



JRC SCIENTIFIC AND POLICY REPORTS

ERAWATCH COUNTRY REPORTS 2012: Greece

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2013



Report EUR 26275 EN

Joint
Research
Centre

European Commission
Joint Research Centre
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JRC 84013

EUR 26275 EN

ISBN 978-92-79-34517-3 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/39730

Luxembourg: Publications Office of the European Union, 2013

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Printed in Spain

EXECUTIVE SUMMARY

The Greek Research Technological Development and Innovation (RTDI) system is small, stagnating and partly contracting because of a severe economic crisis and strongly dependent on foreign support (both Framework Programme and Structural Funds) for its survival. Its research performance has however improved in terms of citations and impact factor, but remains still below the EU average.

A serious problem in RTDI reporting and evidence-based policy is the lack of the latest data on Research and Development (R&D). No surveys (Community Innovation Survey or R&D) were conducted recently. Based on available data (2005) GERD was 0.7% of GDP. Gross Domestic Expenditure on R&D (GERD) grew until 2000 to reach 0.6% of GDP and fluctuated between 0.55% and 0.6% ever since (partly as a function of Structural Funds cycle) and Business Expenditures for Research and Development (BERD) decreased slightly in the period 2005-2007 from 0.19% to 0.17% of GDP. General Secretariat of Research and Technology (GSRT) has sub-contracted the National Documentation Centre to produce data on GERD, BERD and R&D employment. In March 2013 it was announced that GERD is now 0.52% of GDP and the target for 2020 was brought down to 0.67% of GDP. Data on GERD, BERD etc is expected to be published shortly. During 2007-2013, Greece is expected to spend around €4b on innovation. Government traditionally accounts for about half of total available R&D funding.

In 2012 the most striking changes refer to:

- radical changes in the management of HEIs, increasing their autonomy;
- the merger and reorganisation of Public Research Organisations (PROs) to achieve synergies and economies of scale;
- the creation of an Innovation Fund (operational from 2013);
- the launch for "Development Proposals of Research Organisations-KRIPIS", and
- a significant reduction of salaries of researchers, as a result of the overall economic crisis and the severe cuts in public expenditure.

Other changes include a large number of new calls for proposals for competitive funding (for clusters and collaborations) and the continuation of the implementation of calls launched in previous years. This takes place in an effort to speed up the absorption of Structural Funds, which co-fund practically all-competitive calls. Several attempts to introduce a new law for Research have failed, starting with a law that was adopted by Parliament in 2007 but was never put into operation; then consecutive drafts launched for public consultation (the last one in 2012) were eventually not brought before Parliament. A new law is currently in preparation by the GSRT.

Regions have their own research budgets in the current programming period but the majority of their funds are managed by national calls of the same type in every region, while the selection of proposals is limited by the funds earmarked for each region. Only selected regions with stronger research infrastructure give additional resources to their

HEIs, PROs or intermediaries. Smart Specialisation Strategies have been devised for all 13 regions but are not publicly announced yet. In September 2012, the GSRT has prepared its own proposal for the orientation of RTDI policies during the next programming period but the strategy development is still in process.

The Greek Innovation System presents the following challenges:

1. the increase of business demand for new knowledge to ensure increasing competitiveness and to comply with the economic rationale of RTDI interventions; this is however difficult, given the structure of the productive sector and the financial crisis;
2. the assurance of a better-focused and long term public funding of R&D to exploit national competitive edges and avoid thin spreading of funds;
3. the alignment of supply and demand of human resources where there is mismatch attributed to both, the insufficient demand of R&D from the private sector and the non-responsiveness of the education system to the market needs. Within this context, Plan "Athena" which foresees abolishments and mergers of all HEIs all over the country to achieve economies of scale and adapt skills to the labour market. In March 2013, Greek Parliament transferred power to the Minister of Education to implement the Plan;
4. the improvement of the governance of the national innovation system, which suffers from lack of coordination, limited motivation and practically absence of data to support evidence based policy to support policy design.

In spite of the ongoing efforts to address these structural challenges, resources and persistence are lacking. Research and innovation policy can hardly address the low demand from the business sector for new knowledge activities. This challenge needs a long-term investment in coordinating research and innovation policy across the board. Simple subsidies are insufficient. Steps have been taken to ensure better-focused and long term public funding of R&D: The reduction of the number of priority research areas and the emphasis on their consistence with the imperatives of the economy adheres to the need for the creation of economies of scale in better-focused areas. More progress can be found in the focused research areas that have been decided in the new call for cluster development, in the narrowing down of priority disciplines in the National Reform Programme of 2011 and in the development of thematic scientific councils in major disciplines.

The misalignment between demand and supply of human resources, has led to scarce supply of skilled-workers, which was reinforced by the massive unemployment affecting young graduates. For research skills the balance may improve for the wrong reasons: namely, supply maybe reduced without an increase in demand.

Research brain drain has increased in the last two years, because of the crisis, and is expected to increase further, as in 2013 the salary reductions in Higher Education Institutions (HEIs) and Public Research Organisations (PROs) will be fully implemented.

Streamlining efforts may have a positive impact in the long term. No progress has been made to improve the governance of the national innovation system.

Although in theory, the role of research and innovation is important, the current economic crisis has in practice decreased its importance. Governance is poor and funding inadequate. Efforts to rise innovation up on the policy agenda, in particular regarding green investments and service innovation, are visible. Excellence and collaborations are prioritised.

Regarding the ERA pillars, Greece has a high quality research potential but faces significant brain drain; Greece is placing less emphasis on cross-border cooperation, but it is improving in terms of research infrastructures, although it is still not on track with its European Strategy Forum on Research Infrastructures (ESFRI) roadmap. Research institutions and public-private partnerships have been emphasised in 2012. A major bottleneck for knowledge circulation is the very limited foreign direct investment in Greece; on the other hand Greece is performing quite well in terms of participation of Greek research teams in the Framework Programme (FP). International cooperation is insufficiently developed with few scattered bilateral agreements. There is, however, significant potential to tap, and synergies to be pursued, if a persistent and consistent strategy can be developed, benefiting from the assistance of diaspora Greeks and of the Ministry of Foreign Affairs.

The policy mix is stretching to emulate best practices from the EU but it can hardly improve as long as there is no evidence-based policy conception, assessment and systematic improvement.

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12. INTRODUCTION

Greece is an average-sized country in terms of population with 11.3m people in 2012 corresponding to 2.2% of EU27 population. It ranks 9th in the EU, after Germany, France, United Kingdom, Italy, Spain, Poland, Romania, and the Netherlands.

At the end of 2011, GDP per capita was at €18.5m, 73.4% of EU27 average, and has been experiencing a steady decrease from €20.5m in 2009, to €19.6m in 2010. Greece presented an above EU-average growth before the crisis, but has suffered a heavy uninterrupted recession since 2008, which is expected to continue in 2013.

A serious problem in RTDI reporting and evidence-based policy is the lack of the latest data on R&D. No surveys (CIS or R&D) have been conducted recently. The latest available data are from 2007 surveys reporting on 2005 data, while most recent data are only available for GBAORD (2008) and HRST (2010). Based on available data (2005) GERD was at 0.7% of GDP. GERD grew until 2000 to reach 0.6% of GDP and fluctuated between 0.55% and 0.6% ever since (partly as a function of Structural Funds cycle). BERD decreased slightly in the period 2005-2007 from 0.19% to 0.17% of GDP. To cope with the challenge of limited data, the GSRT has sub-contracted the National Documentation Centre to produce data on GERD, BERD and R&D employment. In March 2013 it was announced that GERD is now 0.52% of GDP and the target for 2020 was brought down to 0.67% of GDP. More data on GERD, BERD etc are expected to be published shortly. During 2007-2013, Greece is expected to spend around €4b on innovation¹. Funding is likely to come from Structural Funds, as the financial distress has minimised central government spending.

GERD depends on the absorption of Structural Funds, as practically all public intervention is co-financed by the ERDF/ESF. It is expected that by 2015 all 2007-2013 funds will have been absorbed, including national matching funds. It is expected that during the new programming period 2014-2020 relatively more funds will be allocated to public R&D. It is assumed that during the same period BERD will increase annually by 5%, due to tax and investment law incentives.

The government traditionally accounts for about half of total available R&D funding (46.8%), followed by the Business Enterprise sector (31.1%) and funds from abroad (19%). Most of government funding in 2005 was directed to the Higher Education sector (€359.4m) and to public research organisations (€159.2m). The main source of foreign funding in Greece is the European Union (Framework Programmes for Research and Development account for half of the budget while the remaining comes from the budget of Structural Funds). While the European Commission contributes substantially to the national research funding, foreign enterprises contributed only some 0.7% (€8.1m) of the total funding in 2005. In terms of performance, based on available data (2007), the Higher

¹ [Innovation Union Competitiveness \(IUC\) report](#)

Education sector accounts for about half of total R&D (49%), followed by the Business Enterprise sector and the Government. R&D expenditure in the Business Enterprise sector decreased in the period 2003-2007, as a percentage of total GERD, while the share of Higher Education sector and funds from abroad increased.

The total number of researchers in full time equivalent (FTE) in Greece was 20,800 in 2007. The majority of the researchers are employed in the public research sector with 59.5% working in HEIs and 10.6% in the government sector. The business sector employs only 29.3% of researchers, while the EU-27 aggregate for this sector is 48.8%. Research infrastructure is available and there are regular calls for funding new infrastructure but at a moderate scale. Greece, as a member of all major European research facilities, has access to their infrastructure.

In terms of outputs, scientific publications have remained practically the same from 2008 to 2010, with a slightly diminishing share in EU and OECD countries. However, citations and impacts improved considerably when comparing the 2004-2008 to the 2006-2010 period passing from 3.83 to 4.59. However this remains lower than the EU average (relative citation 0.84)². In the period 2006-2010, HEIs were the largest contributor of scientific publications, accounting for 82.5% of total. In 2010, HEIs accounted for 8,387 scientific publications, compared to 8,742 in 2009. TEIs account for only 4.6% of total scientific publications with 483 publications in 2010. However they exhibited significant growth, above the Greek average up until 2008.

Unlike research productivity, economic productivity is low, at least measured in patents, which remain marginal throughout the last decade. Employment in knowledge intensive industries (manufacturing and services) reached 80.1% of the EU average in 2011. The percentage population aged 30-34 having completed tertiary education is close to 29% compared to 34.6% the EU average. Based on the [Innovation Union \(IU\) Scoreboard](#)³, Greece is classified among the "moderate innovators", along with the Czech Republic, Hungary, Italy, Malta, Poland, Portugal, Slovakia and Spain, with innovation performances below the EU27 average. Its relative strengths are in [Human resources for Research, Linkages & Entrepreneurship](#) and [Innovators](#), while its relative weaknesses are in [Finance and support](#), [Firm investments](#) and [Intellectual assets](#).

Country specialisation has shifted rapidly in the last fifteen years to the service sector with tourism and shipping occupying a large part of value added. Manufacturing contracted to fall below 10% (with food and beverages and chemical industries absorbing a high share of total), whereas the public sector absorbs a well above-average share of employment.

The General Secretariat for Research and Technology (GSRT) operating under the auspices of the Ministry of Education Religion, Culture and Sports is the main organisation designing and implementing RTDI policy since the early 1980s. The Ministry of

² National Documentation Centre <http://metrics.ekt.gr/en/report02/chapter2>

³ http://ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf

Development, Competitiveness, Infrastructures, Transport and Networks is intervening increasingly in innovation in its supporting entrepreneurship capacity. Research budget lines are allocated to the regions and are managed partly locally and partly are transferred to the GSRT, which launches central calls and selects proposals complying with the budget lines transferred for each region. Research activity is concentrated in regions with agglomerations of research centres and universities, who are the best research performers. In the business sector, research performers are few, large, publicly-quoted companies, utilities and smaller ICT and alternative energy firms.

Within the current negative economic environment, the main challenges are to increase business demand for new knowledge, to ensure better-focused and long term public funding of R&D, to align supply and demand of human resources, and finally to improve the governance of the national innovation system.

13. RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

a. National economic and political context

On the political front, two successive elections in 2012, resulted to a near standstill of government activities for about 4 months. The research and innovation system was no exception and was affected by delays and changes in governance (GSRT moving back and forth between the Ministry of Development, Competitiveness, Transport, Infrastructures and Networks to the Ministry of Education, Religion, Culture and Sports).

Greece is experiencing a severe financial crisis in the last three years. Three consecutive Memoranda of Understanding agreed between lenders (represented by the European Commission, the ECB and IMF) and the Greek government foresee wage cuts and rationalisation of employment in the public sector together with structural reforms in order to bring the country back on track, with respect to the Maastricht criteria of the EMU and to ultimately improve the business climate. A restructuring of the public debt in 2012 has deprived the banking sector (and as a consequence the market) from its liquidity. Bank recapitalisation was agreed towards the end of 2012 and is expected to bear fruit in 2013.

This restructuring together with the global crisis triggered serious contraction of GDP and record levels of unemployment. At the end of 2011, GDP per capita was at €18.5m, compared to €19.6 at the end of 2010 (5.6% decrease)⁴. GDP is expected to decrease further by about 6.5% in 2012, affecting private and public consumption (7% and 7.2% reduction, respectively) and investments (3.7% reduction)⁵. Predictions for 2013 suggest further recession. At the end of August 2012 the unemployment rate was at 24.8% in

⁴ Eurostat

⁵ [2013 Central Government Budget-Rapporteur](#)

Greece, compared to 11.2% in EU17 and 10.3% in EU27. Total number exceeded 1.2 million unemployed⁶.

Cuts in public sector spending affect the whole economy. At the end of 2011, government expenditure was at €9,565.5/inhabitant, compared to €10,108.5 per inhabitant at the end of 2010 and €11,049.5/inhabitant at the end of 2009. Gross fixed capital formation was at 1.6% of GDP at the end of 2011, compared to 2.3% in 2010 and 3.1% 2009⁷. This current financial distress is influencing R&D expenditure. Although there are no explicit GERD reduction figures, estimates foresee significant decrease:

- Based on the central government budget announcements for 2013, total funding allocation for the Ministry of Education, Religion, Culture and Sports is estimated to decrease by about €600m in 2013 (€5.8b in 2012 versus €5.3b in 2013), translating i.a. into lower funds for research and development. In terms of public investment € 594m have been reserved for the Ministry of Education, Religion, Culture and Sports for 2013, compared to €496m in 2011 and €586m up to September 2012⁸.
- In addition, fiscal restraint has resulted to horizontal salary decreases in the public sector, also affecting the salary levels of academics and researchers in public organisations⁹. These decreases could affect indirectly R&D efforts in the next three years, as research spending is partly calculated as share of academic salaries.
- Due to funding constraints, Greece although participating in the [European Joint Programme dedicated to the R&D performing SMEs](#) (EUROSTARS Cut off 10), co-funded by the European Communities and 33 EUREKA member countries, it has decided that it will not provide funding¹⁰.

As a positive note, tight control of the public sector has expedited the implementation of measures that have long been awaited; amendments to the operation of Hellenic Statistical Authority¹¹, coupled with a Ministerial Decision for the provision of R&D metrics in the period 2008-2013, are expected to provide significant improvements in the existing R&D statistic database¹².

Data availability on R&D funding is very limited in Greece and their publication takes place with significant time lags. The latest data for funding are available for 2005, while data for expenditures only covers the period up to 2007. The most important funder of research

⁶ Eurostat

⁷ Eurostat

⁸ [2013 Central Government Budget-Rapporteur](#)

⁹ [Law 4093/2012-Approval of the Medium Term Fiscal Strategy Plan 2013-2016,Urgent implementation measures of L.4046/2012 and the Medium Term Fiscal Strategy Framework 2013-2016 \(12.11.2012\)](#)

¹⁰ http://www.gsrt.gr/central.aspx?sId=110I458I1163I646I453967&olID=672&neID=589&neTa=1_632&neID=0&neHC=0&tbid=0&lrID=2&oldUIID=aI672I0I110I458I1163I0I2&actionID=load This may also be related. This is a result of systematic delays of funding by the Greek administration, which acted as a disincentive for consortia to incorporate Greek partners.

¹¹ [L.4072/2012-Improvement of the business environment-New corporate entity-Trademarks-Property Brokers-Regulation of matters related to shipping, ports, fishery and other provisions \(11.04.2012\)](#)

¹² [Ministerial Decision 4460/25.04.2012 of the Minister of Education, Religion, Culture and Sports](#)

activity is the government, which provides approximately 47% (€540m in 2005) of research funding amounting to €1.154m in 2005, followed by the universities. The total government budget appropriations or outlays for R&D (GBAORD) were increasing between 2004 and 2007 with an annual average rate of 6.9%. Growth, however, declined from 14.5% in 2005 to -1.8% in 2007.

In terms of funding, based on available data (2005), the government traditionally accounts for about half of total available R&D funding (46.8%), followed by the Business Enterprise sector (31.1%) and funds from abroad (19%). Most of government funding in 2005 was directed to the Higher Education sector (€359.4m) and to public research organisations (€159.2m). The Business Enterprise sector directs most of its funding to own use (€306.2m). Funds from abroad are primarily addressed to the Higher Education sector (€116.5m). The government's contribution to the Higher Education sector is channelled through the direct government budget and most importantly, through the general university funds (GUFs) (71.1% of the total government research funding was allocated to universities in 2005).

The main source of foreign funding for research in Greece is the European Union. Specifically, almost half of research funding flowing to Greece from the European Union comes from the Framework Programmes for Research and Development, the rest coming from Structural Funds' interventions in the field of research. While the European Commission contributes substantially to research funding in Greece, foreign enterprises contributed only some 0.7% (€8.1m) of the total funding in 2005.

In terms of performance, based on available data (2007), the Higher Education sector accounts for about half of total R&D (49%), followed by the Business Enterprise sector and the Government. R&D expenditure in the Business Enterprise sector decreased in the period 2003-2007, as a percentage of total GERD, while the share of Higher Education sector and funds from abroad increased.

GERD/GDP target was formally 2% for 2020, based on the [Hellenic National Reform Programme 2011-2014](#), and it has now been revised to 0.67% of GDP. GERD is expected to peak in 2012 as funds from NSRF will be absorbed. It is expected that by 2015 all available NRSF funds will have been absorbed, including national matching funds. The Greek government is expected to allocate more funds to R&D&I in the new programming period 2014-2020, in accordance with ERDF guidelines. In the same period, it is assumed that R&D expenditure of the private sector will increase annually by 5%, due to the tax and investment law incentives that have been adopted. The NRP was prepared with 2010 data not anticipating the depth of the crisis; hence it is indicated in the NRP itself that the target was expected to be revised. Based on the formal declaration of the National Council of Research and Technology the target of GERD/GDP is now 1.5%.

Structural funds are the most important source of competitive RTDI funding as they co-fund all open calls. For the eight convergence regions of the country they are also a major source of block funding to local universities and transfer infrastructure. Thematic focus into five major areas is defined in the 2011-2014 NRP including: Agro-food; Information and

Communication Technologies; Materials/Chemicals; Energy-Environment and Health/Biomedicine.

b. Funding trends

There is no recent data on funding trends, the most recent data are from 2005.

	2009	2010	2011	EU27
GDP growth rate	-3.1p	-4.9p	-7,1p	- 0.3 (2012)
GERD (% of GDP)	0.52	0.61	-	2.03s (2011)
GERD (euro per capita)	-	-	-	510.5s (2011)
GBAORD - Total R&D appropriations (€ million)	-	-	-	91,277.1 (EU27 total 2011)
R&D funded by Business Enterprise Sector (% of GDP)	-	-	-	1.26 (2011)
R&D performed by HEIs (% of GERD)	-	-	-	24% (2011)
R&D performed by Government Sector (% of GERD)	-	-	-	12.7% (2011)
R&D performed by Business Enterprise Sector (% of GERD)	-	-	-	62.4% (2011)
Share of competitive vs institutional public funding for R&D	-	-	-	n/a

Source Eurostat data March 2013

s: Eurostat estimate

c. New policy measures

The Hellenic National Reform Programme 2011-2014 was published in April 2011, identifying key priority areas for research. The government intends to pursue these areas through calls addressed to strengthen and support the scientific/research personnel, encourage links between the scientific/research community and businesses and entrepreneurs, the support of bilateral and European and international collaboration and

the promotion of research outreach to the community¹³. The Operational Programme “Competitiveness and Enterprise” was revised in September 2012, following an ex ante evaluation, in an effort to speed up the transformation to a knowledge economy, develop a healthy, sustainable and extroverted business activity and enhance the image of Greece as a business destination, in concordance with environmental priorities and sustainability.

The following measures were new in 2012:

1. In June 2012, the Ministry of Education, Religion, Culture and Sports and the Ministry of Development, Competitiveness and Shipping (now extended in scope renamed Ministry of Development, Infrastructures, Transport and Networks) established by joint ministerial decision the Innovation Fund. The latter will operate as a separate financial unit within the New Economy Development Fund (TANEO) with a total capital of €30m. The Fund will start operating in 2013 and is expected to stimulate investments in new technologies and contribute to the modernisation of the Greek economy.
2. GSRT launched the Programme “Development Proposals of Research Organisations- KRIPIS”, aiming to strengthen research (basic research, industrial/applied research and pilot development) and to make use of its results through the implementation of projects at a high research and scientific level. The programme has a total budget of €32m, will run until 30.07.2015 and is co funded by ERDF and public funds. Only research centres may apply for grants under this call.

Many existing measures launched new calls, completed the selection of proposals and are in the process of signing contracts:

1. Additional support for the microelectronics Corallia Cluster
2. Collaboration (continuation of the implementation of the 2009 call)
3. Pre-selection and final call for cluster development (research-business collaboration) in selected target areas
4. Innovation Vouchers (continuation of the implementation of the 2009 call)
5. R&D support to SME groups (continuation of the implementation of the 2009 call)
6. R&D support to new companies (continuation of the implementation of the 2009 call)
7. Extroversion and competitiveness (continuation of the implementation of the 2011 call)
8. Support to Green Companies and Green Infrastructures (schemes by the General Secretariat of Industry, continuation of the implementation of the 2011 call)
9. Spin off – spin out (continuation of the implementation of the 2009 call)
10. Bilateral research cooperation (China, Romania, Turkey) and contribution to ERANets and JTIs.
11. Cooperation in the areas of digital content, scientific publications, research electronic infrastructure, bibliometrics, research activity indices, open access to

¹³ [Hellenic National Reform Programme 2011-2014](#), April 2011, Hellenic Republic Ministry of Finance

- knowledge between the National Documentation Centre and the Institute of Scientific and Technology Information Communication of China (12/06/2012)¹⁴.
12. Call by the Ministry of Development, Competitiveness, Transport, Infrastructure and Networks for the submission of proposals for financing of investment projects in the areas of Manufacture, Tourism, Retail and Services [addressed to SMEs in 13 NUTS2 regions](#)¹⁵.
 13. Launch of ICT4GROWTH initiative for the financing of investment proposals in the areas of design, development and commercial exploitation of innovative products and high value added services related to ICT technologies¹⁶.

More calls are planned later in 2013, in an effort to absorb the Cohesion Policy funds available.

d. Recent policy documents

Major changes were introduced in Higher Education affecting both research careers and HEI governance:

In February 2012, [Law 4051/2012-Pension reforms and other urgent measures for the implementation of Memorandum of Understanding Law 4046/2012 \(29.02.2012\)](#) was issued, implementing the restructuring of the research sector. The new Law aims to address problems associated with the diversity of research priorities pursued by different research organisations in Greece, the inability of members of research centres to use the infrastructures of other research centres, the lack of cooperation among researchers in Greece and the existence of research organisations with very small number of researchers (more than 20 organisations operate with less than 5 researchers).

The new Law foresees the mergers of different research organisations in Greece, with the purpose to enhance scientific cooperation and synergies in the same research fields, create a critical mass of researchers, decrease administrative and operational costs. Following the application of the Law, research organisations are expected to decrease from 56 to 31 and new governance procedures will be introduced. The restructuring is in the process of being implemented.

By the same Law, Greece undertook the obligation to transform by March 2012 the existing Statistical Law (Law 3832/2010), to introduce major reforms to the operation of Hellenic Statistical Authority and to provide it with the appropriate financial and human resources for the prompt delivery of high quality statistics. Law 4072/2012 was introduced finally in April 2012.

¹⁴ <http://kainotomia.ekt.gr/issue/2012/88/>

¹⁵ <http://www.antagonistikotita.gr/greek/>

¹⁶ <http://ict4growth.ktpac.gr/anakoinoiseis.htm>

In March 2012, the [National Strategy for Digital Technologies and e-government](#) was released, aiming to adjust government priorities to information and communications projects which will achieve fiscal improvements, reinforce the development priorities of the country, modernise public administration, improve productivity of public services and appease the administrative burden, reinforce democracy and transparency through increased participation of citizens in community actions.

In April 2012, [Law 4072/2012-Improvement of the business environment-New corporate entity-Trademarks-Property Brokers-Regulation of matters related to shipping, ports, fishery and other provisions \(11.04.2012\)](#) was issued, introducing amendments to the financing from NSRF and allowing reimbursement of VAT in projects submitted by the public sector, legal public entities, municipalities, non listed public companies. The same law stipulated that advance payments or intermediate payments from NRSF are exempted from any dues and may not be withheld for the payment of dues to the public sector or pension funds.

Another important feature of this Law is related to the introduction of the long awaited amendments for the operation of the Hellenic Statistical Authority and its governance structure. This development, coupled with the decision of the Minister of Education, Religion, Culture and Sports ([Ministerial decision 4460/25.04.2012](#)) to assign to the National Documentation Centre the provision of R&D metrics for the period 2008-2013 are expected to improve significantly R&D statistics in Greece. The project has a total budget of €2m, will be funded by the Digital Convergence OP and will run until 31.12.2014.

In August 2012, [Law 4076/2012](#) on Higher Education was issued amending the Law of 4009/2011 with limited changes but provisions to facilitate the transition to more university autonomy (introducing an external management board for the first time) and prescribing the regulations for the election of professors/assistant professors/lecturers.

In November 2012, [Law 4093/2012-Approval of the Medium Term Fiscal Strategy Plan 2013-2016,Urgent implementation measures of L.4046/2012 and the Medium Term Fiscal Strategy Framework 2013-2016 \(12.11.2012\)](#) was issued, introducing salary cuts to the salaries of researchers and special scientists employed by local research organisations.

In January 2013, Plan "Athena" which foresees abolishments and mergers of all HEIs all over the country to achieve economies of scale and adapt skills to the labour market was introduced. There was significant protest in the academic world but, as Parliament authorised the Minister to merge and abolish departments, the Plan is expected to be implemented as contemplated.

In terms of consultations, a public consultation for a new Law on Research, Technology Development and Innovation was launched in January 2012. Successive changes of government affecting the Ministry of Education and the GSRT blocked the process. The

General Secretary and the Administration are now in the process of amending the draft, which is expected to be launched for consultation shortly.

In November 2012, a public consultation was launched for a new [Law on Strategic Investments](#). The final text of the Law is not yet available, but it is expected to increase total allowable period for tax incentives to 12 years for newly established companies and 10 years for all other companies. The Law is expected to go to Parliament early 2013.

e. Research and innovation system changes

The major change refers to the movement back and forth of the General Secretariat of Research and Technology (GSRT), which in August 2012, was moved again from the Ministry of Development, Competitiveness, Transport, Infrastructures and Networks to the Ministry of Education, Religion, Culture and Sports. Although this does not seem to be a major change, since all functions of the GSRT moved to the Ministry, it has a major implication for innovation policy: Hosting the GSRT in the Ministry of Education was a demand from the academic community; on the other hand, the culture of this Ministry is not close to innovation. At the same time the Ministry of Development, Competitiveness, Transport, Infrastructures and Networks retained responsibility for Enterprise and Exports and in this context innovation is of major interest for it and there are both actions supporting innovation in the context of enterprise and industrial policy, as well as consultations on how to enhance innovation and improve coordination between all actors interested in innovation. It is expected that new government changes will take place in this direction in 2013.

At the research-performers' level, there have been changes in university governance rules towards adopting a dual system. There will be an internal board (senate for academic affairs) and an external board (composed of both academics and representatives of the business sector and internationally recognised academics from other organisations), expected to improve management and the quality of education and research.

At the advisory level, the National Council of Research and Technology has been more active than in the past, in suggesting priority areas and presenting its positions in various national and international fora.

f. Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

Regional Strategies for RTDI are included in the Regional Operational Programmes for 2007-2013. The eight Convergence Regions are also benefitting from national funds. These strategies have been mostly uniform and managed by national calls and regional budgetary quotas.

In the period 2014-2020, the existence of Regional and National Research and Innovation Strategies on Smart Specialisation (RIS3) will be a prerequisite for the provision of ERDF

funds¹⁷. In September 2012 the GSRT has published its proposal for the orientation of RTDI in the context of the national development plan. At the same time, studies for Smart Specialisation in all 13 regions have been prepared by a team of international and Greek experts in the context of RIS3 . They both form the background for the preparation of the 2014-2020 strategy, which is under way. Greek regions will participate in peer review workshops, aiming to present their work on RIS3 and discuss their strategies within their peer group.

g. Evaluations, consultations

In 2012, with a significant delay, the Mid Term reviews of the Structural Funds were contracted. While the final results are not available, preliminary findings on RTDI include:

- Competitiveness and Enterprise Operational Program 2007-2013: There is low performance in all priority axes, except for technical support and state aid to SMEs. Underachievement is principally attributed to lengthy maturity periods of projects, complex procedures related to funds' allocation and commitments, and frequent lack of coordination between cooperating parties.
- In Attica the 'enhancement of competitiveness, innovation and digital convergence' priority axis exhibits low absorption rates, though it is the second most important axis in terms of funding.
- In the Operational Programme of Crete and the Aegean there were overachievements in Digital Convergence and Competitiveness priority axis in all regions.

In October 2012, GSRT issued an open tender for the selection of a contractor who would undertake an evaluation of RTDI activities in the context of the Operational Programme for Competitiveness and Enterprise. The project is scheduled to last 12 months and has a maximum budget of €450,000, including VAT. For formal reasons the tender process was cancelled and the call was re-launched with the same specifications in March 2013.

The last evaluation of PROs took place in 2005. The next was planned for 2010 but was delayed and is expected to start in 2013.

h. Policy developments related to Council Country Specific Recommendations

Not applicable to Greece.

¹⁷ [Regional and National Research and Innovation Strategies on Smart Specialisation, Cohesion Policy 2014-2020](#)

14. STRUCTURAL CHALLENGES FACING THE NATIONAL SYSTEM

HUMAN RESOURCES	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	1.2
Percentage population aged 25-64 having completed tertiary education	25.4
Open, excellent and attractive research systems	
International scientific co-publications per million population	544
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	9.5%
Finance and support	
R&D expenditure in the public sector as % of GDP	0.43
FIRM ACTIVITIES	
R&D expenditure in the business sector as % of GDP	0.17
Linkages & entrepreneurship	
Public-private co-publications per million population	15.8
Intellectual assets	
PCT patents applications per billion GDP (in PPS€)	0.42
PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)	0.1
OUTPUTS	
Economic effects	
Medium and high-tech product exports as % total product exports	94.31
Knowledge-intensive services exports as % total service exports	5.4
License and patent revenues from abroad as % of GDP	n/a

Data Source: [Innovation Union Scoreboard 2011](#)

Based on the [Innovation Union \(IU\) Scoreboard](#)¹⁸, Greece is classified among the “moderate innovators”, along with the Czech Republic, Hungary, Italy, Malta, Poland, Portugal, Slovakia and Spain, with innovation performances below the EU27 average. Its relative strengths are in:

15. Human resources - The number of PhD holders has been increasing at a faster pace, compared to the EU average in the period 2000-2008. At the end of 2010, there were 1.2 new graduates (ISCED 6) per 1000 population aged 25-34 years old, compared to an EU average of 1.5. The percentage of population with tertiary education has also been increasing, following closely the EU average. At the end of 2011 25.4% of population had completed tertiary education compared to an EU average of 26.8%. At the end of 2011, there were 544 co-publications per million of population, against 300 co-publications per million of population which is the EU average. Greece is above average in terms of the quality of publications, as Greek publications within the top 10% most cited publications worldwide account for 9.5% of total scientific publications of the country compared to 10.9% in the EU¹⁹;
16. Linkages & Entrepreneurship - The number of SMEs collaborating with others is increasing at a high pace, making Greece not only outperforming its peer group with an annual increase of above 10%, but also the EU27 average²⁰. Growth performance in Open, excellent and attractive research systems, Finance and support, Linkages & entrepreneurship and Intellectual assets is well above average country growth;
17. Innovators - The share of turnover corresponding to new or significantly improved products only new to the firm is high in Greece, well above 12% compared to the EU average of about 10% (2006)²¹.

Relative weaknesses are in:

1. Finance and support, reduced significantly by the recent financial crisis;
2. Firm investments;
3. Intellectual assets; In 2009, patent applications in the area of societal challenges were equal to 0.13 per billion GDP, compared to an EU average of 0.96²².

During 2007-2013, Greece has earmarked around €4b to spend on innovation²³. Funding is likely to come from Structural Funds, as the financial distress has minimised central government spending.

Within this negative environment the main challenges are to increase business demand for new knowledge, to ensure better-focused and long term public funding of R&D, to align

¹⁸ http://ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf

¹⁹ [Innovation Union Competitiveness \(IUC\) report](#)

²⁰ [Innovation Union Competitiveness \(IUC\) report](#)

²¹ Community Innovation Survey 2006

²² [Innovation Union Competitiveness \(IUC\) report](#)

²³ [Innovation Union Competitiveness \(IUC\) report](#)

supply and demand of human resources, and finally to improve the governance of the national innovation system.

Increase business demand for new knowledge

All R&D and innovation performance indicators related to the business sector have remained well below the EU-27 average (European Commission, 2011; Pro Inno Europe, 2011). A combination of structural problems and significant institutional and bureaucratic obstacles, together with a volatile policy environment force the business sector to invest in activities with either high rates of return in the short-term or very low risk (Bartzokas, 2007). The demand for research-based knowledge from the private sector has remained very low even in sectors with relatively high innovation performance; the latter focusing their innovation efforts mainly on non-R&D and non-technological aspects such as marketing and organisational improvements. The low share of manufacturing (just below 10% of GDP), and the financial turmoil that has reduced liquidity and has affected the business sector severely, are both likely to further reduce research-based innovation.

With limited and reducing demand for R&D a major challenge for public policy is:

- to create a stable macro-economic environment that will trigger investments in technology that need a longer term horizon to amortise and
- to eliminate factors that hamper innovation/entrepreneurship, remove bureaucracy that turns away SMEs and attract ambitious companies minimising crowding out.

Ensure better-focused and long term public funding of R&D

Public funding of R&D and innovation has remained low, while gradually becoming heavily dependent on Structural Funds. GBOARD is around 0.3% of GDP, which is half of the EU-27 average²⁴. The contribution of Structural Funds to R&D represents approximately 10% of GERD. Excluding general university funds (GUF), funding from Structural Funds amounts to 42% of the direct government funding of R&D (Maroulis, 2011).

As the design and management of the Structural Funds is complex and the management capacity of the Greek administration is limited, the dependence on Structural Funds has resulted to fragmented planning and budgets being allocated to various sectoral and regional Operational Programmes. In addition, absorption rather than impact is in general the dominant funding criterion. This leads to a vicious circle between chasing funds and neglecting priorities. For years the lack of priorities and the scarcity of public funding have created an opportunistic supply driven research system (Bartzokas, 2007). This system often followed the priorities of the EU Framework Programmes (Grant et al, 2011), which were not always related to the needs of the country. Even worse, lack of focus hindered the creation of economies of scale of national relevance and importance in research areas (Grant et al, 2011).

²⁴ The average Greek GBAORD for the years 2004-2007 was 0.32% of GDP while the EU-27 average for the same period was 0.7% of GDP.

The current debt crisis and the severe budget cuts increase the importance of consolidated and targeted funding towards few and well-defined priority areas.

Align supply and demand of human resources

According to Lianos (2007) and Lambrianidis (2011), there is a mismatch between supply and demand of human resources. This misalignment can be attributed to both the insufficient demand of R&D from the private sector and the non-responsiveness of the education system to the market needs. Lambrianidis (2011) argues that the overabundance of highly educated individuals relative to the overall demand is due to the low demand from the private sector for highly qualified personnel.

The demand for researchers is also low compared to the EU-27 average. The share of researchers (in full time equivalents) as a percentage of total employment in Greece was 0.46% in 2007²⁵, much lower than the EU-27 average of 0.66%. Compared to EU-27, the demand from the business sector is especially low (Maroulis, 2009) and, therefore, most PhD graduates pursue academic careers. There is limited and old data only on PhD holders' employment. Based on a 2005 survey, approximately 85% of PhD holders were employed by the university sector and by research organisations and only 7% by the business sector. However, this may have changed since. PhD studies financed by the Structural Funds have proliferated and substantially more PhDs were produced, but many PhD holders have left the country since the crisis.

The challenge for public policy is to increase the responsiveness of the higher education system to the needs of the economy and to increase the demand from the private sector for highly qualified personnel, as well as the demand for R&D-based knowledge in companies.

Improve the governance of the national innovation system

Although no systematic assessment of the R&D and innovation policy has been implemented so far, apart from some piecemeal efforts from time to time, the evolution of the main R&D and innovation indicators and the gap between targets and achievements²⁶ reveal low effectiveness and impact.

The concentration of design and implementation of the R&D policy within a single agent (GSRT) has been repeatedly criticised (Tsipouri and Papadakou, 2005; Maroulis, 2009a). Furthermore, the positioning of GSRT within the auspices of the Ministry of Education Religion, Culture and Sports makes the coordination of innovation policies of other bodies and Ministries difficult.

²⁵ The latest available data on researchers provided by Eurostat for Greece is in FTE for 2007. The latest data on head counts is for 2005.

²⁶ For example, the Lisbon targets

Several efforts to create new structures (like a special service to act as an implementation agency), improve coordination and reorganise management have not yet been successful. At the operational level, complex administrative rules, inefficient management structures, and low administrative capacity inhibit the consistency of competitive funding. Grant et al (2011) list several cases where funding decisions were delayed or committed research funds were not paid on time. As a result, competitive funding for the period 2007-2008 was virtually zero (Maroulis, 2011). Absorption increased in 20011-2012 but there is no evidence of significant change in terms of coordination and vision.

The lack of efficient monitoring mechanisms and of systematic evaluation has hindered policy learning and does not allow for improvements in the design and implementation of policies. There is also no systematic training for the civil servants involved in policy design and implementation (INNO-Policy TrendChart, 2009). Most striking is the total lack of systematic surveys, leading to lack of evidence to support effective policy-making.

Despite the urgent need for improvements at all levels of governance, budget cuts and reductions of personnel are disincentives for improvement, while at the same time tensions within the existing organisational structures increase.

18. ASSESSMENT OF THE NATIONAL INNOVATION STRATEGY

a. National research and innovation priorities

The national strategy for research and innovation follows the programming cycle of the Structural Funds, being its principal source of funding. The strategy for the current programming cycle was developed in 2007 and is described in the "[Strategic Development Plan for Research, Technology and Innovation](#)" (SDP) and the [OP "Competitiveness and Entrepreneurship"](#). The main goal defined in the SDP was the **support of the objective of sustainable development by investing in knowledge and excellence**.

The strategic plan also defined 11 priority areas for research covering a mixture of economic and societal challenges. However, changes in the government led to a new strategy focusing on fewer sectors and technology areas that are either considered key for the economy or address societal challenges. As reported in the Hellenic National Reform Program 2011-2014, five areas have been prioritised for research in the next three year period: 1) Agro-food, 2) Information and Communication Technologies, 3) Materials/Chemicals, 4) Energy-Environment, and 5) Health/Biomedical sectors. Applied economic and social research and research on cultural heritage were also recognised as areas of national importance²⁷.

A new important element of the strategy is related to the consolidation of funding from different Operational Programmes into one strategic plan. The consolidation serves monitoring purposes rather than the coherence or coordination of policy design, given that the main priorities and the allocation of funding per priority in each of the Operational Programmes have been decided long before the creation of the new strategy.

A positive aspect post 2009 has been the activation and involvement of a National Council for Research and Technology in the RTDI debate. On a negative note, changes in the policy priorities during the last three years illustrate the lack of continuity of policy design, which in effect has undermined the capability of the governance system to implement reliable multi-annual strategies.

In January 2012, the Ministry of Education, Religion, Culture and Sports and the National Council of Research and Technology launched a two-month public consultation for the drafting of the new National Strategic Framework for Research, Technological Development and Innovation. The consultation aimed to look for ideas, suggestions from the academic and business community of the country for the National Strategic Framework for Research, Technological Development and Innovation that would run up to 2020, which would define the objectives and policy priorities and provide the financial means for their

²⁷ [Hellenic National Reform Programme 2011-2014](#), April 2011, Hellenic Republic Ministry of Finance

pursuit²⁸. The GSRT and the National Council are now elaborating the new strategy taking the consultation process into consideration.

Social challenges are not explicitly addressed in the national debate. In practice, however, they are addressed, partly through the participation in certain EU partnership and partly through the emphasis given by the overall development model into the green economy and alternative energies. There again, policy has relied more on subsidising (solar, wind and waterfall) investments and less (but still with some success stories) on developing new technologies.

Consistency of priorities with the structural challenges

- *Increase business demand for new knowledge:* Research and innovation policy could hardly address the low demand from the business sector for new knowledge activities. This is primarily a matter of the structure of the economy and the overall economic climate. This challenge needs a long-term investment in coordinating research and innovation policy across the board (industrial, competition, trade, human resources and education policy). Simple subsidies will not be able to make any difference. Discussions on better coordination have started but experience from the past suggests that all institutions will wish to maintain responsibilities and avoid sharing. The challenge is still very much on the table, in particular as the overall economic climate has discouraged private investments.
- *Ensure better-focused and long term public funding of R&D:* The reduction of the number of priority research areas and the emphasis on their relevance to the imperatives of the economy is consistent with the need to create economies of scale in better-focused areas. The new law for the governance of the research system is expected to address some of the structural deficiencies of the governance system. More progress can be found in the focused research areas decided in the new call for cluster development, the narrowing down of priority disciplines in the National Reform Programme of 2011 and the development of thematic scientific councils in major disciplines. However, still priorities are sufficiently broad to encompass most areas of research.
- *Misalignment between demand and supply of human resources:* The misalignment in skilled employment has widened because of the massive unemployment affecting graduates, in particular young ones. In the case of research skills balance may improve for the wrong reasons: better balance because supply will be reduced without demand increasing. Research brain drain has increased in the last two years, because of the crisis, and is expected to increase further, as in 2013 the salary reductions in HEIs and PROs will be fully implemented. For the longer term the

²⁸ <http://www.opengov.gr/ypeth/?p=1436>

Ministry of Education has expressed the intention of significant mergers between HEIs, between TEIs and closing down of poorly attended schools, or disciplines for which there is no demand in the market (known as Athena Plan), in an effort to rationalise expenditure and attain benefits through economies of scale. Concrete decisions for consultation (and social reactions from the side of the institutions affected) are expected early in 2013.

- *Improve the governance of the national innovation system:* In this area no progress has been made, but there are signs of further deterioration. One more year has passed and no evidence (evaluations, surveys, foresights, benchmarks) have been conducted. Coordination is discussed but does not progress; on the contrary individual ministries adopt their own agendas. As RTDI is not in the focus of the restructuring agenda at the moment, it is important to exercise all possible pressure to at least develop the evidence necessary to improve policies.

b. Evolution and analysis of the policy mixes

The role of research and innovation

Research and innovation, although recognised for their importance in enhancing competitiveness, have failed to mobilise government funds²⁹, as is clearly evidenced by the low share of R&D funding in the general government expenditures compared to EU average. GERD is expected to rise in parallel with the absorption of the Structural Funds but diminish after the end of the cycle. However, GERD/GDP is likely to rise because GDP is rapidly contracting. Funds for innovation are planned to increase as development is increasingly shifting to new technologies and exports.

The quality of R&D and innovation governance

The existing governance model originates from the 1980s, and subsequent efforts to modernise it and adjust it to current needs have so far failed to meet the challenge. There are overlaps, lack of coordination and occasional confusion between policy and implementation. Emphasis on evidence tools for better policies is of paramount importance.

The new law (4076/2012), is expected to modernise governance in HEIs. Overall, the volatile policy environment and the frequent changes in the leadership of GSRT during the last three years have slowed down the reforms of the governance system.

Adequacy of public funding

The main dimensions of the policy mix were defined in 2007 as a result of the design of the NSRF and reaffirmed in 2011. Inefficiencies in the planning and implementation of the R&D and innovation policy resulted to late implementation.

²⁹ See also the speech of the General Secretary for Research and Technology in the Parliament's Special Permanent Committee on Technology Assessment on 11/10/2011.

The overall budget for research and innovation measures (institutional funding not included) in the programming period 2007-2013 amounts to €1.5b.³⁰ The budget of past programmes (2009-2011) amounts to €1.22b, representing 81% of the total budget for the whole period 2007-2015. Grants remain the only type of support for R&D. However, new financial instruments such as tax allowances, equity schemes (co-funded by public funds) and soft loans are expected to influence funding for innovation.

The scope of innovation policy

Innovation policy, along with industrial and entrepreneurship policy are recognised as the best tools for mobilising corporate investments. They have now shifted their focus on investments that foster innovation, supporting organisational and other non-technological aspects of the innovation process. Innovation in services has become increasingly important, as services have become the driving force of the Greek economy. In total, €103m are directed to innovation in services.

Similarly, emphasis is placed on the development of a new growth paradigm for Greece based on “green development”. The efforts in this area focus on generating demand by encouraging the introduction of green technologies and applications. The budget of the programmes supporting green innovation amounts to €46m. However, the innovation component is more on diffusion of embodied technology than on the local development of innovative products.

Promoting private investments

In response to the economic crisis and under the pressure of the first “Memorandum of Economic and Financial Policies”, government launched an ambitious programme of reforms in 2010, in an effort to improve the framework conditions that enable investments, including R&D and innovation. The reform programme included the simplification of the procedures, so that new firms can be established in one day; the conception of a new type of limited liability company with a symbolic capital deposit; the improvement of the regulatory framework for the development of industrial areas and business parks; finally the creation of a road map for removing thirty of the largest obstacles for entrepreneurship and innovation. However, the slow progress of the reforms and the deepening of the economic crisis³¹ have further deteriorated the economic environment and discouraged business investments. Anecdotal evidence, which is also confirmed by IOBE (2012), points to the emergence of small innovative start-ups in niche markets e.g. in services, ICT, or agriculture, as an exception to this trend.

Recognising the need to strengthen R&D and innovation in the business sector, the government has directed 39% of its R&D budget (€592m) towards the support of R&D and

³⁰ The data in this section are estimates based on data of Unit A1, Special Management Service of the OP “Competitiveness and Entrepreneurship” and analysis of the database of calls of the NSRF 2007-2013 <http://www.espa.gr/en/Pages/Proclamations.aspx>.

³¹ GDP is expected to further decrease by 5.5% in 2011.

innovation in companies. Grants for R&D are mainly allocated to SMEs and to new companies via two programmes that support R&D in networks of SME and in young SMEs. The budget for both programmes amounts to €44m.

The Investment Law, which traditionally was recognised as the main instrument for mobilising private investments in the business sector, was redesigned in order to replace more and more subsidies by fiscal and financial tools and to extend its scope to support innovation. The law now also contains a green dimension, allocating €7m to environmentally oriented investments.

Another new programme aimed at promoting the internationalisation of companies was launched in 2011, with a budget of €44.8m. The programme supports innovative ideas and non-technological innovations that advance Greek products in European and international markets. "New innovative entrepreneurship" is another new programme that was launched also in 2011, supporting new innovative ventures with a budget of €30m.

Following the trend to increase the weight of financial-market-type-of-instruments, a new "Entrepreneurship Fund" (ETEAN SA), was created in 2011 through the merger and expansion of pre-existing funding instruments. The Fund is expected to mobilise about €460m of public funding for the support of entrepreneurship through venture capital, start-up and seed capital, and business angels. Innovative ventures are expected to absorb 10% of the total budget. The Innovation Fund, created in 2012, is expected to increase funding in the five NRP thematic areas.

The objective to stimulate business activities towards knowledge intensive segments of the economy, continues in the current period. A public initiative supporting spin-offs from public research organisations and the creation of new firms out of them, which started at the end of 2009 with a budget of €24m, continued in 2011, and a new call was expected later in the year. However, the experience with the last call was that the proposals were not of sufficiently high quality. As a consequence it was decided to shift the funds of the GSRT earmarked for spin offs to SME support, managed by the General Secretariat for Industry to cover the increased demand triggered by the crisis. In 2012, competitive calls were announced, focusing on the development of human capital for research in a knowledge economy (including support to excellent researchers, support to mobility of researchers towards enterprises and support to training for innovation activities), with a total financing in excess of €150m in the period 2011-2013.

Innovation in services is funded by three programmes with a budget of €103m in total. "Green Tourism" started in 2010 with a budget of €13m. The other two were launched in 2011 and focus on ICT services and software applications. Together with the green dimension of the Investment Law and "Green Tourism", two more (demand-side support) programmes, namely "Green Enterprise" and "Green Infrastructure", serve the objective of green growth.

The new Law for Strategic Investments which is expected to be issued in the beginning of next year following a consultation process in November 2012 aims at improving the business environment and stimulate employment.

Primacy given to the pursuit of excellence

Institutional funding for public research organisations and HEIs covers mainly the salaries of the permanent staff and the operational costs. Research projects are funded on a competitive basis through open selection procedures with emphasis on scientific excellence. Investments in the development of research infrastructures are also subject to competitive selection.

Competitive funding of research in HEIs and public research organisations represents the second largest area of support, amounting to €376m³². Investments in research infrastructures total €140m, of which 22% is directed to the participation in ESFRI. Research projects are funded by four programmes with a total budget of approximately €231m. The programmes support post-doc research (30m); research in TEI (€21m); large research consortia (€120m); and research projects implemented by a primary investigator (€60m).

In an effort to better organise the public research sector, reduce overlapping and increase economies of scale, the government has announced the consolidation of the public research organisations, through Law 4051/2012.

Partnerships at all levels

The main instrument for promoting cooperation is "Collaboration", a programme that supports consortia of HEIs, public research organisations, and companies in performing research in national priority areas. The programme started in 2009 with a first call of €93m. A new call followed in 2011 with €68m.

In addition, funding of innovation clusters is a new, much narrower and more ambitious effort. The first round of funding started in 2008 with the support of the Corallia microelectronics cluster with a budget of €35m. In 2012, €30m were allocated to the creation of Innovation Clusters in the areas of Information and Communication Technologies and Knowledge Intensive Services (2), Energy/Environment (3), Health/Biomedicine (1), Materials and Chemicals (2).

In addition to direct support measures, the development of an entrepreneurial and innovation friendly culture in the higher education sector aims to facilitate collaboration. To this end, €101m are budgeted for the development of offices in universities and TEIs that combine career development counselling activities with the promotion of business planning competitions; as well as for the creation of entrepreneurship clubs and the development of courses on entrepreneurship. The 2011 law for HEI recognises these

³² This includes a budget of €31m for participating in ESFRI.

offices and gives them the status of “Innovation and Liaison Offices” which are also responsible for IPRs.

In the last three years, participation in European initiatives for the design and implementation of collaborative programmes and research infrastructures also gained importance. However, the budget is thinly distributed to several initiatives driven by bottom-up initiatives rather than by top-down prioritisation. In addition to the €31m for ESFRI, an additional amount of €34m has been allocated for supporting the participation in the Joint Technology Initiatives (€13m), in ERA-NETs (€17.5m) and in bilateral research agreements (€3.5m). With a high number of agreements that have an average budget between €0.4m and €0.5m, the latter has remained a marginal area of support for several years. The efficiency of such fragmentation of funding is currently questioned by GSRT and a scheme containing fewer but larger agreements is considered. Following negotiations, the Greek government managed to reduce annual contributions to ESA and CERN.

Production of the right mix of skills

The Heraclitus II programme providing grants for PhDs was launched in 2009 (€39.6m). A programme of €15m was launched in 2011 to support the hiring of highly qualified science and technology personnel in the business sector. Another €4m have been invested in interventions that increase awareness, starting in 2010.

Although funding for the improvement of the quality of human resources has increased compared to the previous programming period, no progress has been made in addressing the misalignment between supply and demand.

At the level of tertiary education there is no coordination of skill development. There is an oversupply of graduates in Social Sciences and Humanities (because of the low cost of creating such faculties) generating massive unemployment, whereas HEIs and TEIs in small peripheral cities were created and are maintained with regional development rather than educational targets.

Other policies affecting R&D investments

Within the domain of education policy, a new reform of the HEIs was implemented in 2011. The new Law 4009/2011 has replaced the previous reform of 2005 and has introduced radical changes towards the modernisation of higher education. These concern foremost the management (creating a new management board including non-academics for the first time), the academic units, and the organisation of studies. Furthermore, the funding of HEIs is under scrutiny in an effort to increase accountability, to improve management, and to strengthen the HEIs’ autonomy. The reforms have strongly been opposed by a part of the academic community and by the majority of the management of HEIs, as had been the previous reform in 2005. An amendment of the Law in 2012 made adjustments facilitating the transition, and has succeeded in reducing resistance. New boards have been elected in almost all HEIs, after a recent and long overdue provision allowing electronic voting in these elections.

c. Assessment of the Policy Mix

The effectiveness of the policy mix in addressing the main structural challenges is undermined by the profound economic crisis. Both the business sector and the government are at the moment concerned with the survival rather than the modernisation of companies.

Since early 2011, obstacles that hindered entrepreneurship are in the process of being removed, introducing regulations aiming to reduce red tape in several aspects of business activities, such as licensing, setting up of companies, etc. The effectiveness of these reforms will be tested in 2013. Despite the government announcing improvements, the business sector has still serious complaints, and the press/blogs are full of horror stories about bureaucracy.

Due to the reduction of domestic demand, a large number of companies have shifted their focus to the international market. Exports have increased by 6.8%³³ between November 2011 and October 2012, following a similar increase in 2009-2010. The competitiveness of the international market is an important driver for the innovation intensity and the demand for new research based knowledge, providing that all other obstacles (e.g. cost of internationalisation, red tape, need of information, access to international suppliers' networks etc.) are removed. The existing policy mix gives increasing but still insufficient attention to improving the framework conditions for exports.

The consolidation of research areas, combined with a clearer focus on economic and social challenges and the restructuring of the public research system could increase the efficiency and effectiveness of committed resources. However, the pressure to reduce public expenditures within a very tight schedule could favour changes that minimise cost without improving the efficiency and effectiveness of the system.

The alignment of supply and demand for human resources and skills would be the long-term result of reforms in the education system and of better coordination between labour, education and research policy. The new law for the HEIs is making some progress towards their ability to respond to the needs of the economy and society. The reorganisation of the higher education and research systems needs to be accompanied by reforms in the way the decisions are taken regarding the number of new students per faculty³⁴. After a massive funding of graduate studies in the last decade, it is time to proceed to a more selective and effective allocation of public funding for Master's degrees, PhD and post doc programmes taking the labour-demand side into consideration.

³³ ELSTAT

http://www.statistics.gr/portal/page/portal/ESYE/PAGE-themes?p_param=A0902&r_param=SFC02&y_param=2011_10&mytabs=0

³⁴ Currently, the Ministry of Education centrally decides on the ex-ante number of admissions.

The introduction of a new law is a good starting point for improving the governance of the national innovation system. However, other important areas also require intervention, including training, the systematic use of evidence (e.g. surveys and evaluations), improving personnel recruitment, restructuring of the government units involved in policy making, and simplifying the NSRF management structure.

The following table summarises how the policy mix affects the structural challenges identified in section 3 above, and assesses their appropriateness and performance.

Table1: Assessment of policies addressing structural challenges

Challenges	Policy measures/actions ³⁵	Assessment in terms of appropriateness, efficiency and effectiveness
Increasing business demand for new knowledge	<p>Simplification of the regulatory environment for companies and investments</p> <p>39% of the competitive funding budget is directed to R&D and innovation in companies.</p> <p>Eco-innovation is encouraged through demand side programmes.</p> <p>Financial instruments will gain in importance as tools to promote innovation</p> <p>Support for investments in companies is increasingly directed towards innovative ventures</p> <p>The new Innovation Fund agreed is expected to be operational in 2013</p>	<p>Simplifying regulations is a move in the right direction but an insufficient measure to counterbalance the very negative economic environment, the uncertainty and the impact of tax increases.</p> <p>The new regulations were applied only in mid-2011, hence no evidence of success or failure exists yet.</p> <p>The implementation of R&D and innovation programmes is hindered by the inefficiencies of the public administration.</p> <p>Funding will never be sufficient as long as the macro-economic climate is unstable</p>
Ensure better-focused and long term public funding on R&D	<p>Reduction of the number of research priority areas</p> <p>Restructuring and consolidation of the public research sectors</p> <p>Narrow focus of the call for cluster development</p>	<p>Reducing the number of priority areas would sharpen the focus of policy. However, reliable long term planning is undermined by the budget cuts and the uncertainty due to the crisis.</p> <p>Even the reduced number of</p>

³⁵ This includes changes in the legislation and other initiatives which are not necessarily related to funding.

Challenges	Policy measures/actions ³⁵	Assessment in terms of appropriateness, efficiency and effectiveness
		<p>priorities still leaves a broad spectrum available to spread funds thinly</p> <p>Consolidation is mainly driven by the need to cut expenses as soon as possible. The time pressure does not allow for an in-depth analysis and design of the restructuring of the public research sector.</p>
Align supply and demand of human resources	<p>The new law 4009/2011 aims at improving the coordination of decisions within HEI, regarding the orientation of postgraduate studies. The law 4076/2012 has succeeded in the creation of new, mixed (internal-external membership) HEI governing boards.</p> <p>The Athina Plan for the consolidation of HEIs is in the process of implementation.</p>	<p>The coordination of labour, education and research policy is still underdeveloped.</p> <p>The decision on the number of students per faculty remains a privilege of the Ministry of Education and there is no streamlining yet.</p>
Improve the governance of the national innovation system	<p>A new law was launched for consultation but not yet adopted</p> <p>Mergers and consolidation of Public Research Organisations</p> <p>Concentration of research programme management under the GSRT</p> <p>The use of international peer review in project appraisals has become the norm.</p>	<p>A new law could significantly improve the governance system. However, its enforcement will have to be monitored, as the previous law was never implemented. In addition other important elements are still missing.</p> <p>No emphasis on collection of evidence, on which one could build effective policy design.</p> <p>Improving the project appraisal system is important but does not constitute a major issue.</p>

19. NATIONAL POLICY AND THE EUROPEAN PERSPECTIVE

The deepening of the economic crisis and the severe cuts of public expenditures, which will continue at least until 2014, greatly reduce the ability of the Greek government to mobilise the necessary additional funding to develop the existing public research system and to reach the targets. Therefore, its efforts should focus on reforms aiming at increasing the efficiency and effectiveness of the research system and on directing the limited funding towards policies that stimulate demand and facilitate the access of innovative enterprises to new markets.

In the short run, a new strategic plan for research and innovation ought to be drafted for consultation with stakeholders. Although the available budget has already been largely allocated to specific measures, the development of a strategy is a prerequisite for the effective design of research and innovation interventions in the next programming period of the Structural Funds.

The active involvement of the General Secretariat for Industry and the General Secretariat for Investments (Cohesion Policy) in innovation policy raises the issue of a better coordination with GSRT, which was traditionally responsible for research and innovation.

The consolidation of research infrastructures will create economies of scale, reduce fragmentation of resources, and increase effectiveness and efficiency of the available funding. A similar restructuring in the education sector is planned to follow. Again, this is a medium rather than a short-term objective, as merging or closing institutes or university departments and TElS should take place as a result of thorough planning, aiming at optimising the utilisation of resources and ensuring quality.

Given the failure of supply side policies to stimulate business demand for research-based knowledge, the role of demand side policies in the policy mix has to be tackled. Currently, demand side policies are being implemented in the area of green investments and eco-innovation, but they favour embodied technologies only. Public procurement, standards, and support to users procuring innovative products have never been studied, let alone implemented.

Greece is in theory fully aligned with the ERA objectives but faces difficulties in their implementation. By and large, the EU is the major source of policy inspiration for the country. A better use of ERA opportunities could contribute to maximising synergies in areas of national priority, instead of simply aiming at maximising funding. Within this context, a clear strategy should be defined in the short run, setting priorities for the development of collaborations in a small number of areas where a critical mass could be achieved. Better participation of Greek employees in RTD areas both from the public and the private sector to European fora would be a good training opportunity for them.

Concretely:

1. More effective national research systems: Competitive funding has become an integral part of the national support mechanisms, which are all co-financed by the EU Structural Funds. Institutional evaluations are undertaken regularly (even if with some delays) and an HEI accreditation mechanism has been set up. Its operation is slow and it lacks resources. Moreover, the evaluation results are not at least for the time being, influencing the attribution of block funding; institutional funding is mostly path dependent. A recent reorganisation of HEIs and TEIs is expected to limit wasted resources and overlaps. Few national research infrastructures are large enough to be of global relevance. Reduced fragmentation and synergies would improve their scale and visibility. Funding earmarked for research infrastructures has increased and the preparation of the National Infrastructures Roadmap is announced; decisions on the participation in specific ESFRI infrastructures (€35m) are expected in the context of the planning of the new programming period 2014-2020.
2. Optimal transnational co-operation and competition: Greek research teams participate extensively to ERAnets and other EU initiatives and in some cases play an important role in research agendas for grand challenges. Energy and environment are priority areas for the country. However, national funding is not always available and both budgetary constraints and administrative rigidities hamper more active involvement. Progress is observed in the last calls for academic community research funding, as proposals in the last two calls had to be submitted in English and be evaluated by foreign peer reviewers.
3. An open labour market for researchers: Greece has a high quality research potential with significant brain drain, reinforced by the recent economic crisis. Academic promotion is based on open and competitive procedures and has in recent years been reorganised to include foreign researchers in the selection panels. Researchers have a right to appeal. While the system is in principle open, knowledge of the Greek language is a hampering factor for inward mobility. In addition salaries are low and have been further reduced, hence hardly attractive for foreign researchers. Doctoral training has increased significantly, in quantitative terms, in the last decade but in their majority doctoral studies follow traditional training.
4. Gender equality and gender mainstreaming in research: No specific initiatives are undertaken in this respect. While the number of female researchers, in particular in senior positions, is limited, there are no explicit barriers in terms of salaries or other pecuniary benefits. Hence for gender mainstreaming there is a need for cultural and institutional change rather than legal modifications.
5. Optimal circulation, access to and transfer of scientific knowledge including via digital ERA: While by comparing achievements and access Greece is lagging behind in that respect, the debate for open access has developed energetically in the last year with initiatives taken mainly by the National Documentation Centre. The larger



HEIs subscribe the major scientific journals and faculty members and students have access via the intranet of the institution. e-Journals are circulating but remain marginal compared to traditional journals accessed via the web.

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LIST OF ABBREVIATIONS

BERD	Business Expenditures for Research and Development
CERN	European Organisation for Nuclear Research
ERA	European Research Area
COST	European Cooperation in Science and Technology
ERA-NET	European Research Area Network
ERP Fund	European Recovery Programme Fund
ESA	European Space Agency
ESFRI	European Strategy Forum on Research Infrastructures
FP	European Framework Programme for Research and Technology Development
EU	European Union
EU-27	European Union including 27 Member States
FDI	Foreign Direct Investments
FP	Framework Programme
FP7	7th Framework Programme
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GSRT	General Secretariat of Research and Technology
GUF	General University Funds
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HQA	Hellenic Quality Assurance and Accreditation Agency
IP	Intellectual Property
NARIC	National Academic Recognition and Information Centre
NCRT	National Council for Research and Technology
NSRF	National Strategic Reference Framework
OECD	Organisation for Economic Co-operation and Development
PRO	Public Research Organisations
PSCTA	Permanent Special Committee on Technology Assessment
R&D	Research and development
RI	Research Infrastructures
RTDI	Research Technological Development and Innovation
SDP	Strategic Development Plan for Research Technology and Innovation
SF	Structural Funds
SME	Small and Medium Sized Enterprise
S&T	Science and technology
VC	Venture Capital

European Commission
EUR 26275 – Joint Research Centre – Institute for Prospective Technological Studies

Title: ERAWATCH Country Reports 2012: Greece

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Luxembourg: Publications Office of the European Union

2013- 37 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-34517-3 (pdf)

doi:10.2791/39730

Abstract

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). The main objective of the ERAWATCH Annual Country Reports is to characterise and assess the performance of national research systems and related policies in a structured manner that is comparable across countries.

The Country Report 2012 builds on and updates the 2011 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context. They further analyse and assess the ability of the policy mix in place to consistently and efficiently tackle these challenges. These reports were originally produced in December 2012, focusing on policy developments over the previous twelve months. The reports were produced by independent experts under direct contract with IPTS. The analytical framework and the structure of the reports have been developed by the Institute for Prospective Technological Studies of the Joint Research Centre (JRC-IPTS) and Directorate General for Research and Innovation with contributions from external experts.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.

