Strategic Evaluation on Innovation and the Knowledge Based Economy in relation to the Structural and Cohesion Funds, for the programming period 2007-2013

Contract n° 2005 CE.16.0.AT.015

A report to:

The European Commission
Directorate-General Regional Policy
Evaluation and additionality

Country Report: GREECE

Version: Final

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LOGO TECH Innovation & Development

7 July 2006

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Executive Summary

Over the past eleven years GDP growth rates in Greece have been higher than the Euro zone. However, performance was systematically and considerably below the EU average in research and innovation, as demonstrated by a variety of benchmarks.

The governance system for research, technological development and innovation (RTDI) in Greece is centralised with low coordination between the various stakeholders. Policy making for RTDI activities is mainly the responsibility of the General Secretariat of Research and Technology (GSRT) of the Ministry of Development (MoD), which has limited means and relative political weight compared to the other units in the public administration and thus has little opportunities to directly influence policies of other ministries.

Overall, the policy mix applied over the current programming period corresponds to the major problems and challenges the Greek economy is facing and it is well balanced and adequate. An exception is the insufficient support to RTD and the improving of governance of RTDI policies. However, any reallocation in favour of these areas presupposes an increase of business demand and research spending for the former and significant changes in the governance of innovation for the latter.

A series of problems related to institutional, legal and financial framework created bottlenecks for the implementation of RTDI policies and have led to low absorption of the allocated RTDI resources. However, it is expected that most of the targets will be met applying the n+2 rule. Significant variations exist across the types of measures and operational programmes. Research projects show the highest absorption rates, as the GSRT has a long experience on planning and implementing research programmes and many have been running across several programming periods. On the contrary, research infrastructures need longer periods of planning and preparation before the projects could start. Furthermore, novel measures usually require a longer time for learning and adapting the regulatory environment. However, many of the regulatory obstacles now have been removed and the necessary adaptation has been done for a number of innovative instruments. Furthermore, experience has been accumulated over the last few years on planning and implementing these new instruments.

Implementation of RTDI measures in the Greek regions, although with many variations, proved to be more problematic. According to the mid term evaluation of the Structural Funds, the main bottleneck in the regions are the low planning capacity particularly for RTDI measures. The lack of experience and of adequate staff, in terms of qualifications and quantity, delayed the process of planning and publishing of calls for tenders. For the next programming period this lack of capacity will be the major bottleneck and threat as the two metropolitan regions (Attiki and Kentriki Makedonia), where the majority of industry and knowledge production is concentrated, will be supported only from their Regional Operatonal Programme (ROP) with no funding from the horizontal and centrally planned and managed OPs.

Despite the deficiencies of the regional innovation system in all Greek regions, there is significant potential for future development in the following directions:

- transformation of the metropolitan regions to research and innovation poles;
- revitalisation of low tech industries by exploiting opportunities offered by the convergence of enabling technologies such as biotechnology, nanotechnology and ICT with the existing technologies in these sectors;
- creation of multi-functional agricultural space in rural areas;
- creation of a higher value added tourism sector by linking tourism activities with content development, recreational activities, development and transfer of tourism logistics technology;
- exploitation of the rich renewable energy resources of the country.

Greece's approach for confronting the systemic deficiencies in developing a knowledge society in the new programming period 2007-2013 can be summed up in the following axes:

- Production of new knowledge and link research with the economy.
- Commercialisation of knowledge and exploitation for the benefit of the economy.
- Promotion of excellence in the research sector.
- Promotion and strengthening of the extraversion of the Greek economy and research sector through European and international collaborations, and
- The quantitative and qualitative improvement of RTDI personnel.

The above priorities and the suggested mix of measures are well balanced. Interventions should be diversified across the different regions, based on their potential and capacity. Research funding should be focused in those regions with research capacity while measures supporting technology transfer, creation of innovative funding mechanisms, improvement of governance etc. can be supported in all regions.

The following recommendations should be seen as complementary to the above development axes, addressing specific major deficiencies of the Greek national innovation system:

- reorientation of firm's strategies with emphasis on knowledge and high value activities;
- promotion of networking, clustering and development of innovation poles;
- increasing public and private R&D funding directing more than 10% of the total Structural Funds' funding towards to RTDI measures;
- gradual shifting of funding towards new market driven funding instruments;
- development of a National Innovation Strategy and re-engineering of the regional governance system for R&D and innovation, together with intensive training and establishing links of regional authorities with GSRT.

1 Introduction

In March 2000, the EU Heads of State and government launched an ambitious political initiative for the European Union to become "the most competitive, dynamic, knowledge-based economy by year 2010". The agenda, which has become known as the 'Lisbon Strategy', has included a broad range of policies and regulatory measures to achieve this goal.

At the 2005 Spring Council of European Union, Heads of State and government concluded that all appropriate national and Community resources, including those of Cohesion Policy, should be mobilised in order to renew the basis of Europe's competitiveness, increase its growth potential and its productivity and strengthen social cohesion, placing the main emphasis on knowledge, innovation and the optimisation of human capital. In short, the Council recognised that while some progress has been made since 2000 in moving towards the goals enshrined in the Lisbon Strategy there remains a need to create "a new partnership for growth and jobs"[1]

In launching the discussion on the priorities for the new generation of cohesion policy programmes, the Commission published on 6 July 2005 draft Community Strategic Guidelines entitled "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013". One of the specific guideline is to improve the knowledge and innovation for growth. More specific areas of interventions, which are proposed by the Commission, include: improve and increase investment in RTD, facilitate innovation and promote entrepreneurship, promote the information society for all, and improve access to finance.[2]

Innovation is an important factor in releasing the potential of the Lisbon agenda. The knowledge captured in new technologies and processes can drive growth and competitiveness and create new jobs. But knowledge must be treated as part of a wider framework in which business grow and operate. Developing knowledge-based economy requires adequate levels of investment in R&D, education, and ICT as well as creating a favourable environment for innovation.

Less developed areas of the Union are also confronted with this new competitiveness challenge. Increasing cohesion leads to improvements in living standards and the reduction of economic and social disparities, which depend to an important extent on increases in productivity. Increasing competitiveness implies economic change through the introduction of new technologies and new methods of production as well as the development of new skills. Innovation is at the heart of this process. Technological and organisational change and new demands generated by rising income levels and factors which create new economic opportunities and therefore, contribute to the growth potential of these countries.

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[1] Communication to the Spring European Council (2005) "Working together for growth and jobs: A new start for the Lisbon Strategy", COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

[2] Communication from the Commission (2005) "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

Structural Funds are the main Community instruments to promote economic and social cohesion. In the past and current programmes, they have contributed to enhance the research potential and innovation in businesses and to develop the information society, particularly in the less developed areas. Cohesion policy has also promoted the development of regional innovation strategies and other similar initiatives in the field of the information society.

The overall objective of the strategic evaluation study, as set out in the terms of reference, is that the study should provide conclusions and recommendations for the future of Structural Fund and Cohesion policy. In particular, the Strategic Evaluation will be used to prepare the negotiations with the Member States for 2007-13, to prepare the next operational programmes and to provide input into the 4th Economic and Social Cohesion Report.

In line with the tender specifications, this country report addresses the following issues:

- An analysis of the current situation in the field of innovation and the knowledge-based economy at national and regional level. For the national level, performance is compared to the average performance for the EU25 Member States plus Romania and Bulgaria; and at regional level, where possible given available statistics, compared to a typology of EU regions;
- Lessons from the past and current experience of implementing innovation and knowledge economy measures in the Structural Funds, both in terms of priorities and strategic approaches; as well as in terms of operational implementation;
- Main needs and potential for innovation in the eligible regions drawing on available studies, strategy development and future and foresight studies; and
- Recommendations on main investment priorities for Structural Funds over the programming period 2007-2013 and their implications for regional development.

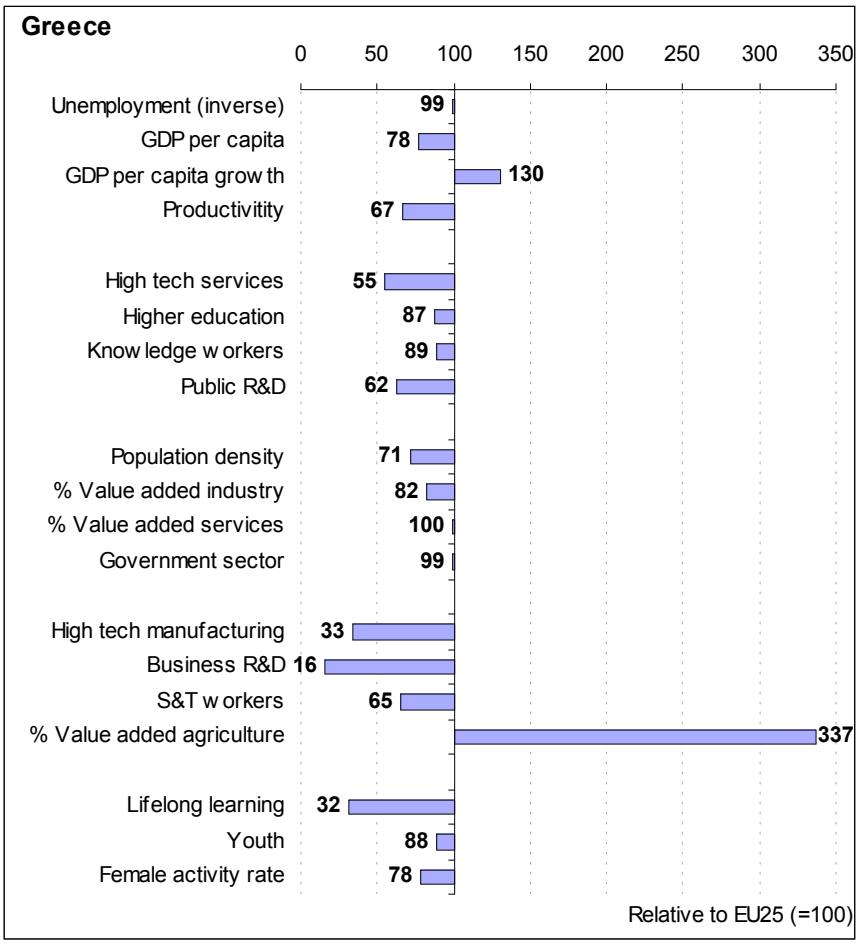
2 Investing in innovation and knowledge: a comparative overview of regional performance

This section provides a synthetic overview of the relative performance of the country, and where relevant main regions, with respect to the EU25 average for a number of selected key structural indicators of innovation and knowledge. The analysis aims to identify **main disparities and needs** at national, and wherever possible, regional level with a view to supporting the definition of priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: innovation and the knowledge economy

Exhibit 1 below provides a snapshot picture of the position of Greece compared to the EU25 average for a series of key knowledge economy indicators.

Exhibit 1: Country performance in key knowledge economy indicators



Source: calculations of MERIT based on available Eurostat and national data from 2002-2003 depending on indicator. Detailed definitions and data for each indicator are provided in Appendix B.

GDP Growth rates in Greece have been higher than the euro zone average over the past eleven years. The main reasons underlying the recent growth have been fiscal expansion[3], low interest rates, significant inflows of EU funds and a strong growth in private consumption and investment[4]. Despite the slight slowdown of economic activity after the Olympic Games, due to fiscal consolidation, growth performance is expected to pick up again in the near future.

However, despite these positive trends GDP per capita remains relatively low compared to the EU-25 average. Even in the case of optimistic assumptions, Greece might not fully converge with EU-15 per-capita incomes before 2030, mainly due to the lack of structural reforms. Inflation was and is likely to remain above the euro-area average, to a certain extent eroding Greece's international competitiveness[5].

More importantly, the income gap reflects low labour productivity (67% of EU average). Hence sustaining robust growth over the longer term will necessitate on the one hand structural reforms in markets, including competition policy, liberalisation, privatisation, fostering entrepreneurship and on the other hand labour market reforms i.e. increasing labour flexibility, mobility and above all skills qualifications. The latter can be achieved only by upgrading the educational system (87% of EU average) and by supporting life-long learning (32% of EU average).

The mismatch between qualifications and needs in many sectors of the economy is reflected in the stubbornly high rates of structural unemployment (55% of total). Unemployment levels remained high over the whole period of growth, particularly among women and the young people.

Furthermore, as a consequence of the prevailing culture of firms, which is based on a low cost – low innovation expenditure model and to the low share of Greek high tech sectors in total output (exhibit 1), the negative trends are reinforced resulting in small absorptive capacity of highly qualified personnel (such as engineering graduates) by Greek enterprises.

Over recent years, Greek performance was systematically and considerably below the EU25 average in research and innovation, as demonstrated by a variety of benchmarks[6], notably with a small share of innovating enterprises. Thus during the 1998-2000 period the share of innovative enterprises reached 27.3% which was the lowest among the EU15. This gap can be attributed mainly to the manufacturing sector. Moreover, the innovation activities of companies were at a large extent incremental and without any ambitions for world market expansion[7]. The Greek innovation system demonstrates low productivity and performance with its main weaknesses being:

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[3] Mainly infrastructure investments for the Olympic Games

[4] MoE (2005) National Reform Programme for Growth and Jobs 2005-2008, MeO(2005) *Hellenic Stability and Growth Programme2005 - 2008* and Alpha Bank (2005) *Short term economic and financial outlook*, December 2005, No 53, Economic Research Devision,.

[5] V. Koutsogeorgopoulou & H. Ziegelschmidt (2005) '*Raising Greece's potential output growth', Economics Department Working Paper no 452,* OECD

[6] e.g., European Scoreboard 2003

[7] Logotech 2004, '3rd *Community Innovation Survey*' for Greece, Ministry of Development, General Secretariat for Research and Technology

- The limited innovation and research activities of the private sector which is reflected in their low participation (less than 30%) in Gross Expenditure on Research and Development (GERD), namely 0.64% of GDP[8] in 2003.
- A small number of links among the major actors of the National Innovation System and particularly between the industry and research organisations and higher education institutes.
- The low public[9] research funding and blurred focus and priorities. Thus during 2003, government budget appropriations on R&D amounted to 0.13% of GDP while higher education expenditure amounted to 0.3% of GDP[10].

In the last CIS survey (1998-2000) there were some positive indications, which for the first time suggested a potential turning point for the Greek economy from a low-cost model to a knowledge-based economy. Although both manufacturing and services contributed to this improvement, the most innovative sector was services. For both sectors the upward trend persisted for three consecutive periods. Nevertheless, this increase was not sufficient for the Greek economy to really converge with the other EU member states.

More specifically, in the primary sector, landholdings are small and fragmented and production relies heavily on subsidies resulting in negligible investments in RTDI activities. Traditional manufacturing activities rely on a low cost production model resulting also in low innovation activities. Within the manufacturing sector the most dynamic ones are the chemicals and plastics, the office equipment, electronic devices and medical equipment and metal products. As far as services are concerned, the tourism sector, which is the largest economic activity in Greece, relies also on a low value added model resulting in limited applications of new information technologies. This is also the case in health services. The most dynamic service sector is the ICT sector itself.

Further, Greece's economic specialisation[11] is concentrated on the one hand in a number of services such as hotels, trade, financial intermediation and construction and on the other hand in a number of manufacturing sectors such as furniture, transport equipment, shipbuilding, petroleum, textiles, the food industry and agricultural products. A common characteristic of these sectors is that they are of low R&D intensity. Particularly for the manufacturing sector most of these industries rely mainly on process innovation. Thus a restructuring of the production base and the support of new higher value added economic activities, in parallel to traditional sectors, could constitute an alternative policy direction for the country.

In terms of research and development, despite some gradual growth in expenditure during the 1990's, research investments over the past few years were stagnating. Moreover, the growth exhibited over the previous decade was mainly the result of

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[8] S.Frank. '*R&D expenditure in Europe',* Statistics in Focus, Eurostat, 6/2006.

[9] Public R&D expenditure is low as a percentage of GDP, although it constitutes the bulk of research expenditure in Greece.

[10] OECD OFFBERD 2005.

[11] Future data requirements of the ERAWATCH base load inventory: Feasibility study on R&D specialisation, ERAWATCH NETWORK ASBL (forthcoming), NIFU STEP, Logotech SA, SPRU, Freunhofer ISI and Joanneum Research, 2006.

both a rise of public expenditure (from 138.3 MEUR in 1993 to 450.6 MEUR in 2003)[12] and of business expenditure (from 59.6 MEUR to 291.6 MEUR in 2003). However, BERD still accounted for less than 0.2% of GDP (16% of the EU average).

Further, in the context of the Lisbon objectives, Greece is expected to increase GERD to 1.0% of GDP by 2010, of which 40% should come from the business sector. Even more challenging than the above targets is the corresponding required increase in the number of R&D employees necessary to support the above increases in spending, i.e. 47.000 people (researchers, technical staff, support staff, administrative personnel etc) by 2010[13].

2.2 Regional disparities and recent trends

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables into a small number of factors by means of factor analysis. These factors are:

- Public Knowledge (F1): human resources in science and technology combined with public R&D expenditures and employment in knowledge intensive services is the most important or common variables in this factor. Regions with large universities will rank high on this factor.
- Urban Services (F2): The most important variables for this factor are value-added share of services, employment in government administrations and population density. A key observation is that academic centres do not necessary co-locate with administration centres.
- Private Technology (F3) This factor is most strongly influenced by business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries.
- Learning Families (F4). The most important variable in this factor is the share of the population below the age of 10. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

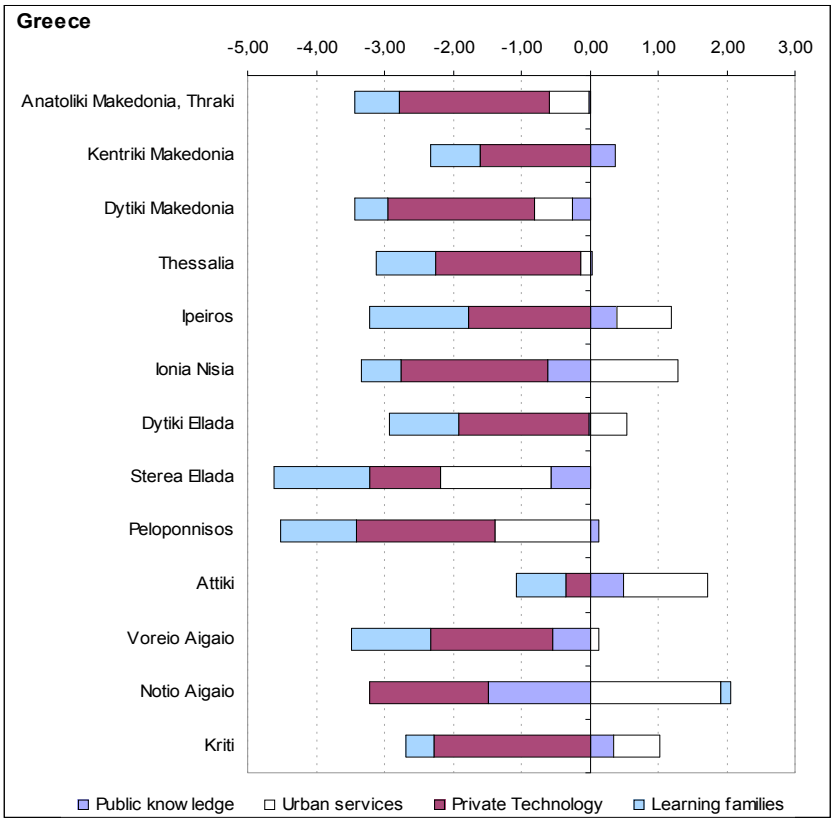
In a second step, the 200 plus EU27 regions were grouped into 11 types of regions (see appendix A) displaying similar characteristics by means of a cluster analysis.

[12] Same as 10.

[13] According to GSRT calculations based on the goals of Greece.

Exhibit 2 presents the scores the 13 Greek Regions vis-à-vis the four factors and their diversion from the average.

Exhibit 2: Regional factors scores per region



Source: MERIT. The bars are stapled factor-scores showing the deviation (1=standard deviation) per factor from the average of 215 EU regions (0.00). The longer the bar, the bigger is deviation. Detailed regional scorecards can be found in Appendix B.

Based on those scores the Greek regions are grouped as follows:

The capital region **Attiki** stands out from the other Greek regions as a member of the cluster "**Local Science and Services"** This group of regions consists mainly of other capital cities, such as Madrid, Warsaw, Lisbon and Budapest. These urban areas serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region (see Exhibit 2). GDP per capita is on average slightly below the EU25 average, but growing. The low score on learning families is a weakness in most Local Science & Services regions, especially compared to the wealthier and advanced Science & Service Centres.

The Attiki region presents the most promising trends in a number of indicators (Annex B.2). The region concentrates 37.7% of Greece's GDP and most of the research and higher education resources.

The region experienced the highest reduction of unemployment among the Greek regions and above average growth of GDP per capita (higher by 6% in 2002), despite the increase of population. These trends reveal an increase in productivity above the country's average. Growth in the region came from the expansion of manufacturing (44% of companies and employees are concentrated in the region) and construction.

During the same period, Attiki experienced the third highest increase in the share of highly educated people.

The region has GDP per capita higher than the clusters' average, while performance in higher education and knowledge workers is around the cluster average. Although there is a high concentration of important research centres, universities and knowledge workers the performance in public R&D and high-tech services is lower than the cluster's average indicating significant room for improvement. On the other hand Attiki is behind the cluster average in life long learning and knowledge development in business. Attiki is regarded as a *phasing out* region in the new programming period.

Sterea Ellada and Peloponnisos belong to the "**Rural Industries**" cluster, besides a low per capita GDP, regions in this cluster have in common a low score on both the factors Urban Services and Private Technology. In addition, Population density is very low while the services sector is often very small. Agriculture and manufacturing industries are usually the dominant sectors in this type of region.

Sterea Ellada is the second industrial centre in Greece (industry represents 40% of the regional GDP). The region is regarded as a *phasing in* region in the new programming period, despite the fact that it is lagging behind in all indicators but the GDP per capita. The latter is due to the significant agglomeration of industry in the industrial areas of Inofita, a few kilometres out of Athens. The prosperity of Sterea Ellada therefore depends directly on decisions made by enterprises based in a neighbouring region.

While the region has the highest GDP per capita (40% higher than the country's total), GDP per capita in the non-industrial area is quite low (approximately 16% of the GDP per capita of the region). As the region lacks any significant knowledge infrastructure it is as expected behind the average performance of the cluster "Rural Industry". The region is behind in all indicators apart from productivity where its performance is four times higher than that of the cluster and 44% higher than the national average.

Peloponnisos experienced the third highest increase in GDP per capita between 1996 and 2002 which was combined with structural changes in its economic profile as production shifted from agriculture to industry (reduction of agriculture value added by 5.8 percentage points while industry share increased by 7.4 points). As is the case of Sterea Ellada, industrial activity is concentrated near the border with Attiki. At the same time the percentage of highly educated people and of R&D expenditures has increased. However, the improvements are still far from bringing the region close to the EU average or to the average for "cohesion regions". Comparing the region with the typical Southern Cohesion Region a significant gap in business R&D, knowledge intensity of local industry and services and share of S&T workers is apparent.

In short, both Sterea Ellada and Peloponnisos can be regarded as "*Satellites of Athens*" as they host production sites of businesses located in Athens and are depended on Athens for human resources and knowledge production.

The other ten regions are classified as "**Southern Cohesion**": These regions are located in Southern Europe, consisting apart from Greek ones, of some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is hardly any high-tech manufacturing or business R&D. Services is the most important sector, but also agriculture remains a rather large sector. The share of

manufacturing industry in value added is very limited. Population density is low, but on average it has been increasing. The following are the Greek Southern Cohesion |Regions:

Kentriki Makedonia is the second metropolitan region in the country producing the 17% of country's GDP. Growth of GDP per capita is above country's average while unemployment is increasing. Gradually, services are strengthening their position while industry and agriculture are declining. The region experienced the second highest increase in the percentage of highly educated people, reflecting on the one hand the transformation of its economic profile and on the other the existence of important higher education and R&D infrastructures. However, despite the improvement, the region is still behind the EU average in knowledge workers, public R&D and higher education, although the performance is higher than the cluster average. Furthermore, despite the growth of services, high-tech service remains below the national average.

Comparing K. Makedonia with the average of Southern Cohesion cluster the under performance of the K. Makedonia in business knowledge production and learning environment becomes apparent. The significant weakness is the private sector which is low-tech with low performance in innovation and therefore low demand for R&D services and high quality workforce.

Due to the agglomeration of significant knowledge and research infrastructures and human capital in the region, the 'Local Science and Services" cluster could be a better benchmark for K. Makedonia which together with the other metropolitan region Attiki, constitutes the two most promising regions in regard to the knowledge society. Both of them could be regarded as "*Metropolitan Regions"*.

Kentriki Makedonia is regarded as a *phasing-out* region in the new programming period.

Dytiki Ellada, Ipeiros and **Kriti** have all been classified in the Southern Cohesion cluster. Their growth is based mainly on tourism while agriculture and industry are shrinking. Another common characteristic of the three regions is their striking performance in public R&D, which is one or two times above the cluster average, due to the existence of universities and research centres. However, their links with the local economy are very weak, due to the absence of high-tech services or manufacture in the region and the prevalence of traditional firms with low innovativeness. These characteristics of the local firms are also reflected by the lack of demand for knowledge workers and the low business R&D. Furthermore, apart from Kriti, the regions have not managed to create an environment favourable to learning in comparison with the average "Southern Cohesion" regions.

Due to the striking difference in performance between the "public knowledge" and "private R&D" the regions could be regarded as "*Cathedrals in the desert*".

Anatoliki Makedonia-Thraki, Dytiki Makedonia, Thessalia and **Voreio Aigaio** are the regions with the highest share of agriculture in value added, amounting to approximately two times the country average. Industry is also above national average while share of services is much lower. During the last few years shares of industry and agriculture are diminishing in Anatoliki Makedonia and Thessalia while in Dytiki Makedonia industry is losing ground rapidly in favour of agriculture due to massive migration of low cost labour intensive production plants to neighbour low cost countries. Only in V. Aigaio has industry slightly improved its position.

Comparing with the Southern Cohesion regions, they are lagging behind in business R&D, intensity of knowledge in industry and in the share of high educated workers in the private sector. The gap is narrower in the environment favourable to learning, and for A. Macedonia-Thraki in the public production of knowledge.

Despite its low performance in most of the indicators Dytiki Makedonia is regarded as a *phasing out* region in the new programming period due to the agglomeration of industry (notably the energy production sector).

Ionia Nisia and Notio Aigaio have a growth above the European average based mainly on tourism and agriculture sectors, while industry is limited and the public sector is below average for Ionia Nisia and above average for Notio Aigaio. Knowledge performance is the main drawback for both regions as human resources in education, lifelong learning and private and public expenditure in R&D are quite low compared with the Southern Cohesion cluster average due to the lack of knowledge production infrastructure.

Despite its very low performance in almost all knowledge economy indicators Notio Aigaio is regarded as *phasing in* region in the new programming period due to the rapid development of tourism and subsequently to the rise of GDP per capita.

Exhibit 3: Regional research and innovation performance – trends 1996-2002

		Unemployment 1996-2003 %-pnt ch.	Per capita GDP 1996-2002 % growth	Industry share 1996-2002 %-pnt ch.	Agriculture share 1996-2002 %-pnt ch.	Population density 1996-2002 %-pnt ch.	Tertiary education 1999-2002 %-pnt ch.	R&D intensity 1996-2002 %-pnt ch.
EU25		--	--	--	--	--	--	--
Greece		-0,30	6,20	-0,04	-2,00	2,58	0,87	0,14
Anatoliki Makedonia, Thraki	EL11	0,70	5,20	-4,03	-2,47	1,90	0,11	0,16
Kentriki Makedonia	EL12	1,30	6,04	-1,86	-2,02	4,02	1,73	0,01
Dytiki Makedonia	EL13	-0,20	6,90	-9,87	4,23	0,65	-1,00	-0,14
Thessalia	EL14	2,10	5,13	-3,16	-3,82	-0,57	0,25	0,08
Ipeiros	EL21	-0,10	8,07	0,05	-6,07	1,10	-0,63	0,32
Ionia Nisia	EL22	5,50	6,56	-0,47	-3,53	4,97	-1,66	0,02
Dytiki Ellada	EL23	0,30	4,36	-5,40	-2,97	1,27	-1,25	0,33
Sterea Ellada	EL24	-1,70	4,59	-4,95	0,00	0,00	-1,72	-0,03
Peloponnisos	EL25	1,30	8,05	7,40	-5,84	1,57	1,35	0,33
Attiki	EL3	-3,10	6,59	4,02	-0,56	3,28	1,60	0,23
Voreio Aigaio	EL41	0,30	9,61	0,96	1,09	0,38	-0,05	0,00
Notio Aigaio	EL42	6,00	6,87	-2,42	0,12	5,76	0,56	-0,02
Kriti	EL43	3,40	5,44	-0,08	-8,02	4,22	2,86	0,16

Source: MERIT based on Eurostat data for period indicated

Among the Greek regions those improving their knowledge performance during the period 1996-2002 are the capital region of Attiki and Kentriki Makedonia, Peloponnisos and Kriti (see Exhibit 3). All the above regions increased by one or two points the percentage of highly educated people in the total population of the region.

The improvement in the education level was combined with a shrinking of agriculture in favour of industry and/or services. However, their total R&D expenditures increased only marginally, putting in question the depth and structural character of the improvement.

2.3 Conclusions: innovation and knowledge performance

The country as a whole has to overcome significant impediments in order to maintain high growth rates in the long run and converge to the EU25 average. Among the major barriers Greece has to overcome are low innovation expenditures in all economic sectors, the small contribution in total output of high value added economic activities, the low share of exports in GDP, the need for reform of the educational system and the low propensity for collaborations between the various actors of the national innovation system.

In terms of the regions, the relatively high disparities among them and the diverging production and knowledge infrastructures that characterise them necessitate different policies and approaches towards their development. This development should be based on endogenous strengths and on meeting the key needs (Exhibit 4) in every region.

Summing up, most regions in order to overcome their weaknesses have to achieve productivity increases, improve their competitiveness, bridge the gap of living standards compared to the EU average, increase investments in research and technology, increase the participation in life long learning. These changes could create the necessary conditions for the transition to a knowledge-based society/economy.

Exhibit 4: Summary of key disparities and needs per region

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
Metropolitan Regions: Attiki, Kentriki Makedonia	While Attiki outperforms country's average in all indicators there are important divergences from clusters' average in public knowledge, private technology and lifelong learning due to: • Relatively low public R&D funding • Risk averse and low innovativeness in the business sector, resulting in low R&D and low value added products and services. • Incapacity to attract foreign investments. The above factors explain also disparity for K. Makedonia. Furthermore, despite the significant capacity and potential in higher education and public R&D of K. Makedonia, there is very limited collaboration with the local businesses.	• Reorientation of public R&D in areas of economic interest and significant rise of public R&D funding. • Incentives to business for rising R&D and focusing in value added services and products. • Creation of a new generation of innovative firms • Support lifelong learning by taking advantage of the higher education capacity. • Improvement in quality of life.

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
Satellites of Athens: Sterea Ellada, Peloponisos	• Lack of knowledge production infrastructures and knowledge diffusion mechanisms. • Industry is relying on the neighbour regions of Attiki for the supply of high quality workforce and technology. • Despite the concentration of services in the regions their added value is rather low.	• Improvement of local workforces • Incentives for the development of high tech services that could support industrial activity in the regions. • Development of links between the business and the R&D and knowledge infrastructure in the neighbouring regions.
Cathedrals in the Desert : Dytiki Ellada, Ipeiros and Kriti	• Prevalence of low-tech non innovative firms with no or limited linkages with the high quality public research infrastructures in the region. • Incapacity to capitalise on the existing agglomeration of R&D and higher education infrastructures and attract foreign investments.	• Exploitation of synergies between local firms and public R&D in high tech services. • Encourage out-reach of HEI and PROS in the regions and develop links with business sector at the national and European level. • Incentives for increasing value added in agriculture and tourism • Enhancing R&D expenditure also in low-tech sectors.
Agro-Industrial areas with insufficient production of knowledge: A. and D. Makedonia, Thessalia and V. Aigaio	• Despite the existence of HEI in the region the production and diffusion of knowledge is insufficient. • Domination of low technology low added value manufacturing and services • Lack of business services. • Low quality workforce and very weak or inexistent lifelong learning and vocational training infrastructure and services. • Delocalisation of industry to low cost countries.	• Emphasis on technology transfer and exploitation of existing local potential in knowledge production. • Diversification of production towards more value added rich activities. • Research in areas that support diversification of production and restructuring of local economy. • Improving interaction between educational institutions and enterprise
Tourism hot spots: Notio Aigaio, Ionia Nisia	• Prevailing of low value added tourism. • Inexistence of knowledge production infrastructures • Low quality human resources	• Emphasis on technology transfer and business innovation (non-technological innovation) • Diversification of tourism towards more value added rich activities

3 Innovation and knowledge: institutional context and policy mix at national and regional levels

Structural Fund support for innovation and knowledge is contingent on and seeks to strengthen the existing national (and/or regional) innovation system[14] in each Member State. In particular, institutional, legal and financial factors in the innovation system can limit the potential for certain types of intervention. Moreover, within the framework of the EU's "Lisbon objectives", Structural Fund interventions are expected to complement and provide added value to national (or regional) policy framework. In some Member States, Structural Fund interventions in favour of innovation and knowledge are marginal with respect to the national investment and policy effort, in others Structural Funds provide a main source of funding for such interventions. In both cases, there is a need to identify relevant national and EU policies which can have an impact on decisions on funding priorities.

3.1 Institutional and legal framework for innovation and the knowledge economy

This section of the report appraises two broad factors that condition the potential for coordinated intervention of EU and national (regional) policies in favour of innovation and knowledge:

- The first concerns the organisational structures of public and semi-public bodies responsible for the design, implementation and monitoring of innovation and knowledge economy policies. In particular, the analysis considers the responsibilities for funding or managing specific types of measures liable to be considered for support under the Structural Funds;
- The second concerns the institutional, legal and financial frameworks, which condition the linkage of national (regional) financing with EU financing.

The RTDI governance system in Greece is centralised with low coordination between the various stakeholders, while at the same time attempts are made to increase the competences of Regions. Policy making for RTDI activities is mainly the responsibility of the General Secretariat for Research and Technology (GSRT) of the Ministry of Development (MoD), which has limited means and relative weight compared to the other units in the public administration and thus has little opportunities to directly influence policies of other ministries. This deficiency in the system is further exacerbated by the lack of S&T and innovation sectoral policies by the individual ministries that could increase the need for coordination, inter-ministerial collaboration and improve policy-shaping and design.

Another important contributor of R&D funding is the Ministry of Education (MoE). Despite the fact that over half of GERD is spent by higher education institutes (HEI),

[14] The network of organisations, individuals and institutions, located within or active within national or regional boundaries, that determine and shape the generation, diffusion and use of technology and other knowledge, which, in turn, explain the pattern, pace and rate of innovation and the economic success of innovation.

the MoE has no explicit strategy for research and innovation. The whole higher education system is bottom-up as it depends on the personal strategy of professors and the leverage effect of various project-funding schemes of the GSRT, the EU, industry or other ministries. This is the basic reason for the fragmentation of research. MoE has no significant research budget apart from a flat contribution to the academic salary independently of the research output (General University Funds-GUF's). Thus. small amounts are directed to funding RTD in HEI as well as to the enhancement of entrepreneurial culture in schools and higher education institutions, through courses and study visits.

Regional Councils are responsible for planning their own RTDI strategies; however, most of them do not have the capability to elaborate an innovation policy and to develop mechanisms to implement it. This is mainly the outcome of the lack of financial and administrative capacity of the regions. Various EU initiatives (RIS/RITTS in particular) have supported some improvements in this situation over the last decade.

Other Ministries such the MoD (apart from GSRT), the Ministry of Economy and Finance and the Ministry of Defence, Ministry of Rural Development and Food among others contribute to the planning of specific segments of RTDI policies as can be seen in exhibit 5.

The private sector through its representative bodies such as the Federation of Greek Industries (FGI), the Federation of Industries of Northern Greece (FING) and the Athens Chamber of Commerce and Industry (ACCI), have a marginal role in the formulation of the national RTDI policy. The limited participation of the private sector in policy planning can be attributed on the one hand to the centralised character of the Greek public sector which leads to small participation of relevant stakeholders in public consultations and on the other hand on the inertia exhibited by these bodies.

In addition, the role of the banking system in promoting innovative ventures has also been marginal due to its risk-averse attitude. This is one of the reasons in the current programming period that fused the creation of a Guarantee Fund for SME's (TEMPE) and of the New Economy Development Fund (TANEO) which aimed at creating a robust VC industry. The common characteristic of both measures was to reduce the risk for financial institutions in order to support innovative ventures.

Exhibit 5: Main organisations per policy area

Policy objectives	Type of organisation	
	National (&/or regional) public authorities and agencies	**Key private or non-profit organisations**
Improving governance of innovation and knowledge policies	• GSRT • Regional authorities • National Council for Research and Technology • Ministry of Agriculture • Ministry of Defence • Ministry of Economy & Finance	• Universities, • Consulting firms
Innovation friendly environment	• Ministry of Development • GSRT • Ministry of Economy & Finance • Ministry of Education	• Information Society SA • New Economy Development Fund (TANEO) • Guarantee Fund

Policy objectives	Type of organisation	
	National (&/or regional) public authorities and agencies	**Key private or non-profit organisations**
		(TEMPE)
Knowledge transfer and technology diffusion to enterprises	• Ministry of Development • GSRT • Ministry of Economy & Finance • Regional authorities supported by Management Authorities • Ministry of Rural Development and Food	• Information Society SA • Centres for Entrepreneurial and Technological Development, • Regional Development Organisations • Technology parks, incubators and liaison offices
Innovation poles and clusters	• Ministry of Development • GSRT • Regional authorities supported by Management Authorities • Ministry of Macedonia and Thrace	• Universities • Research Institutes • Associations of Local Industries • Regional Innovation Poles
Support to creation and growth of innovative enterprises	• Ministry of Development • GSRT • Ministry of Economy and Finance • Regional authorities supported by MA's	• Information Society SA • Higher education research laboratories • Public or research centers
Boosting applied research and product development	• Regional authorities supported by GSRT • GSRT	• Universities • GSRT's Research Institutes

The major funding sources of RTDI are the Public Investment Programme (PIP), the (ordinary) State Budget (SB), and the Structural Funds (SF). PIP and SB are managed by the Ministry of Economy and Finance (MEF) and cover part of the operational costs of research infrastructures, while (PIP) and SF constitute the bulk of funding of R&D expenditure through projects and cover the remaining of the operational costs.

As RTDI funding and the national policy on innovation pass mainly through the Structural Funds, the main bodies responsible for RTDI interventions are the General Secretariats of the ministries that are responsible for the management of the respective operational programmes. These are the same organisations that were responsible for managing national RTDI policy in the past, which were however not significantly upgraded in terms of administrative, financial and human resources in order to meet the more demanding challenges rising from their new roles.

Over the current programming period, a series of problems related to institutional, legal and financial frameworks created bottlenecks for the implementation of RTDI policies and have led initially to the low absorption of the allocated RTDI resources. However the regulative framework has been gradually adapted to the requirements of the SF's since they remain the major funder of RTDI in Greece.

In general, the interpretation of EU State Aid rules discourage the design of innovative measures and leads planners to resort to conventional or previously implemented measures. This is done in order to avoid complications since negotiations of a more simplified and case specific framework regarding state aid is

expected to be time consuming and potentially lead to successive redefinitions of the scope of the programme.

Finally, in many cases the existing legislative framework regulating the functions and role of various public bodies had to be amended in order to enable them to expand their scope. For example, while GSRT has the willingness and foresight to exceed its role beyond funding and planning for R&D to include policies related to innovation, the existing legislative framework regulating its role was quite restrictive. As a result, regulatory interventions become necessary, affecting the timely and effective implementation of novel interventions.

3.2 Policy mix assessment

This section provides a summary overview and analysis of the national and regional policy mix in favour of innovation and knowledge in which the Structural Fund interventions take place. The analysis is conducted with respect to seven broad categories of objectives of innovation and knowledge policies (see appendix C for an explanation of each category).

Measures identified per category of the policy objectives are then further sub-divided in terms of the direct beneficiaries of funding (or legislative) action. To simplify, the report adopts three broad types of organisation as targets of policy intervention:

- Policies supporting academic and non-profit knowledge creation institutions;
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, etc.;
- Policies supporting directly innovation activities in the private sector.

The matrix below (Exhibit 6) summarises the current policy mix at national level. A simplified coding system is used with intensity of support (financial or political priority) for different policy areas and targets indicated by a colour coding system.

Exhibit 6: Policy mix for innovation and knowledge

	Target of policy action		
Policy objectives	**Academic /non-profit knowledge institutions**	**Intermediaries/bridging organisations**	**Private enterprises**
Improving governance of innovation and knowledge policies	• National Foresight • Regional Foresights • Evaluation of the research institutes supervised by the GSRT	• National Foresight • Regional Foresights	• National Foresight • Regional Foresights
Innovation friendly environment	• Introduction of 'entrepreneurship' courses in universities. • Schemes favouring the mobility from abroad	• Guarantee Fund for SME's (TEMPE) • New Economy Development Fund TANEO	• Training of research directors in technology and innovation management • Development of VC's with the support of public funds • Schemes favouring the mobility from abroad

Knowledge transfer and technology diffusion to enterprises	• Training of new researchers • Exploitation of public research results by researchers and private financing institutions & companies	• Development of liaison offices • Creation of technology brokers • Development of Technology parks for NTBF's co-funded by the private sector • Development of Centres for Entrepreneurial and Technological Development • Human networks for transfering know -how	• Aid schemes for the transfer of embedded knowledge • Aid schemes for application of environmental friendly technologies • Aid schemes for utilising ICT services (e – commerce) • Demonstration projects of new technologies developed by PROs • New Research Staff in Businesses
Innovation poles and clusters	• Development of several regional innovation poles– Development of the Innovation Zone in Thessaloniki • Networking of PRO's with industry	• Development of innovation poles in several regions– Development of the Innovation Zone in Thessaloniki • Creation and development of private S&T parks and incubators	• Development of several RIP– Development of the Innovation Zone in Thessaloniki • Promotion of SME clustering and subcontracting
Support to creation and growth of innovative enterprises	• Support for researchers from Universities or PRO's to create spin-off companies	• Support the creation of and Technology Parks and Incubators • Development of incubators for NTBF's co-funded by the private sector	• Clustering of SME's • New Research Staff in Businesses • Support to private investments on RTD laboratories, high technology and innovative ventures
Boosting applied research and product development	• Development of Industrial Research • Research and technological development consortia in sectors of national priority		• Development of Industrial Research • International Co-Operation in Industrial Research & Pre-Competitive Activities • Research and technological development consortia in sectors of national priority

Legend

Top policy priority
Secondary priority
Low priority

Source: calculations of study team based on national/regional policy documents, TrendChart reports, OECD reports, etc.

Improving governance of innovation and knowledge policies

The stated objectives within this policy area were to increase the efficiency of the administration to design and implement RTDI policies and measures and the inclusion of an increased number of stakeholders within the planning processes. The main measures for the achievement of the above objectives were a National Foresight, exercise co-funded by the Structural Funds and Regional Foresights funded Innovative Actions. In addition, one further objective of the National Foresight was the assessment of the NIS in relation to the Lisbon Objectives.

Overall, little importance is given so far to innovation policy governance issues. The commitment of public administrations to the above initiatives, with the exception of GSRT, is low, reflected also in the relative limited funds directed towards this policy area. The few and rather fragmented initiatives are without continuity, without follow ups and with insignificant impact, facts that are expressed by the low level of incorporation of policy suggestions of the above studies within the policies of public administration. Moreover, particularly at regional level the capacity for planning, monitoring and funding RTDI measures is very weak.

The systematic external evaluation of the performance of the research institutes supervised by the GSRT (1995, 2000, 2005), and the expected evaluation of the universities, shows the emergence of an evaluation culture in the country.

Innovation friendly environment

The main objectives, in the context of this policy area, were the creation of a modern environment conducive to innovation, in terms of regulations, infrastructures (such as ICT), and availability of funding, skills and quality of services provided by the public administration. This policy area was addressed by a batch of measures supporting mobility, employment of researchers and creation of a fund of funds for SMEs (TEMPE), with the latter receiving more emphasis compared to the other measures.

At the same time in the field of Innovation financing a venture capital industry emerged through the New Economy Development Fund (TANEO). However, the progress of the measure was slow and until today the majority of VC funds were directed to commercial enterprises and to a lesser degree towards innovative, high tech start-ups. Thus there is still a need for directing novel funding mechanisms towards funding novel initiatives. Finally, a number of actions were designed in order to reduce red tape inhibiting entrepreneurship, particularly through the use of advanced ICT. However, this was one of the policy areas with the lowest rate of progress.

Knowledge transfer and technology diffusion to enterprises

The main policy objective within this policy area was to increase the competitiveness of enterprises. This policy area was addressed in the current programming period by a batch of measures with many being complementary. Such measures included incentives to researchers to commercialise their research results, creation of links for research projects between public research centres (PRO's) and enterprises, creation of technology parks and subsidies for technological upgrading to enterprises.

The concept of enterprise level competitiveness underlining the above measures was thus two sided. On the one hand, emphasis was put on the technological upgrading in most cases not linked to innovation and on the other hand, competitiveness was linked with knowledge transfer through increased collaborations and exploitation of R&D results from research organisations. The prevailing approach however was the former. In addition, the technology transfer institutions that were created for supporting this policy area need further strengthening in terms of funding and staffing in order to achieve the expected quality of services.

Innovation poles and clusters

The basic objectives of this policy area were the strengthening of regional competitiveness by increasing the collaborations between the various actors in the Regional Innovation Systems and the creation of a critical mass of competitive organisations in selected fields. This policy area is covered by various programmes with direct and indirect impact on clustering, particularly with regard to SME's.

The relatively new measures of Regional Innovation Poles and the Innovation Zone of Thessaloniki received the highest attention, in terms of political support and level of funding. However there is a need for complementary actions that will strengthen actors' capabilities, support the sectors active in the clusters and poles in order to develop a critical mass in the selected sectors. Further support will be required for the internationalisation of the efforts of the clusters and their inclusion in pan European networks and value chains.

Support to creation and growth of innovative enterprises

The main objective of the above areas was the provision of support for the establishment of new technology based firms (NTBF's) and spin–off companies in high value added sectors. The most important measures launched towards achieving the above objectives concerned human capital training, placing researchers to enterprises, creation of incubators, financial aid schemes for RTDI activities and provision of VC funding and of seed capital for the establishment of PRO spin-offs.

Despite however the flexibility provided by the fact that all measures are transversal, the lack of focus and priorities inhibits the development of new business sectors (benefiting traditional sectors). The main problems that still remain are the small patenting activities by enterprises, the lack of entrepreneurial culture by researchers and the lack of international perspective / strategy of the majority of SMEs. Of equal importance is the inability of many SMEs to exploit the plethora of measures due to management inefficiencies and lack of information and qualified personnel.

Boosting applied research and product development

The main policy objective of this area was to increase the private and to a lesser extend public R&D expenditure in order to fulfil the corresponding Lisbon Objectives[15]. The above objectives were catered for by a batch of measures providing companies with many alternatives, such as the promotion of collaboration between firms and PROs, the creation of research and technological development consortia in sectors of national priority and the development of industrial research and technology. However, most of the above measures promote short-term projects and not long term relationships. In addition, due to red tape (concerning payments) their impact is likely to be reduced. Overall, support for research is rather fragmented with many measures following an outdated linear logic which limits the flexibility necessary for industrial research activities. Furthermore, the necessary link to the commercialisation of the research outcome is missing as activities related to final stages of product development are not eligible in R&D measures and firms have to look for other measures for support.

Conclusions

Overall, based on the analysis made in chapter 2 and above, the policy mix corresponds to the major problems and challenges the Greek economy is facing at the level of the stated policy objectives, as in the case of the lack of funding for innovative ventures, the low technological capacity of enterprises, the simplification of the administrative and regulatory environment and the exploitation of research results. However, the plethora of different measures for R&D and innovation development and their linear logic fragment the efforts of firms and reduce the attractiveness of the interventions.

At the same time, two policy areas, i.e. RTDI governance and boosting applied research appear to receive less attention compared to the remaining four policy areas. Moreover, political considerations and traditional policy approaches in many cases debilitate the planning of innovative measures. An example is the conceptualisation of technology transfer as technological upgrading through the acquisition of new equipment.

Furthermore, the share of the Structural Funds allocated to pure RTDI interventions for the period 2000 -2006 has been estimated to be 2.4%, which is considered marginal. Even more critical to the above, is the behaviour of the private sector, and its willingness to shift from low cost and defensive strategy to innovation based and offensive strategy. Therefore emphasis should be put on measures supporting entrepreneurship, liberalisation of markets, increase of competition and reduction of costly bureaucratic procedures. Finally, it will be necessary to strengthen the designing, implementation, monitoring and evaluation procedures in the public administration in order to ensure the efficient allocation and absorption of resources and maximisation of CSF impacts.

[15] In the context of the Lisbon and Barcelona objectives, Greece set its own moderate objectives to move from the poor 0.65% GERD/GDP in 1999 to 1.0% by 2010, one third of the target for the whole EU as an average.

3.3 Conclusions: the national innovation system and policy mix

Over the previous years there has been an increased awareness of the importance of the National Innovation System (NIS), both by public and private actors, for the competitiveness of the Greek economy. Moreover, efforts are made by the public administration to formulate policies based on the systemic nature of the NIS. Despite these efforts, important weaknesses and bottlenecks in the policy mix approach still remain. These weaknesses are not only related to the implementation of the measures but also to their planning and to the coordination between the various bodies at national and regional level. Exhibit 7 summarises the main opportunities presented for the Greek NIS in relation to the Structural Funds, but also the constraints and bottlenecks that limit the effectiveness of these funds.

Exhibit 7: Key opportunities and constraints for investment by the Structural Funds

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Improving governance of innovation and knowledge policies	• Develop planning and management capacity in particularly in the regions. • Use of National Foresight results introduced during the previous period to become an integral part of planning. • Systematic use of evaluations at various stages of policy planning. • Weak coordination among various bodies responsible for RTDI policy.	• Lack of a national strategy for innovation and lack of forward thinking attitudes, evaluation structures and culture • Bureaucratic management procedures • No downstream follow-up of innovation policy objectives
Innovation friendly environment	• Development of more market driven funding mechanisms such as venture capital, guarantees or loans. • Increase the efficiency and quality of public services by increased usage of ICT • Build entrepreneurship friendly attitudes in schools and universities	• Regulatory environment still considered insufficient. Legislative interventions made case by case for new innovative measures. • Introduction of ICT requires reengineering of public services. • Red tape still prevails.
Knowledge transfer and technology diffusion to enterprises	• Increase funding and staffing in technology transfer institutions and improve quality of provided services. • Promote innovation in processes, services and products through ICT.	• Lack of coherent and professional strategy by the technology transfer organisations. • Lack of qualified technology transfer professionals in Greece. • Low demand and absorption capabilities in and SME's.
Innovation poles and clusters	• Develop critical mass in sectors active in the poles developed during the current programming period. • Support the alignment of SMEs in supplier networks of big corporations (including multinational companies).	• Low demand by enterprises • Inability of management structures • State aid rules creating difficulties in funding of complex programmes.

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Support to creation and growth of innovative enterprises	• Facilitate access of newly established firms to business services. • Support organisational and business innovations. • Increasing application of ICT by enterprises.	• Lack of international perspective by SME's and weak management capabilities. • Due to the transversal nature of most measures they do not sufficiently promote the establishment of new business activities in high value added sectors.
Boosting applied research and product development	• Substantial increase of R&D funding; • Increase public research and business long term collaboration • Adopt a non linear logic for the R&D programmes and increase their flexibility, as well as their complementarily and synergies with innovation development measures. • Increase international collaborations. • Exploitation of opportunities offered by 7^{th} FP	• Low demand by firms because of: their strategic orientation; low profit margins; or lack of real competition in some industries. • Low commitment and focus by universities and PRO's in industry – science collaboration.

4 Structural Funds interventions to boost innovation and create a knowledge economy: 2000-2006

This section of the reports provides an analysis of the patterns of Structural Fund expenditures in the fields of innovation and knowledge-based economy during the current programming period (2000-2006 for EU-15 or 2004-2006 for the new Member States). It examines the patterns from both a strategic point of view (the policy mix pursued by the Structural Funds programmes) and at an operational level (consumption of funds, management of innovation measures, indicators of relative effectiveness of measures, case studies of 'good' practice).

4.1 Strategic framework for Structural Fund support to innovation and knowledge

4.1.1 Strategic approach to innovation & knowledge in Structural Fund programmes

In total there were 24 Operational Programmes in Greece funded by ERDF and ESF, out of which 13 regional programmes and 11 multiregional programmes covering thematic areas i.e. education; employment and vocational training; highways, ports and urban development; transport; competitiveness; rural development; fisheries; environment; culture; health and welfare; and information society.

The majority of RTDI expenditures in Greece come from the Community Support Framework and therefore CSF is an integral part of the national RTDI policies.

An RTDI strategy has been explicitly set in the Regional Development Plan and certain policies have been foreseen in the OP "Competitiveness" (OPC) aiming at reducing the weaknesses of the innovation system:

- Commercialisation of research results produced in universities and public research centres;
- Increase of research activities in the private sector
- Strengthening of links between enterprises and public research organisations and intensify technology transfer;
- Increase of international cooperation in research;
- Creation of regional innovation poles.

However, the defined is far from being a horizontal issue affecting the philosophy and orientation of other Operational Programmes. Furthermore, in all OPs even in the OPC (apart from the above mentioned Priority 4 in OPC), the relation between innovation and competitiveness is not clear. The lack of a clear perception on innovation affects the selection of instruments, the quality of the design and the effectiveness of measures.

Apart from those objectives set by the 4th priority axis in the Competitiveness, OP objectives in favour of innovation and knowledge creation can be found in the 18 out of the 24 programmes, adopting a broad definition of RTDI. However, multiregional thematic or sectoral programmes dominate. Their major objectives could be

summarised as following: the simplification of procedures and communication between the Government and the enterprises and the citizens through e-government applications in the "Information Society" OP; improvement of entrepreneurship and R&D management in enterprises through training in Universities, funded by the "Education and initial vocational training" OP; Support diversification of production in agriculture in OP Rural Development and investments in innovative ventures in the energy sector in OP Competitiveness.

The 13 Regional OPs have allocated a limited share of their budget to a spectrum of RTDI measures ranging from research infrastructures to support spin-offs, e-marketing or simple investments in embodied technology.

The calculations presented below in the two exhibits are based on the allocation of Structural Fund budgets based on the intervention code classification. For practical purposes, the calculation of financial resources allocated to innovation and knowledge has been limited to the RTDI codes:

- 181 Research projects based in universities and research institutes
- 182 Innovation and technology transfers, establishment of networks and partnerships between businesses and/or research institutes
- 183 RTDI Infrastructure
- 184 Training for researchers

Additional calculations based on broader definitions of innovation are presented in Appendix D.

Exhibit 8: Overall allocation of resources at an objective 1 and 2 level (planned figures in Euro)

Objectives	Total cost	Structural funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	892.880.636	478.297.842	350.022.492	128.275.350	193.826.935	220.755.858
TOTAL COHESION POLICY						
Objective 1	37.728.017.346	22.707.000.000	15.248.128.868	4.683.418.835	11.564.395.422	3.456.621.924

Source: programming documents and financial data provided by DG REGIO

The overall funding of the Greek Community Support Framework for RTDI measures corresponds to 2.37% of the total funding, while approximately 70% of the RTDI funding comes from the OP Competitiveness. The distribution of support of the multiregional programmes to the regions has not been calculated, but it is estimated that Attica received the highest share of the support.

Within the Regions the share of RTDI resources is marginal and on average is less than 1.1% of the total SF budget of each of the 13 ROP. A significant part of the above RTDI resources in the Regions is directed to the transfer of embodied technology through equipment supply.

Exhibit 9: Regional allocation of resources (Euro)

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
Attiki	5,264,974	5,264,974	-	1,116,641,725	1,029,941,801	68,000,308
Kriti	7,595,595	7,595,595	-	508,426,662	366,782,173	49,803,471
Voreio Aigaio	14,473,124	14,473,124	-	369,661,715	282,269,791	33,992,308
Notio Aigaio	-	-	-	390,121,530	312,827,181	39,271,807
Ipeiros	5,397,604	5,397,604	-	443,918,408	330,633,482	32,900,309
Sterea Ellada	6,010,770	6,010,770	-	539,284,605	405,984,682	43,600,306
Dytiki Ellada	4,999,290	4,999,290	-	505,940,694	389,774,219	35,147,873
Ionia Nisia	3,517,594	3,517,594	-	257,831,814	206,363,900	25,183,298
Kentriki Makedonia	26,290,059	26,290,059	-	937,167,219	713,087,559	78,004,122
Dytiki Makedonia	2,439,040	2,439,040	-	390,179,449	280,133,422	26,562,254
Anatoliki Makedonia-Thraki	5,120,865	5,120,865	-	760,995,208	534,066,805	68,037,028
Peloponnisos	-	-	-	465,028,950	362,329,027	22,200,310
Thessalia	2,437,500	2,437,500	-	571,067,454	406,782,533	43,500,306
Obj. 1 - Total Regional Ops	**83.546.414**	**83.546.414**	**0,00**	**7.256.265.433**	**5.620.976.575**	**566.203.700**
O.P. Competitiveness	334,276,078	266,476,078	67,800,000	2,055,773,607	1,898,820,196	156,953,411
O.P. Education & Initial Vocational Training	60,475,350	-	60,475,350	2,072,930,711	390,760,323	1,682,170,388
O.P. Railways, Airports, Public Transport	-	-	-	1,468,752,690	1,468,752,690	-
O.P. Culture	-	-	-	473,585,027	473,585,027	-
O.P. Rural Development - Restructuring of the Countryside	-	-	-	1,482,755,239	-	-
O.P. Environment	-	-	-	430,073,656	430,073,656	-
O.P. Fisheries	-	-	-	257,733,308	34,121,408	-
O.P. Highways, Ports, Urban Development	-	-	-	3,369,500,470	3,369,500,470	-
O.P. Information Society				1,793,581,863	1,321,033,996	472,547,867
O.P. Employment & Vocational Training	-	-	-	1,585,737,360	10,000,000	1,575,737,360
O.P. Health & Welfare	-	-	-	384,979,997	164,699,998	220,279,999
Technical Assistance	-	-	-	75,330,639	65,804,529	9,526,110
Obj. 1 - Total Multiregional Ops	**394,751,428**	**266,476,078**	**128,275,350**	**15,450,734,567**	**9,627,152,293**	**4,117,215,135**

Source: programming documents and financial data provided by DG REGIO

Attiki directs only an insignificant 0.47% of the budget towards RTDI interventions. On the opposite end of the scale is the **Voreio Aigaio,** which has allocated 4% of funds to RTDI measures that could contribute to the diversification of the local economy and the reduction of its dependence on tourism. **Kentriki Makedonia** has the second highest share, while its RTDI budget is the highest in absolute values. The aspiration of the region is to become a key economic and knowledge centre in the broader Balkans area. The ROP has devoted approximately 2.8% to RTDI supporting the creation of an innovation friendly environment, the improvement of the significant public R&D capacity and the development of links with the local economy. **Kriti** focuses its RTDI efforts on the one hand on the improvement of competitiveness of the local economy by increasing the knowledge content and the quality of products and services, and on the other hand on the diversification of the local production with the increase of knowledge intensive services or attraction of FDI. **Ionia Nisia** devotes 1.4% of SF funding on RTDI, however the focus of the effort is rather weak and vague. In **Ipeiros** the emphasis is given on the strengthening of collaboration between local economy and University, focusing on the development of ICT services and products for health, tourism, education and culture.

Overall, innovation and knowledge development were not among the priorities of the regions, while in the cases where RTDI measures have been foreseen, it is more a result of pressures from the local Universities and research organisations rather than a deliberate efforts of the regional authorities.

Despite the fact that eight of the Regions had or were implementing RIS/RITTS and Innovative Actions projects, only few of them managed to utilise the results and the experience gained in order to design and effectively implement RTDI interventions. This reflects the low governance capacity in the regions due to the lack of experienced human resources, the thin administrative structure and their high dependence on policy making from the central government.

4.1.2 Specific measures in favour of innovation and knowledge.

The largest share of RTDI funding corresponding to 53.9% of the total budget for RTDI measures goes for **supporting transfer and diffusion of knowledge to enterprises**. The strategy underlining this policy area is, on the one hand to build the necessary technology transfer mechanisms and infrastructures, such as industry liaison Offices, technology parks and technology brokers, and on the other hand to provide incentives to firms for transferring and absorbing technology. However, many interventions supported embodied technology by providing aid schemes for investments in equipment, aiming at the improvement of productivity and the expansion of production capacity. Technological breakthroughs or investments directly related to innovation are not a prerequisite in most of the cases. Furthermore, the demand oriented character of most of the measures in this category does not enable focus on specific technological areas or sectors. Therefore, while this strategy targets one of the major structural problems of the economy i.e. the low technological capabilities of firms, and the domination of low to medium-tech production sectors, the design and implementation did not always address these problems.

Support to creation and growth of innovative enterprises is the objective of 22 measures representing 23.3% of the RTDI budget. A mix of innovative and traditional measures serves this policy. The innovative ones are the PRAXE A (pre-seed capital) and PRAXE B (first stage capital) which support spin-offs from Universities and

public research centres, aiming at releasing innovative potential existing in the PROs and creating new high-tech economic activities. The measure addresses one of the most important challenges, that of restructuring the industry and directing potential towards high-tech sectors, while on the other hand a new generation of entrepreneurs is created. Recently, some of the ROPs adopted the same approaches due to their success. On the other hand, a number of traditional aid schemes support youth and female entrepreneurship without setting adequate criteria about the innovativeness of the ventures.

Exhibit 10: Key innovation & knowledge measures

Policy area	Number of identified measures (all programmes)	Approximate share of total funding for innovation & knowledge measures	Types of measures funded (possibly indicating importance)
Improving governance of innovation and knowledge policies	2	3.3%	National Technology Foresight. Evaluation of Research-institutes
Innovation friendly environment	12	15.0%	Fund for VC funds (TANEO); Studies for preparation of institutional and regulatory changes; e-government services; Development of incubators for NTBFs with private contribution (ELEFTHO)
Knowledge transfer and technology diffusion to enterprises	49	53.9%	Wide range of measures from supply of equipment to transfer of knowledge and technology projects. Development of technology parks with private participation (ELEFTHO). Demonstration projects (PEPER). Centres for Entrepreneurial and Technological development (EKETA) Employment of new researchers in industry (HERON).
Innovation poles and clusters	4	6.5%	An Innovation Zone and 6 Innovation Poles.
Support to creation and growth of innovative enterprises	22	23.3%	Pre-seed capital and first stage financing for spin-offs (PRAXE). Various measures supporting new firms without explicit focus on NTBFs Investment law supporting RTD laboratories, innovative and high technology firms
Boosting applied research and product development	16	11.5%	Funding for industrial research (PAVE); Funding of collaborative research; Development of research labs in public ROs with cooperation with industry (AKMON).

Nb: this table is a summary of the table in appendix D.2. The total of the percentage share per policy area may sum to more than 100 since certain measures fall into several categories.

Promotion of innovation friendly environment is third, representing 15% of RTDI funding. A mix of traditional and more innovative measures is supported. A significant part of the above investments concerns ICT infrastructures and e-government services for enterprises and training on new technologies. Efforts are also devoted to the development of quality mechanisms and standards, and on

infrastructures and institutions facilitating the development of a better entrepreneurial environment. Finally, a breakthrough of innovation policy in the country was the creation of TANEO, which is a fund for venture capital funds aiming at filling a significant gap in the financing of innovative and high-risk ventures.

Policy **boosting applied RTD** receives a moderate amount representing 14% of the total RTDI budget. All RTD measures directly fund collaborative research projects of enterprises and research organisations or research projects within enterprises. Considering the fact that CSF is the only source of funding for research (excluding operational costs of PROs and general university funds), the budget allocated is insufficient. However, it is not merely a matter of top down allocation but reflects the low demand from enterprises as well.

Development of innovation poles in the Regions and innovation networks across the country receives a modest but adequate 6.5% of the RTD budget. The bulk of the funding goes to an innovative for the country approach, namely the development of Regional Innovation Poles in a restricted number of qualified regions and an Innovation Zone in Thessaloniki. While the budget is not big, it is sufficient for the current period where the idea is being piloted. Apart from these measures, support of networking and clustering follows a rather traditional approach of direct funding of enterprises for developing new products, upgrading their equipment and facilities or developing common distribution networks.

Finally, the lowest share of RTDI funds is directed to measures that **improve governance capacity for innovation** representing a very small 3.3% of the total RTDI budget. The majority of the projects are studies supporting planning and evaluation of interventions. The most important measure is the National Foresight Programme, which identified a number of research priorities and policies. Taking into consideration that the capacity of the public administration to design and manage innovation policies is quite low the allocated amount is insufficient and does not reflect the real needs.

The OP Competitiveness is covering all the policy areas while the other multiregional or regional OPs contribute to specific policy areas that are closer to their objectives and scope.

Overall, the SF support to the country's policy mix is well balanced and adequate, with the exceptions of the support to applied RTD and the improving of governance of RTDI policies. However, any reallocation in favour of these areas presupposes: increase of business demand and research spending for the former and significant changes in the governance of innovation for the latter.

4.2 Learning from experience: the Structural Funds and innovation since 2000

4.2.1 Management and coordination of innovation & knowledge measures

This section reviews the overall management of Structural Funds interventions in favour of innovation and knowledge during the current period. It examines the coherence of the role of key organisations or partnerships in implementing Structural Funds measures for innovation and knowledge, the linkages between Structural Fund interventions and other Community policies (e.g. the RTD Framework Programme)

and the financial absorption and additionality of the funds allocated to innovation and knowledge.

No special structures have been created for the better implementation of RTDI measures, as the GSRT, which is responsible for the implementation of the bulk of RTDI measures, despite its gradual deterioration and brain drain has long experience and a good track record. However, broader considerations on the quality of the overall management and the need for stricter financial control, led the Greek Government to create a new structure within the public administration. A Managing Authority (MA) staffed by selected civil servants and experts from the private sector, was created in every ministry and Region implementing OPs. In practice the development of this new structure within the existing structure of the Ministries, created an excess of controlling structures, penalising planning and evaluation of actual impact on real growth, grey areas of overlapping responsibilities and created sources of tension. To some extent, the bureaucracy was also increased as new levels and interactions were added in the decision procedure. However, the MAs have proved useful in cases where the administration was very thin, such as in Regions.

Despite the support of regions by the MA, the former proved to have neither the capacity nor the experience to plan in detail RTDI measures, transform them into funding schemes and manage the implementation. Therefore, GSRT finally took over these responsibilities. For the new programming period, the Government is planning to reduce the number of ROPs from 13 to 5, each one covering more than one region. The consolidation of ROPs will result in a consolidation of the management structures, which will inevitably be separated from the administration of the regions.

Specifically for the projects of the Information Society OP, a non profit company, the Information Society S.A, was created with the responsibility to prepare terms of references and programming agreements with the final beneficiaries (mainly from the public sector).

Synergies with other EU programmes were aggressively exploited by the research system as a result of bottom-up driven strategies. Participation of Greek research teams in Community RTD Framework Programmes was quite successful as it exceeds the national share in EU-RTD funding. While the latter is lower than 1%, the share of Greek teams in the Framework Programme funding ranges from 3.5% to 4.5%, depending on the year. Government's intervention and support is restricted at providing the necessary matching funds.

Exhibit 11: Absorption capacity of RTDI interventions

CODES	ALLOCATED	DISBURSED	EXPENDITURE CAPACITY
OBJECTIVE 1			
181 - Research projects based in universities and research institutes	94,249,338.81	40,739,795.50	43.2%
182 - Innovation and technology transfers, establishment of networks and partnerships between businesses and/or research institutes	267,900,773.11	68,768,107.89	25.7%
183 - RTDI infrastructure	42,727,606.14	4,829.745.12	11.3%
184 - Training for researchers	67,800,000.00	16,939,151.59	25.0%
TOTAL OBJECTIVE 1	**478,297,842.36**	**131,343,312.09**	**27.5%**

Absorption capacity of the RTDI measures was rather low until 2005 as only 27.5% of the allocated budget had been absorbed. However, it is expected that most of the targets will be met in conformity with the n+2 rule. Significant variations exist across the types of measures and operational programmes. Research projects show the highest rates, as GSRT has a long experience in planning and implementing research programmes and many of them continue for many years and across programming periods. On the contrary, research infrastructures need longer periods of planning and preparation before the projects could start.

Exhibit 11a: Absorption capacity of RTDI interventions by type of Operational programmes

OPERATIONAL PROGRAMMES	EXPENDITURE CAPACITY
OP Competitiveness	27.0%
OP Education and initial vocational training	54.9%
Regional Operational programmes	10.1%
TOTAL OBJECTIVE 1	**27.5%**

Comparing types of operational programmes the highest absorption has been achieved by the OP Education and initial vocational training programme where absorption of RTDI measures is higher (54.9%) than the overall absorption of the programme (40.8%).

Absorption of RTDI measures in the Competitiveness programme is around the average mainly due to a number of innovative measures such as the fund for funds New Economy Development Fund (TANEO), the pre-seed and first stage capital for spin-offs (PRAXE) or the incubators with the contribution of the private sector (ELEFTHO). A learning period was necessary before GSRT was able to finalise the new measures. Public-private partnerships foreseen in the measures, proved to be a source for additional delays and tension as public sector and PROs were traditionally suspicious and aloof from the private sector. On the other hand, adaptations in the legislation were necessary, before public bodies (e.g. PROs) were able to form partnerships with private sector. Furthermore, harmonisation of the planning of the above measures with the state aid rules caused also significant delays and frustration. Especially for PRAXE, additional delays were caused due to the lack of a clear policy for IPRs in Universities and to a lesser extent in research centres. Finally, despite the initial delay, demand for PRAXE was strong in the several consecutive calls of the programme and there is still demand for new calls. Therefore, during the revision, PRAXE was one of the measures that was favoured with an increase of their budget. The budget for applied research has also been increased while a new measure for the creation of innovation poles in the regions was added.

Implementation of RTDI measures in Regions, although with many variations across regions, proved to be the most problematic. According to the mid term evaluation of the Structural Funds, the main bottleneck in the regions was the low planning capacity particularly for RTDI measures. The lack of experience and of adequate, in terms of qualifications and quantity, staff, delayed the process of planning and publishing of calls for tenders. As a fall-back solution, many of the regions finally selected measures from those existing in the OP Competitiveness, and GSRT undertook the

responsibility to implement, manage, monitor and prepare the calls for RTDI interventions on behalf of the Regional authorities. Thus, many of the RTDI measures have only just recently started to be implemented.

4.2.2 Effects and added value of Structural Funds support for innovation and knowledge

This section of the report analyses the effects and added value of the Structural Fund interventions in favour of innovation and knowledge during the current programming period. The analysis is based on two main sources, namely: a) available evaluation reports or studies concerning Structural Fund interventions; b) interviews and additional research carried out for this study. Accordingly, this section does not pretend to provide an exhaustive overview of the effects or added value[16] of Structural Funds interventions but rather, is based on the examination of a limited number of cases of good practice. These good practice cases may concern the influence of the Structural Funds on innovation and knowledge economy policies (introduction of new approaches, influence on policy development, etc.), integration of Structural Funds with national policy priorities, promoting innovative approaches to delivery (partnerships), or measures which have had a particularly important impact in terms of boosting innovation potential, jobs and growth.

Although no evaluation of the results and impact of the RTDI measures have been made so far and some of the most interesting measures are still too new for demonstrating significant achievements, there are some comments that can be made.

It is questionable whether the overall approach significantly contributed to the country's efforts in facing the most important challenge, namely to step towards Lisbons' objectives for R&D and to mobilise and increase the innovativeness of the private sector. During the period 2001-2004, R&D expenditures continue to diverge from the target of 1.0%[17] of GDP (target for 2010). Total R&D expenditure as a percentage of GDP declined from 0.64% in 2001 to 0.58% in 2004. Following the same trend, the business enterprises R&D expenditure fell from 0.12% of GDP in 2001 to 0.17% in 2004.

New measures such as HERON (in OP Competitiveness) which subsidises the employment of new research personnel, in particular PhD holders, and provide incentives for investing in RTD laboratories, proved to be a failure as only a limited interest was expressed by the private sector.

AKMON (in OP Competitiveness) requiring long term contracts between public laboratories and firms, for service provision to the latter, met with the reluctance of the private sector to enter into long term commitments.

PRAXE A, the pre-seed capital for starting spin-offs proved the most popular and most efficient in terms of absorption of funds (see boxed case 1). At the moment, the number of supported ideas exceeded the target although the outcome in terms of

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[16] A good definition is "The economic and non-economic benefit derived from conducting interventions at the Community level rather than at the regional and/or national level". See Evaluation of the Added Value and Costs of the European Structural Funds in the UK. December 2003. (Available at : www.dti.gov.uk/europe/structural.html)

[17] The initial target of 1.5% of GERD in GDP was revised to 1.0% in March 2006.

created firms, which could be supported by PRAXE B (first stage capital), is still far behind the target (10 instead of 100), which was quite optimistic.

ELEFTHO, the new measure for the creation of technology parks and incubators is a novelty for Greece as it encourages the active involvement and ownership of parks and incubators by the private sector (see case box 2). However, the Universities' lack of interest for the commercialisation of research results, the inability of the public research centres and universities to understand the complexity of the ventures, and the opportunistic behaviour of the private sector inhibit the unleashing of the full potential of the initiative. In spite of the various problems, the performance of the incubators is close to the European average according the mid-term evaluation of the OP Competitiveness.[18]

The experience from ELEFTHO and PRAXE indicate that the mobilisation of private equity and the use of more market driven funding mechanisms could be an option that should be considered seriously in the next programming period.

PRAXE: boosting spin-offs in Greece

Exploitation of research results is one of the main policy objectives in Greece within the current programming period 2000-2006. The programme PRAXE, whose goal was the creation of spin-offs by researchers from public research organisations and universities, is a novelty for Greece and one of the major tools for the attainment of this goal.

The programme is structured in two phases. PRAXE A is the pre-seed capital phase, supporting the preparation of a business plan and fund raising from private investors, while PRAXE B, the first stage capital phase, supports the setting up of spin-offs based on the most promising business plans. The most significant precondition is the participation of private equity funds or private investors.

While the impact of the measure has not yet been evaluated, since it is still under implementation, some positive effects are already visible. On the one hand, it served as a training mechanism for researchers, as they had for the first time the opportunity to see their work from a market perspective. On the other hand, it gave the opportunity to Universities and research centres to develop more coherent strategies on commercialisation of research results and particularly their IPR and royalties' strategies.

Furthermore the programme managed to mobilise private equity (business angels, VC's etc) for the funding of innovative ventures. Finally, the measure inspired similar initiatives in the Regions, through the Regional Operating Programmes.

TANEO, the new fund for venture capital funds, started operating after a long period of preparation and negotiation with the European Commission. However, up until now, only a small fraction of its budget has been spent. While at the stage of planning, expectations about the VC market were high and the number of VC funds where increasing rapidly, when TANEO was launched only a very small number of VC funds had survived due to the low deal flow and the pressure at the mother

[18] BCS and REMACO (2005), First Review of the OP Competitiveness, 31/10/2005, 2nd edition

companies, most of them banks, to cut cost. Apart from the bad timing, incentives to VCs were not sufficient, as they could use other instruments such as PRAXE B for participating in new ventures.

> ***A new generation of incubators***
>
> *The creation of mechanism supporting the establishment of new technology based firms and the commercialisation of research results from public research organisations with the contribution of private funds was one of novelties introduced in the period 2000-2006.*
>
> *This objective was served by measure ELEFTHO, aimed at the establishment of private incubators. Each incubator should provide private equity capital for the support of the incubatees ether by creating of a fund with 50% contribution from private sources or by cooperating with a VC.*
>
> *Although not all of the created incubators were commercially viable the most successful of them managed to mobilise significant private funds and to host commercially promising enterprises. Furthermore, as the ongoing evaluation of the Operation Programme Competitiveness indicates, the hosted companies exhibit survival rates close to EU average.*

Although most of the technology transfer interventions resulted to investments in embodied technology in equipment, with low impact on transfer of knowledge and technological changes in the recipient companies, a market for innovative products was created, which affected to some extent the demand for Greek products and services. This effect is more apparent in the ICT sector, where many of the local vendors were relying on these programmes. However, in-depth analysis and evaluation is needed in order for the real impact of those programmes to be understood. At the level of regions, no impact of the regional OPs is still visible and the main problem remains the mobilisation of the private sector.

4.3 Conclusions: Structural Funds Interventions in favour of innovation and knowledge

The OP Competitiveness was the major contributor to innovation & knowledge while the ROPs had insignificant results due to insufficient budgets and the low capacity of the regions to plan and implement RTDI measures. For the next programming period this lack of capacity will be the major bottleneck and threat as the two metropolitan regions (Attiki and K. Makedonia), where the majority of industry and knowledge production is concentrated, will be supported only from their ROP with no funding from the horizontal and centrally planned and managed OPs.

There is sufficient capacity and experience on planning and implementing research and technology transfer projects, however novel measures require a longer time for learning and adapting the regulatory environment. However, many of the regulatory obstacles have been removed and the necessary adaptation has been done for a number of innovative instruments. Furthermore, experience has been accumulated over the last few years on planning and implemented these new instruments.

Exhibit 12: Main outcomes of innovation and knowledge measures

Programme or measure	Capability	Added Value
OPC Measure 2.5 Technological and organisational modernisation of firms.	Good absorption capacity. The output targets will be met.	Technology transfer and organisational innovations for improving quality, environmental management and safety.
OPC Measure 4.1 Pre-seed and First stage capital for spin-offs (PRAXE).	Significant absorption capacity of the pre-seed capital (PRAXE A) despite the initial delays and fair for the first stage capital. Absorption in PRAXE B is expected to be lower. The necessary legislative environment has been created. Mobilisation of private equity.	Novelty for Greece. HEIs and PROs started developing their strategies for exploiting research results. Researchers had the opportunity to asses their work from the market point of view. Proved the feasibility of using market driven funding mechanisms as substitutes or complements to subsidies.
OPC Measure 4.2.1 Incubators and technology parks (ELEFTHO)	The target of supporting 3-5 incubators has been achieved and it is expected to be exceeded. Mobilisation of private equity.	The novelty for Greece is the participation of private sector. The performance indicators of the incubators are close to the European average. Proved the feasibility of using market driven funding mechanisms as substitutes or complements to subsidies.
OPC Measure 4.3.1 Industrial research (PAVET) and 4.3.2 Industrial research for new firms (PAVET-NE).	Good absorption capacity for the established firms. Low absorption for new firms due to low demand.	Increase R&D spending in the private sector and especially in new SMEs and facilitate collaboration with public research sector.
OPC Measure 4.3.3 Demonstration projects.	Good absorption capacity. The target has already been met.	Facilitate technology transfer through good practices and demonstration of applications.
OPC Measure 4.4 Cooperative research in priority areas.	Despite the initial delays the absorption capacity is satisfactory. It is estimated that the output target will be met.	Increase research capacity and capabilities in areas of national priority.
OPC Measure 8.3 Development of the research human capital.	Good absorption capacity	Increase research capabilities and experience of young researchers. Although the output is achieved, it is expected that only a small fraction of the researchers will be employed in the private sector due to lack of demand.
RTDI measures in Regional Operational Programmes.	Low absorption capacity	Improvement of technological capabilities of firms, facilitation technology transfer, and set up of NTBFs

Sources: BCS and REMACO (2005), *First Review of the OP Competitiveness*, 31/10/2005, 2nd edition, Mid terms evaluations of Regional Operational Programmes

5 Regional potential for innovation: a prospective analysis

This section of the report seeks to summarise and draw conclusions from the analysis of the preceding sections, available studies and interviews and focus groups carried out for this study in order to provide an analysis of the regional innovation potential. In doing so, the aim is to provide a framework for orientations in terms of future Structural Fund investments in innovation and knowledge.

5.1 Factors influencing regional innovation potential

The Region of Attiki presents the highest potential for the development of a knowledge based economy, since it concentrates the bulk of public and private R&D actors and a large number of Higher Education Institutes followed by the region of Kentriki Makedonia and particularly the city of Thessaloniki. A high concentration of renowned academic and research institutions is also present in the region of Kriti and mainly in the cities of Hania and Irakleion. The region of Dytiki Ellada has also high quality PRO's and academic institutions concentrated in the city of Patra, while the region of Ipeiros has built research capabilities in the city of Ioannina.

The regions of Thessalia, Anatoliki Macedonia Thraki and Voreio Aigaio are characterized by a gradual building up of capacities in the fields of RTDI and by an increasing presence of academic institutions distributed among the largest urban agglomerations. In the region of Voreio Agaio, the islands of Lesbos and Samos concentrate the majority of academic and research institutions. Finally, the less privileged regions, in terms of RTDI capabilities, are the regions of Peloponnisos, Dytiki Makedonia, Notio Aigaio, Ionia Nisia and Sterea Ellada.

The services sector is the dominant sector in Greece with an increasing share in GDP, employment, value added and an increasing number of innovative enterprises. The shipping and tourism sectors are among the most dynamic sectors of the economy. Other important services areas with potential for further development are the health and the ICT sector.

There are opportunities to create novel products and services in the tourism and recreational industries, by exploiting digital technologies which could have significant impacts on the development of rural and insular regions. The development of new digital content firms in capital regions, with a focus on international markets could have positive impacts on the Regions of Attiki and Kentriki Makedonia.

In addition, there are growing opportunities in the energy sector, particularly due to the abundance of renewable energy resources, improvements in the regulatory and investment frameworks and the development of pan-European networks for energy. Thus, the development of know-how and the exploitation of renewable energy resources can also boost the growth of the national economy. Increased opportunities are provided in the islands, for the development of renewable energy resources, while the regions in Northern Greece (Kentriki Makedonia, Ipeiros, Dytiki Makedonia and Anatoliki Makedonia Thraki) have an opportunity to integrate pan European energy networks. This can be achieved by combining R&D in bio-energy, wind and photovoltaic systems with investments in building up the energy production capacity.

In the field of ICT a challenge is the development of novel ICT services (broadband, wifi) in order to close the gap of the digital divide between Greece and the EU, particularly evident in rural and insular regions. Development of applications, such as e–health, e–commerce, e-tourism and management of complex transport networks, will also create added value and synergies with other dynamic sectors of the economy.

In the same line, synergies can also be created in rural regions by the creation of clusters which link tourism and recreational activities with agriculture and other rural activities. Motives must also be provided for the creation of health clusters for primary treatment based on e–technologies in specialised resorts. This could have a significant impact on large metropolitan areas, as well as on some large islands and rural areas with high population density.

In the manufacturing sector, the majority of industries belonging to traditional sectors, such as furniture and textiles are declining in terms of competitiveness, value added and employment and face severe competition from low cost countries. These trends have led to a de-industrialisation and closure of many industries particularly in the regions of Dytiki Makedonia, Anatoliki Makedonia Thraki, Kentriki Makedonia and to a lesser extent in Peloponnesus and Ipeiros. The main challenges for these regions are the revitalization of traditional sectors by converging existing sectors' technologies with nano, bio, ICT, advance materials, for the production of innovative products of high added value (smart house, smart furniture, technical textiles smart apparels).

The chemicals, pharmaceuticals, plastics, publishing and printing, metal products, food products and electronic equipment sectors are exhibiting a dynamic upward course as well. Thus the key challenge is to increase the knowledge capacity of enterprises and private investments in R&D. Of particular interest are the hybrid technologies that transcend the boundaries of sectors such as nanotechnology and biotechnology, microelectronics, new materials and environment-friendly technologies.

Finally, in the agricultural sector the current production model (small landholdings) is moving to a dead lock. The sectors contribution to GDP and employment has been decreasing. The improvement of quality of agri-business products based on biotechnology, the development of "new" agriculture based on knowledge and the development of multifunctional agricultural space (agro-tourism, bio-energy, small agri-business etc) are necessary in order to reverse the negative trends. The regions that could mainly benefit from such a policy are those of Thessalia, Kentriki and Dytiki Makedonia, Kriti, Anatoliki Makedonia Thraki and to a lesser extent the insular regions.

Exhibit 13: Factors influencing innovation potential by type of region

Region	Main factors influencing future innovation potential
Metropolitan Regions: Attiki and Kentriki Makedonia	• Agglomeration of public research organisations and HEIs • High quality human capital • Agglomeration of high value added and knowledge intensive services (mainly in Attiki) • Access to innovation financing • Proximity to two industrial centres (Athens' Satellites regions) • Strengths in health services, pharmaceuticals, ICT, culture, e-commerce, energy, chemicals, textile.
Athens' Satellites : Peloponnisos ; Sterea Ellada	• Agglomeration of industry • Lack of knowledge production and technology transfer infrastructure. However proximity to Attiki provides opportunities for access to a significant pool of knowledge and human resources. • Strengths in plastics, chemicals, agro-food industry, metal products, tourism
Cathedrals in the desert Kriti; Dytiki Ellada; Ipeiros	• High quality public research organisations and HEIs • Strengths in tourism, agro-food industry, plastics, chemicals, metal products, ICT • Weak co-operation between HEIs and industry • Abundant renewable energy resources
Agro-industrial regions with insufficient knowledge production: Anatoliki Mekedonia – Thraki; Thessalia; Dytiki Makedonia; Voreio Aigaio	• There is research capacity due to the HEIs in all regions but the D. Makedonia. However these capabilities are not sufficient enough and not always in areas relevant to the economic environment. • Weak co-operation between HEIs and industry. • Strengths in agriculture and in the industries of energy, textiles, agro-food, ICT and tourism. • Abundant renewable energy resources • Small landholdings with low educational level of human capital. • Lack of training and life-long learning capabilities • Aging population in remote rural areas
Tourism hotspots: Notio Aigaio and Ionia Nisia	• There is no RTDI potential • Tourism and agriculture are the main sources of wealth • Abundant renewable energy resources • Small landholdings and tourism businesses with low educational level of human capital. • Lack of training and life-long learning capabilities • Aging population in remote rural areas

5.2 A prospective SWOT appraisal of regional innovation potential

The analysis in previous chapters reveals significant variation in the RTDI capacity of the different groups of regions.

"Metropolitan regions" (Attiki and K. Makedonia) are characterised by the agglomeration of significant public research capacity, as the biggest research centres and Universities are located there. A pool of high quality human capital is available as well. However, the demand from industry is not sufficient, reflecting the low-to-medium technology structure of the economy. Innovation capacity in the private sector is high, relatively to the country average, although it is lagging behind compared to the EU. The weak innovativeness is also reflected by the low private spending on R&D and low collaborations with public research organisations and HEIs. Although, both regions score high in most of the indicators compared to the country average, they are lagging behind compared to the "Local science and services" cluster.

The major strength of the "**Cathedrals in the desert**" regions (Kriti, D. Ellada and Ipeiros) is the agglomeration of research capacity and the existence of HEI in all regions. However, the economic environment is characterised by low-tech (mainly agro-food industry and tourism) and very low R&D spending. Collaboration of the private sector with the Universities and research centres in the region is very weak.

The economic structure of the **"Athens' satellite"** regions (Peloponisos and Sterea Ellada) is quite heterogeneous. The GDP is mainly produced in the regions' industrial areas located close to Athens, while the rest of the regions is characterised by low value added agro-food businesses and tourism. Industry's R&D expenditure is above country's average, while the lack of public research infrastructures and of high quality human capital is the major weakness. Furthermore, the lack of business services and technology transfer mechanisms hamper industry's development and reduce leverage effects in the region. However, the proximity of the industrial areas to Athens could allow under certain conditions, access to a significant pool of knowledge.

The "**Agro-industrial regions with insufficient knowledge production**" (Anatoliki Mekedonia –Thraki; Thessalia; Dytiki Makedonia; Voreio Aigaio) combine low-to medium-tech manufacturing with low added value agriculture. Despite the existence of HEI in almost all the regions, research capacity and diffusion of knowledge in the economy are quite low. Furthermore, the quality of human capital is below the country's average.

The **tourism hotspots** strengths are the quality of the environment and abundant renewable energy resources and the fast growing tourism activities, while the major weaknesses are the lack of private and public knowledge production activities and the very weak knowledge diffusion mechanisms.

Exhibit 14: Innovation and Knowledge SWOT

Metropolitan Region: Attiki	**Opportunities**	**Threats**
Strengths	▪ High scientific and technological potential and opportunities for developing high value added economic activity in health, pharmaceuticals, ICT, culture, e-government	▪ Low levels of public R&D funding threatens scientific and technological potential in cutting edge fields e.g. bio, nano, new materials, ICT.
Weaknesses	▪ Alignment of public research organisations with industry needs is hampered by the formers scope, culture and obsolete organisation.	▪ Marginal improvements of entrepreneurial environment and market competition, restrain transformation of the economy. ▪ Lack of sufficient planning and implementation capacity of the Regions' authorities hampers efficient use of SF funding.
Metropolitan Region: Kentriki Makedonia	**Opportunities**	**Threats**
Strengths	▪ High scientific and technological potential especially in biotechnology, chemistry, energy. ▪ High level of human resources.	▪ Delays in deregulation of energy market and lack of a coherent renewable-energy policy undermine the development of energy industry.
Weaknesses	▪ The potential of revitalising traditional sectors (textile, agro-food) by exploiting convergence of sector technologies with bio, nano, ICT, chemistry etc. is hampered by the risk averse culture and cost cutting defensive strategies of business sector	▪ Delocalisation of industry to lower cost regions due to inability to increase the value added of local production. ▪ Lack of sufficient planning and implementation capacity of the Regions' authorities hamper efficient use of SF funding.
Cathedrals in the desert (Kriti, Dytiki Ellada, Ipiros)	**Opportunities**	**Threats**
Strengths	▪ High scientific and technological potential in PROs ▪ Development of services hub for ICT, health, high value tourism.	▪ High Scientific and technological potential is threatened by the limited business activity and the very low R&D capacity of local firms. ▪ Delays in deregulation of energy market undermine development of energy industry.
Weaknesses	▪ Revitalising of agriculture by developing a multifunctional agricultural space and exploiting biotechnology is hampered by lack of industry –science links.	▪ Lack of sufficient planning and implementation capacity of the Regions' authorities hamper efficient use of SF funding.

Athens' Satellites (Peloponisos Sterea Ellada)	Opportunities	Threats
Strengths	▪ Increasing industrial capacity due to the proximity to Athens	▪ Lack of high quality of human capital threatens the development of high value added industry and services.
Weaknesses	▪ Development of food industry cluster is hampered by the lack of necessary technological support and access to complementary services. ▪ Despite the lack of PROs, proximity to Athens provides opportunities to firms for creating links with the existing strong public science and technology capacity in Athens. ▪ The underdeveloped business services sector hampers further development of industry.	▪ Delocalisation of industry to lower cost regions due to inability to increase the value added of local production. ▪ Lack of sufficient planning and implementation capacity of the Regions' authorities hamper efficient use of SF funding.
Agro – industrial regions	**Opportunities**	**Threats**
Strengths	▪ High production capacity in medium tech and traditional industrial sectors.	▪ Existing scientific and technological potential is threatened by the limited business activity and the very low R&D capacity of local firms.
Weaknesses	▪ The potential of revitalising traditional sectors (textile, agro-food) by exploiting convergence of sector technologies with bio, nano, ICT, chemistry etc. is hampered by the risk averse culture and cost cutting defensive strategies of business sector ▪ The reorientation of agriculture and tourism towards higher value added activities is hampered by the lack of knowledge diffusion infrastructures.	▪ Delocalisation of industry to lower cost regions due to inability to increase the value added of local production. ▪ Lack of sufficient planning and implementation capacity of the Regions' authorities hamper efficient use of SF funding. ▪ Energy for the development of alternative (clean) technologies is based on technologies produced in other regions.
Tourism hotspots	**Opportunities**	**Threats**
Strengths	▪ Strong tourism sectors and abundant natural resources for production of energy (solar, wind etc) ▪	▪ Over exploitation of natural resources create dangers of environmental degradation. ▪ Lack of sufficient planning and implementation capacity of the Regions'
Weaknesses	▪ Low quality of human capital and lack of training and life long learning infrastructures. ▪ The reorientation of tourism towards higher value added activities is hampered by the lack of knowledge diffusion infrastructures and small scale of tourism enterprises.	▪ Development of alternative (clean) technologies for energy production is based on technologies produced in other regions.

5.3 Conclusions: regional innovation potential

Policy headline 1: Potential for revitalising low-tech industries.

- Low-tech industries trapped by the competition from the low cost countries could take advantage of the new technological trends and diversify towards more high-tech, high-value products. Converging technologies such as bio, nano and new materials that transcend the boundaries of sectors could allow industries in traditional sectors (textiles, agro-food, furniture, etc) to base their competitive advantage on product characteristics and quality.
- Relevant regions: Regions with strong R&D capabilities i.e. Attiki Kentriki Makedonia, and Kriti, could focus on R&D and product development while those with strong industry presence i.e., Thessalia, Anatoliki Mekedonia Thraki, Dytiki Makedonia, Sterea Ellada, Peloponnisos, could focus on technology transfer, collaboration with research organisations, non technological innovations, or clustering

Policy headline 2: Potential for transforming metropolitan regions to research and innovation poles

- The metropolitan regions of Attiki and K. Makedonia concentrate the 68% of total R&D expenditure in Greece and 75% of the BERD, while they host the biggest HEIs and public research organisations, and extended educational infrastructures. Attiki is also the centre of high value added services. These agglomerations constitute a critical RTDI capacity that could transform the regions into research and innovation poles, capable of generating spill over effects to the other regions and especially to neighbour ones with significant industrial capacity such as Sterea Ellada, Peloponisos and Dytiki Ellada.

  However, low collaboration between research and business sector remains an obstacle and further efforts for developing co-operation should be supported in parallel to the significant support of R&D and development research infrastructure.
- Relevant regions: Attiki, Kentriki Makedonia.

Policy headline 3: Potential for creating a multifunctional agricultural space

- Development of multifunctional agricultural space by transiting from commodity production and family based farm ownership to a set of professional knowledge driven economic activities based in rural areas is a challenge for most of the rural areas. Regions with RTDI capacity could combine research activities in areas such as agro-food, biotechnology, logistics, bio-energy with technology transfer to farms, cluster development, organisational and business innovations. Regions with no sufficient RTDI capacity should concentrate on the latter.
- Relevant regions: Thessaly, Kentriki Makedonia, Peloponnisos, Anatoliki Makedonia Thraki, Voreio Aigaio, Kriti, Ionia Nisia,

Policy headline 4: Potential for creating high value added tourism sector

- Tourism is an important activity for many of the regions. Notio Aigaio and Ionia Nisia depend mainly on tourism for their development while they have limited innovation capacity. On the other side tourism is also important for Kriti and Ipeiros while knowledge production and diffusion are facilitated by the existence of HEIs and research infrastructures. The challenge is to link the tourism sector on the one hand, with content development, recreational enterprises, development

and transfer of logistics' technology and on the other with other high value added activities.

- Relevant regions: Ionia Nisia, Notio Aigaio, Kriti, Ipeiros, Peloponnisos, Voreio Aigaio,

Policy headline 5: Potential for exploiting the renewable energy resources of the country such as the solar, wind and biomass.

- High potential for developing technologies and research in alternative sources of energy such as solar and wind and production of biomass.
- Relevant regions: Attiki, Kriti, K.Makedonia, Notio Aigaio, Thessalia.
- Islands and rural areas offer opportunities for investments based on technologies produced in other regions of the country with high R&D potentials in the field, such as the regions of Attiki, Kriti and K.Makedonia.

6 Future priorities for Structural Fund support for innovation and knowledge: options for intervention

The priorities identified in the NRP (2005-2008) and those proposed by GSRT[19] in the context of the NSRF, which is currently in the process of public consultation, can be summed up in the following axes:

- Knowledge: Production of new knowledge and linking research with the economy.
- Value: Commercialisation of knowledge and exploitation for the benefit of the economy.
- Excellence: Promotion of excellence in the research sector.

Additionally, the promotion and strengthening of the internationalisation of the Greek economy and research sector through European and international collaborations, and the quantitative and qualitative improvement of RTDI personnel (the creation of a critical mass of researchers in selected sectors and the increase of researchers' mobility), are two important cross cutting priorities.

Although there is not yet specific allocation of budget among the different priorities, the policy mix proposed by GSRT is well balanced in terms of foreseen measures and specific objectives. However there are three issues that need attention:

- Successful RTDI policies presupposes coordination with other non-RTDI specific policies and among different actors. Therefore RTDI priorities should be set and coordinated at the highest possible level. According to the current structure of the Operational Programmes, RTDI policy is clearly defined as a priority only in the OP "Entrepreneurship and Competitiveness" and it is expected to be so in the 5 regional OPs. However, innovation and R&D are crucial at least for the OPs supporting: higher education and human capital, environment and sustainable development, digital convergence and upgrading public administration. Taking into account the fact[20] that GSRT has limited weight compared to other units in the public administration, it is an issue how its strategy could influence other OPs.
- In the new programming period D. Makedonia and the two Metropolitan regions namely, Attiki and K. Makedonia are phasing out regions while Sterea Ellada and Notio Aigaio are phasing in regions. These five regions will be supported only by their regional operational programmes while the multiregional programmes will not fund any beneficiary located in them. The implication of that is significant, as these regions, concentrating the majority of the research organisations, and the biggest HEIs of the country and producing around 70% of country's GDP, will not be supported by the RTDI measures foreseen in the OP "Entrepreneurship and Competitiveness". Under the new funding regime, regional authorities should develop and implement their own RTDI policy despite the lack of experience and capacity. Therefore, the challenge is to develop close collaboration among the regional authorities and GSRT, not only during the planning phase but also during

[19] GSRT (2006)
[20] See comments in Section 3.1

the implementation. The policy framework prepared by GSRT can be used as a basis for that.

- The policy mix should be diversified across the different regions, based on their potential and capacity, directing R&D measures only to those regions with research capacity. Furthermore, an additional distinction should be made between the national and regional level. With the exception of the five transition regions where everything will be planned and implemented at regional level, the support for R&D and research infrastructures should be designed and implemented at national level, as a regional approach would probably not allow for economies of scale and could reduce competition leading to a fall-off of the quality of research. Nevertheless, measures supporting technology transfer, creation of innovative funding mechanisms, clusters, improvement of governance can be implemented regionally.

6.1 Strategic orientations for Structural Fund investments in innovation and knowledge

Key conclusion 1: Low interest of enterprises to innovate and create new knowledge

A large share of Greek enterprises adopts defensive strategies with a focus on low cost. In addition most of the firms are oriented in catering only for the local markets. Therefore, innovations and production of new knowledge are currently of low priority for most enterprises. Furthermore, small enterprises with limited innovation capacity represent a very high share of the overall business population compared to other European countries. The implication of the above is the very low level of in-house and outsourced innovation and R&D activities.

Recommendation 1: Reorientation of firms' strategies with emphasis on knowledge and high value added activities

Reorientation of firms' strategies presupposes a policy mix that includes: initiatives creating an environment favorable to innovation by reducing the barriers and creating incentives for innovation; measures contributing to the increase of the absorption capacity of SMEs; and measures supporting firms of all sizes on moving to higher value added products.

Among the issues that are important for the first two issues the following are regarded of high priority:

- Support the development of high quality human capital with engineering, R&D and management background for enhancing and strengthening firm's capacity to innovate and compete in a global environment. For the rural areas the necessary skills are related to agro-food technologies, new production methods and management of agro-business, while in tourism intensive areas ICT services, and tourism management are important. However, increase of demand for human resources with such qualifications depends on the progress made in reorientation of firm's strategies.
- Opening up of local markets to international competition and ensuring effective operation of markets will force firms to pursue strategies alternative to low cost ones.

For the third issue, support measures focusing on specific issues, technologies and sectors (adopting a broader definition than that used in statistics) as those defined in chapter five, should combine horizontal interventions. Measures targeting low-tech industries such as textiles, furniture, construction or agro-food should focus on the production of high value added or "intelligent" products. Due to the nonlinear character of innovation, eligible for funding should be a spectrum of activities from R&D to technology transfer and development of products, processes and services. A good practice to that direction is the Finnish Forest Cluster Research Programme Wood Wisdom (1998-2001) and the Finnish-Swedish co-funded Wood Material Science Research Programme (2003-2006) as well as the WoodWisdom-Net Project[21].

Similarly, measures incorporating R&D, technology transfer and the creation of product and services could be initiated for tourism, energy and the creation of multifunctional agricultural space. Possible areas for intervention for those sectors are presented in chapter five.

Key conclusion 2: Weak linkages among the various actors of the National Innovation System

The linkages among the various actors of the national innovation system remain weak and without a strategic perspective, in most of the cases, despite the efforts and the launching of a number of measures over the previous years aiming at increasing the collaborations. The efforts in the new programming period should take into consideration the experience from past failures such as the "Clustering of SMEs" programme launched in 2000. The significant delays and the complex administrative requirements for running the projects were some of the causes of the very low demand.

Recommendation 2: Promote networking, clustering and the development of innovation poles.

Towards the end of the programming period 2000-2006, a number of pilot regional innovation poles are being established following a call for proposal from the GSRT. A condition for further support of these poles and diffusion of the measure in other regions should be the active involvement of the private sector.

For a number of sectors with high shares of SMEs such as in food, textiles or ICT, integration of local companies into supplier's networks of big national or multinational corporations will allow access to high volume markets, to technology and/or to capital. However, successful integration presupposes that local companies are able to supply high volumes according to certain quality standards and tight delivery schedules. Furthermore, for networks serving the higher value added segments of the market, the contribution of suppliers to the increase of the added value of the final products is also important. In these cases the innovation capacity of firms is an important qualification for accessing the networks. Therefore measures supporting networking and alignment to suppliers' networks should include activities:

- that increase productivity (e.g. transfer of technology embodied in equipment, diffusion of ICT systems, process innovations) quality (e.g. certification,

[21] www.woodwisdom.net

investment on equipment, training), innovation capacity (e.g. product innovations, access to high quality human capital);

- that support organisational change;
- that support marketing and promotion of firms in suppliers' networks.

Clustering could increase the linkages among producers, technology providers and public research organisations and develop long-term relationships, provided that it is extended beyond the small supplier networks of few firms. An example of such approach is the Technology Clusters Programme operational since 2000 in the Walloon Region of Belgium. The focus of the clusters of firms, service providers and public research organisation is on innovation and product development. The focus of the clusters in this specific programme is on specific technologies covering partners from various sectors[22]. Clustering activities could be easily combined with the efforts for aligning local firms to big supplier networks of national or multinational corporations mentioned above.

Key conclusion 3: Insufficient levels of public and private spending on RTDI

Despite the stated objective to increase GERD to 1.0% of GDP until 2010, recent trends show that R&D expenditure is decreasing from 0.64% of GDP in 2001 to 0.58% in 2004.

Recommendation 3: Increase public and private R&D funding

Although the current public R&D spending represents approximately 74% of the GERD it is still small (around 0.5% of GDP) and insufficient for creating leverage in the economy. In the current programming period around 480 MEUR have been allocated to strict RTDI activities representing a mere 2.37% of the total SF funding. Following the successful example of other countries in previous programming periods, the amount of funds that should be allocated in favour of research, technological development and innovation should be close to 10% of the total Structural Funds in the new programming period. In addition, national funding from the Programme of Public Investments and the National Budget (apart from the matching funds) should be proportionally raised.

As the two metropolitan areas Attiki and K. Makedonia concentrate more than 68% of total spending on R&D, it is expected that most of the funding will be channelled there. Therefore, a strategy for the most efficient exploitation of funding is necessary. As was pointed out in chapter five, both regions have the potential to be transformed into research and innovation poles. However, in doing so a shared vision among main stakeholders including universities, industry associations and local political leaders is essential. An interesting example that could provide useful insight is the foresight exercise "Knowledge Capital 2008", implemented in Manchester[23].

[22] For an assessment of the specific programme see http://clusters.wallonie.be/xml/fiche__en-IDC--IDA-5447-.html

[23] www.manchesterknowledge.com

Key conclusion 4: Financing of RTDI measures do not exploit the opportunities offered by the contemporary financial instruments

Grants and subsidies are the main funding instruments used for funding RTDI measures. One of the main challenges, identified in previous chapters, is the alignment of RTDI activities with the needs of the economy, funding decisions should strongly incorporate that logic. Experience from measures incorporating private equity such as venture capital, shows that it is possible and effective to mobilise market driven mechanisms.

Recommendation 4: Gradually shift funding towards new market driven funding instruments

Funding should shift from grants and subsidies to funding mechanisms such as private equity, guarantees or loans substituting grants and subsidies. On that ground, JEREMIE initiative and collaboration with EIF provides a good opportunity for developing such instruments. The legislative environment is already adapted to that and the experience from initiatives of TANEO and TEMPE could be used for this goal.

The EIF is going to launch a needs analysis for Greece which will identify more specifically the potential and the priority areas for supporting under the JEREMIE initiative existing or new funding mechanisms. The idea is welcomed and supported by the Greek Government, however it is important that the intervention includes not only mature investments and business activities but technology intensive and innovative ventures. In such a perspective PRAXE B could be entirely replaced. An example of measures that could be funded with the support of JEREMIE is the ARKimedes Fund (Activeren van Risico Kapitaal: Activation of Venture Capital) managed by the Flemish Holding Company. The ARKimedes fund raises funding from private sources and invest them in private Venture Capital Funds with a professional management and successful track record.

6.2 Operational orientations for SF investments in innovation and knowledge

Key conclusion 5: Limited innovation governance capacity

Despite the efforts of GSRT, fragmentation of policy making in RTDI hampers the development of a National Strategy for Innovation that could mobilise and direct public administration at national and regional level. Furthermore, little attention is paid so far to the improvement of regional governance capacity. This goal was pursued mainly through fragmented initiatives, with no follow up. In the new programming period, the capacity of regions is a major priority as significant share of funding RTDI measures will be implemented in the regions.

Recommendation 5: Reengineer the regional governance systems for R&D and innovation and development of a National Strategy for Innovation and Research.

The Greek Government should focus not only on re-engineering the management of OPs but also on actively supporting the governance of RTDI at both national and regional level. As a result of the on-going reform in the structure of policy making in RTDI, a National Strategy for Innovation and Research should be developed which will allow different ministries and regional authorities to align their efforts towards

common goals. This is very important especially for the phasing in and phasing out regions as RTDI will be financed only from their own OPs.

The GSRT should be a decisive player in the effort of improving the regional capacity on planning and implementing RTDI measures, without at the same time substituting for the regional authorities.

Although GSRT will be responsible only for the measures funded by the OP "Entrepreneurship and Competitiveness", it can assist the regional authorities on planning their interventions. Furthermore, training on innovation and R&D policy and provision of technical assistance to the regional authorities are necessary, along with the development of structures supporting networking of GSRT with Regional Authorities. Establishing working teams, consisting of members from GSRT and the Managing Authorities of the Regions, could be a useful approach.

Further to those measures, the mobilisation of existing capacities outside the public administration (consultants, expertise in universities, intermediary bodies etc.) and the promotion of forward thinking of the Greek society and specific actors, especially in the regions is necessary. In doing so, more participatory and forward thinking methods for planning are necessary, including the uptake of foresight or technology road-mapping by more actors.

Exhibit 15: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
Metropolitan Areas	To became R&D and innovation poles for high- tech services and industry. Contribute to the revitalisation of traditional sectors through research and technology transfer. Strengthen governance of RTDI	• Creation of a vision for the future of the regions as innovation poles • Increase substantially the R&D funding both in applied and basic research and promote participation in 7th FP. • Support interdisciplinary R&D and exploit emerging technological fields (i.e. bio, nano) and their convergence with technologies in traditional sectors. Measures should foresee a wide spectrum of activities from R&D to product and process development. • Emphasis on creating NTBF by supporting spin-offs, incubators and technology parks. • Creation of mechanisms for networking and alignment of companies in international value chains and empower networking between firms and PROs through collaborative research. • Support life long learning. • Promote market driven financing mechanisms (CV, micro credit etc.).	15-20% of SF funding in the region
Athens' satellites	To generate spillovers from the industrial agglomerations to the rest of the region. Revitalise traditional sectors.	• Creation of mechanisms for networking and alignment of local suppliers with big corporations located in the industrial areas of the regions. • Support clustering and development of supplier networks. • Promoting networking of local industry with PROs in the neighbour metropolitan regions. • Promote multifunctional agricultural space • Support life long learning. • Promote foresight and forward thinking planning	2-5% of SF funding in the region
Cathedrals in the desert	Link PROs with local and international players. Restructure local economy in favour of high added value activities in agro-food, tourism and selected manufacturing sectors.	• Strengthening national and international links of PROs through collaborative research. Promote participation in 7th FP. • Strengthening PRO's links with local industry through development of product and process innovations, demonstration or problem solving projects. • Creation of mechanisms for networking and alignment of companies in international value chains. • Support spin-offs and existing technology park and incubators.	5-10% of SF funding in the region

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
		• Promote product and process innovation in low-tech sectors as well as organisational and business innovations. • Promote multifunctional agricultural space. • Promote market driven financing mechanisms (CV, micro credit etc.). • Support life long learning. • Promote foresight and forward thinking planning	
Agro-industrial regions with insufficient knowledge production	Strengthen the links of knowledge production with the local economy	• Creation of mechanisms for networking and alignment of companies in international value chains. • Support life long learning. • Balance between R&D funding in universities and technology transfer with emphasis on revitalising traditional industries. • Promote market driven financing mechanisms (CV, micro credit etc.). • Promote product and process innovation in low-tech sectors, as well as organisational and business innovations by exploiting emerging technological fields (i.e. bio, nano) and their convergence with technologies in traditional sectors. • Promote foresight and forward thinking planning.	5% of SF funding in the region
Tourism hot-spots	Diversify economic activity and increase value added in agro-food industry and tourism.	• Development of tourism clusters with links to recreational activities (culture industry). • Development of new firms that provide novel services in tourism, culture and other services (e - services). • Promote multifunctional agricultural space. • Technology transfer for exploiting renewable energy potential.	2-5% of SF funding in the region.

Appendix A Methodological annex

A.1 Quantitative analysis of key knowledge economy indicators

A 1.1 Factor analysis

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables (Table 1) into a small number of factors by means of factor analysis.

Table 1. Reduction of the dataset (215 EU-25 regions) into four factors by means of factor analysis

	The 4 factors			
	F1 'Public Knowledge'	F2 'Urban Services'	F3 'Private Technology'	F4 'Learning Families'
Higher education (HRSTE), 2003	**.839**	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	**.831**	.164	.267	.327
High-tech services employment, 2003	**.575**	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	**.543**	.431	.275	-.195
Value-added share services, 2002	.323	**.869**	.002	.121
Value-added share industry, 2002	-.265	**-.814**	.386	-.061
Employment government administration, 2003	-.217	**.745**	.124	-.175
Population density, 2002	.380	**.402**	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	**.873**	-.089
Value-added share agriculture, 2002	-.222	-.350	**-.672**	-.198
Business R&D expenditures, 2002	.335	-.050	**.664**	.267
S&T workers (HRSTO, occupation), 2003	.560	.178	**.589**	.382
Population share under 10 years of age, 2001	-.237	.060	-.015	**.868**
Life-long learning, 2003	.472	-.009	.165	**.703**
Activity rate females, 2003	.418	-.227	.281	**.620**

Note: Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we can characterise and interpret the four factors and give them a short symbolic name:

Public Knowledge (F1)

Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core). Cities with large universities will rank high on this factor. One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding Science-Industry linkages. Public R&D and higher education seems especially related to high-tech services, whereas Business R&D especially serves high- and medium-high-tech manufacturing.

Urban Services (F2)

This second factor contains information on the structure of the economy. It is well known that industrial economies are quite different from services based economies. It is not a matter of development per se, because in the European regions the variety of economic structure is very large and for a large part based on endowments and path dependent developments like the extent to which government administration is located in a region or not. This factor takes into account the differences between an industrial area and a service based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres not necessary co-locate with administration centres. What may not be surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

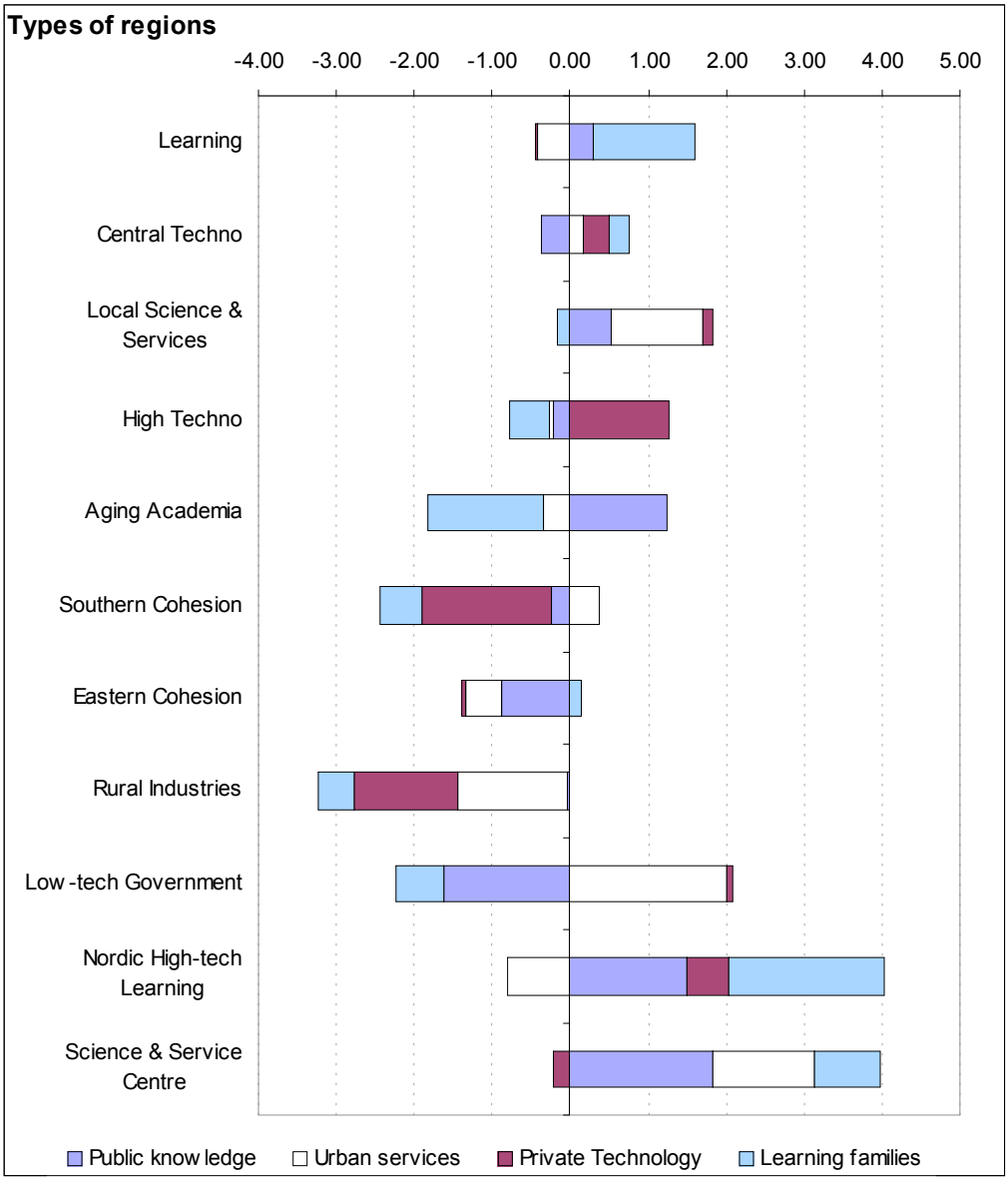
Private Technology (F3)

This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A countervailing power is the existence of agriculture in the region. One interpretation could be that agricultural land-use goes at the cost of possibilities of production sites. Another interpretation is that agriculture is not an R&D intensive sector.

Learning Families (F4)

The most important variable in this factor is the share of the population below the age of 10. Locations with relatively larges shares of children are places that are attractive to start a family. Possibilities for Life Long Learning in a region seems associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

A 1.2 Description of the 11 types of EU regions



1 Learning

The Learning regions are first of all characterised by the high score on the factor 'Learning Families', and the three main components of this factor: life-long-learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average the lowest compared to the other EU regions. Employment in the government sector is limited. GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic High-tech Learning regions, but the business sector in the Nordic version invest more in R&D.

2 Central Techno

This is a rather large group of regions located mostly in Germany and France with close to average characteristic, but the share of High-tech manufacturing is rather high. The factor-scores as well as GDP-per head is slightly above the regional average, except for the Public Knowledge factor which is slightly lower.

3 Local Science & Services

This group of regions with diverse nationality consist mainly of capital cities, such as Madrid, Warsaw, Lisbon, Budapest and Athens. These urban area's serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region. GDP per capita is on average slightly below the EU25 average, but growing. The low score on life-long-learning is a weakness in most Local Science & Services regions, especially compared to the more wealthy and advanced Science & Service Centres.

4 High Techno

The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g. Bayern and Baden-Wurtemberg), some in Italy (e.g. Lombardia and Veneto) and two French regions. This type is very strong in Private Technology and has a high level of GDP per capita. The factors Public Knowledge and especially the Learning Family factor shows a relative weakness, e.g. in life-long-learning. Growth in terms of GDP per capita has been low and unemployment didn't improve much in the previous years.

5 Aging Academia

This group of regions is mostly located in east-Germany and Spain and also includes the capital regions of Bulgaria and Romania. The strength in the Public Knowledge factor is mostly based on the high share of people with tertiary education. The low score on the Learning Family factor is due to little life-long-learning and hosting relatively few children. The unemployment situation has improved, but is still very high.

6 Services Cohesion

Services cohesion regions are located in Southern Europe, consisting of many Greek, some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is hardly any high-tech manufacturing nor business R&D. Services is the most important sector, but also agriculture is still a rather large sector. The share of manufacturing industry in value added is very limited. Population density is low, but on average it has been increasing.

7 Manufacturing Cohesion

Manufacturing industries is the dominant sector, whereas services and agriculture are rather small sectors. This type of region is mostly located in Poland, Czech Republic, Hungary and Slovak Republic. Two Portuguese regions are also included. The Public Knowledge factor is the main weakness of this type of regions. However, the score on the Private Technology factor is close to average, which means that it is much stronger in this respect than the Services Cohesion regions. Unemployment is high, even compared to Rural Industries and Services Cohesion regions.

8 Rural Industries

Besides a low per capita GDP, Rural Industries regions have in common a low score on both the factors Urban Services and Private Technology. Population density is very low. The service sector is often very small. Especially agriculture but also manufacturing industries are relatively large sectors.

9 Low-tech Government

This type of region, mostly located in southern Italy is characterised by a very low score on Public Knowledge combined with a high share of employment in the Government sector. Unemployment is severe, on average comparable to Manufacturing cohesion regions. GDP per capita is however close to the regional average.

10 Nordic High-tech Learning

The Nordic version of the learning regions are typically strong in the Learning Family factor, but this type also has by far the highest business R&D intensity. In contrast with the popular characterisation of Nordic societies, the size of the government administration is the lowest of all the types. The low score on Urban Services is also due to the low population density. A rather unique feature of this type of regional knowledge economy is the combined strength in both the Public Knowledge and the Private Technology factor.

11 Science & Service Centre

The main characteristics of this urban group of regions are the high scores on the Public Knowledge and Urban Services factors. Population density is very high. This type also has the highest GDP per capita and productivity. The variables that are captured by the factor Learning Families also show a score above the regional average, but disappointing is the relatively low presence of high and medium-high-tech manufacturing and the business R&D intensity.

A.2 Qualitative analysis and preparation of country reports

In summary, the country reports were prepared in the following stages:

- A first country document was prepared by the core study team in the form of a **template country report**. It contained overall guidance to the country experts and included a number of pre-filled tables, graphs and analysis sections based on information available at EU level.
- Next, the core team members and the national experts who were involved in the pilot phase of the project commented completed elements of the templates. Drafted elements and templates were completed and compiled into **first country briefings (draft pilot reports)** by the national experts involved in the pilot phase of the project. These pilot country reports were prepared by experts for Belgium, Greece, Italy, France, and Poland.
- Once the five first country briefings were completed, a **final set of guidelines** was prepared by the core team. These guidelines were agreed with the Commission services responsible for this evaluation. Prior to this, all first country briefings were reviewed during the January 2006 and presented to a first meeting of the scientific committee.

The work during the **country analysis phase** included:

- Undertaking a series of key interviews (KI) with policy decision makers;
- Organising a focus group (FG) with key national or regional RDTI stakeholders;
- Collecting additional information and finalising short case studies; and
- Preparing the synthesis notes of these various activities.

The above-mentioned work served as qualitative data and allowed the national experts to compile the draft **country reports**. All reports were subsequently reviewed, checked and finalised by the core team and the consortium members. Once this first check was completed, the core team organised a final peer reading of the document to verify its overall consistency and to ensure a final English language editing of the document. The core team then completed the final editing and layout of the document with a view to publication.

An overall synthesis report of all has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

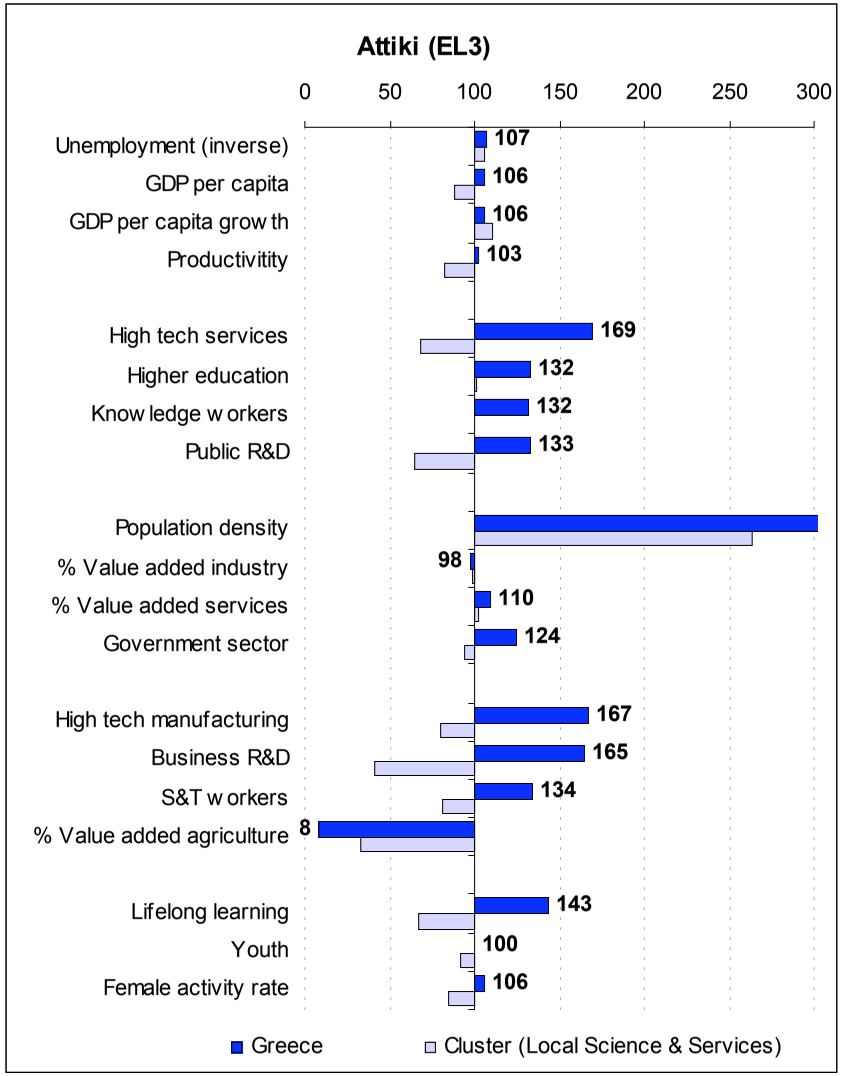
Appendix B Statistical tables and regional scorecards

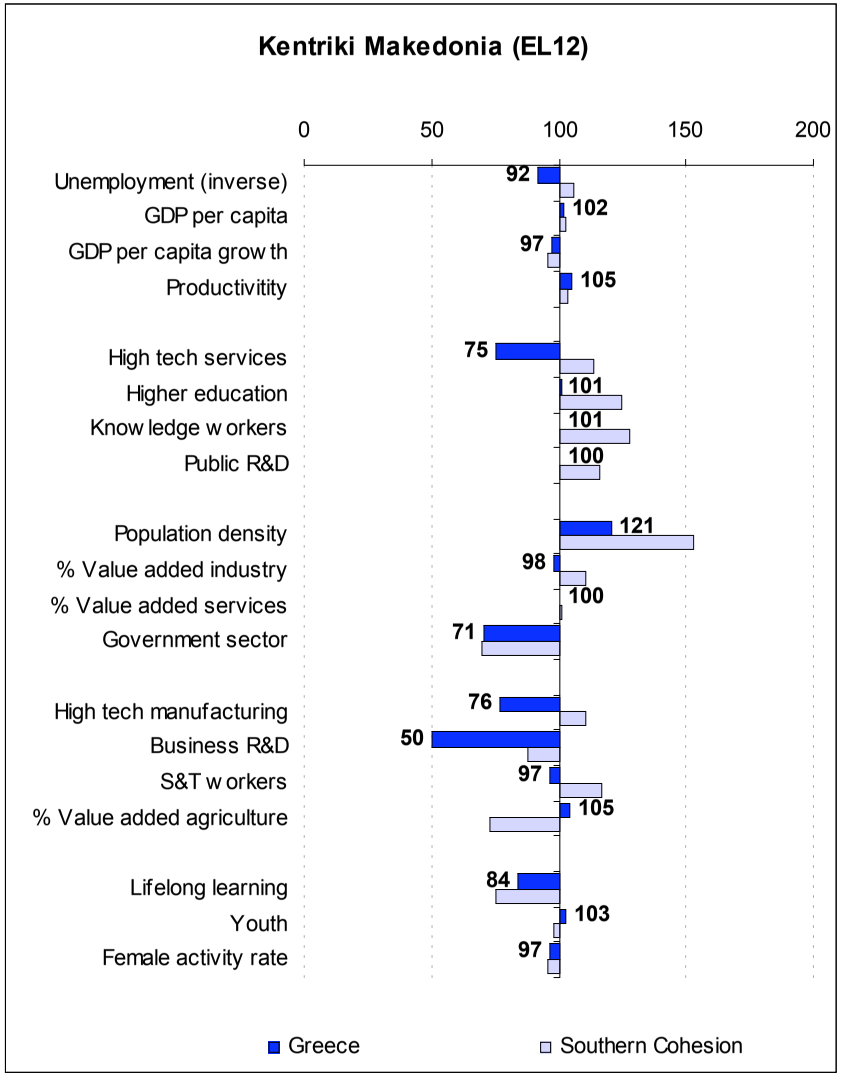
B.1 Overall quantitative analysis per region of Greece

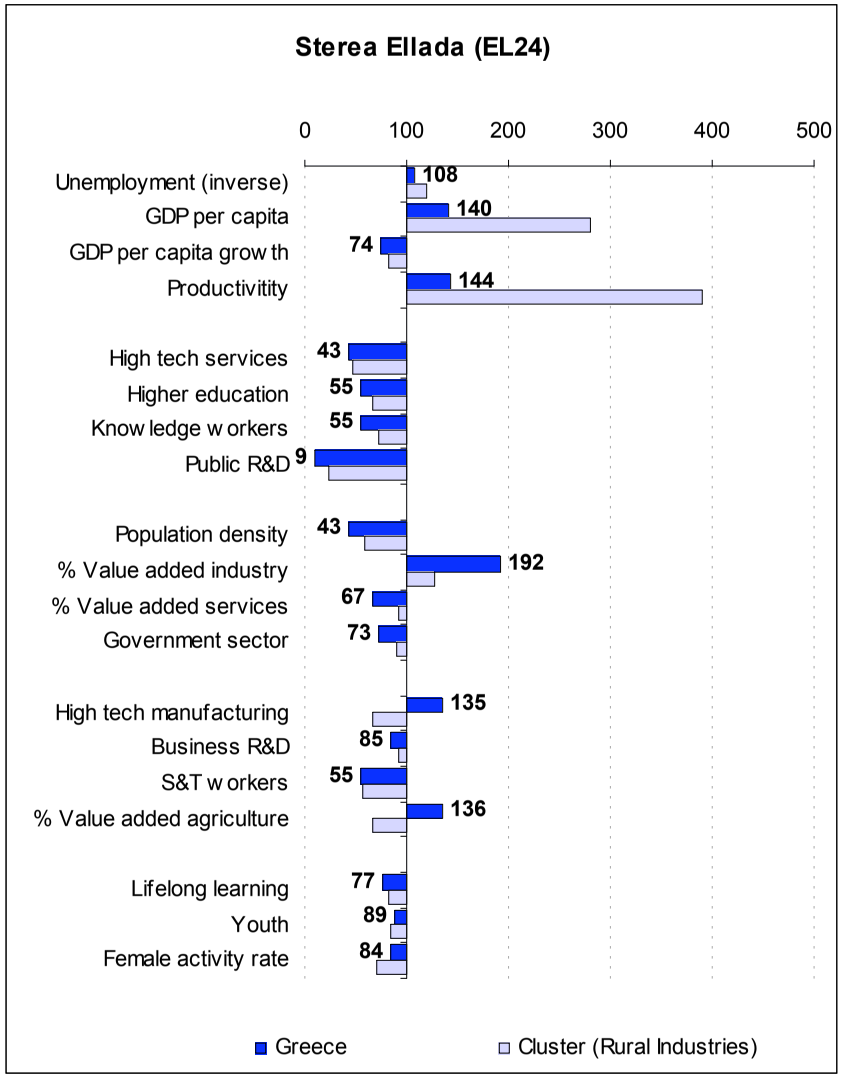
			Economic performance				Public knowledge				Urban services				Private technology				Learning families		
		Cluster	Unemployment	GDP per capita	GDP per capita growth	Productivitity	High tech services	Higher education	Knowledge workers	Public R&D	Population density	% Value added industry	% Value added services	Government sector	High tech manufacturing	Business R&D	S&T workers	% Value added agriculture	Lifelong learning	Youth	Female activity rate
			2003	2002	1996-02	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	200
EU25			9,2	21170	4,8	4556	3,2	20,7	11,6	0,69	117	27,0	70,9	7,5	6,6	1,24	20,7	2,1	8,7	10,8	48,3
Regional average			9,4	18882	4,8	3914	2,8	18,9	10,7	0,49	294	28,9	66,6	7,6	6,5	0,80	19,5	4,3	7,1	10,5	47,2
Greece	EL		9,3	16425	6,2	3043	1,8	18,1	10,4	0,43	84	22,3	70,6	7,4	2,2	0,20	13,5	7,1	2,8	9,6	37,7
Relative to EU25			99	78	130	67	55	87	89	62	71	82	100	99	33	16	65	337	32	88	78
A.Makedonia, Thraki	EL11	6	10,3	12522	5,2	2308	0,5	13,0	7,5	0,42	43	24,0	59,3	7,1	1,0	0,11	9,6	16,7	3,6	9,9	39,8
Kentriki Makedonia	EL12	6	10,1	16710	6,0	3191	1,3	18,3	10,5	0,43	101	21,9	70,7	5,2	1,7	0,10	13,1	7,4	2,3	9,8	36,5
Dytiki Makedonia	EL13	6	16,1	17059	6,9	3434	1,1	12,9	7,8	0,05	31	25,6	59,7	6,8	0,5	0,01	9,4	14,7	2,4	10,0	37,5
Thessalia	EL14	6	9,7	13710	5,1	2633	0,8	15,1	9,6	0,20	53	21,1	63,2	7,9	1,3	0,06	11,9	15,7	2,1	9,6	34,1
Ipeiros	EL21	6	11,0	13116	8,1	2548	1,1	16,0	9,2	0,79	37	15,1	75,6	7,7	0,6	0,03	11,7	9,3	2,1	8,4	34,4
Ionia Nisia	EL22	6	11,0	14303	6,6	2586	0,6	10,3	6,7	0,12	93	8,1	83,1	6,9	0,1	0,00	9,5	8,7	1,7	9,3	34,4
Dytiki Ellada	EL23	6	8,9	12339	4,4	2398	1,2	12,9	7,9	0,73	64	16,5	70,7	7,3	1,2	0,11	10,6	12,8	2,1	9,7	34,3
Sterea Ellada	EL24	8	8,6	23045	4,6	4380	0,7	10,0	5,7	0,04	36	42,7	47,6	5,4	3,0	0,17	7,4	9,6	2,1	8,5	31,7
Peloponnisos	EL25	8	7,7	16371	8,1	2858	0,8	12,5	6,3	0,03	39	30,3	55,4	4,5	0,9	0,42	8,0	14,3	0,9	8,4	38,6
Attiki	EL3	3	8,7	17420	6,6	3131	3,0	23,9	13,7	0,57	1027	21,8	77,6	9,2	3,7	0,33	18,1	0,6	3,9	9,5	39,8
Voreio Aigaio	EL41	6	7,4	16795	9,6	3701	1,6	10,9	6,2	0,26	53	24,0	63,6	7,4	0,5	0,01	8,9	12,4	1,5	9,3	27,4
Notio Aigaio	EL42	6	10,9	19265	6,9	3731	1,2	9,7	5,3	0,07	57	7,6	84,5	9,5	0,9	0,02	8,1	8,0	1,5	10,9	38,3
Kriti	EL43	6	6,8	15908	5,4	2725	1,2	15,2	8,3	0,88	72	10,8	78,2	5,4	0,2	0,04	10,3	11,1	2,1	10,6	43,2
Learning		1	4,3	23139	4,7	4900	3,2	22,1	12,5	0,40	216	30,5	66,0	6,0	6,2	1,12	22,0	2,4	15,1	12,2	53,8
Central Techno		2	7,5	20700	4,0	4884	2,9	18,7	10,6	0,42	182	30,0	66,8	8,2	7,5	0,84	20,7	3,1	6,7	11,2	47,6
Local Science & Services		3	9,2	19852	6,0	3780	4,3	23,6	13,7	0,88	389	22,0	76,2	9,8	4,6	0,79	22,4	1,8	5,9	10,4	46,9
High Techno		4	6,1	25202	3,6	5591	3,1	17,5	10,3	0,58	288	31,7	66,7	7,3	11,9	1,31	22,8	1,6	5,6	9,7	46,4
Aging Academia		5	13,3	17508	5,3	3649	2,5	27,4	13,2	0,67	185	30,1	66,9	7,6	6,7	0,57	18,8	3,0	4,8	7,4	46,0
Southern Cohesion		6	10,7	16213	6,3	3082	1,2	14,7	8,2	0,37	66	19,9	70,0	7,5	1,5	0,11	11,2	10,2	3,1	10,0	38,2
Eastern Cohesion		7	14,2	9776	5,3	1230	1,9	12,0	7,2	0,26	113	34,2	61,3	6,6	6,6	0,33	15,9	4,5	4,1	11,0	48,4
Rural Industries		8	10,3	8204	5,6	1120	1,6	14,8	7,8	0,17	62	33,6	52,0	6,0	4,5	0,18	12,9	14,5	2,6	10,1	45,3

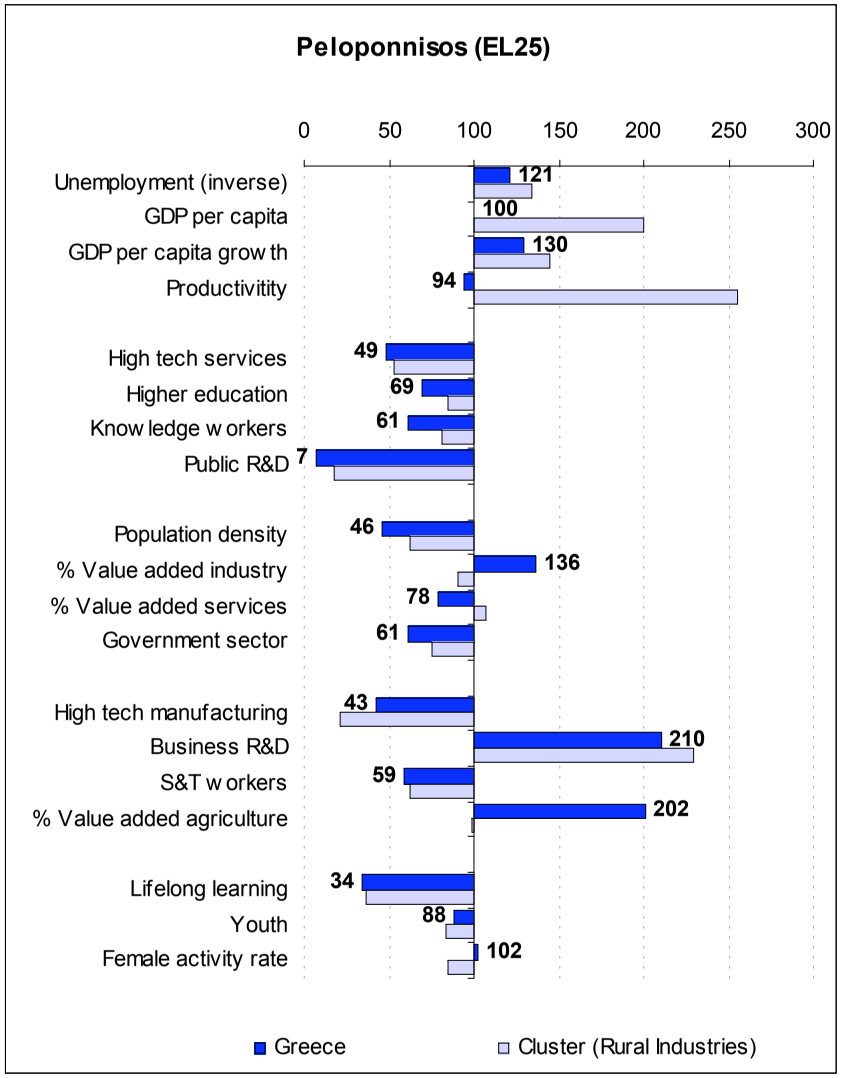
	Cluster	Economic performance				Public knowledge				Urban services				Private technology				Learning families		
		Unemployment	GDP per capita	GDP per capita growth	Productivitity	High tech services	Higher education	Knowledge workers	Public R&D	Population density	% Value added industry	% Value added services	Government sector	High tech manufacturing	Business R&D	S&T workers	% Value added agriculture	Lifelong learning	Youth	Female activity rate
		2003	2002	1996-02	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	200
Low-tech Government	9	14,1	18553	4,1	4848	2,3	10,0	6,2	0,55	161	21,2	75,1	12,9	4,2	0,28	16,2	3,7	4,6	10,1	32,4
Nordic High-tech Learning	10	6,4	23323	4,7	5202	4,5	28,5	18,7	0,41	67	29,9	67,9	5,4	7,6	3,05	30,2	2,3	25,0	11,9	58,2
Science & Service Centre	11	6,1	34489	5,3	6663	5,6	28,5	16,8	0,98	2118	16,8	81,2	7,4	3,8	1,00	30,5	0,8	12,8	11,4	55,5

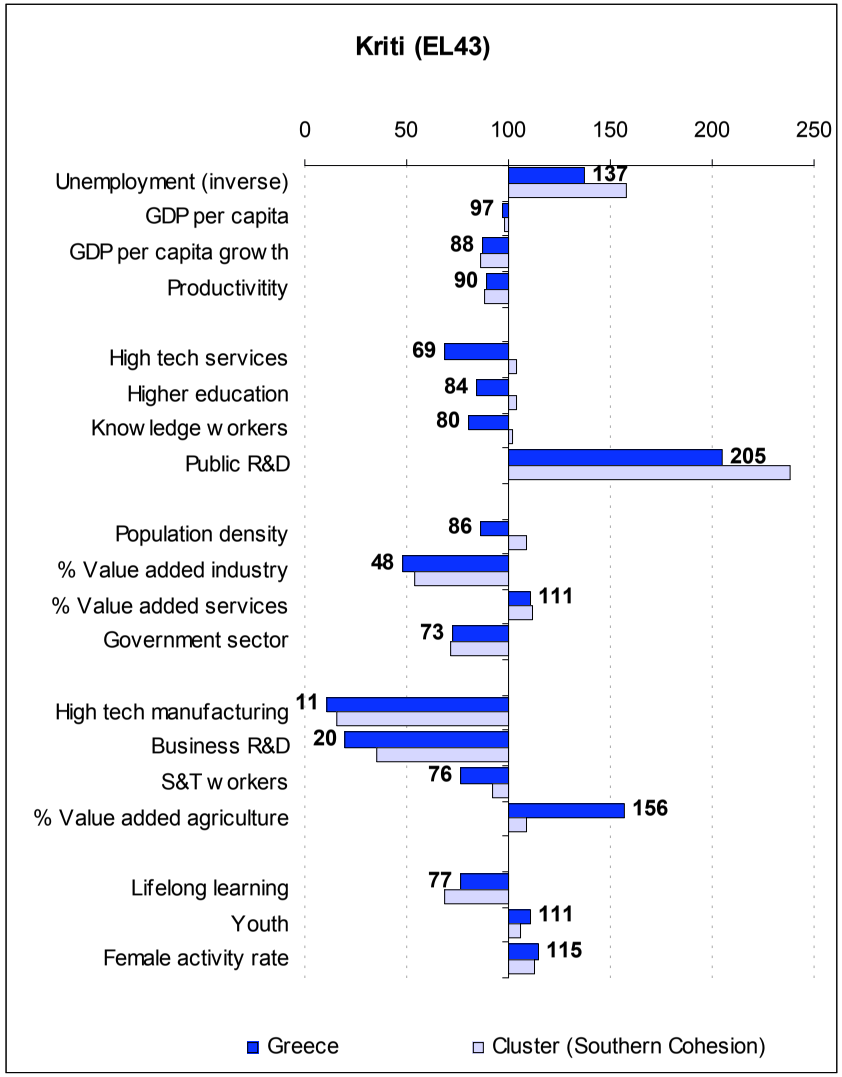
B.2 Regional Scorecards

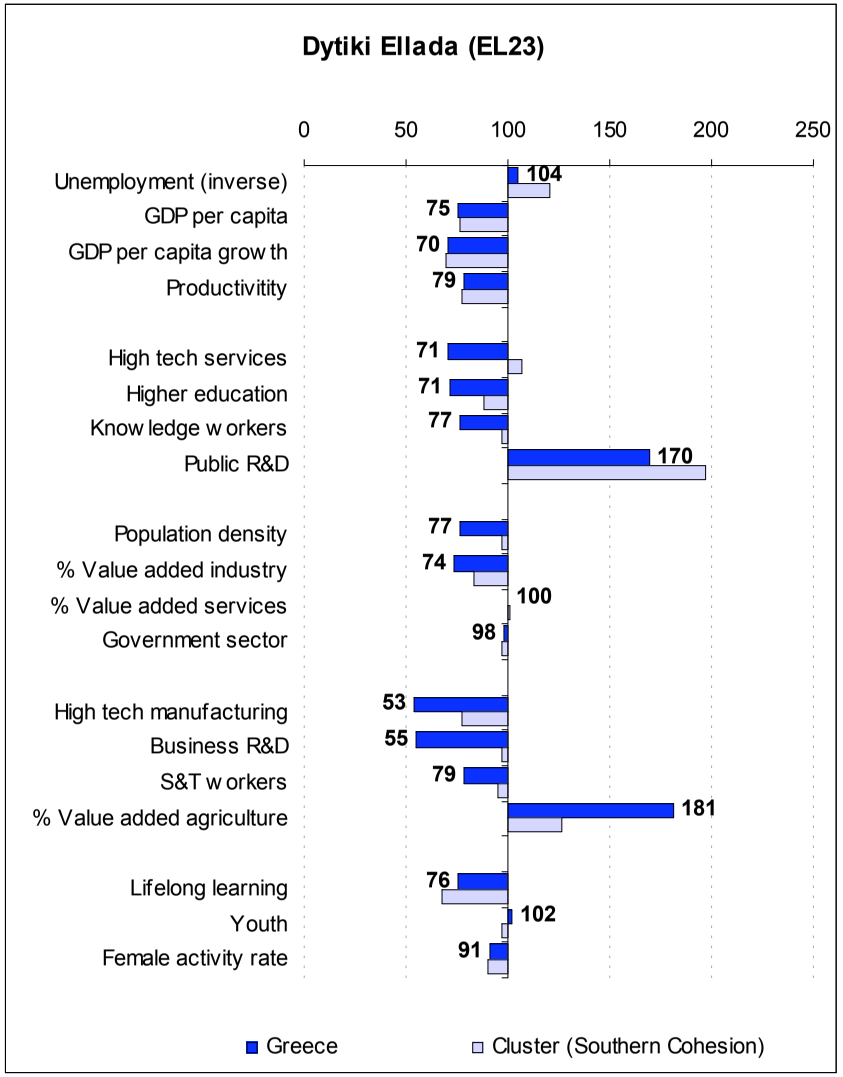


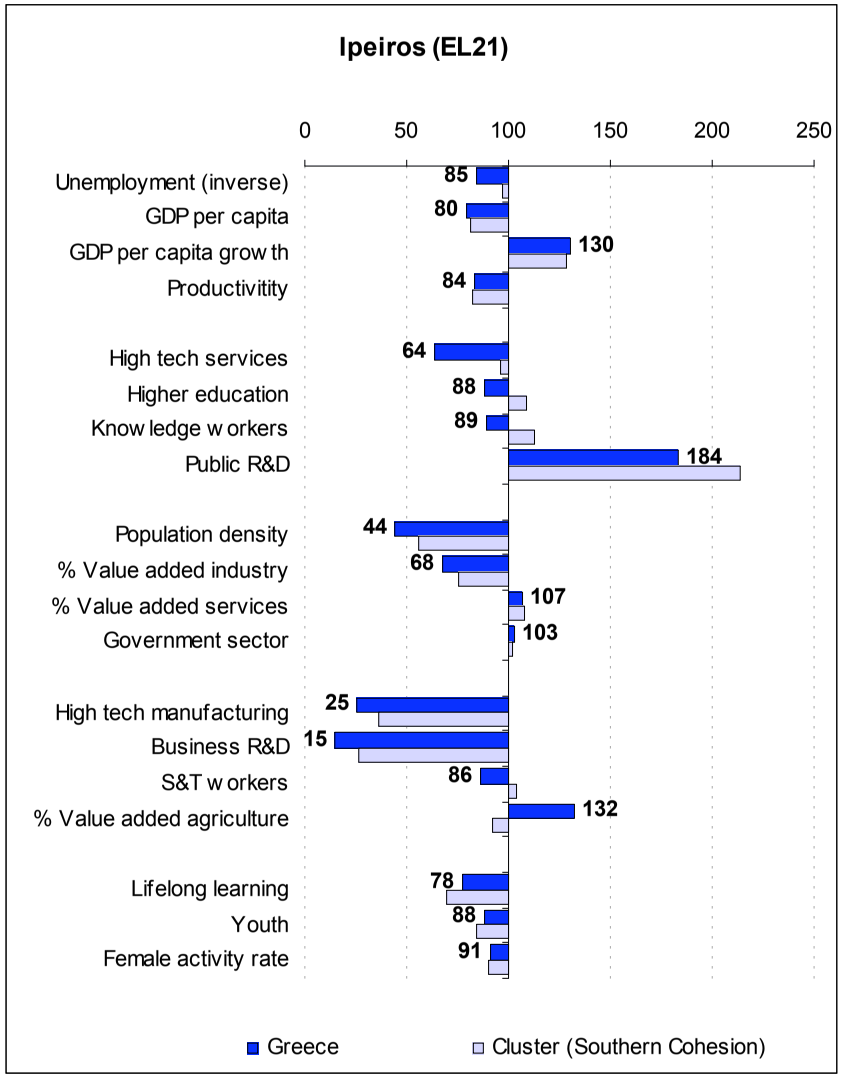


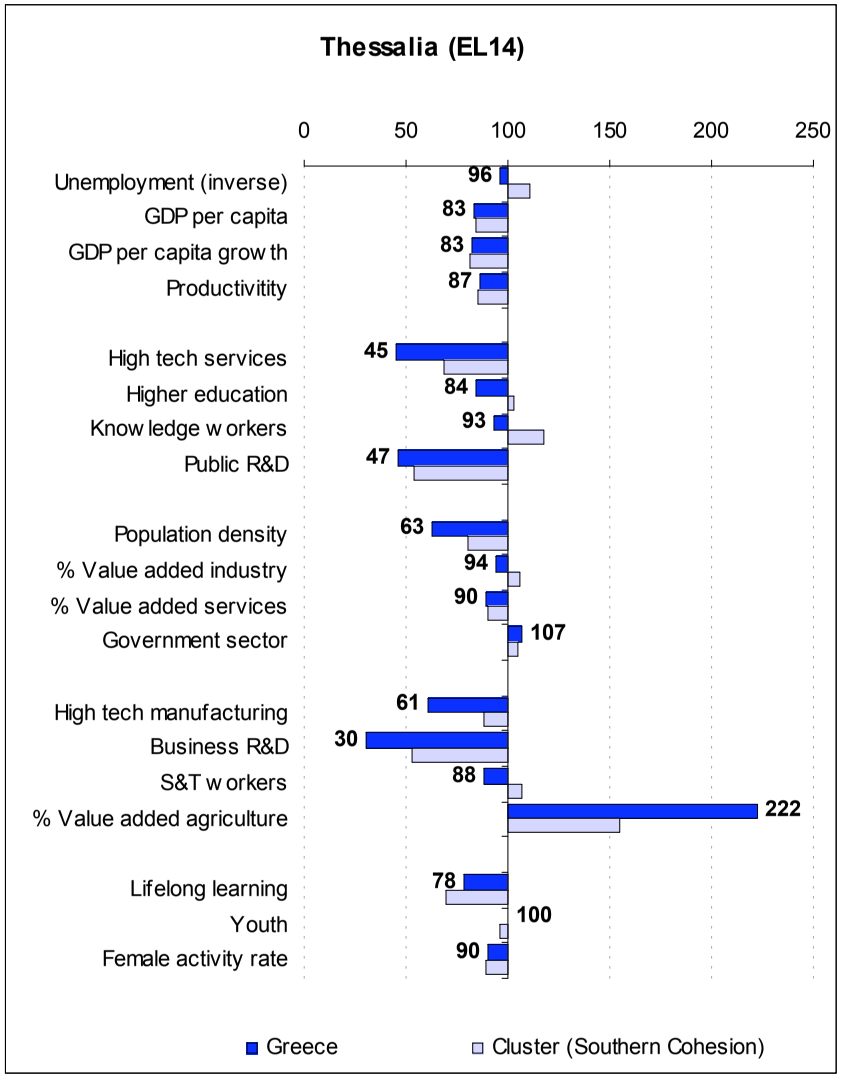

Sterea Ellada (EL24)
0
100
200
300
400
500
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
108
140
74
144
43
55
55
9
43
192
67
73
135
85
55
136
77
89
84
Greece
Cluster (Rural Industries)

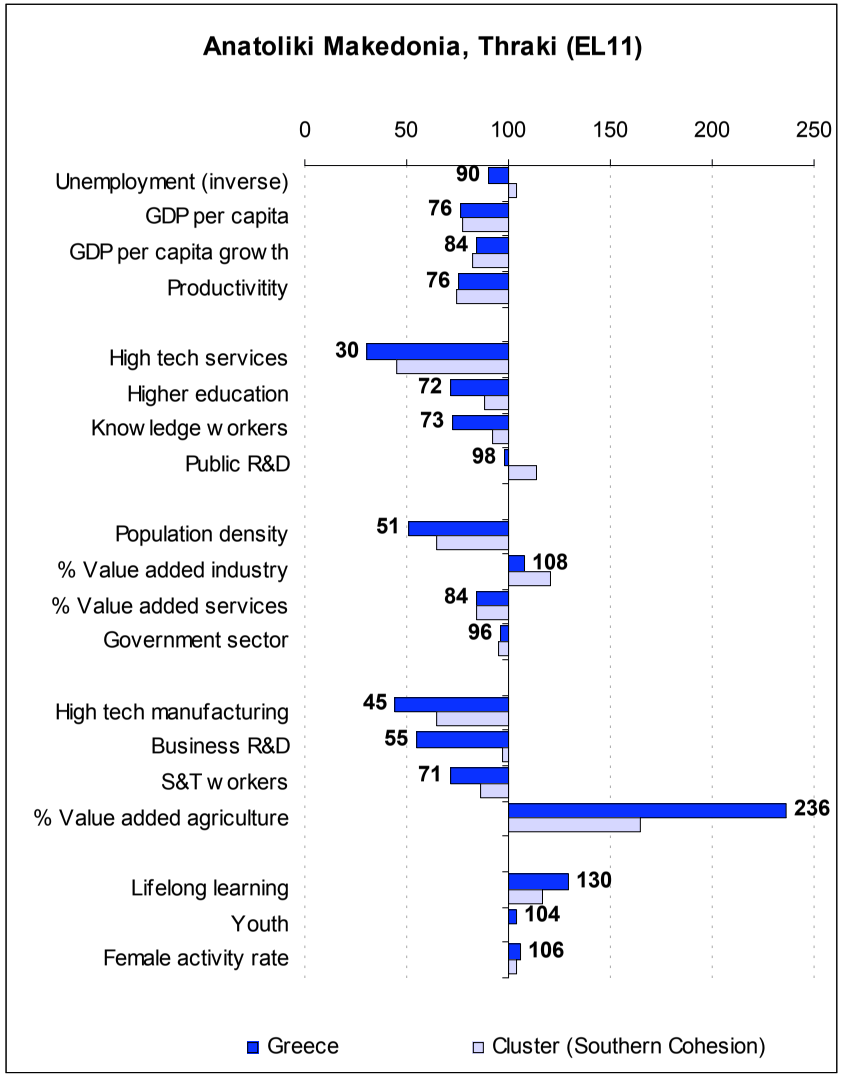

Peloponnisos (EL25)
0
50
100
150
200
250
300
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
121
100
130
94
49
69
61
7
46
136
78
61
43
210
59
202
34
88
102
Greece
Cluster (Rural Industries)

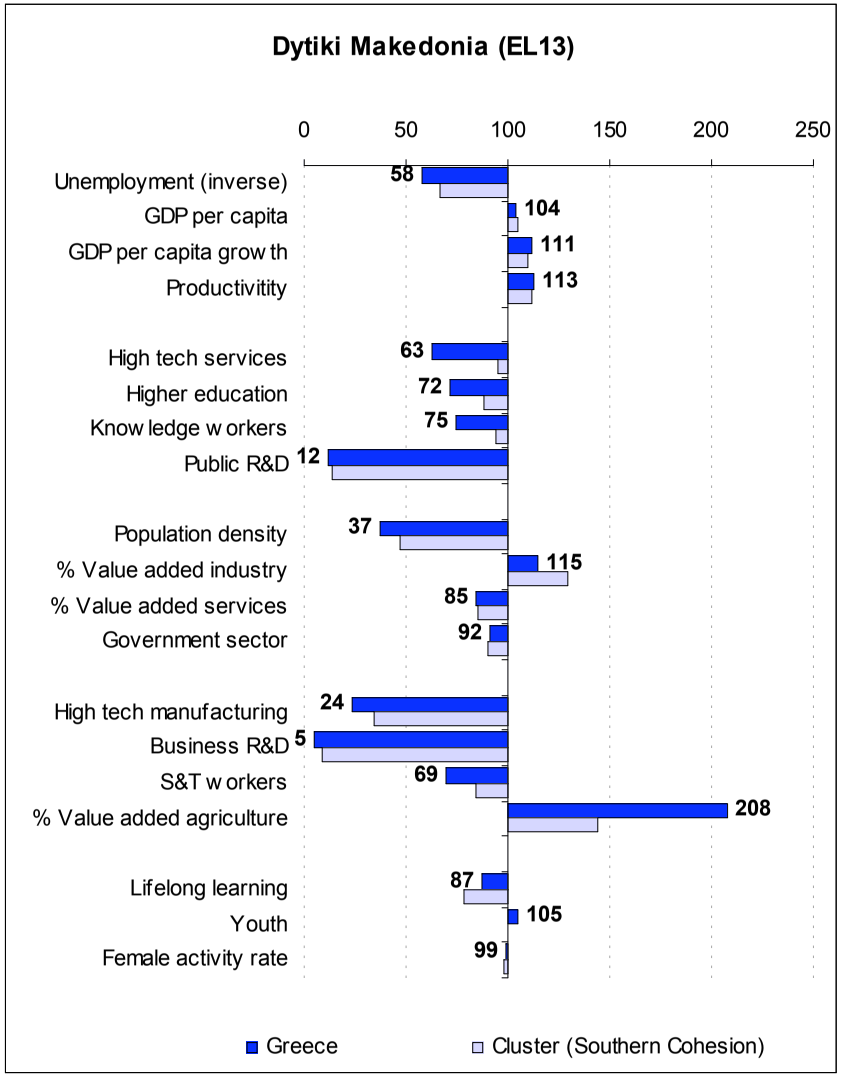

Kriti (EL43)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
137
97
88
90
69
84
80
205
86
48
111
73
11
20
76
156
77
111
115
Greece
Cluster (Southern Cohesion)

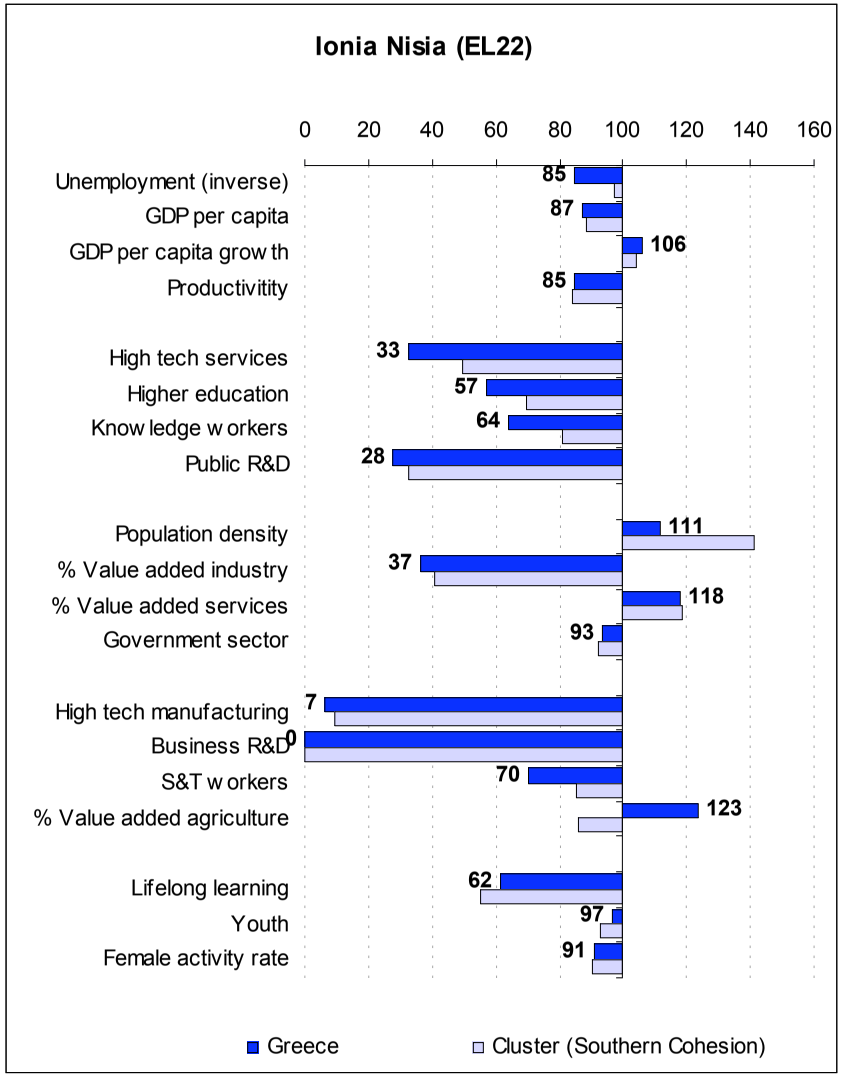

Dytiki Ellada (EL23)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
104
75
70
79
71
71
77
170
77
74
100
98
53
55
79
181
76
102
91
Greece
Cluster (Southern Cohesion)

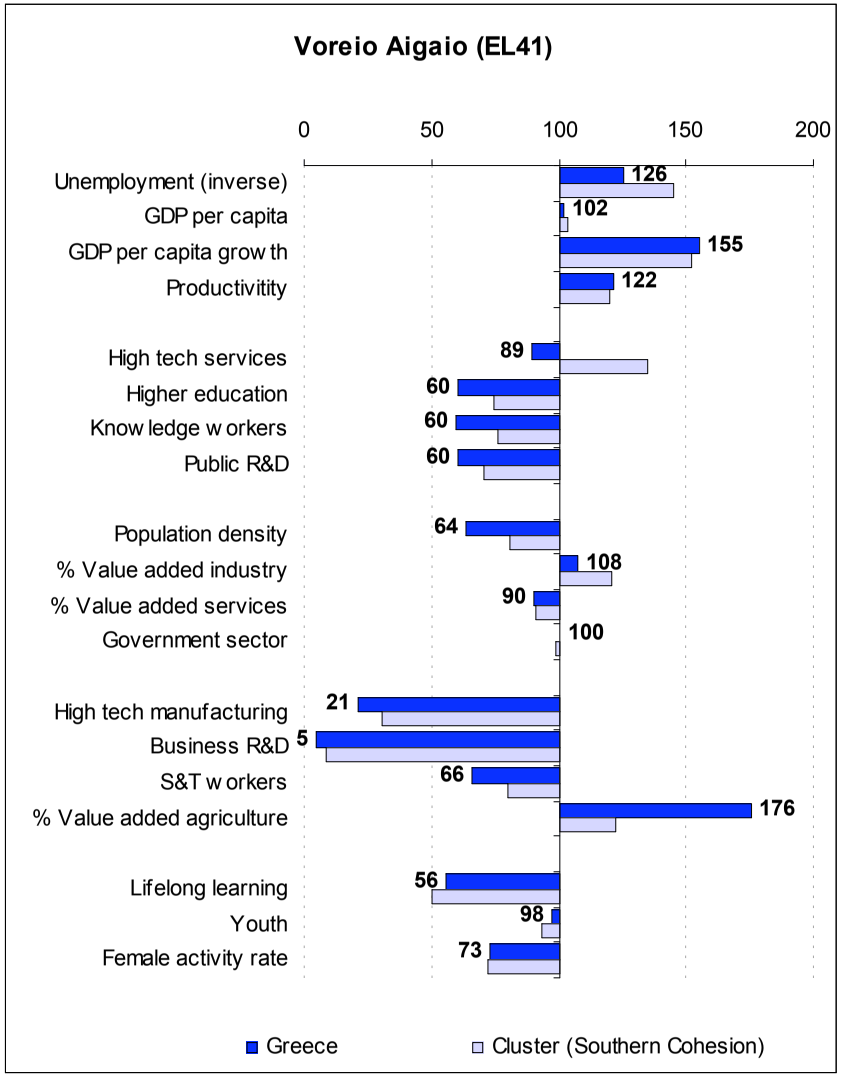

Ipeiros (EL21)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
85
80
130
84
64
88
89
184
44
68
107
103
25
15
86
132
78
88
91
Greece
Cluster (Southern Cohesion)

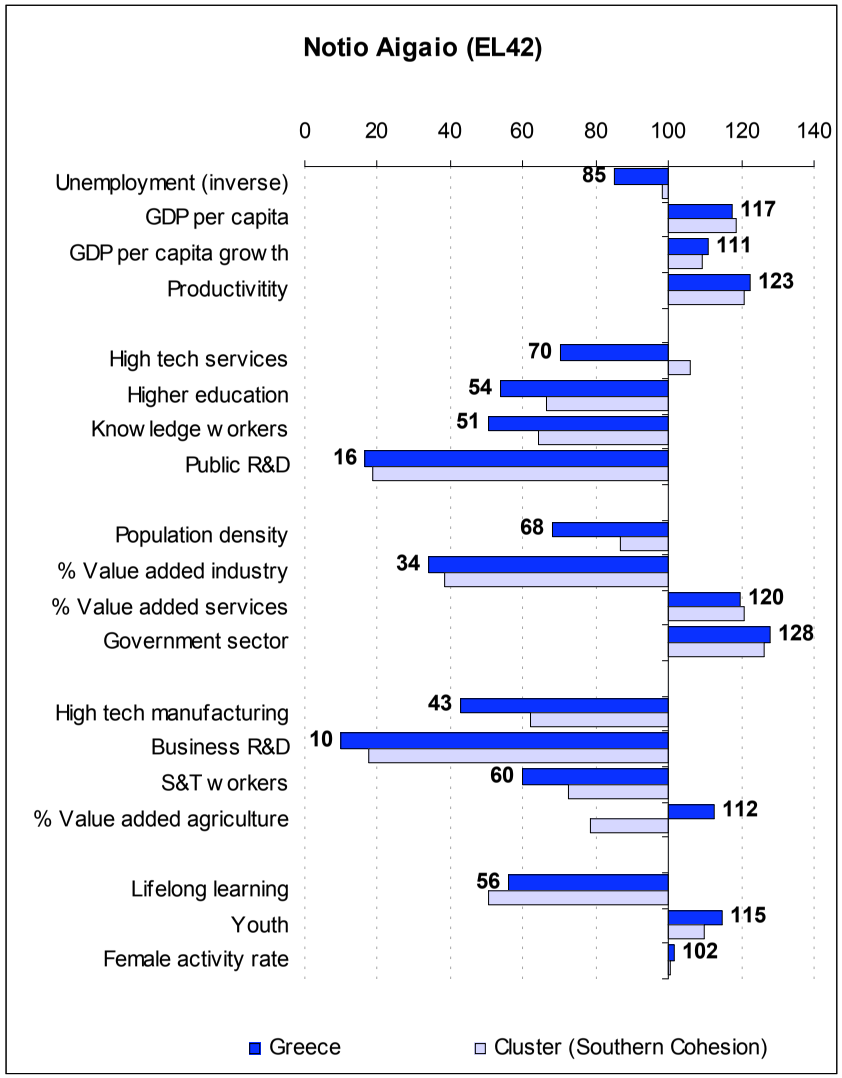

Thessalia (EL14)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
96
83
83
87
45
84
93
47
63
94
90
107
61
30
88
222
78
100
90
Greece
Cluster (Southern Cohesion)


Anatoliki Makedonia, Thraki (EL11)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
90
76
84
76
30
72
73
98
51
108
84
96
45
55
71
236
130
104
106
Greece
Cluster (Southern Cohesion)


Dytiki Makedonia (EL13)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
58
104
111
113
63
72
75
12
37
115
85
92
24
5
69
208
87
105
99
Greece
Cluster (Southern Cohesion)


Ionia Nisia (EL22)
0
20
40
60
80
100
120
140
160
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
85
87
106
85
33
57
64
28
111
37
118
93
7
0
70
123
62
97
91
Greece
Cluster (Southern Cohesion)


Voreio Aigaio (EL41)
0
50
100
150
200
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
126
102
155
122
89
60
60
60
64
108
90
100
21
5
66
176
56
98
73
Greece
Cluster (Southern Cohesion)


Notio Aigaio (EL42)
0
20
40
60
80
100
120
140
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
85
117
111
123
70
54
51
16
68
34
120
128
43
10
60
112
56
115
102
Greece
Cluster (Southern Cohesion)

Appendix C Categories used for policy-mix analysis

C.1 Classification of policy areas

Policy area	Short description
Improving governance capacities for innovation and knowledge policies	Technical assistance type funding used by public authorities, regional agencies and public-private partnerships in developing and improving policies and strategies in support of innovation and knowledge. This could include past ERDF innovative action programmes as well as support for instance for regional foresight, etc.
Innovation friendly environment;	This category covers a range of actions which seek to improve the overall environment in which enterprises innovate, and notably three sub groups: • innovation financing (in terms of establishing financial engineering schemes, etc.); • regulatory improvements and innovative approaches to public services and procurement (this category could notably capture certain e-government investments related to provision of services to enterprises) ; • Developing human capital for the knowledge economy. This category will be limited to projects in higher education aimed at developing industry orientated courses and post-graduate courses; training of researchers in enterprises or research centres[24];
Knowledge transfer and technology diffusion to enterprises	Direct or indirect support for knowledge and technology transfer: • direct support: aid scheme for utilising technology-related services or for implementing technology transfer projects, notably environmentally friendly technologies and ITC; • indirect support: delivered through funding of infrastructure and services of technology parks, innovation centres, university liaison and transfer offices, etc.
Innovation poles and clusters	Direct or indirect support for creation of poles (involving public and non-profit organisations as well as enterprises) and clusters of companies • direct support: funding for enterprise level cluster activities, etc. • indirect support through funding for regrouping R&D infrastructure in poles, infrastructure for clusters, etc.
Support to creation and growth of innovative enterprises	Direct or indirect support for creation and growth of innovative firms: • direct support: specific financial schemes for spin-offs and innovative start-ups, grants to SMEs related to improving innovation management, marketing, industrial design, etc.; • indirect support through funding of incubators, training related to entrepreneurship, etc.
Boosting applied research and product development	Funding of "Pre-competitive development" and "Industrial research" projects and related infrastructure. Policy instruments include: • aid schemes for single beneficiary or groups of beneficiaries (including IPR protection and exploitation); • research infrastructures for non-profit/public organisations and higher education sector directly related to universities.

[24] This is part of the wider area of in-house training, but in the present study only the interventions targeted to researchers or research functions will be analysed.

C.2 Classification of Beneficiaries:

Beneficiaries	Short description
Public sectors	• Universities • National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc..) • Public companies
Private sectors	• Enterprises • Private research centres
Networks	• cooperation between research, universities and businesses • cooperation between businesses (*clusters of SMEs)* • other forms of cooperation among different actors

C.3 Classification of instruments:

Instruments	Short description
Infrastructures and facilities	• Building and equipment for laboratories or facilities for university or research centres, • Telecommunication infrastructures, • Building and equipment for incubators and parks for innovative enterprises
Aid schemes	• Grants and loans for RTDI projects • Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises
Education and training	• Graduate and post-graduate University courses • Training of researchers

Appendix D Financial and policy measure tables

D.1 Additional financial tables

D 1.1 RTDI plus business (innovation technology) support

Objectives	Total cost	Structural funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	3.072.625.419,97	1.126.683.191,32	998.407.841,32	128.275.350,00	644.562.455,81	1.301.379.772,84
TOTAL COHESION POLICY						
Objective 1	37.728.017.346,00	22.707.000.000,00	15.248.128.868,00	4.683.418.835,00	11.564.395.422,00	3.456.621.924,00

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
Attica	20.993.974,10	20.993.974,10	-	1.116.641.725,00	1.029.941.801,00	68.000.308,00
Crete	13.067.904,96	13.067.904,96	-	508.426.662,00	366.782.173,00	49.803.471,00
North Aegean	19.407.031,20	19.407.031,20	-	369.661.715,00	282.269.791,00	33.992.308,00
South Aegean	4.942.500,00	4.942.500,00	-	390.121.530,00	312.827.181,00	39.271.807,00
Epirus	11.386.837,35	11.386.837,35	-	443.918.408,00	330.633.482,00	32.900.309,00
Central Greece	8.886.662,02	8.886.662,02	-	539.284.605,00	405.984.682,00	43.600.306,00
Western Greece	8.285.160,00	8.285.160,00	-	505.940.694,00	389.774.219,00	35.147.873,00
Ionian Islands	4.698.543,75	4.698.543,75	-	257.831.814,00	206.363.900,00	25.183.298,00
Central Macedonia	30.594.593,90	30.594.593,90	-	937.167.219,00	713.087.559,00	78.004.122,00
Western Macedonia	6.560.871,80	6.560.871,80	-	390.179.449,00	280.133.422,00	26.562.254,00
Eastern Macedonia - Thrace	27.472.012,33	27.472.012,33	-	760.995.208,00	534.066.805,00	68.037.028,00
Peloponnese	10.755.000,00	10.755.000,00	-	465.028.950,00	362.329.027,00	22.200.310,00
Thessaly	3.775.500,00	3.775.500,00	-	571.067.454,00	406.782.533,00	43.500.306,00

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
Obj. 1 - Total Regional Ops	**170.826.591,41**	**170.826.591,41**	**0,00**	**7.256.265.433,00**	**5.620.976.575,00**	**566.203.700,00**
O.P. Competitiveness	895.381.249,91	827.581.249,91	67.800.000,00	2.055.773.607,00	1.898.820.196,00	156.953.411,00
O.P. Education & Initial Vocational Training	60.475.350,00	-	60.475.350,00	2.072.930.711,00	390.760.323,00	1.682.170.388,00
O.P. Railways, Airports, Public Transport	-	-	-	1.468.752.690,00	1.468.752.690,00	-
O.P. Culture	-	-	-	473.585.027,00	473.585.027,00	-
O.P. Rural Development - Restructuring of the Countryside	-	-	-	1.482.755.239,00	-	-
O.P. Environment	-	-	-	430.073.656,00	430.073.656,00	-
O.P. Fisheries	-	-	-	257.733.308,00	34.121.408,00	-
O.P. Highways, Ports, Urban Development	-	-	-	3.369.500.470,00	3.369.500.470,00	-
O.P. Information Society	-	-	-	1.793.581.863,00	1.321.033.996,00	472.547.867,00
O.P. Employment & Vocational Training	-	-	-	1.585.737.360,00	10.000.000,00	1.575.737.360,00
O.P. Health & Welfare	-	-	-	384.979.997,00	164.699.998,00	220.279.999,00
Technical Assistance	-	-	-	75.330.639,00	65.804.529,00	9.526.110,00
Obj. 1 - Total Multiregional Ops	**955.856.599,91**	**827.581.249,91**	**128.275.350,00**	**15.450.734.567,00**	**9.627.152.293,00**	**4.117.215.135,00**

Categories 181 to 184 plus :
152 Environment-friendly technologies, clean and economical energy technologies
153 Business organisation advisory service (including internationalisation, exporting and environmental management, purchase of technology)
155 Financial engineering
162 Environment-friendly technologies, clean and economical energy technologies
163 Enterprise advisory service (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology)
164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs)
165 Financial engineering

D 1.2 Broad innovation and knowledge economy funding

Objectives	Total cost	Structural funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	3.939.518.368,65	1.735.985.776,39	1.521.460.426,39	214.525.350,00	902.152.819,42	1.301.379.772,84
TOTAL COHESION POLICY						
Objective 1	37.728.017.346,00	22.707.000.000,00	15.248.128.868,00	4.683.418.835,00	11.564.395.422,00	3.456.621.924,00

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
Attica	30.189.845,29	30.189.845,29	-	1.116.641.725,00	1.029.941.801,00	68.000.308,00
Crete	16.042.552,86	16.042.552,86	-	508.426.662,00	366.782.173,00	49.803.471,00
North Aegean	23.435.281,00	23.435.281,00	-	369.661.715,00	282.269.791,00	33.992.308,00
South Aegean	8.791.875,00	8.791.875,00	-	390.121.530,00	312.827.181,00	39.271.807,00
Epirus	14.685.372,98	14.685.372,98	-	443.918.408,00	330.633.482,00	32.900.309,00
Central Greece	10.221.364,42	10.221.364,42	-	539.284.605,00	405.984.682,00	43.600.306,00
Western Greece	8.285.160,00	8.285.160,00	-	505.940.694,00	389.774.219,00	35.147.873,00
Ionian Islands	5.743.162,50	5.743.162,50	-	257.831.814,00	206.363.900,00	25.183.298,00
Central Macedonia	30.594.593,90	30.594.593,90	-	937.167.219,00	713.087.559,00	78.004.122,00
Western Macedonia	8.982.001,50	8.982.001,50	-	390.179.449,00	280.133.422,00	26.562.254,00
Eastern Macedonia - Thrace	34.063.567,03	34.063.567,03	-	760.995.208,00	534.066.805,00	68.037.028,00
Peloponnese	10.755.000,00	10.755.000,00	-	465.028.950,00	362.329.027,00	22.200.310,00
Thessaly	3.775.500,00	3.775.500,00	-	571.067.454,00	406.782.533,00	43.500.306,00
Obj. 1 - Total Regional Ops	**205.565.276,47**	**205.565.276,47**	**0,00**	**7.256.265.433,00**	**5.620.976.575,00**	**566.203.700,00**
O.P. Competitiveness	895.381.249,91	827.581.249,91	67.800.000,00	2.055.773.607,00	1.898.820.196,00	156.953.411,00
O.P. Education & Initial Vocational Training	60.475.350,00	-	60.475.350,00	2.072.930.711,00	390.760.323,00	1.682.170.388,00
O.P. Railways, Airports, Public Transport	53.510.637,40	53.510.637,40	-	1.468.752.690,00	1.468.752.690,00	-
O.P. Culture	-	-	-	473.585.027,00	473.585.027,00	-
O.P. Rural Development - Restructuring of the Countryside	-	-	-	1.482.755.239,00	-	-

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
O.P. Environment	5.035.800,00	5.035.800,00	-	430.073.656,00	430.073.656,00	-
O.P. Fisheries	-	-	-	257.733.308,00	34.121.408,00	-
O.P. Highways, Ports, Urban Development	27.735.736,21	27.735.736,21	-	3.369.500.470,00	3.369.500.470,00	-
O.P. Information Society	488.281.726,40	402.031.726,40	86.250.000,00	1.793.581.863,00	1.321.033.996,00	472.547.867,00
O.P. Employment & Vocational Training	-	-	-	1.585.737.360,00	10.000.000,00	1.575.737.360,00
O.P. Health & Welfare	-	-	-	384.979.997,00	164.699.998,00	220.279.999,00
Technical Assistance	-	-	-	75.330.639,00	65.804.529,00	9.526.110,00
Obj. 1 - Total MultiRegional Ops	**1.530.420.499,92**	**1.315.895.149,92**	**214.525.350,00**	**15.450.734.567,00**	**9.627.152.293,00**	**4.117.215.135,00**

This third calculation adds RTDI plus business (innovation & technology) support plus information society. As D.1.1 plus:

322 Information and Communication Technology (including security and safe transmission measures)

324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)

D.2 Summary of key policy measures per programme

D 2.1 : main measures in favour of innovation and knowledge

	Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
O.P. Rural Development - Restructuring of the Countryside	Investment in agricultural holdings	3	Aid schemes	Private sector Networks
O.P. Fisheries	Innovative Actions	3	Aid Schemes	Private sector
O.P. Information Society	e-Government: Business plans, studies, pilot projects	2	Infrastructures and facilities	Public Sector
	Regional geographic information systems and innovative actions	2	Infrastructures and facilities, Aid schemes, Education & Training	Public Sector, Private Sector
	Creation of a ¨digital¨ environment for the new economy	2,3,5	Aid schemes	Private sector
	Bringing Enterprises in the digital economy	3	Aid schemes	Private sector
	Research and technological development for the IS	6	Aid schemes	Public Sector, Private Sector, Networks
	Building Mechanisms for the Implementation of the Legal Framework and the Strengthening of the Liberalisation Process	2	Infrastructures and facilities	Public Sector, Private Sector
	Advanced telecommunications services for the citizens and the Enterprises	3	Infrastructures and facilities	Public Sector, Private Sector
O.P. Competitiveness	Industrial, Technological & Business Infrastructures	3	Aid schemes	Private Sector
	National Quality System	2	Aid schemes	Public Sector, Private Sector
	Simplification of the Business Environment	2	Infrastructures and facilities	Private Sector
	Aid for Private Investment (Law 2601/98) in the Processing Sector	3	Aid schemes	Private Sector
	Continuing Investments under the Development Law 2601/98	3,5	Aid schemes	Private Sector
	Technological & Organisational Modernisation of Enterprises	3,5	Aid schemes	Private Sector

	Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
	Fund for Venture Capital Funds for NTBFs	2	Aid schemes	Private Sector
	Support for the Competitiveness of SMEs and VSEs	3,4,5	Aid schemes	Private Sector
	Support of Entrepreneurship in the Environmental Sector	3	Aid schemes	Private Sector
	Establishment and Operation of a Bailment Fund for SMEs and VSEs	2	Aid schemes	Private Sector
	Promotion of Business Excellence in the Energy Sector	3	Aid schemes	Private Sector
	Promotion of Business Excellence in Processing and Tourism Enterprises	2	Aid schemes Infrastructures and facilities	Private Sector
	Promotion of Excellence in Technological Development and Research	6	Aid schemes	Public Sector Networks
	PRAXE pre-seed capital and first stage funding for spin offs	5	Aid schemes	Public Sector
	Incubators for New Knowledge-Intensive Companies in Science and Technology Parks and Public Research Centres with the Participation of Enterprises	3,5	Infrastructures and facilities	Public Sector, Private Sector
	Encouragement of Research, Transfer and Diffusion of Technology in Companies. Support for Activities of International Science and Technological Co-operation and Technology Transfer	6	Aid schemes	Private Sector Networks
	Increasing Public Awareness in New Technologies. Support and Formulation of R & T Policy. Management of R & T Information	2	Education and training	Public Sector
	Consortiums for Research and Technological Development in Sectors of National Priority	3,6	Aid schemes	Public Sector, Private Sector Networks
	Development of Regional Innovation Poles. Development of Innovation Zone in Thessaloniki	1,3,4,6	Infrastructures and facilities, Aid schemes, Education & Training	Public Sector, Private Sector Networks
	Supporting Enterprises to Invest in Alternative Tourism	5	Aid schemes	Private Sector

	Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
	Promotion of RESs Systems, Co-Production in the Energy System of the Country - Energy Saving	3	Aid schemes	Private Sector
	Adoption of the Use of Natural Gas in the Domestic and Tertiary Sector, by New Industrial Consumers, and in the Transport Sector	3	Aid schemes	Private Sector
	Human Resources in Research and Technology	2	Education and training, Aid schemes	Public Sector, Private Sector
	Technical Aid ERDF	1	Aid schemes	Public Sector
Eastern Macedonia - Thrace	Research - Innovation	3,4,5	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
	Infrastructures for Entrepreneurship	5	Infrastructures and facilities	Public Sector, Private Sector
	Aid for Private Investment (Law 2601/98) in the Processing Sector	2,3,5	Aid schemes	Private Sector
	Support for the Competitiveness of SMEs	2,3	Aid schemes	Private Sector
	Information Society - Telecommunications	2,3	Aid schemes	Private Sector
Attica	Strengthening Entrepreneurship and Innovation	3,5,6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
	Incentives for Private Investments	5	Aid schemes	Private Sector
North Aegean	Incentives, Services and Infrastructures for Businesses	3,5	Aid schemes	Private Sector
	Promotion of Innovation	3,4,5,6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
Western Greece	Support for Private and Productive Investments	3,5	Aid schemes	Private Sector
	Support of SMEs	3,5,6	Aid schemes	Private Sector
	Linking Research and Production - Promotion of Innovation	3,5,6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
Western Macedonia	Entrepreneurial Infrastructures	3	Infrastructures and facilities	Private Sector
	Support for Enterprises	3	Aid schemes	Private Sector
	Integration of Innovation and New Technologies in Businesses - Applied Research Strengthening	3,6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
Epirus	Expansion of Infrastructure - Enterprise Modernization	3	Aid schemes	Private Sector
	Development and Promotion	3,6	Aid schemes,	Public Sector,

	Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
	of Innovation and Information Society		Networking	Private Sector
Thessaly	Infrastructures for Productive Business Environment	3,6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
	Innovative Actions to Improve Competitiveness of SMEs and VSEs	3,5	Aid schemes	Private Sector
Ionian Islands	Innovation Growth - Research and Technology - Information Society	6	Aid schemes Infrastructures and facilities	Public Sector, Private Sector
	Enlargement and Modernisation of the Processing Sector	3	Aid schemes Infrastructures and facilities	Private Sector
Central Macedonia	Thessaloniki as a centre of productive services	3,5	Infrastructures and facilities, Aid schemes,	Public Sector, Private Sector
	Research and development infrastructure	6	Infrastructures and facilities	Public Sector
	Support for innovation and entrepreneurship	3,4,6	Infrastructures and facilities, Aid schemes,	Public Sector, Private Sector Networks
	Combined Development of Innovation & Entrepreneurship	3	Aid schemes	Private Sector
	Support for Innovation Investments in the Processing Sector under the Development Law	3	Aid schemes	Private Sector
	Provision of Infrastructure to Increase Business Competitiveness	3	Infrastructures and facilities	Private Sector
Crete	Educational and Research Infrastructures	6	Infrastructures and facilities	Public Sector
	Familiarisation of Enterprises with New Technologies, Promotion of Innovation	3	Aid schemes	Public Sector, Private Sector
	Technological Upgrading and Provision of Services to the Enterprises of the Secondary Sector	3,5	Aid schemes, Education & Training	Public Sector, Private Sector Networks
South Aegean	Improvement of the Productive Business Environment - Innovative Applications	3,5	Aid Schemes	Private Sector
Peloponnese	Support of the Infrastructures and Competitiveness of the Processing Sector	3	Infrastructures and facilities	Private Sector
	Development and Modernisation of SMEs	3	Aid Schemes	Private Sector
Central Greece	Support - Modernisation of	3	Infrastructures	Private Sector

	Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
	Industry Infrastructures		and facilities	
	Productive Investment Incentives	3	Aid schemes	Private Sector
	Support of SMEs and micro-enterprises	3,5	Aid schemes	Private Sector
	Support of Innovative Actions and Information Society	3	Aid schemes	Public Sector, Private Sector

* Classification of RTDI interventions: (1) Improving governance capacities for innovation and knowledge policies; (2) Innovation friendly environment; (3) Knowledge transfer and technology diffusion enterprises; (4) Innovation poles and clusters; Support to creation and growth of innovative enterprises; (5) Boosting applied research and product development (see appendix).

**Classification of instruments: Infrastructures and facilities; Aid schemes; Education and training.

***Classification of Beneficiaries: Public sectors; Private sectors; Networks

Main source: OPs, annual implementation reports, etc.

Appendix E Case studies

Name of Case (related policy measure or action)
Title of measure/project: (in English & national language) Support of Research Units for prototyping and commercial exploitation of research results. Identification and exploitation of research results by the creation of spin – offs - PRAXE **Description:** The goal of the measure is to support the creation of spin –offs from public research organisations and universities by providing pre –seed capital (PRAXE A) to researchers to explore the technical and economic feasibility for the creation of a company and first stage capital (PRAXE B) for the set up of spin off companies. Zone: Objective 1 – All country **Policy framework:** The measures are part of the Operational Programme Competitiveness.
Brief history and main features
What policy area does the initiative belong to? The measure caters for the policy areas '*Support to creation and growth of innovative enterprises*' and 'Knowledge transfer and technology diffusion to enterprises'. It provides direct support, i.e. pre-seed capital and first stage capital. **What are the main instruments characterising the initiative?** During the pre – seed stage (PRAXE A) eligible for funding are the following actions: a) Prototype design and modifications, technical tests, measurements and industrial design b) IPR protection through patenting in Greece and abroad. c) Creation of business, action and marketing plans d) Participation in exhibitions and competitions, use of experts services in legal, financial and technical issues and support for the signing of agreements with financial institutions. The actions eligible for funding by first stage capital (PRAXE B) are: a) Initial investments such as equipment, property, royalties, technology transfer etc b) Specialised consulting services such as legal advice concerning IPR, development of marketing plans and market research for new markets etc c) Initial costs of the investment, fees to experts that provide technical assistance and travel expenses. d) Operating costs such as salaries and rents. **What are the main beneficiaries characterising the initiative?** The beneficiaries of PRAXE are researchers from public research institutes and higher education institutes that wish to exploit the research results. Moreover, private investors are also beneficiaries of the measure since they participate by over 50% in the share capital of the spin – off companies being set up during the second phase.

Was the intervention inspired by a previous experience? Which one?

The initiative was based on international experience and best practices. Particularly for the designing of the first phase (PRAXE A), valuable insights were provided by a study by Logotech SA for the National Bank of Industrial Development in 1999.

Which organisations have been involved? What was their role?

GSRT is responsible for the design, implementation, monitoring and evaluation of the programmes.

What was the structure of the initiative (operational phases, length…)?

The programme is structured in two phases, the pre – seed (PRAXE A) phase and the first stage capital (PRAXE B) phase. The first phase includes those activities that aimed at the preparation of the investment that could be financed in the second phase.

The total budget of PRAXE A is 9.000.000 EUR, with 100% public funding (national and European authorities). The total public funding does not exceed in any case 44.000 EUR per project. The duration of the projects can not exceed 18 months.

In the second phase -PRAXE B, GSRT funds the spin – off companies for the first years of their operation until the new ventures become viable. The total public funding of the programme is 20.000.000 EUR. The total subsidy per spin – off company can not exceed 1.000.000 EUR and 50% of the total investment. The public funding provided for each new venture can not stretch over a period of 30 months.

Crucial milestones and criticalities?

In the context of PRAXE A, the funding and final approval of the project is subject to the acceptance by GSRT (with the use of experts) of the deliverables, i.e. business plans, patents, etc.

For PRAXE B, those researchers that wished to participate in the creation of a spin - off company should obligatory proceed either directly with the participation of their corresponding organisation in the share capital or after they received written permission. In addition, more than 50% of the spin – off companies must belong to private investors. Spin – off companies applying for funding have to submit the article of association along with their proposal.

What is the degree of novelty of the initiative?

The measure is novel for Greece. As the previous legislative and funding environment was not supportive of such initiatives, before its implementation, important legislative initiatives had to take place. The previous framework for the creation of spin –offs was weak and PRO's had no clear policy on IPR and the distribution of royalties. The above situation created a framework inhibiting for the diffusion of public knowledge that resulted in a marginal number of spin – off companies being established.

Main results

What are the main outcomes (financial and physical)?

In the context of PRAXE A, 226 projects received financing of up to 44.000 EUR, from the 373 that submitted proposals. In the context of PRAXE B, in the first (out of two) calls 31 proposals have been submitted, 16 of which received funding. The total investments of these 16 new ventures amounted to 21.36 MEUR, with 50% of the funds coming from the private sector.

What are the main evaluation results?

No ex post evaluation has taken place for the measure. Particularly for PRAXE B, where the spin – off companies are being set up, they are still at an early stage of development and it is very difficult at this stage to assess how successful they are.

Have all the objectives been fulfilled?

Both phases have been completed and met the quantitative targets that were originally set. However, it is early to judge the impact of these measures, particularly for the second phase (PRAXE B) since the spin off companies that were set up are at a very early stage of their life.

Reasons of success and conditions for repeatability

Why has the initiative been considered a best practice?

This initiative was novel for the country since it is the first time that a clear framework for the establishment of spin off companies was produced. Moreover, this measure managed to raise the interest of a considerable number of researchers and provide public research organisations and researchers with an alternative way for commercialising research results.

What were the main socio-economic and institutional obstacles?

The major obstacles for this measure are the insufficient regulatory framework and the lack of any policy PSRE's regarding the exploitation of IPR and the distribution of royalties. Moreover, the attitude of researchers in many Universities was contrary to the commercialisation of research.

What are the main lessons?

The main lesson drawn from the implementation of this measure is the need to supplement the two phases with training, mentoring and coaching for researchers regarding the exploitation of their research results. This appears to be necessary since a large number of researchers found it difficult to come in terms with market issues.

Did the case inspire new initiatives in either the same or different contexts?

This measure inspired similar initiatives in the Regions, through Regional Operating Programmes. Moreover, it created demand for follow ups (new rounds of proposals) by researchers.

What are the main aspects of the initiative which are susceptible to be transferred?

The two phases funding which allowed researchers to gradually come in terms with market issues, validate their ideas and proceed to the exploitation of research results.

Are there constraints to transferability?

None has been identified so far.

Name of Case (related policy measure or action)
Title of measure/project: (in English & national language) Support of Incubators and S&T Parks in Greece – ELEFTHO programme **Description:** The specific objective of ELEFTHO is to support the creation of NTBF's incubators with the private sector playing a leading role in the venture. The strategic goal of the measure is the facilitation of the creation of NTBS's and the boosting of technology transfer from PSRE's to the private sector. This measure is expected to have spill over effects to the development of the regions through technology transfer and establishment of new companies. Zone: Objective 1 – All country **Policy framework:** The measure is part of the Operational Programme Competitiveness.
Brief history and main features
What policy area does the initiative belong to? This initiative caters for the policy area '*Support to creation and growth of innovative enterprises*' and provides both direct (subsidies and capital) and indirect support (establishment of incubators) to NTBF's. **What are the main instruments characterising the initiative?** The actions eligible for funding in the context of the programme are: e) the planning and development of new incubators f) the development of consulting services for the incubatees including business and action plans, legal, market and organisational services for the housed companies. These services could be provided by incubators through the use of their own resources or could be outsourced. g) Creation of a fund for investment for the hosted companies, 50% of which should come from private sources (VC's, Business Angels, Private Companies) **What are the main beneficiaries characterising the initiative?** The beneficiaries of this measure are private companies that fall into two sets: a) The companies responsible for the management of incubators, that could be either established companies or new companies, regardless their size. b) New companies or companies at their early stage of development which develop or apply technological innovations and are housed in the incubators. The majority of these companies are SME's (according to EU regulation). **Was the intervention inspired by a previous experience? Which one?** The initiative was based on international experience and debate. Until the launching of the programme, all incubators established in Greece were public. Moreover, Greece has one of the lowest ratios of incubators per number of companies in the whole EU and thus there is potential for further development in the field. **Which organisations have been involved? What was their role?** GSRT is responsible for the design, implementation, monitoring and evaluation of the programme. **What was the structure of the initiative (operational phases, length…)?** The total budget of the programme is 68.900.000 EUR, 50% of which will come from public (national and European) authorities. The total public funding does not exceed

in any case 7.5 MEUR and 50% of the total investment per incubator. The evaluation of the proposals is on a first come first served basis, until the available budget of the programme is exhausted. The evaluation of proposals is made by an international committee consisted of three experts.

Crucial milestones and criticalities?

Those incubators that receive funding, have to submit monthly financial reports to GSRT and every trimester they should submit a progress report with qualitative and quantitative information. In addition, incubators after their first year of operation and for a period of 5 years after their establishment should accommodate companies in more than 70% of their available space. In the contrary, they are obliged to return the corresponding subsidies that have not been used (pro data).

What is the degree of novelty of the initiative?

Privately owned incubators are rather rare in the EU and particularly in Greece and therefore the measure can be regarded as novel.

Main results

What are the main outcomes (financial and physical)?

Until the 31st of December 2006 4 incubators have been set up, accommodating 40 companies. Moreover, 5 more incubators are at the final stage of receiving funding. At the end of the programme the output targets are expected to be fulfilled.

What are the main evaluation results?

No ex post evaluation has taken place since the deadline, for the final proposals for funding of incubators, is on the 31st of December 2006. However, the measure has been evaluated in the context of the Ongoing Evaluation of the Operational Programme Competitiveness submitted on 31.10.2005.

Have all the objectives been fulfilled?

Based on this evaluation the objectives as measured by the output indicators on 30/06/05 have been partially fulfilled. In more detail:

a) Four incubators have been set up and thus the target of 5 until the 30th of June 2008 is expected to be fulfilled.

b) These 5 incubators were expected to accommodate 50 companies by the 30th of June 2008. The current number of hosted companies is 40, however with the establishment of the new incubators this target will most probably be fulfilled.

What is the current state in terms of execution? What are the expected prospects?

The above evaluation offers some more insights on the current terms of execution, by using additionally to the output indicators a benchmarking study commissioned by the EU[25]. Although it is early to reach some final conclusions based on this benchmarking report, it appears that the established incubators are doing well in terms of costs, both fixed and operational, which are approximately half compared to the mean values within the EU.

Moreover, the survival rate of the accommodated companies is longer than the EU mean, as is the share of newly established firms housed in these incubators. However, almost all incubators are relatively smaller in size compared to the EU mean and only one houses spin – off companies, in contrast to the EU pattern.

Reasons of success and conditions for repeatability

[25] 'Benchmarking of Business Incubators', Centre for Strategy and Evaluation Services, European Commission, Enterprise Directorate General, February 2002.

Why has the initiative been considered a best practice?

It is one of the first cases in the country where private funds were mobilised for the materialisation of such investments.

What are the main socio-economic and institutional conditions that contributed to the success? How?

On the one hand, the availability of private capital looking for high returns on investment and on the other hand the high demand for services similar to those provided by incubators created a favourable environment for such an initiative. At the same time, the subsidies provided by the government reduced the risk that companies faced by establishing incubators, making returns on investment higher.

What were the main socio-economic and institutional obstacles?

Insufficient regulatory framework.

What are the main lessons?

Did the case inspire new initiatives in either the same or different contexts?

S far, no ex – post evaluation has taken place since the programme is still open for submission of proposals, but it has raised interest in various stakeholders**.**

What are the main aspects of the initiative which are susceptible to be transferred?

The creation of a fund for investing to incubatees, where the private sector plays a leading role.

Are there constraints to transferability?

None has been identified so far.

Appendix F Further reading

Alpha Bank (2005), *Short term economic and financial outlook*, December, No 53, Economic Research Division

BCS and REMACO (2005), *First Review of the OP Competitiveness*, 31/10/2005, 2nd edition

Communication to the Spring European Council (2005) "Working together for growth and jobs: A new start for the Lisbon Strategy", COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

Communication from the Commission (2005) "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

GSRT (2006), *Draft for the Research, Technology and Innovation in the framework of the National Development Planning 2007-2013*.

Koutsogeorgopoulou, V. & H. Ziegelschmidt (2005), *Raising Greece's potential output growth, Economics Department,* Working Paper no 452, OECD.

Logotech 2004, *3rd Community Innovation Survey for Greece*, Ministry of Development, General Secretariat for Research and Technology.

Ministry of Economics and Finance (2005) *National Reform Programme for Growth and Jobs 2005-2008*

Ministry of Economics and Finance (2005) *The 2005 update of the Hellenic Stability and Growth Programme 2005 - 2008*, December

Web sites:

GSRT: www.gsrt.gr

Main indicators of the Greek economy: http://www2.mnec.gr/sdds/users.asp

Ministry of Economy and Finance, Integrated Information System: http://www.mnec.gr/ergorama/defaultx.asp.

Ministry of Economy and Finance, Community Support Framework: http://www.hellaskps.gr/

National Statistical Service of Greece: http://www.statistics.gr/

Appendix G Stakeholders consulted

List of all individuals interviewed

Name	Position	Organisation
Dimitris Deniozos	Former General Secretary for Research and Technology	GSRT
Aliki Papa	Directorate of Programming and Planning	GSRT
Pantelis Skagiannis	Head of Department of Spatial planning	University of Thessaly
Asterios Hatziparadisis	Head of the Programming and Evaluation Unit	Management Authority of OPC

Participants to focus group

Name	Position	Organisation
Giannis Firbas	Director of the Special Service for Strategy, Planning and Evaluation of Development Programmes	Ministry of Economy
Asterios Hatziparadisis	Head of the Programming and Evaluation Unit	Management Authority of OPC
Agni Spilioti	Director of Programming and Planning	GSRT
Aliki Papa	Head of Unit	Directorate of Programming and Planning, GSRT
Pantelis Skagiannis	Head of Department of Spatial Planning	University of Thessaly
George Amanatidis	General Director	ANKO
Aris Spiliotis	New business development	Omega Bank
Panagiotis Baltas	Director of the Technology Transfer Office	Research Centre "DIMOKRITOS"