programme “Competitiveness and Entrepreneurship” on the basis of their capability for using 10% of their budget for human resources. Otherwise, in cases of calls for autonomous funding schemes, the following will apply:

- § The actions for the specialisation of researchers (funding of research programmes towards a PhD thesis, , basic research etc.) across all grades (junior researchers, researchers in higher grades, highly qualified researchers, teams thereof etc.), as well as actions to attract-employ researchers from abroad in S&T organisations, will be funded by the Operational Programme of the Ministry of Education. These actions are in synergy and complementarity with those to be planned and implemented by the Ministry of Education.
- § The actions for specialisation and mobility of human resources, such as the development of PhD theses jointly funded by the industry, the mobility of researchers from research organisations to the production sector etc., and in general the actions concerning human resources which will also involve – directly or indirectly – enterprises, will be funded by the Operational Programme of the Ministry of Employment. An agreement has already been signed concerning the cooperation between the two Operational Programmes.
- § The following training actions will be funded by the Operational Programme “Competitiveness and Entrepreneurship” and by the Ministry of Interior, Public Administration and Decentralisation: (a) Training actions for GSRT personnel, participation in international conferences or EU seminars on issues related to the responsibilities of the GSRT, and training of personnel from the country’s Regions who are responsible for managing research and innovation activities funded by national and/or Community resources; and (b) training actions for executives and other personnel from Research Centres and Institutes, Technology and Science Parks, and in general from organisations under the responsibility of GSRT involved in innovation management, linking research and production, and the exploitation of research results, together with personnel from the corresponding entities in the country’s Universities and Higher Technological Education Institutions (e.g. Technology Transfer Offices).



**HELLENIC REPUBLIC
MINISTRY OF DEVELOPMENT
GENERAL SECRETARIAT FOR RESEARCH
AND TECHNOLOGY
DIRECTORATE FOR PLANNING & PROGRAMMING
Programming Department**

**STRATEGIC PLAN FOR THE DEVELOPMENT OF
RESEARCH, TECHNOLOGY AND INNOVATION
UNDER THE NSRF 2007-13**

ANNEX:

THEMATIC PRIORITIES

Athens, October 2007

INTRODUCTION

Funding of research under the National Strategic Reference Framework (NSRF) aims at supporting the restructuring of the Greek economy and its transition to the knowledge economy. More specifically, according to the NSRF, the priority areas should focus on **improving the competitiveness and outwardness of Greek enterprises, and on restructuring them through a shift to the production of high value-added products and services**. Along with economic criteria, areas of national priority were also included in the funding priorities. In addition, the choice of thematic priorities has been made in such a way so as to allow the achievement of economies of scale and scope, on the national as well as on the European level.

Given the above framework, the priority areas satisfy at least one of the criteria listed below:

- They are crucial to the international competitiveness of sectors which either are important to the Greek economy or are expected to play an important role in the future.
- They strengthen research in dynamic scientific and technological areas in which the national research system has accumulated high-quality research potential. The development of corresponding capabilities in enterprises, or the existence of demand by the economy, is a desirable but not necessary condition.
- They are expected to play an important role in the future, by changing the situation concerning competition in a number of sectors.

The country's production and export specialisation related to Europe were used as the criteria to establish the sectors in which Greece holds a relatively strong position. In addition, using as criterion the expenditures for research and for the submission of patent applications to the European Patent Office, the sectors in which Greece exhibits a research and technological specialisation were identified. Finally, based on the growth rate of added value at the European level, the most dynamic sectors were identified. The synthesis of all the above resulted in a list of sectors whose technological needs should be further examined.

In parallel, based on scientific publications and reports, on the participation of research teams in projects under the 6th Framework Programme, and on the evaluations of the Research Centres supervised by the GSRT, the broader scientific and technological areas in which the Greek research community is distinguishing itself at the European level were identified.

The synthesis of the technological areas which are important to the Greek industry, and of the areas in which the Greek research community is distinguishing itself, led to the formulation of the research priorities for the Programming Period 2007-2013.

At the next step, a public consultation was held regarding these priorities, based on which the final text on the research priorities was drawn up.

Science and Technology Priority Sectors

1 Information and Communication Technologies

1.1 Objective

The goals of funding research in ICT are the following: To exploit the opportunities offered by ICT for improving the competitiveness of the Greek economy; to reduce the gap from other European countries in terms of ICT penetration; and, most importantly, to enhance the quality of life of citizens. Development sectors of major importance, such as health, education, public administration, transport, and tourism, will benefit directly from strengthening research in the field of ICT.

More specifically, strengthening of research activities in ICT seeks to:

- Contribute to the development of broadband infrastructures and services, and especially of audio, data and image convergence services.
- Improve the competitiveness of the Greek economy and safeguard long-term employment in sectors that are important to the country, such as the textile industry, tourism, commerce, transport, financial services and health services, by utilising ICT to improve procedures and develop new, high value-added products and services.
- Contribute to the improvement of services and activities that are important to the quality of life, welfare and development of the Greek society, such as healthcare, education and the protection of the environment.
- Drive the indigenous development of the IT and telecommunications sectors, by boosting demand for innovative products and services (e.g. new services utilising the convergence of data, sound and image), and accelerate the penetration of ICT in all aspects of economic and social life.
- Attract new business activities and refocus the country's production capacity on high value-added products and personalised services.
- Follow the technological developments in fields which are pillars for the future development of ICT, such as grid and global computing, and 4th generation wireless telecommunications, regardless of their current level of growth in Greece.

1.2 Detailed description of priorities

Communication networks and infrastructures for the development of IT Services

The sub-areas to be given priority are the following:

- Broadband wireless networks, cellular networks and next-generation telecommunications.
- Wireless sensor networks.
- Technological background for the convergence of voice, data and video services and development of related services - connected means.
- Grid computing and Global computing.

- Embedded systems.
- Radio-frequency identification (RFID).
- Software technologies with emphasis on open platforms.
- Multimedia signal processing.
- Development of multimedia applications: videoconferencing, videophone, interactive digital television, visualisation of medical data.
- Development of mechanisms for knowledge base management and data integration from heterogeneous sources.
- Management of communication networks and service development infrastructures.
- Network security.

Information systems, information technologies for knowledge management and communication with the surrounding environment

- Information systems applications and software applications adapted to the Greek SMEs (collaborative applications development by Greek SMEs, open source software etc).
- Improvement of business processes by using ICT in combination with acquiring certification.
- SOA (Service-Oriented Architecture) applications and utilisation thereof in Greece and abroad.
- Flexible management platforms for multimedia content and applications.
- Multimedia data bases: content analysis for metadata export, content summary, representation, recognition, indexing and recovery of multimedia content.
- IT services (i.e. outsourcing services, so that the threat of IT services migrating to other countries may be transformed into an opportunity).
- Knowledge management systems and systems for communication with the environment.

Microelectronic devices and integrated circuits and systems

- Development of tools for design, control and verification of integrated circuits, nano-microelectronic and micro-electromechanical systems.
- Design of new circuits and systems at the nano, micro and macro level.
- Development and manufacture of nano-microelectronic and micro-electromechanical, lab-on-a-chip and hybrid systems for manufacturing sensors and actuators, with emphasis on the following application areas:
 - Embedded microsystems in materials, machines and constructions.

Applications in the economy

- Addressing the technological challenges in B2B, B2C, and M2M applications. New models for provision of B2B, B2C and M2M services. Design and development of e-Marketplace services, new security and identity management services.
- Financial services: Development of tools and services which support financial services, such as electronic payment systems, electronic wallets, smart cards, and others.
- Tourism: Smart applications to facilitate visitors as well as tourist services and enterprises. Indicative examples: visitor information and management applications, electronic tourist services.
- Supply chain and Logistics: Supply chain management and optimisation applications. E-logistics applications, data recognition and acquisition technologies, and monitoring of quality parameters.
- Smart business processes, especially for SMEs. Emphasis is given on dynamic network collaborative business processes, collaborative work environments, and knowledge sharing.
- Textile industry (indicatively): Design and production systems for the customisation of products, recognition and use of somatometric characteristics.
- Smart procedures for the economy and for services in priority areas such as agriculture, food and beverages, construction, and the chemical and petroleum industry.

Learning and content development

It focuses specifically on the following areas:

- Development of tools supporting development, use and diffusion of digital content with emphasis on 3D interactive content, such as:
- Customisation of services (user modelling, reporting and navigation systems).
- Intelligent systems for information search and selection.
- Content organization and analysis, semantic representation.
- Development of interactive digital cultural, tourist, educational or entertainment content.
- Creation, production and synthesis of multimedia content: Media processing for modification, consolidation and uniform presentation, combination of media of different form and origin, and development of appropriate user interfaces.
- Development of a multimedia content management platform for mobile devices.
- Development of interactive applications, digital libraries and e-learning tools which promote and enrich the Greek cultural heritage. These applications may indicatively refer to the Greek culture, the Greek history and the Greek language.

- Development of interactive learning environments that encourage users. Design and development of customised learning tools and systems.
- Research on understanding the new circumstances brought about by ICT as regards the learning process and the way in which they (ICT) may be integrated into formal and organised (e.g. public education) or informal learning systems and processes.

Governance, society and quality of life

- Health.
- Governance.
- Provision of services to people with a disability.

Environment, energy, transport and geographical areas

- Environment.
- Energy.
- Transport.
- Intelligent environment and smart areas.

2 Agriculture, Fishery, Livestock Farming, Food and biotechnology

2.1 Objective

The goals of funding research in this area are the following: To exploit the opportunities offered by research and technological development for improving the competitiveness of the food industry and of the agricultural sector (including fishery and livestock farming); to diversify the agricultural business by introducing new, higher value-added activities; and to protect the health of consumers. These goals form part of an overall rationale geared towards sustainable development and the protection of the environment.

More specifically, the objectives are:

- To shift activities in agriculture (including fishery and livestock farming) to high value-added activities, and explore the new opportunities offered by the development of a multifunctional sustainable development standard. To this end, emphasis is placed on the development of renewable plant raw materials for the production of high-value industrial products; the production of renewable energy sources; the development of bio-farming and eco-tourism; and the protection of the environment through the development of bioenergy-based economic activities.
- To enhance the food sector's competitiveness, by improving the safety, quality, and nutritional value of foodstuffs and protecting the health of consumers.
- To leverage biotechnology for attaining the above goals and, more specifically, for address problems in agricultural production, nutrition, the protection of the environment, and biodiversity.

2.2 Detailed description of priorities

Utilisation of biotechnology for sustainable production and management of the natural, marine and animal capital

- Production of reproductive material.
- Biodiagnostic technology

Improvement of sustainability in all production systems, and optimisation of the health of the plant, marine and animal capital

- Plant production.
- Animal production.
- Marine aquaculture and fishery.

Socioeconomic research and support of policies

- The impact of the Common Agricultural Policy (CAP) on the farm economy.
- The New Agriculture – The farm of the future.
- Technology transfer to the farm economy.
- Governance for a sustainable approach to fishery management.

Foodstuffs

- Consumer behaviour and preferences.
- Healthy eating.
- Development of high value-added foodstuffs and new products, in order to meet specific needs and preferences.
- Improvement of processes, packaging and control, in order to achieve high added quality in products.

Utilisation of agricultural by-products, sub-products and other related raw materials for the production of high value-added products

3 High value-added products and manufacturing technologies with emphasis on traditional sectors

3.1 Objective

The funding of research in traditional sectors of the Greek manufacturing industry aims to improve the competitiveness of Greek manufacturing businesses by refocusing traditional sectors on knowledge-intensive and high value-added activities. In addition, it aims to strengthen the sustainable character of development in a way that will contribute to the improvement of the quality of life and to the attainment of the environmental goals set by the country.

More specifically, the funding of research aims to:

Shift the focus of traditional sectors of major importance to the Greek economy and to employment, such as the textile industry, clothing and leather, construction, furniture-making or the chemical industry, on new markets for very high value-added products.

Utilise new technological fields, such as nanotechnology and biotechnology, for producing high-value added.

Seek and develop new competitive advantages, by improving the production process and the supply chain.

Attain the environmental goals set by the country and improve quality of life, by improving design, materials, and production processes.

1.3 Detailed description of priorities

Multifunctional products

Development of products incorporating more than one function and combining traditional use with new applications and uses. Examples of such products are being developed in the textile and clothing industry, in the construction sector, and in furniture-making. Priority is given to applications in the following sectors:

§ Textile industry.

§ Construction.

§ Furniture.

“Smart” products

These are products that interact with their environment, responding to stimuli. In order to operate in this way, “smart” products must integrate all forms and types sensors and actuators. General priority areas are sensor technologies and actuator technologies, with applications in the textile industry and the construction sector.

High-performance products

High-performance products refer to structures whose mechanical or other performance is markedly higher compared to those of common products. These products protect the user from external factors. Priority is given to applications in the textile industry and in the construction sector.

Product design

Product design synthesises the requirements analysis, the design suggestion, the analysis of the suggested model’s behaviour, the iterative process of improvements and, finally, rapid prototyping. Priority is given to applications in the textile industry and the construction sector.

Environment-friendly products and processes – Industrial biotechnology

Development of production methods distinguished by their friendliness to the environment, with emphasis on achieving lower energy, materials and water consumption, and on reducing the quantity and hazardous nature of waste.

§ Industrial biotechnology – White biotechnology.

§ Technologies for recycling and re-use of raw materials and for reducing all types of waste in the production process.

§ Chemical industry – Chemical reactions and process design.

§ Textile industry – Leather.

§ Construction.

Supply chain management

Priority is given to applications in the following sectors: Chemical industry, textile industry, clothing, leather and construction.

4 Advanced materials, nanotechnology – nanosciences and microelectronics

4.1 Objective

The goal of supporting research in the fields of nanotechnology, advanced materials and microelectronics is to support the indigenous development of technological and research potential in these fields, as technological foundations for a large number of sectors. The penetration of the above technologies in the Greek industry increases added value and knowledge intensity, while also changing the terms of competition. More specifically, the objectives are:

- To benefit from the window of opportunity presented for a dynamic entry in the field of nanotechnology, while its growth is still at an early stage.
- To facilitate the familiarisation of the Greek economic activity sectors with nanotechnology and advanced materials, strengthening their competitive position in the Greek as well as in the international market in the medium-to-long run. To this end, emphasis is placed on the development of applications in fields which are important to the Greek economy, such as the chemical industry, construction, and energy, or in sectors which are now emerging Greece, such as microelectronics, pharmaceuticals and medical instruments.
- To strengthen the competitiveness of the dynamically-growing sector of microelectronics, by developing knowledge and technological potential as well as by increasing domestic demand.
- To indirectly support the necessary shift of the industry to technologies with significant social and environmental applications, and to energy, security and protection technologies. These directions are expected to be the major driving forces for growth in the 21st century.

4.2 Detailed description of priorities

Nanotechnology and nanosciences

- Basic research in nanostructures and specifically in: quantum principles of nanostructures in dimensions <10nm; handling of individual atoms for building nanostructures; interaction of nanostructures with microstructures; self-formation of atoms for establishing self-building nanostructures; studies on the self-organisation of nanostructures for producing useful materials with significant properties; impact of nanostructures on tissues and biological materials.
- Processes in building nanostructures and nanoformation of materials.

- Nanometrology for the dimensional calibration of nanostructures.
- Composition and study of nanoparticles.
- Studies regarding the hazardous nature and safety in the use of nanostructures and nanoparticles, either on their own or as parts of structures.
- Nanomaterials for use in developing innovative high value-added products with improved properties for the chemical industry (e.g. coatings, adhesives, cosmetics, plastics). These include:
 - The use of nanomaterials in sensor and MEMS systems.
 - Photovoltaic cells using nanomaterials.
 - Nano-micro-structured catalysts for environmental applications: assimilation of carbon monoxide and carbon dioxide, utilisation of residues and waste, etc.

Advanced materials

- New nano-micro-structured materials with very high thermomechanical resilience.
- Nano-micro-structured catalytic materials
- Self-repairing materials with a high mechanical reliability index for crucial applications.
- Value-added methods, materials and products based on the utilisation of waste and residue.
- Intelligent self-assembling materials and systems with integrated sensors and actuators for use in transport.
- Materials with graded properties for energy absorption and increase of mechanical reliability
- Advanced ceramic and polymer materials and composites thereof using metallic, ceramic and natural fibre reinforcements with improved mechanical properties for high reliability in buildings and constructions, especially in anti-seismic applications.
- Biomaterials and biodegradable polymers.
- New thermal accumulating materials and systems for building applications in order to reduce the energy needs in heating and cooling
- Pigmented micro-materials and colorants.
- New materials for environment-friendly forms of energy production and for electrical energy accumulators.
- Organic – inorganic hybrid materials with suitable optical and electrical properties for creating optical and electronic devices.

Microelectronics

- Opto-nano-micro-electronic materials.

- Bioelectronic materials.
- Meta-materials and organic semiconductors.
- Microelectronic polymers.
- Nano-micro-structured materials and systems for direct production of electricity from solar energy.

5 Energy

5.1 Objective

The funding of research in this area aims to address climatic change; to lessen the dependence on imported energy resources, especially crude oil, in an environment-friendly manner; to enhance energy safety; and to improve the country's position globally in terms of energy-related research. More specifically, the individual objectives are:

To address the problem of climatic change and ensure –as a minimum– the compliance with the goals of the Kyoto Protocol and the decisions of the European Commission which are binding on our country and concern the reduction of the gas emissions released by energy-production activities and contributing to the greenhouse effect, and the protection of the ozone layer.

To lessen the country's dependence on crude oil in an environment-friendly way, by improving energy efficiency, developing innovative technologies for renewable energy sources, and managing rationally the mineral natural resources. In what is especially concerns transport, the objective is to substitute 5.75% of all fuels used with biofuels.

To enhance energy safety, by developing know-how in the interconnection of energy networks, especially of energy networks in the islands with the country's mainland power grid, and to increase pluralism in energy sources (with an emphasis on domestic sources).

To conserve energy for industrial and household use.

To develop economic activities in the field of energy, by developing the energy services industry and increasing the number of energy system facilities and energy conservation system facilities.

5.2 Detailed description of priorities

Electricity production from Renewable Energy Sources (RES)

A prerequisite for attaining the objective of increasing the share of RES-based electricity production in Greece is to research, develop and demonstrate integrated electricity production technologies. The aim of the research is to increase the profitability of investments while maintaining environmental equilibrium, by drawing on the country's energy potential.

Fuel production from RES

The need to use alternative and renewable fuels instead of petroleum and its by-products has accelerated developments in research, as environmental and economic reasons make the

development of biofuels imperative. Emphasis is placed on improving the production processes of biofuels and on producing bioethanol and biodiesel.

Use of RES for heating and cooling

Development of systems for energy conservation and rational use, by using innovative solar facilities and geothermal energy, improving heat pumps, and using absorption systems in households and in industrial/commercial buildings.

Hydrogen and fuel cells

The research in this area focuses on dealing with the shortcomings associated with the production, storage and safe use of hydrogen, and on seeking and making the most of alternative fuels.

Clean coal technologies

The key focus here is on developing new technologies that will enhance the performance of coal, lignite and natural gas, in terms of energy efficiency as well as in terms of contributing to the protection of the environment through lower gas emissions.

“Smart” energy networks

The research is focused on increasing the efficiency, flexibility, safety, reliability and quality of electricity and gas systems and networks, and of their interconnection with the European ones. Emphasis is placed on dealing with the problems associated with the integration of renewable energy sources in the electrical energy system.

Energy efficiency and conservation

The research in this field aims to develop systems and tools which shall contribute to the drastic reduction of energy needs in buildings.

Support of policies

Research in this area concerns the social, economic and institutional preparations for the uptake and diffusion of new energy technologies.

6 Transport

6.1 Objective

The analysis of the current and future potential the transport sector in Greece shows that research in this area can make a significant contribution to upgrading the country's transport sector and improving the transport services provided to citizens. Therefore, the purpose of the research in the Transport priority area is **to promote sustainable mobility in Greece** – in other words, the efficient, safe and environment-friendly transportation of people and goods, while also ensuring continuous improvement of the services provided to citizens and further development of the country's transport systems. Thus, special emphasis is placed on research in the fields which mainly need and allow for improvement in Greece. More specifically, the individual goals of the research on transport in Greece are:

To increase the capacity of public transport infrastructures and means,

To support subsystems with a particular importance for Greece,

To promote more environment-friendly transport means,

To enhance safety in all transport means,

To develop and utilise technological innovations in the field of transport.

6.2 Detailed description of priorities

Interoperability of transportation and public transport systems

The aim of the research is to specify and apply the necessary organisational and technical solutions for better interconnecting transport infrastructures and means.

Managing congestion in the urban and long-distance road network

The research aims to develop and utilise innovative and alternative ways in which to manage congestion in the urban and long-distance road network, giving priority to encouraging the use of public transport means and the mobility of pedestrians, and discouraging the use of private cars during peak-traffic hours.

Optimal operation and maintenance of public transport infrastructures

The aim of the research is to develop new and innovative technical and organisational solutions for efficient and sustainable operation and maintenance of the existing and future transport infrastructures.

Development and utilisation of intelligent transport systems

The aim of the research is to develop and apply new “smart” technologies and systems, which can make transport systems safer, more efficient, and more environment-friendly.

Strengthening the competitiveness of fixed-rail transport systems

The aim of the research is to develop and utilise new organisational and technical solutions that will allow the share of passenger and goods transport by rail to grow against that of transport by road, with emphasis on curbing costs but also on rewarding “cleaner” transport means more fairly.

Integrated sea transport systems

The aim of the research is to develop and utilise new organisational and technical solutions which will allow the provision of integrated and enhanced sea transport services for passengers and goods, in the ports as well as on the ships.

Development of best practices for road safety

The aim of the research is to develop and apply appropriate practices to improve the behaviour of drivers and pedestrians, and to improve road infrastructure and renew vehicles in order to gradually reduce the number of road accidents and of their victims.

Support of integrated multimodal logistic chains

The aim of the research is to develop integrated and effective multimodal logistic chains that will guarantee rapid and low-cost transport of goods from their origin to their final destination.

7 Environment

7.1 Objective

The funding of research in this area aims to allow a better understanding of the environmental processes, problems and risks; to promote the sustainable management of the environment by examining the human impact on country’s environment; to seek out “cleaner” technologies and production processes; and to attain the national goals concerning the improvement of the environmental indicators which support competitiveness. More specifically, the individual objectives are grouped in two categories:

- Development and support of the **environmental policy**, with the individual objectives:
 - To contribute to the **improvement of environmental parameters**, such as the reduction of pollution (air, water resources, land), the improvement of the quality of air in the workplace or the conservation of energy in industrial and construction activities, through the development of environmental technologies that correspond to the Greek conditions and needs.
 - **To support the international environmental agreements signed by our country** and the targets set by them, such as the reduction of emissions of greenhouse gases (Kyoto Protocol) and the protection of the ozone layer (Montreal Protocol).

- To develop **Environmental Intelligence**, which is a prerequisite for: managing ecosystems; monitoring and simulating the climate, in order to identify climate changes and forecast environmental parameters associated with hazardous natural phenomena; improving the calculations of renewable energy potential; enhancing energy conservation and safety in transport and industrial processes, etc.
- **To manage risk**, by establishing comprehensive monitoring and prevention approaches through advanced systems, tools and information used in risk forecasting and assessment for all types of natural hazards (earthquakes, floods, hurricanes, storms, forest fires, droughts, landslides etc.)
- **To manage the natural environment in a sustainable way**, by supporting research aimed at improving the national classification of the various species and at protecting biodiversity and sensitive ecosystems, such as regions under the “Natura” Network Initiative and endangered regions, together with coastal zones under significant pressure by human activities.
- **To ensure sustainable management of water resources**, by developing methods and technologies for improving the quality of water resources and inhibiting the downgrading of aquatic systems.
- **Indigenous development of the environmental industry**, based on the development of know-how (environmental technologies) and of domestic demand, with a medium-term export focus.

7.2 Detailed description of priorities

Climate, climate change, natural hazards - disasters

Research focuses on the following two fields:

- § *Climate*: Study of the existing data records and creation of a national climatological map, and development of methods for identifying climate changes and their impact on the Greek space. Social and developmental impacts related to climate change.
- § *Natural hazards*: Management of disasters related to natural phenomena, and assessment of the impact of anthropogenic factors on ecosystems.

Environmental Intelligence

Research focuses on two directions:

- § Study and research on synthesising data from the country’s climatic and geomorphologic data bases, for developing a national archive of environmental information and parameters which could be used to monitor and forecast environmental parameters, such as hazardous natural phenomena and technological accidents affecting the environment.
- § Addressing the effects of chemical and biological factors on the country’s environment.

Sustainable development, management and assessment of ecosystems and of the natural capital in Greece

Proper management of the natural resources and of the local ecosystems is the basis for the sustainable development and for the safety of people. A critical point in the management of natural resources and local ecosystems is to establish a detailed record of the natural capital and biodiversity of ecosystems, and to examine the lurking causes of biodiversity loss.

Environmental technologies

Development of environmental technologies in the following fields: agricultural pollution, air pollution, water and soil pollution, and solid waste.

8 Health

8.1 Objective

Support of research in the field of health seeks on the one hand to improve the health system and its services, and on the other hand to develop the health economy and especially the pharmaceutical industry and specialised high value-added services.

More specifically, the individual objectives are:

- § To promote health and develop prevention, with emphasis on the development of knowledge about the factors that determine health levels in the country, and on the development of tools and methods for prevention and for early and reliable diagnosis.
- § To contribute to addressing the dysfunctions of the health system, by supporting research in the fields of organisation and management of health services and of technological assessment.
- § To support the emerging pharmaceutical industry, by supporting the development of innovative pharmaceuticals.
- § To reduce the time and cost aspects of the treatment of patients; to develop personalised treatment methods; to improve the effectiveness and reduce the side-effects of medicines, by promoting research in new therapeutic methods; and to develop innovative pharmaceuticals.

8.2 Detailed description of priorities

Nanomedicine – Nanotechnology in Health

The applications of nanotechnology in the field of medicine, especially in the development of innovative pharmaceutical carriers – biosensors and imaging technologies, are particularly important and very promising. Emphasis will be placed on nanotechnology applications for the following diseases: Cancer; Cardiovascular diseases; Neurodegenerative diseases; Immunopathological diseases; Diabetes and metabolic diseases; Infectious diseases.

Translational research in medicine: from basic to clinical research

The transfer of new and innovative research results of basic research to Molecular Biology, Biochemistry and Biophysics is a prerequisite for significant achievements in medical research. Emphasis is placed on research on the identification of new molecular indices and goals, the molecular analysis of predisposition genes, and the synthesis of genetic profiles. Research in these areas is expected to contribute to prevention and early diagnosis, as well as to personalised treatment.

Priority in translational research will be given to the following diseases: Cancer; Cardiovascular diseases; Diabetes; Cerebral diseases; Age-related diseases; Infectious diseases.

Genomics – Proteomics – Systems Biology in Health

The aim is for the fields of proteomics and genomics, and for the rapidly evolving science of Systems Biology, to contribute to the development of therapeutic protocols and to the identification of new pharmaceutical goals in complex pathophysiological systems.

Innovative diagnostic, imaging and treatment approaches, tools, devices and methodologies

The research aims to develop imaging technologies (methodologies/ devices/ radiopharmaceuticals), new pharmaceuticals, cell replacement technologies, integrated diagnostic and therapeutic electronic instruments, or other related approaches.

Public Health, National Health System and support of policies

The development of electronic records and databases that illustrate the situation in public health drawing on data from Greek public and private hospitals, schools or the army, will allow the application of modern epidemiological, biostatistics and accounting tools. This will have immediate positive effects on the quality of life of Greek people and on the formulation of a proper health strategy, and will also offering the opportunity for financial benefits to the National Health System.

In parallel, emphasis is placed on the development of approaches to study and deal with the structural problems of the health system, with priority given to the role of technology. Emphasis is also placed on methodologies and systems to ensure the safety of citizens in crucial areas, such as bio-terrorism, nutrition, radiation and pollution.

9 Space and Security Technologies

9.1 Objective

The funding of research in the fields of space and safety engineering aims: to support the formulation and implementation of a policy in these fields; to follow technological developments and develop knowledge in fields which are considered as pillars for the future development of space and safety engineering, regardless of their current level of development in Greece; and to support the industry, especially in the field of space. More specifically, the individual objectives are:

- § To exploit the opportunities offered by the country's participation in ESA, EUMETSAT, and in the European Space Defence System Team.
- § To utilize space technology for developing techniques and tools to be applied in fields whose significance for the country is crucial, such as safety, monitoring and management of the environment and the natural resources.
- § To contribute to keeping citizens and critical infrastructure safe from threats such as terrorism, organised crime or natural disasters; to also contribute to health services, with emphasis on safeguarding public health and protecting the environment.
- § To create demand for products and technological applications for important sectors, such as IT, telecommunications and electronics, and to create synergies with other scientific and technological areas which are essential components of the multidisciplinary field of security technologies.
- § To enhance the crisis management capabilities and improve the operation of critical infrastructures, through the development, completion, and interoperability of the various safety systems primarily in the public sector but also in the private sector.
- § To address the social, political and ethical issues that arise from the application of security technologies and concern the freedom of citizens, the protection of their civil rights and the social acceptance of technology in general.
- § To enhance business activities in the field of IT and microelectronic applications.

9.2 Detailed description of priorities

Space technology

Research in this area includes activities related to the development and improvement of critical subsystems and components (for telecommunications and navigation, digital data analysis etc.).

Environmental safety, management and monitoring applications

Research in this area includes development of techniques and algorithms for the utilisation of Earth observation data, and the development of telecommunication and navigation technologies for use in environmental safety, management and monitoring applications.

Civil Protection

Research in this area aims to increase the safety of citizens and to combat organised crime activities (smuggling of drugs and weapons, money laundering and child pornography, various other cases of fraud etc.) and terrorism, by developing secure information and financial networks, secure communications, and virtual policing of information infrastructures. Moreover, research is also supported in the field of containment, identification and handling of “blind” terrorist attacks, especially attacks using chemical or biological weapons and various explosive substances. Sensors –active, passive (acoustic, electro-optic, using infrared/ultraviolet radiation or optical waves, radars, lasers etc.)– are early warning tools which are necessary to ensure safety.

Safety of critical infrastructures

The objective is to develop surveillance and protection mechanisms to protect and control administration buildings, train and metro stations, energy storage, production and distribution areas of telecommunications and IT networks, and public events from natural disasters, criminal activities, terrorist attacks, negligence and/or accidents.

Border security

Research in this area aims to ensure the legality of activities along the borders, by developing integrated border management approaches.

Safety and Society

Research in this area aims to protect individual and social rights, by studying the political, ethical and legal terms governing the operation and implementation of security technologies, as well as the specific social and cultural framework to which they belong.

10 Cultural Heritage

10.1 Objective

The aim of supporting research in the field of culture is to contribute to the rational management of the cultural heritage, with the following specific objectives:

- § To develop scientific knowledge in fields where Greece has unique sources at the global level (archives, monuments etc.) and to preserve and utilise this knowledge over long periods of time, among others by developing know-how in the field of digital treatment of cultural goods, so as to ensure their integrity and authenticity as useful historical evidence for the future generations, enabling access to them for creative purposes.
- § To develop innovative tools, products and services with a cultural content, with the aim of stimulating interest in culture and linking it more directly to tourism, the leisure economy and the pursuit of well-being.

10.2 Detailed description of priorities

Development of knowledge and understanding of cultural heritage

The objective is to develop the knowledge and the understanding of our cultural heritage, and to link and develop collaboration fields with the international environment to incorporate existing knowledge into the Greek research efforts.

Showcasing cultural heritage and linking it to tourism

The objective is to develop a strategy for systematically showcasing the cultural heritage at the national and international level, with a focus on: increasing the number of visitors and strengthening the sustainable development of expression-promotion poles for cultural heritage; developing new technologies and designing integrated tools for showcasing cultural heritage; promoting the national tourist product; and designing and developing new cultural products. Priority will be given to products and services that enrich and improve the tourist product.

Restoration, preservation and management of monuments, works of art, collections and archives

Research in this area includes the development of non-destructive technologies for assessing, diagnosing and monitoring damages, as well as for the restoration and preservation of monuments and works of arts which are a key part of cultural heritage.

Preserving a balanced relation between the development of cultural heritage and the conservation of the particular characteristics of the natural environment

The objective is to develop approaches for protecting and preserving a natural and balanced relation between the development of cultural heritage and the conservation of certain special characteristics of the natural environment.

Establishing the conditions for structured development of digital cultural heritage

This action line concerns the primary digital material that is the product of contemporary intellectual and artistic creation or digital imaging, and the secondary digital material that results from the digitisation of existing analogue images, recordings and representations. The timely establishment of the conditions for conservation and subsequent utilisation of this material is particularly important, as the creation of the primary or secondary digital material represents usually a costly investment which in some cases can not be repeated.

11 Social and Economic Dimensions of Development

11.1 Objective

Supporting research in specific fields of economics and social sciences has the following objectives:

- § To strengthen the competitiveness of the financial sector and to improve performance and successful management of risks in enterprises, by understanding investment behaviours, developing new financial analysis tools and, ultimately, developing new financing products.
- § To support policy planning through a better understanding of significant aspects of economic development and of its relation to employment, sustainability, quality of life and other social components.

11.2 Detailed description of priorities

Financial dimensions

Research in this area will focus on the study of alternative sources of capital, structured derivative products, business financing and sector restructuring, and on the human behaviour in the financial environment.

Structural changes in the Greek economy

The objective is to examine and understand the effect of globalisation on the structure of the Greek economy and on the research and innovation system, and the changes observed from the emergence of services as a strong growth pole, with emphasis on: specialisation and development in the context of globalisation, the impact of internationalisation on the Greek research and innovation system, and the role of services in the Greek economy.

Regional development

Research in this area focuses on the development and organisation of data at the regional level, and on the assessment of the regional dimension of development by understanding the key development challenges faced by the Greek Regions at the economic, social and environmental level.

Sustainable development

This area concerns the development and application of tools and methodologies for the evaluation of policies, and the examination of the interactions, conflicts or synergies between the various objectives of sustainable development based on the Greek reality.

Ex-post and ex-ante analysis of the impact of research policies and programmes

The objective is to develop methodological tools for ex-post and ex-ante evaluation of policies and programmes that corresponding to the Greek conditions and requirements, and to create a methodological base for the development of systems of indicators, at least on the programme level.

Human and social capital

Research in this area focuses on the examination of the structural characteristics of the human capital in Greece, especially in connection with the trends and developments in the economy, as well as on the examination of the nature and characteristics of the social capital in Greece and of its interactions with economic growth and social cohesion.