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

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Report produced by:
Andrea Ciffolilli
Andrea Naldini
Luca Rossi
Enrico Wolleb
Ismeri Europa S.r.l.

TECHNOPOLIS

In association with

ISMERI EUROPA

LACAVE, ALLEMAND & ASSOCIES CONSULTANTS

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Executive Summary

Structural factors are the main thrusts behind the sluggish innovation performance of Italy, relative to EU15 and also EU25. Specialisation in low and medium technology sectors, characterised by lethargic demand growth rate, scarce utilization of highly trained human capital and a very small production scale are some of these structural features. The regional situation is however quite different and a new regional and spatial development pattern is emerging.

Some regions, with either a strong concentration in terms of supply of RTDI services and resources or with a strong demand potential, show fast adaptation to an innovation-based development. In fact, some of the weaknesses of the national innovation system are less pronounced in regions with RTDI poles and magnified in regions without them. The polarization of demand and supply help to shape the nature of local innovation gaps and needs, and the adaptation speed to faster innovation. Therefore, concentrations of RTDI are critical to the formulation of effective policy and to the potential absorption of financial resources during the next programming period.

The interpretation of regional differences based on RTDI endowments leads to a classification of Italian regions beyond the traditional dichotomy north-south, as well as the more recent grouping based on the so called "diffused development". Endowments positively influence governance and policy efficiency as a result of a more developed market and stronger collaboration networks between local RTDI actors.

Firstly, High Techno regions in rapid transformation[1] are favourably placed for the establishment of a knowledge based economy. They are on a path of transformation driven by strong actors from the supply and demand side. In the future, they may absorb a relevant amount of resources in relatively highly efficient projects, with a progressively stronger private component.

High Techno regions in transition[2] are at a crossroads and either join the best group or take steps backwards. They still need to solve problems related to their productive fabric and the new specializations and products that can emerge from a previously strong industrial tradition. Resources need to be directed towards a future which is not yet clear to policy makers who are tempted by an unproductive conservationist approach. Once this problem is solved they need to invest resources to ease the process of creating the new specializations.

Low-tech Government regions[3] are problematic. They lack a developed productive fabric and their poles, where present, are of limited weight and isolated. They first need to invest more resources in governance and methods. Moreover, they need to concentrate on strengthening existing poles and attracting new investment from abroad by creating an innovation friendly context.

[1] Piedmont, Lombardy, Liguria, Friuli Venezia Giulia, Emilia Romagna, Tuscany + Lazio.
[2] Trentino Alto Adige, Veneto, Umbria, Marche + Valle d'Aosta and Abruzzo.
[3] Campania, Molise, Apulia, Basilicata, Calabria, Sicily and Sardinia.

It is worth mentioning that the foregoing threefold classification of regions is characterised by the presence of borderline areas. For example, Trentino and Veneto among High Techno in transition are very advanced even though, with respect to the considered parameters, they lack the concentrations typical of other Northern regions. Moreover, Umbria and Abruzzo despite having been classified as High Techno do not share much with the most advanced regions in many respects. In the Low-tech group, certain areas in Campania, Sicilia and Apulia (e.g. Catania, Naples) stand out due to their concentrations of research assets and innovative activities. All these specifications and structural conditions must be taken into account when conceiving and fine-tuning RTDI policy.

A second feature of the national RTDI system is multilevel governance and shared competences between the central government and the regions, without clearly assigning competences and without clear ideas of how to coordinate local and central actions. This lack of clarity has brought strategic thinking and planning procedures to a standstill, as it is not clear who has the power to plan actions, and who enforces planning decisions. The source of the problem is political as much as administrative.

In this governance context, some regions, especially those in rapid transformation, are well equipped with their own laws and specific RTDI plans. Other regions approved innovation laws and are in the process of setting up purposeful plans, while the rest, weak regions in particular, still lack appropriate legal instruments for managing RTDI in any meaningful way.

At present the Italian RTDI system of intervention is supported by direct aid schemes and measures in favour of universities, and to a more limited extent, networking. The former focus on bringing down investment costs for industrial research and their applications, the latter are geared towards human capital development. These interventions are accompanied by different forms of support to networking between firms and universities or research labs. Initiatives based on tax relief are almost negligible.

The analysis carried out on Structural Funds confirmed that, compared to the previous phase, the share of community resources devoted to regional RTDI policy *stricto sensu* has grown in the current programming period, but is still tiny. This is true especially in Low-tech Government regions, despite the remarkable weight of Community support in these areas. In the other regional grouping, mainly objective 2 (i.e. High Techno regions in transformation and in transition), funds were few, but results were more satisfactory, with some cases of excellence which can be transferred and implemented elsewhere. In those regions, the relevance of Structural Funds is almost negligible since they represent approximately only 0.5% of Industrial policy resources devoted to research and innovation. Expenditure capacity, however, was poor everywhere, due to delays in the approval of programming documents, regional laws and the definition of regional strategies. Undoubtedly, the Central Government was more effective in allocating and disbursing Community resources. This is the case, for example, of the NOPs Research and Industry which did much more than the ROPs, in terms of RTDI investment.

The present strategic evaluation study produced a set of future recommendations for RTDI policy and the most appropriate role of Structural Funds for supporting this strategic field. First, given that all regions are affected by the problem of governance, working towards a clear-cut division of competences is a crucial preliminary condition to make RTDI policy more effective. Adequate governance also implies strengthening policy intelligence and management control, by means of more sophisticated tools (e.g. feasibility studies, benchmarking, foresight), and reorganising public or semi-public agencies engaged in the provision of advanced services, through an opening of the market for advanced services.

Apart from the issue of governance, policy initiatives should be calibrated according to the RTDI potential of each group of regions. Interventions have the opportunity to push on advanced research projects in some regions while in others, interventions are bound to close-to-the-market innovation support.

High Techno regions in rapid transformation need to follow the path of development around their poles, where firms and high-tech supply are bound to grow, to diffuse technological change and create spill over. High Techno regions in transition need to restructure and upgrade their demand and supply of innovation in order to find the right road for a new specialization. Most of the other areas, and Low-tech Government regions in particular, still need to build up a proper innovation-friendly context in order to develop existing potential and attract new high-tech activities using the funds at their disposal.

Poles of supply and technological platforms are useful instruments to give strategic coherence to public policies and avoid dispersing resources in too many streams. Selectiveness of intervention should be a general guideline for all regions. This means that central government and the regions need to focus on few strategic areas and technological priorities to be decided around a national plan of intervention, by gathering research excellence and main firms. This is particularly important for breakthrough innovation and frontier research in new technological areas. These plans must be multi-annual and be protected against the frequent budgetary crisis of the government. In addition, marginal innovation of existing SME needs to reinforce local advanced services, firms restructuring as well as mergers and networking. All this can be supported by the existing aid schemes strengthened by technological foresights and by an effective monitoring of results and impacts of innovation.

Finally, it is important to consider RTDI supply actors (Research labs, universities, etc.) as a productive sector in its own right, independently from their connection with the nearby local SMEs. This can be achieved only by concentrating resources on poles and by speeding up the university transformation. Universities should be selected in relation to their performance and their access to market demand for research and related services. The financing of universities is not by itself a RTDI effective policy, it must be tied to precise and controllable outcomes and be limited to the priority areas defined in the central planning exercise, otherwise it is a substitute of ordinary funding to finance current activities. University control has been difficult in the past, given the autonomy they enjoy in their functioning.

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"[4]

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.[5]

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.

[4] 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.

[5] 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 Italy and its 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 regional level with a view to defining priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: innovation and the knowledge economy

Italy is an advanced industrial country characterised by a low level of investments in private R&D and human capital as well as by limited weight of high-tech services. Exhibit 1 highlights the discrepancy between the satisfactory level of economic indicators such as GDP per capita, productivity and high tech manufacturing and the inability to develop RTDI assets[6]. This contradiction is due to the growth pattern of the past thirty years based on clusters of successful SMEs. A combination of informal innovation and network economies, on the one hand, and exchange rate devaluation, on the other, allowed the Country to grow despite the decline of large firms and the low activity rate in some areas.

Low private expenditure in RTDI is mainly explained by the size and specialisation of the industrial fabric[7] while new-knowledge creation (e.g. basic and applied research, ICT infrastructure) is mostly sustained by the public sector, either through direct support to universities and public research bodies or through funding research projects in firms. This feature is common to other European Countries.

The Italian performance in terms of public R&D is close to EU25 average, even though it is lower (e.g. in 2002, public R&D expenditure was 0.54 % of GDP, while the EU25 average was about 0.69). Differently from other advanced countries (e.g. France, Nordic Countries and US), where the role of large private companies is stronger, Italian business R&D intensity is weak. In recent years it has been less than half of EU25 (e.g. in 2002, private R&D expenditure as % of GPD was 0.53 in Italy, while the EU25 average was 1.24). Private R&D expenditure is concentrated in large firms while small enterprises contribute to less than 6% to private research expenditure. The most important sectors are: Telecommunication equipment, chemicals and pharmaceuticals, vehicles and aerospace. Apart from few cases of

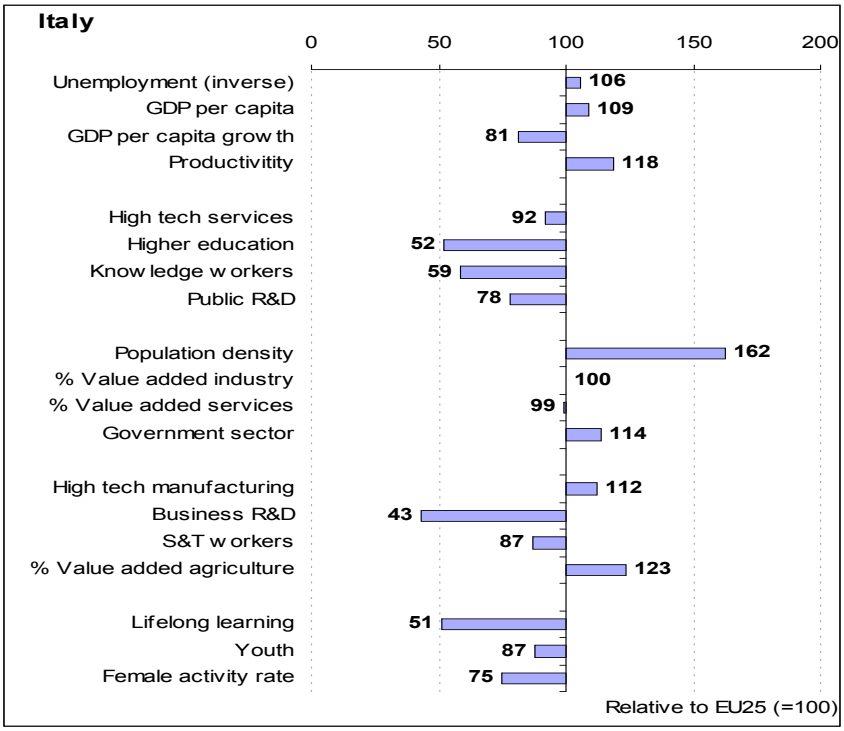
[6] The graph provides a snapshot of Italy's position, relative to EU25, in terms of a series of key knowledge economy indicators. Italy is quite weak in terms of R&D expenditure and human capital indicators such as higher education (11% in 2003 compared to an average of 21% in EU25), knowledge workers (18% in 2003 compared to 21% in EU25) and share of youngsters among the population. According to the Third European Report on Science and Technology Indicators (EC – 2003), the proportion of Italian S&T professionals as % of the population was one of the lowest in Europe. This ratio (which includes teachers, doctors, nurses, pharmacists, architects, engineers, economists, sociologists, lawyers, researchers, public and private managers) was 3.3% in 1999 and has not changed substantially in recent years. Detailed data and definitions for each indicator can be found in Appendix B.

[7] It is worth noting that the wave of liberalisation and privatisations which took place in the 90s contributed to the dismantling of some large firms which had competitive research centres.

excellence, Italian high-tech firms are unwilling to invest in basic and frontier research.

Despite the reluctance to invest in R&D, the country's performance tops the EU average for the sales of new-to-market products and comes close to the average for new-to-firm-products. The satisfactory performance for sales from new-to-market innovation could reflect innovative processes specific to firms, difficult to classify and register in official statistics. This is the case of design innovation, one of the strength characterising some of the most successful products "made in Italy" (e.g. high fashion, luxury goods).

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.

Poor performance in adapting education and universities are another element of the weak Italian RTDI system which is highlighted by exhibit 1. With some remarkable exceptions, universities are not dynamic and find it difficult to interact with the productive system.
The number of graduates at Italian universities increased during the 90s and nearly doubled in 2001. The ongoing reform of university degrees, which introduced 3-year courses, is likely to further boost this growth. However, in the medium-longer run, the number of graduates is expected to decrease as a consequence of unfavourable demography.

Approximately 23% of the graduates (2003) come from scientific disciplines (i.e. engineering, chemistry, pharmacology, geo-biological sciences, mathematics and physics). This percentage is expected to decrease given the scarce demand for technicians and engineers. Doctorate courses are few and not very appealing to both Italian and foreign students (foreigners make up only 1% of the total, compared to a

European average of over 11%). Doctorates produce much less doctors than EU15 (a meagre 0.16 doctors, as ‰ of the population aged 25-34, graduated in 2001 compared to 0.56 in EU15).

Nevertheless, Italian research outputs (in terms of quality and quantity of patents and scientific publications per researcher) are comparable to other advanced countries. Furthermore, the university research system is characterised by many cases of excellence in fields such as biotech, nanotech, energy, life sciences etc.

The discussed figures are just a symptom of the crisis of competitiveness which the Italian model of development is undergoing nowadays. In recent years, Italy experienced a recession: GDP growth has been below the euro-area average since 2002 and, in 2004, Italian GDP per capita was 96,7% of European GDP, seven percentage points below the 1995 level. The Italian share of world trade fell from 4,6 in 1996 to 2,9 in 2004. In the same period, the Italian productivity growth amounted to approximately half of EU15 average and the total factor productivity has been falling. Only employment growth was strong, facilitated by a more flexible labour market, and allowed a moderate increase of per-capita income.

To reinforce research and innovation, the structural weaknesses which should be dealt with can be summarised according to the following six main factors:

- *high public debt*- hampered expansive policies;
- *inadequate endowment of infrastructures and inefficient legal framework* (e.g. justice and proceedings, bankruptcy and labour laws require urgent reforms);
- *insufficient competition in the internal markets (e.g. banking, utilities, professional services)*. This is mostly a consequence of: Decades of devaluation and high public expenditure, which consolidated competitive advantages in low added value sectors; inadequacy of antitrust laws and lack of management capacities[8]; underdeveloped financial markets.
- *fragmentation and insufficient size of firms*- prevent the full exploitation of ICT and limit private RTDI expenditure and in-house training;
- *specialisation focused on mature and low-knowledge sectors*- implies a high vulnerability to cost competitiveness from the new industrialised countries[9];
- *under exploited human capital*[10]- the productive system does not invest in human capital. This factor makes the modification of the productive fabric and a move towards more innovative and knowledge based sectors more difficult.

All these factors constrain GDP growth, productivity and private investments and do not produce an adequate competitive pressure to increase public and private expenditure in R&D (as mentioned, all related indicators in Exhibit 1 are below the EU average). Therefore, it is unlikely that the Barcelona target (3% of GDP devoted

[8] High profits in presence of low growth and a higher inflation rate than other similar European countries, in absence of wage pressure, confirm the relevance of these elements

[9] Some studies try to simulate Italy's potential economic performance with a different model of specialisation (e.g. similar to Germany). The results highlight a persistent inability of the Italian productive fabric to deliver. If these studies are considered reasonable, the Italian decline is not to be attributed to structure but rather to the lack of competitive pressure which elsewhere boosts innovation (Banca d'Italia, Relazione annuale sul 2004, May 2005; Barca, F. Spunti in tema di ritardo di competitività e politica di sviluppo nelle diverse Italie. Verso una strategia nazionale di politica regionale per il 2007-2013, dattiloscritto, July 2005).

[10] The gap is relevant in the education level and in the quality of the human capital.

to R&D) will be met in 2010. Indeed, in a very optimistic scenario of 6% annual increase of both public and private R&D since 2002, coupled with a 50% increase in the expenditure for researchers[11], the total R&D/GDP will only be able to meet a target of 1.5% by 2010.

To conclude, Italy is experiencing a deep structural adjustment under the pressure of the new global competitive environment. Reluctant institutional and economic forces delayed this process of adjustment and fomented a progressive economic decline. In a situation where market forces and public choices are modifying the productive structure, RTDI assumes a critical role in boosting national competitiveness. The analysis reveals the numerous obstacles that need to be removed in order to make RTDI policy effective.

2.2 Regional disparities and recent trends

The analysis of the RTDI performance of Italian regional economies is carried out in two steps:

1. At a **European level**, Italian regions are classified according to a cluster analysis which allows to cast them in the wider EU 27 context. This is done after condensing all relevant statistical information, available for a majority of regions, by means of some synthetic RTDI indicators[12].
2. At a **National level**, the European cluster analysis is fine tuned by introducing sub-clusters. These are identified on the basis of a subset of the variables used at the EU 27 level. The goal is to highlight the disparities across Italian regions, which do not emerge from the previous step.

The **European level** analysis involves the reduction of the information taken 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 are the most important variables in this factor. Regions with large universities 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; 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.

[11] Sirilli, G. (2004), "Will Italy meet the ambitious European target for R&D expenditure? *Natura non facit saltus*", in Technological Forecasting and Social Change, vol.71/5, pp. 509-523.
[12] See the full methodological explanation in appendix A.

Considering the regional factor scores presented in exhibit 2, the main Italian features are:

- The below average score concerning Learning Families and Public Knowledge in all the regions. This result depends on a general negative trend in demographic growth, associated to an insufficient equal opportunity policy, on scarce human resources in S&T and on a widespread specialisation in low-knowledge intensive sectors.
- The relative above average score of Southern regions in Urban Services. This reflects a low weight of manufacture and a high importance of public services[13]. Tourist services may also substantially contribute to the high score of this factor in most of the South as well as in some northern regions (e.g. Liguria and Valle d'Aosta).
- North-Centre regions (e.g. Piedmont, Lombardy, Lazio, Veneto, Emilia-Romagna, and Friuli Venezia Giulia) score relatively high in Private Technology. Some Southern regions (e.g. Abruzzo, Basilicata and, to a certain extent, Molise and Campania) also show above average score in this respect.

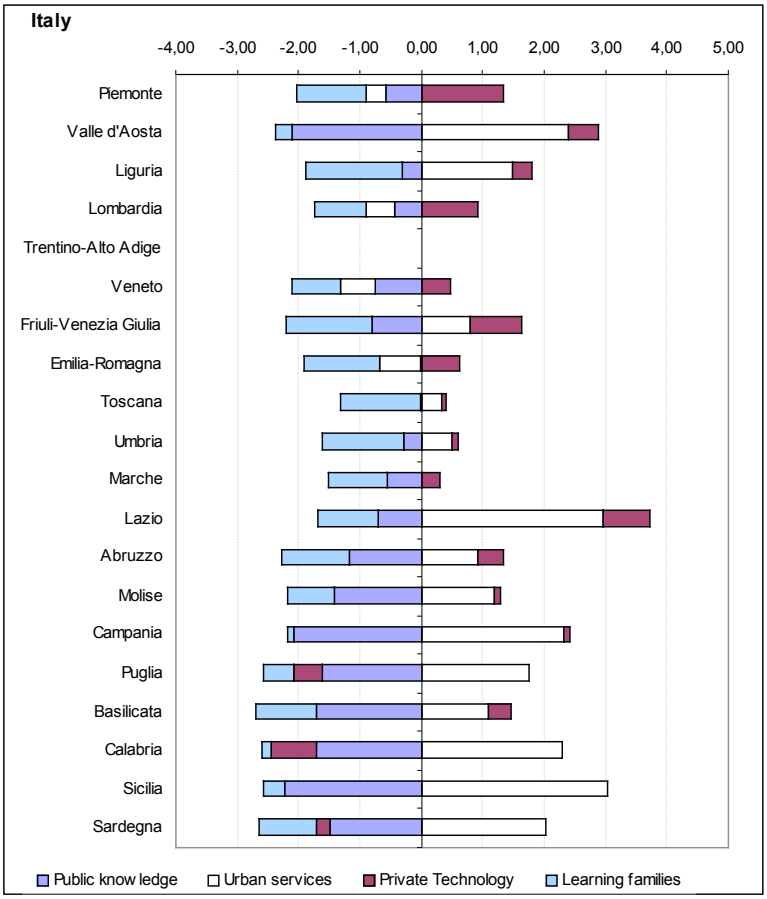
After the factor analysis, the 200 plus EU27 regions are grouped into 11 types with similar characteristics by means of a cluster analysis (see appendix A). This analysis categorizes Italian regions into two macro groups:

- *High Techno*: These host many high-tech manufacturing industries[14] and include: Lombardy, Piedmont, Liguria, Trentino A. A., Veneto, Friuli V.G., Emilia-Romagna, Umbria, Tuscany and Marche.
- *Low-tech Government*. This type of region is characterised by a very low score in Public Knowledge combined with a high share of employment in the Government sector[15]. The cluster includes: Lazio, Valle d'Aosta, Abruzzo, Molise, Apulia, Campania, Basilicata, Calabria, Sicily and Sardinia.

This provides an initial and approximated account of regional differences in terms of RTDI endowments and effort, without going beyond the rough distinction between Northern and Southern Italy.
In order to analyse the regional needs in terms of RTDI in Italy, a more in-depth investigation of regional differences and performance is necessary. Therefore, at a **National level**, the European cluster analysis can be fine tuned on the basis of RTDI demand[16] as well as supply[17] side parameters indicating the degree of actual and potential development of the RTDI sector in the region.

[13] Total public expenditures in these regions is over the 70% of GDP.
[14] The High Techno regions are strong in Private Technology and have a high level of GDP per capita. The Public Knowledge and especially the Learning Family factors shows a relative weakness (e.g. in life-long-learning). Growth in terms of GDP per capita has been low and unemployment remained high over the years.
[15] In Low-tech Government, unemployment is severe, on average. GDP per capita is however close to the regional average.
[16] The following "RTDI demand" variables were selected: Manufacturing and service firms as % of population (2003); High-tech exports as % of total exports (2003); FDI in the region as ‰ of FDI in EU15 (2003); Gross capital formation as % of GDP (2003); Total R&D expenditure as % of GDP (2003); Venture capital investments in high-tech firms as % of regional GDP (2003); ICT expenditure per employee (2002).
[17] The following "RTDI supply" variables were considered: Private R&D as % of total capital formation (2003); R&D staff as ‰ of labour force (2003); EPO patents per million of people (2002);

Exhibit 2: Regional factor scores across regions



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.

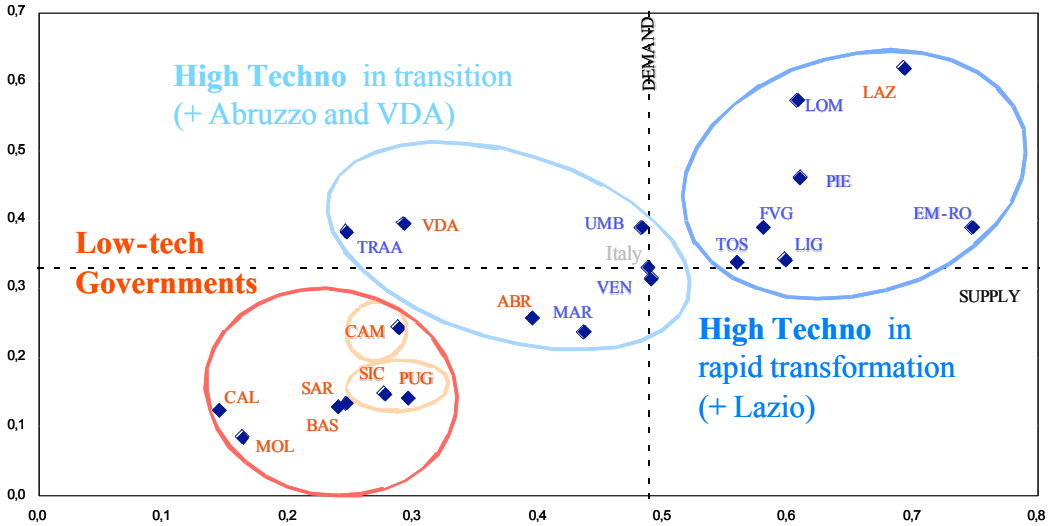
Exhibit 3 shows the outcome of this exercise (the position of each region on the map is determined by two composite indexes[18] which represent the coordinates of each dot, Italian average corresponds to the intersection of the axes).

This additional analysis suggests a division of the High Techno group into two sub-clusters and allows to describe more precisely the differences which exist within Italian regions. Moreover, it points out that it is not totally appropriate to classify Lazio, Valle d'Aosta and Abruzzo in the Low-tech Government group. Moreover, some regions are clearly border-line (e.g. Campania among Low-tech, Veneto among the High Techno). These elements must be necessarily taken into account when clusters are used to synthesise regional performance and needs.

Patents filed at USPTO (2003) per million of people; Employment in medium-high and high-tech manufacturing as % of labour force (2003); Employment in medium-high and high-tech services as % of labour force (2003); S&T graduates as ‰ of 20-29 years old people (2002); Number of researchers as % of pop (2002); Broadband coverage as % of reached population (2003).

[18] Summary innovation indexes concerning RTDI demand and supply sides have been calculated on the basis of EIS 2003 methodology (see: http://trendchart.cordis.lu/scoreboards/scoreboard2005/methodology.cfm)

Exhibit 3: Regional RTDI performance according to composite indexes concerning demand and supply side



Source: ISMERI EUROPA

In the **High Techno** group, Lombardy, Piedmont, Liguria, Friuli Venezia Giulia, Emilia-Romagna, Tuscany are **in rapid transformation**. They are characterised by a concentration with respect to both RTDI demand and supply. For them, the process of becoming a knowledge based economy is under way. They are among the most advanced Italian regions best performers in terms of SMEs labour productivity, patent activity, employment in high- and medium high-tech manufacturing, S&T graduates, participation to FP6. Piedmont, Lombardy, Emilia Romagna and Liguria are characterised by RTDI poles related to the presence of large manufacturing firms, their research labs and important technological districts (e.g. biomedicine in Modena, Torino Wireless). Tuscany and Friuli Venezia Giulia rely more directly on the excellence of their universities (e.g. Pisa) and technology parks (e.g. molecular biomedicine in Trieste).

In exhibit 3, these regions are located in the N-E quadrant. Lazio, despite its classification as Low-tech Government[19] on the basis of the EU cluster, due to the weight of the Public Administration and of services, it is a top performer in many RTDI respects. Lazio is a leader, for instance, in terms of number of graduates, employment in high- and medium high-tech services and high-tech exports. For this reason it grows substantially faster than other Italian regions. Lazio shows also a very high level of public R&D expenditure, however, it must be noted that the administrative spending of certain public research agencies such as the CNR is recorded in Rome and may produce a slight overestimate of gross research expenditure in Lazio.

All High Techno regions in rapid transformation host poles of excellence, defined here as outstanding agglomerations, in terms of either productive fabric or private and public research capacity. These agglomerations are, in most cases, closely related to the presence of large urban areas (e.g. Milan, Turin, Bologna and Modena, Rome) which fuel both demand and supply. Overall, High Techno regions in rapid

[19] Mainly due to the size of the public sector.

transformation, including Lazio, concentrate about 69% of total national R&D employees. Some of the main weaknesses of these regions are the relatively low proportion of high-tech exports and low birth rate of enterprises.
Veneto, Umbria, Marche and Trentino Alto Adige have been also classified among High Techno regions at the EU 27 level. Even though they show an encouraging number of innovative firms and some of them excel in particular areas relevant to RTDI (for example, Umbria is a leader in terms of venture capital investments in high-tech firms), these **High Techno** regions **in transition** are not characterised by the same degree of concentration of the previous sub-cluster. They are located in the central section of exhibit 3. For them the adjustment process is still uncertain with respect to both RTDI strategies and actors, despite some pre-conditions are already fulfilled. High Techno regions in transition include primarily all the regions characterised by well developed productive fabric which rely upon industrial districts and SMEs. Regions such as Veneto, Umbria, Abruzzo and Marche, are neither dragged by highly performing university research nor by the presence of large high-tech poles. Therefore, they have some difficulties in adjusting their productive structures to the new challenges of globally integrated markets and rapid paced technological change.

The adjustment process towards a knowledge based economy of **Low-tech Government** cluster still necessitates pre-conditions (strategies and actors). This is the case of Molise, Basilicata, Apulia, Sicily, Sardinia, Calabria and Campania. To a certain extent Campania stands out thanks to its relative strength in terms of RTDI human capital as well as productive structure[20]. It may be described as a weak region with some "poles of excellence". All the others regions in this group do not show a comparable degree of demand and supply concentration[21]. It is worth underlining again as the position of three regions (Lazio, Valle d'Aosta and Abruzzo) which fall in this cluster should be reconsidered after a closer examination. Apart from the case of Lazio discussed above, Valle d'Aosta and Abruzzo are two objective 2 regions more industrially developed than the rest of the cluster and stronger in the private technology factor. These aspects should be considered in order to provide meaningful support to policy decisions.

The fundamental element of this interpretation is the "concentration" of actual and potential poles of supply and demand of a critical size to actually influence the regional economy. Poles are crucial endowments for carrying out effective RTDI policy and they allow overcoming the traditional North-South divide.

[20] Campania has a tradition in research policy: The area of Naples is strong, for example, in polymeric and composite materials; the universities of Naples, Salerno and Sannio, together with the National Research Council and the private R&D labs of some relatively large aerospace firms constitute a technological district which employs over 30,000 people in high tech firms.
[21] Some poles, in terms of supply, exist in Sicily, Basilicata and Apulia however their weight is limited and very difficult to capture by composite indicators. For instance, Sicily hosts, in the area of Catania, ST Microelectronics which is a leader in patent filing and accounts for a significant slice of the total Italian private R&D effort. This firm employs over 4400 staff (mainly graduates and technicians). Its location in the area has attracted other multinational firms and boosted, since mid 90s, the development of high tech SMEs. Other cases of excellence are in Basilicata (Research centre of ENEA specialised in Agro-biotech, renewable energy and laser applications) and in Apulia (the industrial districts and the agglomeration of technologically advanced firms in Bari, Barletta and Casarano etc.).

2.3 Conclusions: innovation and knowledge performance

The main drivers behind the sluggish innovation performance of Italy as a whole are: Insufficient market competition due to the institutional framework and past exchange rate policy, specialisation in low technology sectors characterised by slow demand growth rate, very small production scale and underutilisation of human capital.

The European single currency and the pace of globalisation require a capacity to increase competitiveness by investing on research and innovation. This implies overcoming the foregoing obstacles.

The regional analysis brings to light important differences among geographical areas in terms of RTDI needs and potentials. In particular:

- The regional performance is highly differentiated in general and also among High-Techno and Low-Tech clusters. In perspective, an effective RTDI policy might help to overcome the North-South divide faster than other more traditional development policies.
- Within the High Techno some regions are in a path of rapid transformation supported by strong economic actors and research supply potential. For them, the process of adjustment towards becoming knowledge based economy is under way and is rooted on solid basis. Other regions of this group are lagging behind since the process of productive restructuring is still unclear (weak clusters of SMEs);
- Some regions, with either a strong concentration in terms of supply of RTDI services and resources or with a strong demand potential, show fast adaptation to an innovation-based development. In fact, some of the weaknesses of the national innovation system are less pronounced in regions with RTDI poles and magnified in regions without them. The polarization of demand and supply help to shape the nature of local innovation gaps and needs, and the adaptation speed to faster innovation. Therefore, concentrations of RTDI are critical to the formulation of effective policy and to the potential absorption of financial resources during the next programming period.

Exhibit 4 summarise the weaknesses and the key needs that emerged from the analysis carried out in section 2.2.

Exhibit 4: Summary of key disparities and needs per group of regions

Group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
High Techno regions in rapid transformation (including Lazio)	• Breakthrough innovation and frontier research still limited to excellence poles which constitute a narrow part of productive fabric • Weak capacity to attract qualified human capital from abroad • Low proportion of high-tech export • Low birth rate of enterprises	• Need for adjustment through strengthening effort in breakthrough innovation, also building collaboration with excellence centres either extra-regional or international • Favour the innovative contagion of the rest of the productive sector by reinforcing networks and clusters • Schedule focused labour policies to promote employment of foreign researchers • Rearrange and reinforce local advanced services market, particularly in order to support innovative start-up
High Techno regions in transition (including Abruzzo e Valle d'Aosta)	• Absence of agglomerations of innovative firms and lack of excellence research nodes • Lack of large firms with R&D divisions and great number of small firms which are specialized in traditional sectors with low growth rate of demand • Low public and private R&D expenditure as well as low employment in high-tech manufacturing and services • Absence of large cities able to stimulate a strong demand of innovative services • Insufficient demand for high profiles and researchers by firms	• Ease the structural transformation of the obsolete model of specialisation • Increase public R&D investments with leverage effects • Development of skilled human capital and of mobility schemes university-firm and, generally, strengthen linkages between public and private sector
Low-tech Government regions (apart from Lazio, Abruzzo e Valle d'Aosta)	• Limited and isolated excellence clusters • Poor social context and scarce propensity to innovate • Feeble productive fabric and strong specialization in traditional sector with low value-added • Absence of adequate infrastructures • Very low public and private R&D expenditure and scarce employment in high-tech manufacturing and services • Insufficient demand for high profiles and researchers by firms • Weak competition in service markets and lack of innovation in the financial sector • Low degree of openness	• Promote the necessary interventions to build an innovation friendly environment (e.g. service market, ICT interventions, innovative financial instruments, basis infrastructures) • Exploit local skilled human resources, promote their recruitment by firms and reverse brain-drain • Set up incentives to attract innovative large firms • Fortify policies to attract foreign direct investments • Promote the industrial exploitation of public research results (e.g. TT, IPR policies, spin-offs) • Condition aid schemes to the undertaking of actual innovation projects rather than favour the protection of existing productions

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 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 frameworks. In some Member States, Structural Fund interventions in favour of innovation and knowledge are marginal compared 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 to influence 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 institutional framework and the division of responsibilities for RTDI policies among national and regional bodies;
- The second concerns the capacity of policy makers to plan and implement RTDI interventions.

In Italy, after the modification of the Constitution in 2001, competences on R&TD policy are shared between National and Regional Governments. However, the national Government focuses mostly on coordinating RTDI policy and pre-competitive development concerning strategic sectors identified in the National Research Programme. Regional Administrations concentrate on supporting local production systems, provision of innovative services as well as technology transfer. Exhibit 4 summarises the main organisations coordinating RTDI policy, and distinguishes between policy areas.

Exhibit 5: Main organisations per policy area

Policy area	Type of organisations	
	National/Regional public authorities and agencies	Key private or non-profit organisations
Improving governance of innovation and knowledge policies	• MIUR, MAP, MIT • Regional Administrations • CRUI (Association of the Rectors of Italian Universities)	N/A
Innovation friendly environment	• MIUR, MAP, MIT • Regional Administrations • Public Universities • Public Research Centres (e.g. CNR, INFN, ASI, ENEA, IIT) • IPI – Institute controlled by MAP • Sviluppo Italia (national public agency) • Regional Innovation Agencies (e.g. Ervet, Filas, Aster) • Regional Competences Centres	N/A
Knowledge transfer and technology diffusion to enterprises	• MIUR, MAP, MIT • Regional Administrations • IPI – Institute controlled by MAP • RIDITT (Italian Network for Innovation and Technology Transfer to SMEs) • Science and Technology Parks • Innovation Relay Centres	• Service Centres of Industrial Districts
Innovation poles and clusters	• MIUR, MAP, MIT • Regional Administration	N/A
Support to creation and growth of innovative enterprises	• MIUR, MAP, MIT • Regional Administrations • Agitec financial services provider • Sviluppo Italia • Science and Technology Parks • BICs	• Private Banks • Private Intermediaries • Italian Business Angels Network (IBAN) • Venture Capital and Private Equity Association (AIFI)
Boosting applied research and product development	• MIUR, MAP • Regional Administrations	• Private Banks grant loans as part of aid schemes designed by policy makers

Source: Study team based on national/regional policy documents, TrendChart reports, OECD reports, etc. See appendix C for a detailed definition of the policy categories.

At the national level there are four Ministries promoting and implementing RTDI policy:

- **Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR).** The Ministry of Education, University and Research is responsible for promoting education, scientific and technological research, monitoring and coordinating universities and research bodies[22]. MIUR designs policies in partnership with Regional administrations and drafts the National Research Programme (PNR).
- **Ministero delle Attività Produttive (MAP[23]).** The Ministry of Productive Activities is also responsible for innovation policy[24]. In partnership with the

[22] Such as the National Research Centre (CNR), the National Institute for Nuclear Physics (INFN), the Italian Space Agency (ASI) and other minor research bodies

[23] After general elections in April 2006 and the establishment of the new National Government, the name MAP has been changed to MSE – Ministero per lo Sviluppo Economico. In this report, to avoid

Ministry of Technological Innovation, MAP drafts a National Plan for digital innovation (the second plan was published in 2005). Within MAP, IPI (Italian Institute for Industrial Promotion) is a government agency specializing in the promotion of growth and competitiveness, with particular regard to the SME system. In 2003, IPI launched the RIDITT initiative (Italian Network for Innovation and Technology Transfer to SMEs). RIDITT stems from the need to improve the competitiveness of SMEs by strengthening the supply of services for innovation and for the creation of new high-tech enterprises. The RIDITT Portal is the tool to activate partnerships between SMEs and Innovation centres.

- **Ministero dell'Innovazione Tecnologica (MIT[25]).** The Ministry of Technological Innovation (created in 2001) focuses on ICT, its main mission is the elaboration and implementation of a strategy for developing the Information Society in Italy.
- **Ministero dell'Economia e delle Finanze (MEF).** Within MEF, the Department for Development Policy (Dipartimento per le Politiche di Sviluppo – DPS) and, in particular, the Service for Structural Funds Policy (one of the divisions of DPS) is the management authority with respect to the Community Support Framework. It negotiates objective 1 programmes and identification of objective 2 areas with the Commission. It carries out activities of analysis, coordination and monitoring.

Regional Governments also design and implement specific interventions fostering innovation. In many cases regional administrations can also rely on local development agencies, mainly public or semi-public[26]. Regions especially focus on technological transfer and local spill-over of R&D activities.

The division of responsibilities between central State and regions has not been clearly defined yet. This uncertainty does not help the identification of a national strategy and carries the risk of creating overlapping and fragmentation in RTDI initiatives.

At a central government level the lack of consolidated governance has seriously limited its strategic and operational progress. In addition, national and local public administrations did not make the necessary investments to build up the knowledge and technical competence for defining and managing RTDI policy[27]. Control procedures regarding aid schemes are still formal and bureaucratic, and often result in an inefficient use of resources[28].

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confusion and considering that the analysed RTDI programmes refer to the current programming period, the name MAP will be still used.

[24] MAP also controls industrial agencies, it supervises the Institute for Industrial Promotion (IPI) and the National Energy and Environment Agency (ENEA).

[25] After general elections in April 2006 and the establishment of the new National Government, the name MIT has been changed to "Ministero per le Riforme e l'Innovazione nella Pubblica Amministrazione". Within the Minister, DIT (Department for Innovation and Technologies) coordinate ministerial policies for the development of the Information Society and the promotion of innovation in public offices as well as among citizens and businesses. In this report, to avoid confusion, only the name MIT will be used.

[26] For example, these are: Regional service centres and innovation agencies; regional agencies of Sviluppo Italia; BICs; Science and Technology Parks; Industrial District Service Centres.

[27] This is reflected in the lack of technological foresights and scarce use of specialized planning tools at national and regional level. Such instruments, combined with efficient procedures for project selection, monitoring and evaluation, are essential to manage policy design and implementation effectively.

[28] For example, independent experts very rarely have the authority to assess funded projects, interrupt them when they are not promising or reward them when they are particularly successful. As a consequence, the probability of inefficient use of public resources is high.

The governance issue concerns the entire Country but is a serious obstacle especially in low tech-government (objective 1) regions where the productive fabric is weaker, unable to guide strategic choices and put pressure on the public administration. Very often in these regions, few large public players (universities or public bodies) tend to play more than one part in the design, implementation (e.g. selection of beneficiaries) and evaluation of policy. All this negatively affects the efficiency of the innovation system which remains closed to outside players and auto-referential. The regional market for innovation has been reserved to local actors in a non competitive setting whereas it needed to include trans-regional actors and the private sector as a necessary condition for its efficiency.
Advanced regions tend to adopt more efficient models of governance. In general, public administrations cooperate with specialised territorial agencies which provide the necessary skills, effective tools for technological transfer and other advanced services to support enterprises in the development of complex projects[29]. On the other hand, the leading medium size and large firms are able to guide the process of matching supply and demand for innovation, and the service market is more open to external players.

3.2 Policy mix assessment

This section provides a brief overview and analysis of the national and regional policy mix in favour of innovation and knowledge. The analysis is based on six broad categories of objectives of innovation and knowledge policies (see appendix C for an explanation of each category).

At the beginning of the current programming period, the main socio-economic objectives of RTDI public expenditure were universities, industry and non-mission oriented research (e.g. basic research carried out by large public agencies and laboratories). In 2000, these three categories absorbed approximately 40%, 15% and 10% of allocated resources respectively. The rest was made up by research activities in fields such as health, energy and space. Traditionally, the defence sector absorbed limited resources (0.9%).

Since 2000, the role of direct aid schemes as an instrument to support firm's R&D projects grew substantially. Previously, support to enterprises concerned mainly investments in machinery, or for employment and mobility. The change in RTDI policy trend has led to a sharper distinction between measures for research and innovation, on a one hand, and industrial development interventions, on the other. The former finances industrial research, prototyping and industrialisation of research findings, following a positive assessment of a project's potentials. The latter consist of automatically granted funds. The use of selective instruments, introduced by the new policy course, requires strong managerial competences to assess the impact of a project.

[29] For example, in Piedmont the technological parks ensure some of these functions; in Emilia-Romagna a specialised regional agency supports the Region; Tuscany promotes a network of local research and technological centres. In these and in other regions, the increasing use of independent experts and the development of specialised staff are also improving the efficiency and transparency of the selection methods for granting resources.

The matrix below anticipates the main features of the policy mix at national level by means of a visual representation. A simplified coding system is used with intensity of support (financial and political priority) for different policy areas and targets indicated by a colour coding system.

The matrix is followed by a brief discussion of policy objectives and measures identified from key policy documents for each area. For a more detailed analysis of legislation, individual measures and funding level, see tables in annex C.

Exhibit 6: Policy mix for innovation and knowledge

	Target of policy action[30]		
Policy objectives	**Academic /non-profit knowledge institutions**	**Intermediaries/bridging organisations**	**Private enterprises**
Improving governance of innovation and knowledge policies			
Innovation friendly environment			
Knowledge transfer and technology diffusion to enterprises			
Innovation poles and clusters			
Support to creation and growth of innovative enterprises			
Boosting applied research and product development			

Key

Top policy priority

Secondary priority

Low priority

Source: assessment of study team based on national/regional policy documents, Trend Chart reports, OECD reports, etc.

Improving governance of innovation and knowledge policies. Despite its importance, the interventions to reduce ambiguities and to improve governance were slow and rather ineffective. The (legal) confusion over the partition of competences has caused a long political standstill rather than a fast and problem solving reaction; the coordination role of the central government has consequently been questioned.

All regions, with the exception of Abruzzo and Calabria, introduced specific laws to regulate the intervention in innovation[31]. The process of legislation started in the early 90s and was favoured by the devolution reform, which took off in 1998, and by the rearrangement of National RTDI policy framework (1999-2001). Some of the most advanced regions such as Piedmont, Lombardy and Lazio were ahead of the others by setting up specific innovation policies back in the late 80s. In most cases the legislation is more recent (2003-2005). Laws to support innovation are scarcely focused on R&D *stricto sensu* and consider innovation as a limited aspect of the

[30] To simplify, the report adopts three broad types of organisation as targets of policy intervention:
- Policies supporting academic and non-profit knowledge creating institutions;
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, etc.;
- Policies supporting directly innovation activities in private sector.

[31] See tables with regional laws and main strategic RTDI programmes in annex C.

policies to support firms[32]. Most regions also adopted specific plans to support the information society, which were a distinguished part of the regional operational plans.

In the last years, in an effort to improve governance nearly all the regions adopted innovation strategies within the general Regional Development Plans, but only few set up specific RTDI plans[33]. Objective 1 regions were obliged to draft a Regional Innovation Strategy (RIS) since the CSF had made the approval of regional RTDI measures of the regional operating plans dependent on the approval of RIS by MIUR. Several regions were hampered by the delay in the definition of RIS, which should have been completed by the end of 2001. Delay and low quality of RIS were the main obstacles to a quick and effective launching of the regional innovation policy.

Innovation friendly environment. Human capital development and support for ICT diffusion have been the most important interventions in this policy area.
For the development of human capital, the National Research Programme supports the system of higher education with a view to increasing the total number of S&T graduates and reverse brain drain[34]. The CSF, through the third axis of the NOP Research focuses on this policy area[35] by financing masters programmes, doctorates in scientific fields as well as universities equipment and guidance services.
In this area, there was an overlapping of National and Regional interventions, particularly in higher education and training. For example, both the Central Government and Regions gave financial support to new master courses in scientific fields. Often this competition has determined an excess of supply of extempore masters to the detriment of the quality of education and its relevance to the labour market.

Information and communication technologies catalysed a remarkable effort, starting with the establishment of MIT in 2001. Several initiatives[36] concerning e-government and IT diffusion were implemented together with the creation of ad-hoc regional competence centres[37]. Furthermore, all the regions have signed a framework programme agreement with the State concerning the development of Information Society.

The underdevelopment of the financial market for high-tech initiatives and the lack of substantial financial engineering initiatives have remained serious obstacles to the

[32] Only in a few cases have the bespoken regulations been defined with the exclusive goal of addressing research and innovation: in objective 2, Emilia Romagna, Valle d'Aosta and more recently Friuli Venezia Giulia (2005), Provincia Autonoma di Trento (2005) and Piedmont (2006); in objective 1, Campania and Basilicata.
[33] Programmes for the promotion of Information Society; Regional Plans for Innovative Actions, used to set out guidelines for innovation strategy; Sectoral plans for industrial development.
[34] Attraction of foreign researchers is pursued by means of tax relief initiatives (D.M. 501/2003)
[35] A total budget of over 700 MEUR has been devoted to higher education and training both in the private and public sectors
[36] MIT produced, in 2002, a series of Guidelines for the Development of the Information Society which established the main objectives to be achieved during the next 4 years (e.g. e-procurement concerning at least 50% of P.A. expenditure, email to be used as the only means of internal written communications, distribution of 30 million digital ID cards, diffusion of digital signature etc.). The Second Plan for Digital Innovation in Firms was drafted by MIT and MAP in 2005.
[37] 20 Regional Competence Centres (CRC) have been created since 2002 by MIT. These promote and facilitate the development of the information society and of e-government at regional level

creation of an innovation friendly environment. A few initiatives took place in this area and mostly in the strong regions.

Knowledge transfer and technology diffusion to enterprises. RDTI national policy has been geared towards supporting knowledge and technology transfer as well as networking between firms and universities. Such intervention has been carried out by the Regions and to a limited extent by MIUR. The central role of the Regions is however recognized by all institutional actors. Current interventions in this field are at a very early stage and weak in their impact, especially in objective 1, while in objective 2 and especially in connection to industrial districts and clusters of firms, there were systematic and sometime successful technology transfer activities.

In the last years and in the light of previous experience, policy makers have been oriented more towards "soft" initiatives (e.g. technological audits, consulting services, liaison offices, lab-tech) rather than "hard" ones (e.g. science and technology parks). After long negotiation between MIUR and the Regions, specific measures concerning liaison offices[38], technology competence centres[39], private/public labs[40] have been recently launched. This intervention is aimed at adapting the Universities and their research potential to the demand for innovation expressed by the firms, which has been one of the main weaknesses of the objective 1 regions.

Innovation poles and clusters. A polarized structure of demand and supply of research and development is a crucial factor for RTDI policy development. The regional economy of the High Techno regions includes economies endowed with strong poles and clusters of firms whose performance is distinctively better than regions without such concentrations. Also in some of the Low-tech Government regions, the development of poles is bound to make the difference in the speed of RTDI development. The national RTDI policy has tried to support this process by defining, in each region, a number of technological districts[41] where to concentrate interventions. This is one of the major novelties of the national innovation policy designed with the objective of fostering innovation of industrial districts. Many of the designed poles of the objective 1 regions are, however, too weak to attract investments.

Other interventions favouring clusters and poles of innovation were implemented by the law 297/99, financing projects submitted by clusters of firms. Four sectors of intervention have been selected as technological priority: Transports, energy, cultural

[38] As part of the NOP Research, a specific measure funds the establishment of industrial liaison offices in universities, particularly those located in objective 1 regions. The goal of these structures is to link public research endeavours and firms, especially SMEs, in order to promote technology transfer processes and create spin-offs

[39] To date, the measure of NOP Research which deals with competence centres is still in the phase of negotiation with the European Commission.

[40] In 2005, MIUR promoted the creation of 11 laboratories based on partnerships between private and public actors in strategic fields such as high-tech medical instruments for diagnosis, energy, ICT platforms, biotech etc. A total budget of 212 MEUR, drawing upon FAR, was devoted to these labs.

[41] CIPE ("Comitato Interministeriale per la Programmazione Economica" is part of MEF) devoted 130 MEUR to the establishment and the reinforcement of Technological Districts in objective 1. To date, there are 22 Districts in Italy, in fields such as: aerospace and defence, biotech, ICT, logistics, advanced mechanics. etc

heritage and agro industry. Some objective 2 regions financed clusters of firms and labs.

Support to creation and growth of innovative enterprises. Early stage financing is crucial for the creation and growth of innovative enterprises and empirical evidence underlines a slowdown in the growth of high-tech firms during the last five years. However, there are marked differences between High Techno and Low-tech Government regions, considering that over 65% of high tech firms established since 2000 are located in the North-Centre. This geographical divide is reflected also in the birth rate of academic spin-offs[42]. Over 200 spin-offs were funded in total but only six of them in the South. This was mainly a result of the slow adaptation of universities to the market demand for innovation.
In 2004, MIT set up a fund with a budget of 160 MEUR aimed at easing the access to credit of SMEs.
The European Investment Bank (EIB) and MIUR signed a framework agreement concerning the analysis of investment needs for new spin-offs from public research (universities and public research centres) and on financing opportunities for incubators of innovative enterprises.

Boosting applied research and product development. Law 297/99, main aid scheme for supporting research and development, was a fundamental step forward in RTDI policy as it fuelled the absorption of public funds for industrial research in SMEs.

However, in recent years, the exhaustion of financial resources[43] has halted the aid schemes and determined a long waiting list for projects which had already been assessed positively. In order to counterbalance lack of national funding, the regions decided to strengthen local support for industrial research. Most of the regions introduced interventions related to both applied research and pre-competitive development. Some regions (i.e. Tuscany and Sicily) limited their intervention to pre-competitive development while others (i.e. Friuli Venezia Giulia, Province of Bolzano, Campania and Basilicata) also introduced incentives for basic research, invading a field of action supposedly competence of the central Government. Nonetheless, in many objective 1 regions, the *de-minimis* regime constrained the effectiveness of this line of action.

In addition to law 297, MAP financed "PIA Innovazione" which support innovation programs near to the market. It was one of the novelties of the national intervention which has been appreciated by firms and absorbed significant resources.

As a consequence of financial constraints, recently the national policies have been oriented towards the encouragement of thematic and sector priorities. The macro programmes designed by MIUR (2005) and addressing ten strategic sectors are coherent with this approach and represent the main line of intervention[44].

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[42] D.Lgs 297/99 introduced support for seed capital to create academic spin-offs and also addressed innovation financing to develop innovative enterprises.
[43] In 2005, for instance, the Financial Law did not provide resources to FAR and FIT
[44] MIUR has recently singled out ten strategic sectors (e.g. quality of life measured in terms of health, safety, environment) and set up related macro programmes ("Grandi Progetti Strategici") combining objectives which simultaneously concern basic research, applied research, pre-competitive

The financial constraint penalized objective 2 regions particularly since their funds were exhausted in 2004. Regions have tried to support private projects only with small amounts of own resources. In synthesis, the support for research funded through regional laws has suffered from lack of money in objective 2 and from overlapping with national intervention as well as lack of strategic focus and management control in objective 1 regions.

Overall, the policy mix seems off balance, with a strong emphasis on direct support to industrial research aiming at marginal rather than breakthrough innovation. As most RTDI aid schemes lack a strategic technological focus, any firm has been a potential beneficiary, while there are no initiatives specifically addressing the most innovative high-tech companies. Supporting measures are based either on bottom-up direct funding schemes or top-down interventions while weak fiscal incentives have been introduced only recently.

3.3 Conclusions: the national innovation system and policy mix

The Italian RDTI institutional framework is penalized by inadequate coordination between national and regional governments which result in the duplication of efforts and overlapping between national and regional measures. The removal of this obstacle requires institutional and organisational initiatives as well as more efficient and problem solving partnerships. In other words, a new policy approach is necessary, based on dialogue with the business world in order to identify its specific needs and provide quick responses.

In general, the scarcity of public resources calls for surgical interventions, while the aforementioned problems of coordination do not allow fine tuning and effectiveness.

In terms of national instruments for sustaining RTDI, direct aid schemes, centred on pulling down investment costs of enterprises, and support for human capital development play the most important role while interventions based on tax relief are almost negligible. National RTDI policy is increasingly geared towards strategic sectors and the development of networks. FAR and FIT, managed respectively by MIUR and MAP, are the most important national sources of funding.

Regional initiatives, although general in scope, are mainly devoted to developing technology transfer services. Some regions, especially the High Techno in rapid transformation, are well equipped with their own laws and specific programmes (e.g. Emilia-Romagna, Piedmont, Lombardy). Some others approved innovation laws and are in the process of setting up purposeful plans. The rest, Low-tech Government regions in particular, still lack the experience for managing complex instruments such as foresight and monitoring of project results. As a result, regions are constantly tempted to finance universities independently from a specific and mission oriented project design. This practice has penalized efficiency and strategic coherence of the development path of regional RTDI and must be discouraged.

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development and higher education and training. Their beneficiaries are both private and public sectors. 196 projects have been selected and may draw upon a total amount of over 1.200 MEUR (new rotational fund for support to enterprises, FAR, FIRB)

Aid schemes for industrial research, breakthrough innovation, and for near to market innovation absorbed significant amount of resources and has a potential for absorbing additional resources if available, both in High Techno and Low-tech regions.

Exhibit 6 presents the main opportunities for Community funding, in terms of current and future priorities, as well as the most important constraints which limit effectiveness of intervention.

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

Policy objectives	**Opportunities for Community funding** (current and future national priorities)	**Constraints or bottlenecks** (factors limiting Community funding and effectiveness of intervention)
Improving governance of innovation and knowledge policies	• National initiatives are only marginal. There is a strong need for training of staff in charge of policy management. • Sophisticated tools and practices for a meaningful future-oriented planning (e.g. Foresight) need to be developed.	• Coordination: Overlapping of National and Regional competences • Lack of a technical capacity and management control system • No clear cut identification of actors and intermediaries (e.g. universities public agencies) which sometimes act simultaneously as policy makers and beneficiaries.
Innovation friendly environment	• Few and fragmented initiatives in innovation financing. There is a urgent need to develop this area and improve access to credit for innovation of SMEs in particular. • Measures dealing with higher education and training already absorb large amount of resources, in the future, focus should be on selected needs (e.g. lack of S&T graduates, demand of skilled human capital arising from ongoing strategic projects), should be avoided university financing independently from a specific and well focused projects, and outside a competitive context. • Support to employment of researchers and technicians in SMEs. • Initiatives for increasing attractiveness of low tech geographical areas and develop international co-operation.	• Lack of competition in banking and advanced services. National banks are lacking of technical competences allowing effective risk analysis • Backwardness and closure of the higher education system where nepotism is still stronger than meritocracy especially in southern regions • Overlapping of National and Regional competences especially in higher education and in objective 1 • Low professionalism of public ad semi-public agencies providing consulting services
Knowledge transfer and technology diffusion to enterprises	• Opportunity to support generation of spill-over from poles and establishment of concentrations of RTDI activities. The focus should be on industrial exploitation of high quality outcomes of public research • Room for development of university liaison and transfer offices.	• Lack of professionalism of bridging structures capable of providing effective services in this area • Weak demand of technology transfer services given the productive fabric which is mainly made of SMEs • Familiarity with innovation strategies based on trade secret rather than patents as a mean to protect intellectual property • Scarcity of Community resources, especially in the North • Overlapping of National and Regional competences (e.g. Competence Centres) • Closure of Italian university system
Innovation poles and clusters	• Poles of excellence can be strengthened and multiplied by means of initiatives aimed at increasing the average firm size or the efficiency of universities and by concentrating resources and interventions to reach a critical size for a positive impact of RTDI policies.	• Lack of planning capacity to single out sectors and area with best potentials • Inadequate human capital governing key policy making institutions

	• Technological districts, where build up on the basis of actual potentials, may represent an opportunity for Community funding • The importance of scale issues, traditional specialisation and lack of networking policy provides a room for development in this policy area. Interventions have the opportunity to focus on the healthiest and most profitable activities of the supply chain.	
Support to creation and growth of innovative enterprises	• The instruments to encourage spin off need to be revised and fine tuned to solve the problems arisen in objective 1 regions, where results have been poor. • Incubators and training related to entrepreneurship are still in an embryonic phase of development; there is room for focused infrastructures and services for high tech firms growth.	• Lack of competition in banking and advanced services. However, national banks are lacking of technical competences allowing effective risk analysis • Lacking socio-institutional conditions necessary to render less developed areas more attractive • Lack of policies to attract external investors • National universities, particularly in the South, are unable to raise private funding and develop new enterprises from research
Boosting applied research and product development	• The scarcity of resources requires the use of sophisticated tools for a meaningful future-oriented planning: technological forecast and project monitoring need to be implemented on a systematic basis at the regional and national level. • This area absorbed the bulk of resources for innovation. Policy focused on demand side and there are opportunities to devote resources to research infrastructures for public/non-profit organizations • Aid schemes for groups rather than single beneficiaries may also be a way to foster networking and overcoming scale weaknesses	• Scarcity of resources • Low innovation propensity of SMEs • Excessive length of procedural time for accessing funds

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

This section of the report provides an analysis of the Structural Fund expenditure patterns 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, indications of relative effectiveness of measures, case studies of 'good' practices).

4.1 Strategic framework for Structural Fund support to innovation and knowledge

4.1.1 Strategic approach to innovation & knowledge in Structural Fund programmes

During the current programming period, objective 1 and 2 catalysed over 53 bln EUR in Italy[45], taking into account both community and national resources. This amount corresponds to approximately 0.7% of the annual GDP (2004). A share of Community resources, ranging from 4.5 to 12%, was devoted to research and innovation. This range is dependent on the scope of the definition of RTDI that is used[46].

In addition, the PRAI (Regional Programmes of Innovative Actions) have been focused on RTDI[47] and, in many cases, helped the regional administrations to define a local innovation strategy.

Italy has always put a certain emphasis on R&D within cohesion policy at national level. The NOP Research was first established in the programming period 1989-93 and re-launched in the following period 1994-99. Its weight increased from 4% of total objective 1 funds in the first period to 6.5% in the second period. At that time, the NOP was focused on infrastructures and funded essentially public research bodies and universities.

With respect to objective 1, The revised version of the CSF approved in 2004 is directly linked to the Lisbon strategic goals by making explicit provision for the growth of the R&TD sector in Italian southern regions.

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[45] Initiatives in objective 2 are funded only ERDF. In the same areas, initiatives concerning the development of human capital are addressed by objective 3.

[46] A strict definition includes pure R&D support while a wider definition encompasses more general aid schemes and Information Society. See page 28 and Annex D for more detailed information about the RTDI definition used to calculate allocated and disbursed resources.

[47] PRAI initiatives concern for example: Finance engineering in favour of SMEs (Emilia Romagna); university and research centres (Lombardy); new projects to promote interaction between universities and technological poles (Marche, Apulia); establishment of regional innovation observatories (Lombardy, Apulia); design of a regional strategy for technology dissemination in firms (Campania). The overall allocated resources, including both public and private shares, amount to 115 MEUR.

The overall strategic objectives[48] which characterise SF interventions are pursued through seven National Operative Programmes (NOPs) and seven Regional Operative Programmes (ROPs). Among the NOPs, two programmes are particularly relevant for research and innovation:

- The *NOP Research* pursues a "demand-oriented" strategy and deals with aid schemes addressed to enterprises, particularly SMEs, and with the public research sector, particularly universities. Initiatives funded by the NOP are meant to be complementary to regional programmes which follow mainly indirect support policies.
- The *NOP Industry* is comprised of specific measures geared towards research and innovation. In particular, PIA (Integrated Packages for Innovation) represent a good, and at the moment successful, example of integration between aid schemes for industrial research, pre-competitive development and industrialisation[49].

Differently from the case of NOPs, RTDI did not have a strategic role within the ROPs at the beginning of the current programming period. Its importance increased with the definition of the Regional Innovation Strategies (RIS)[50].

In general, regional RTDI measures either fund few complex projects of cooperation between Universities, local public agencies, enterprises etc.[51] or widespread small incentives (often in *de-minimis*).

In objective 2, 14 Single Programming Documents (SPDs) cover 12 regions[52] and two autonomous provinces (Trento and Bolzano). Most of the programmes include measures dedicated to technological innovation in general, as well, as technology transfer and financial engineering in particular.

The overall allocation of SF resources to RTDI is presented in exhibit 8 while exhibit 9 provides a picture of allocated resources at a regional level. The definition of innovation and knowledge that has been employed is narrow in scope. It is based on the following "pure RTDI" fields of intervention (i.e. codes defined by the European Commission):

- 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.

[48] Strengthening the R&TD sector of Mezzogiorno; promoting linkages between firms and scientific community in order to fuel technology transfer initiatives and creation of high tech enterprises; improving the higher education system; increasing product innovation propensity; promoting international cooperation networks; promoting research and innovation in strategic sectors for southern regions; promoting innovation demand of public and collective bodies.

[49] Some regions (e.g. Umbria and Apulia) are implementing these kind of initiatives with their own resources.

[50] The RIS, whose implementation was a *conditio sine qua non* for community funding, have been an initial step for coordinating regional and national RTDI interventions in the CSF and for defining future regional RTDI policies.

[51] For example, competence centres in Campania, technological districts in Calabria or financing of large research projects in Sardinia.

[52] Piedmont, Liguria, Lombardy, Veneto, Friuli Venezia Giulia, Valle d'Aosta, Emilia Romagna, Tuscany, Umbria, Marche, Lazio, Abruzzo.

Exhibit 8: Overall allocation of resources at an objective 1 and 2 level (Millions of euro)

Objective	Total Cost	Structural Funds			National Funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	2.097,2	1.067,6	1.061,8	5,8	719,4	310,3
Objective 2	266,0	89,1	89,1	-	176,7	321,8
Total	2.363,2	1.156,6	1.150,8	5,8	896,0	632,1
TOTAL COHESION POLICY						
Objective 1*	46.021,7	23.946,7	15.918,1	4.440,1	21.513,7	561,3
Objective 2	7.204,9	2.721,0	2.721,0	-	4.276,9	206,9
Total	53.226,5	26.667,7	18.639,1	4.440,1	25.790,6	768,2

* Total objective 1 includes ERDF, ESF and other funds such as EAGGF and FIFG
Source: programming documents and financial data provided by DG REGIO

The restrictive definition encompasses measures that are entirely devoted to research and innovation promotion, therefore it is certainly of great relevance, as a benchmark, to policy makers in order to avoid overestimates and carry out cross-regional as well as cross-country comparisons. Additional calculations based on broader definitions of innovation are presented in Appendix D.

Exhibit 9: Regional allocation of resources (Millions of euro)

Programmes	RTDI interventions			Total		
	Total SF	ERFD	ESF	Total SF	ERFD	ESF
ROP Basilicata	6	6	-	848	434	221
ROP Calabria	19	19	-	2.131	1.259	425
ROP Campania	182	182	-	4.281	2.776	702
ROP Apulia	65	65	-	2.947	1.722	604
ROP Sardinia	1	1	-	2.118	1.300	372
ROP Sicily	71	65	6	4.284	2.524	846
ROP Molise	3	3	-	201	128	29
NOP Technical assistance	-	-	-	373	196	176
NOP Education	-	-	-	537	110	427
NOP Local Entrepr. Development	-	-	-	2.248	2.181	66
NOP Research	721	721	-	1.323	814	509
NOP Safety	-	-	-	631	569	62
NOP Fisheries	-	-	-	122	-	-
NOP Transport	-	-	-	1.905	1.905	-
TOTAL ROPs OB. 1	**347**	**341**	**6**	**16.804**	**10.143**	**3.200**
TOTAL NOPs OB. 1	**721**	**721**	**-**	**7.138**	**5.844**	**1.241**
TOTAL OBJECTIVE 1	**1.068**	**1.062**	**6**	**23.942**	**15.987**	**4.440**
SPD Abruzzo OB. 2	15	15	-	194	194	-
SPD PA Bolzano OB. 2	0	0	-	34	34	-
SPD Emilia-Romagna OB. 2	4	4	-	128	128	-
SPD Friuli venezia giulia OB. 2	8	8	-	101	101	-
SPD Lazio OB. 2	8	8	-	388	388	-
SPD Liguria OB. 2	8	8	-	201	201	-
SPD Lombardy OB. 2***	-	-	-	209	209	-
SPD Marche	-	-	-	131	131	-
SPD Piedmont OB. 2	32	32	-	510	510	-
SPD Tuscany OB.2	8	8	-	336	336	-
SPD PA Trento OB. 2	-	-	-	18	18	-
SPD Umbria OB. 2	-	-	-	157	157	-
SPD Valle d'Aosta OB. 2	-	-	-	17	17	-
SPD Veneto OB. 2	6	6	-	298	298	-
TOTAL OBJECTIVE 2	**89**	**89**	**0**	**2.721**	**2.721**	**0**
TOTAL OBJECTIVE 1 & 2	**1157**	**1151**	**6**	**26663**	**18708**	**4440**

*** Data concerning Lombardy are unreliable, regardless of the employed definition of research and innovation. In an analysis conducted by Ismeri Europa and based on national data, Lombardy allocates approximately 23% of ERDF resources to RTDI.

Source: programming documents and financial data provided by DG REGIO

In objective 1, Structural Funds devoted to RTDI make up about 5% of total cohesion resources, while in objective 2 this ratio decreases to about 4%.

In order to overcome some of the problems which may arise from using the EU codes, a "measure by measure" analysis has been also carried out[53]. The analysis pinpoints that:

- In objective 1, about 60% of total RTDI resources are part of multiregional programmes (40% accounted by the NOP Research and 20% by the NOP Industry);
- Among objective 1 regions, Campania and Apulia allocate the largest share of resources to RTDI. These regions (including phasing out Molise) allocate about 10% of their resources to research and innovation. Basilicata and Sardinia allocate slightly less than 10%, while Sicily and Calabria devote less than 4% of their ROPs.
- In objective 2, Piedmont allocates to RTDI 25% of total SPD resources, followed by Abruzzo and Veneto (15% and 12% respectively). Tuscany, Lombardy and Lazio take up about 8% each. All the others account for a maximum share of 4%[54].

4.1.2 Specific measures in favour of innovation and knowledge

Exhibit 14 summarises the relative importance of policy favouring innovation and knowledge by showing the number of specific identified measures and their share of total funding[55].

Exhibit 10: Key innovation & knowledge measures (regional and multiregional programmes)

Policy area	Number of identified measures*	Approximate share of total funding measures	Types of measures funded
Improving governance of innovation and knowledge	3	4%	• Technical assistance in the design of regional innovation strategy
Innovation friendly environment	58	40%	• Financial engineering; • Secured and unsecured loans; • Infrastructures and services for e-government and ICT diffusion; • Education and training aimed at developing industry oriented and post-graduate courses
Knowledge transfer and technology diffusion to enterprises	24	14%	• Aid schemes for utilising ICT related services and implementing technology transfer projects; • ICT infrastructures; • Competence centres

[53] The "measure by measure" scrutiny is a fine tuning of the analysis carried out at EU25 level on the basis of field of intervention codes. The "measure by measure" approach is characterised by a wider scope and is based on the examination of regional and national OPs as well as Complements of Programming.

[54] When considering RTDI allocated resources as % of total ERDF resources in each region, figures vary between about 23% (e.g. Lombardy, Veneto) and 6-8% (Valle d'Aosta, Tuscany). Abruzzo dedicated to innovation over 30% of ERDF, but data may be biased given the difficulty of distinguishing RTDI measures from more general interventions.

[55] The calculation of total funding takes into account both public (National and Community) and private resources. Again, the exhibit has been compiled on the basis of a specific "measure by measure" analysis of national and regional programmes.

Innovation poles and clusters	4	1%	• Measures aiming at increasing attractiveness of certain poles
Support to creation and growth of innovative enterprises	16	4%	• Aid schemes for start up and grants related to improving internationalisation and marketing; • Common services and infrastructures (e.g. incubators)
Boosting applied research and product development	16	37%	• Secured and unsecured loans for SMEs in order to carry out both mission oriented and bottom up research projects.

* This calculation takes into account also some multipurpose measures which address simultaneously more than a single policy area.

Overall, boosting applied research and innovation friendly environment measures are prevalent (more than 75% of total resources). The weight of knowledge transfer and technology diffusion measures is more limited while financial relevance of support to creation of innovative enterprises and innovation poles & clusters is extremely low.

The most common RTDI policy instruments consist of aid schemes (about 60% of measures), followed by infrastructures (20%) and education & training. Within the categories of beneficiaries, enterprises represent the largest group but it should be acknowledged that most of the measures are addressed to a combination of private and public sectors. Very little is left to networks.

In objective 1, interventions dealing with the development of human capital and information society are predominant. In terms of beneficiaries, clusters of enterprises is poor while most actions combine public (e.g. universities, research institutions, local public bodies) and private sectors (enterprises, private research centres) as main beneficiaries.

In objective 2, the most important type of initiatives is financial measures in favour of SMEs, innovative approaches to public services and procurement (e.g. e-government) as well as attraction of investments. Knowledge transfer and technology diffusion as well as support to creation and growth of innovative enterprises play a much more important role than in objective 1 regions. This probably reflects that objective 2 areas are more familiar with a culture of innovation and accustomed to the benefits of knowledge diffusion.

Despite a growing attention devoted to the needs of enterprises, there is little coherence between measures funded through Community support and key disparities and needs identified in section 2. This mismatch is due to:

- *Dispersion of intervention*; funded projects are frequently small and distributed without a clear strategy; there is no concentration on poles of excellence.
- *Marginal attention to the transfer of knowledge from the public research system to the private sector*; this would be particularly important in areas dominated by traditional sectors which are hardly able to maintain their competitiveness.
- *Overcrowded regional service centre market*; no action has been undertaken to put order among public agencies and bodies, on the contrary, new intermediaries have often been often introduced.
- *Insufficient use of Community resources to improve governance* by introducing advanced planning tools or experimenting new implementation methods.

It must be emphasised that the weight of Community support was almost negligible in objective 2 areas. There, SPD initiatives resemble surgical interventions complementary to regional policy. In objective 1, resources were abundant and ROP as well as NOP measures have been critical for the establishment of rudimentary foundations of a knowledge based economy. In this case, Structural Funds are the pillar of RTDI policy which would be almost absent without them[56]. Therefore discussing coherence with regional policy mix is not meaningful in this case.

4.2 Learning from experience: Structural Funds and innovation since 2000

4.2.1 Management and coordination of innovation & knowledge measures

This section reviews the overall management of Structural Fund 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 Fund measures for innovation and knowledge, the financial absorption and additionality of the funds allocated to innovation and knowledge.

RTDI policies funded through SF are mainly managed by the Ministers mentioned in chapter 3 and by regional governments. Some regions delegate innovation management competences to local agencies (e.g. ASTER in Emilia-Romagna), but no specific organization has been set up for structural funds[57].

Absorption capacity is an important issue concerning the management of RTDI measures funded through Structural Funds. The following table provides a snapshot of expenditure capacity with respect to RTDI measures, at both objective 1 and 2 level. With respect to objective 1 as a whole, 36% of allocated resources have been disbursed, according to data on certified expenditure extracted on 10 January 2006. Regarding objective 2, the expenditure is about 23% of total allocated resources.

In terms of disbursements, RTDI performance, after 5 years of implementation, appears poor compared with the overall absorption capacity of Community resources: 41% in objective 1 and 45% in objective 2.

[56] Total Community resources disbursed by ROPs and NOPs and devoted to RTDI amount to about 30% of national resources for industry support and concerning RTDI projects. Differently, in objective 2, this ratio decreases to 0.5% level. This disparity provides an insight on the different weight of Structural Funds in the two areas of intervention.

[57] In general, the mentioned problems of RTDI governance affect also Structural Funds. In particular the relationships between public and private sectors is weak; the role of public intermediaries and Universities is unclear; there is no structure with a co-ordination role with respect to regional and national RTDI policy. MIUR made an attempt to achieve some coordination by promoting the so called "Conferenza Stato-Regioni". The results were mixed but on the whole not satisfactory.

Exhibit 11: Absorption capacity of innovation & knowledge measures (Millions of euro)

Objective	Allocated	Disbursed Total SF	Expenditure Capacity
ROPs Ob. 1	346.64	82.12	23.7%
NOPs Ob. 1	720.90	301.14	41.8%
Total Objective 1	1067.55	383.26	35.9%
Total Objective 2	89.05	20.44	23.0%

Source: programming documents and financial data provided by DG REGIO

Within objective 1, there are some relevant differences. The NOP Research is characterised by an expenditure capacity of 42% while objective 1 regional average is very low (24%). However, the variance is extremely high among regions and capacity varies between a minimum of 0% in Basilicata and a maximum of 53% in Molise. Apulia and Campania show relatively satisfactory performances (34 and 29% respectively), while Calabria, Sardinia and Sicily perform poorly (9, 7 and 5% respectively)[58].

In objective 2, despite an average of 23%, values vary from a maximum of 44% in Emilia Romagna to a minimum of 9% in Friuli Venezia Giulia. Lazio is characterised by a relatively satisfactory performance (36%) while other regions such as Piedmont and Veneto perform quite poorly (approximately 15%).

Exhibit 12 shows expenditure capacity in relation to EU intervention codes. In objective 1, while measures related to innovation and technology transfer as well as R&TD infrastructure have an absorption capacity of over 30%, research projects in universities and research institutes are characterised by a meagre 1%. In objective 2, the situation is different, with a 15% absorption capacity associated to the same intervention code (181).

Exhibit 12: Absorption capacity by intervention codes (Millions of euro)

Codes	Allocated	Disbursed	Expenditure Capacity
OBJECTIVE 1			
18 – Research, technological development and innovation (RTDI) – detailed information unavailable	3.30	1.75	53.1%
181 – Research projects based in universities and research institutes	29.41	0.31	1.0%
182 – Innovation and technology transfer, establishment of networks and partnerships between businesses and/or research institutes	777.51	296.20	38.1%
183 – RTDI infrastructures	257.33	85.00	33.0%
OBJECTIVE 2			
181 – Research projects based in universities and research institutes	13.82	2.07	15.0%
182 – Innovation and technology transfer, establishment of networks and partnerships between businesses and/or research institutes	62.91	15.89	25.3%
183 – RTDI infrastructures	12.32	2.48	20.1%

Source: programming documents and financial data provided by DG REGIO

[58] In the same period, the overall absorption capacity was 53% in objective 1 multiregional programmes and 36% in ROPs. Again, the performance of RTDI measures is worse.

A peculiarity of the Italian case is the absence of code 184. Indeed, most education and training related measures are captured by omni comprehensive codes (e.g. 23, 24), not specific to RTDI, which are not considered in the present analysis.

4.2.2 Effects and added value of Structural Fund 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 mean to provide an exhaustive overview of the effects or added value[59] of Structural Fund interventions but is based on the examination of a limited number of cases of good practices[60].

Overall, the main results of Structural Fund interventions on innovation and knowledge economy performance at national and regional levels can be summarised as follows:

- In comparison to the past, the current programming period increased the resources devoted to RTDI and the implemented measures have been mostly demand-oriented and more capable of generate participation of firms;
- Some innovative interventions have been introduced for the first time in objective 1 (e.g. "PIA Innovazione", sector orientations) and other interventions have been reinforced in objective 2 (technology transfer and financial support to SMEs).
- Often RTDI interventions are oriented towards the weakest productive segments (small traditional enterprises) in order to safeguard employment. This may preclude the possibility of promoting breakthrough innovation.
- Very seldom RTDI is considered a productive sector in its own right. The capacity of research and development activities in attracting external investments and directly producing high value added services is underestimated.

Objective 1

- In objective 1, the most important positive effects of Structural Funds are have been achieved in the multiregional program. Aid schemes for enterprises, related to research projects took off after years of scanty demand by firms in southern Italy. The technological content of funded projects has been appraised as medium-high[61]. Nonetheless, the scale of the impact is still limited to an "elite" of southern firms and does not yet affect structural change.

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[59] 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)

[60] 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.

[61] Furthermore, the capacity to generate spill-over, promote the creation of networks and interactions between public and private sectors, generate research results and subsequent industrialization, emerged from the evaluation study.

- The NOP Research emphasized positive effects also with respect to universities and higher education systems, especially in objective 1. Again, this process is still embryonic and experiences difficulties and resistances (e.g. failure of "spin-offs").
- Within the NOP Industry, "PIA Innovazione" has been an innovative instrument and appears a successful experience. The high demand for participation was a positive aspect of this instrument. Nonetheless, Mid Term Evaluation (MTE) underlined the necessity of improvements in the selection criteria and in the operational support of financial institutions to the selection procedure.
- The preliminary results of regional programmes are less satisfactory. The implementation of regional measures for research and innovation is slow and, in general, not very efficient[62].

Objective 2

- In objective 2, regional programmes seem to have produced better outcomes, despite the limitations of available resources. According to the existent evaluations, Structural Funds contributed to reinforce regional priorities[63] in a period of decreasing national resources for enterprises. Funds were in no way adequate to express an effective and widespread intervention at the benefit of RTDI policy.
- At the same time, RTDI measures have been marred by low disbursement capacity, as a consequence of inefficiencies of public administrations and universities involved in the interventions.
- Despite the good quality of outcomes, the impact of RTDI measures funded with Community resources was limited in objective 2 due to small size of target areas and scarce resources. Actually some of the most advanced regional RTDI initiatives (e.g. PRITT in Emilia-Romagna) concern areas wider than objective 2.
- Other critical points emerging from the evaluation of SPDs are: support focused on traditional business sectors; long procedural times not compatible with successful management of innovation; unsatisfactory execution of financial engineering measures (the time needed for Commission approval); delay in execution of innovation transfer and network building measures.

Despite the various limitations, several best practices can be identified in the current programming period. These concern initiatives characterised by strategic relevance and repeatability in the future and in other regions. The next two boxes concern two cases chosen on the basis of their relevance and novelty. The goal is to provide some added value to literature already available on RTDI policy best practices in Italy[64]. More detailed information about these cases is included in Annex E.

[62] The problems discussed in the previous chapter are still valid here. These are: insufficient regional governance capacities; lack of coordination between local and central governments; delay in defining regional strategies; "De minimis" aid regime which constrains effectiveness of actions and prevents large scale effects.

[63] Especially in terms of boosting applied research and pre-competitive development in firms.

[64] See for example Magnatti (2005).

Ingenium[65] *is the first Italian seed capital fund which provides financial support on the basis of a purely market based assessment of applicant potential. The fund, controlled by a joint venture specialised in fund management, allows acquiring equity stakes in firms characterised by very high growth potential and high quality managerial staff. The managing authority has been identified through a European call for tenders. It involves an Italian (Meta Group) and a Dutch (Zernike Group) fund management consultancy. This joint venture also provides consulting services on complementary funding schemes, support to the penetration of foreign markets, and a network of contacts and partners. Thanks to Ingenium, firms are supported in their seed and start up phases. Ingenium can count approximately on 15 MEUR. This amount includes 4 MEUR directly invested by the joint venture. The procedure to access Ingenium is quite quick. An application form can be sent by fax or email, then the managing authority carries out a first document based selection and finally, if needed, purposeful meetings may be arranged.*

The launch of Ingenium experienced a delay (the contract with the joint venture has been signed in December 2004) due to complexity and novelty of the initiative relatively to previous regional experiences. The fund became operational at the beginning of 2005. So far, over 40 applications were submitted by regional SMEs but also by Dutch, Spanish, Slovenian, Indian and Argentina companies. Most projects concern ICT and, to a lesser extent, biotech, energy, aeronautics etc. Eight firms have already passed the initial scouting and are nearing the final stage leading to access to the fund.

The initiative is considered a best practice mostly because of its degree of novelty. It resembles a successful partnership between the private and public sectors. Ingenium was an innovative and courageous initiative strongly wanted by the highly competent staff in charge of managing RTDI policy in Emilia Romagna. In theory, the experience may be easily replicated elsewhere. However, transferring the concept behind Ingenium to other weaker institutional contexts may encounter opposition of short sighted administrations.

Centri Regionali di Competenza[66] *(CRdC) are bridging institutions introduced by Campania region. They capitalise on existent regional structures rather than create new ones. Each centre includes the main regional actors active in the public research system (e.g. universities, technological parks). They operate in sectors of strategic importance for the region, due to presence of innovative enterprises or leading public research centres. CRdC promote knowledge and technology transfer from public research to firms. Moreover, they encourage the participation of enterprises in the design and implementation of R&D activities. Finally, they contribute to attracting private investments in forefront high-tech sectors. In terms of policy area, the initiative can be classified as knowledge transfer and technology diffusion to enterprises and, at the same time, creation of an innovation friendly environment. In addition CRdC contribute to improve governance capacities for innovation and knowledge policies. CRdC represent a real novelty of the regional innovation system. The aspects of selecting strategic sectors and attracting investments represent a unique experience for local policy makers. An international panel of knowledge management experts has been employed during the phase of project selection. The experts did not only assess the project proposals but also contributed to improve them.*

[65] Measure 1.5 – SPD Emilia Romagna. Support to innovative start-ups (Sostegno allo start-up di imprese innovative).

[66] Measure 3.16, ROP Campania – Promotion of research and technology transfer in the most relevant sectors for growth and sustainable development (Promozione della ricerca e del trasferimento tecnologico nei settori connessi alla crescita e allo sviluppo sostenibile del sistema Campania)

Over 200 MEUR have been allocated to CRdC. At the end of 2005, approximately 160 MEUR were committed to the initiative. The absorption capacity is 41%, well above objective 1 average (36%). 10 CRdC have been set up. They operate in seven scientific fields which reflect local potential. For example, CRdC address the following themes: Analysis and monitoring of environmental risk, advanced biology, agro-industry, new composite materials etc. Over 2000 people are involved in the initiatives and about 600 scholarships have been granted.

The initiative is considered a best practice mostly because it succeeded to a certain extent in reorganizing the local system of agents providing technology transfer services, promoting private-public partnerships. The partnership between CRdC and private enterprises led to the establishment of several consortia.

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

Exhibit 14 provides a synthesis of the main results, in terms of added value and capabilities, arising from RTDI programmes and group of measures.

Exhibit 13: Main outcomes of innovation and knowledge measures

Programme or measure	Capability	Added value
ROPs	• Governance problems negatively affect timing and efficiency of disbursements • Room for intensification especially in technology transfer. More efficiency and demand oriented approaches are necessary • Policy concerning innovation poles and clusters is still underutilised but necessary • Aid schemes generated a remarkable and growing demand. • Universities and other public bodies absorbed many resources with poor efficiency and few spill-over effects	• RIS promoted a first attempt to conceive a strategic plan and deal with multilevel coordination • Initial conditions for developing a more effective and pervasive innovation strategy
NOPs	• New methods for planning and implementing should improve effectiveness • Large demand and medium-high quality of projects • Expenditure capacity higher than regional initiatives	• Financial additionality • Strengthening of scientific high education • Prevailing of a demand-oriented approach • Available resources allowed the take-off of aid schemes for enterprises
SPDs	• Governance is satisfactory in many regions, but it can improve further • Good execution of interventions in favour of SMEs and strong support to technology transfer • Poor results of financial engineering and some other innovative measures • Expenditure capacity much higher than the available resources • Poor concentration of resources on promising poles and technology platforms with high expenditure capacity	• Reinforcement of regional priorities, especially in terms of boosting applied research

In conclusion and as summarised in the table, some relevant lessons relevant to RTDI capability have been learned from the experience of the current programming period:

In objective 1

- regional measures did not perform well and an increase of resources in this direction will require radical adjustments in strategic orientations and management capacity;
- Aid schemes for enterprises have been successful and are expected to maintain a high capacity of expenditure. Some improvements are possible in terms of: identification of the technological areas strategic for the future; strengthening the connections with poles; increasing the capacity of attracting external investments of R&D
- Technology transfer initiatives are still poor and often based on public bodies or universities with weak linkages with enterprises. These measures require an improvement in regional innovation systems.
- Measures concerning human resources have been successful and their absorption capacity is high. However, in order to avoid waste, their approval should be conditioned to the existence of strong linkages with R&D programs of enterprises and Universities

In objective 2

- A change in strategy appears necessary, favouring the leverage effects coming from the reinforcement of excellence poles
- The expenditure capacity is very high in, both, measures for technology transfer and in measures for boosting applied research.
- Measures for human resources have also a high capacity of expenditure, but as in objective 1, they should be better targeted to research programmes and employment of researchers in firms.
- The long delays in the approval of the programming documents must be avoided. They had negative consequences on the organisation of efficient monitoring systems and on the reliability of MTEs;

5 Regional potential for innovation: a prospective analysis

This section of the report seeks to summarise and draw conclusions from the analysis of the previous chapters, the available literature (e.g. foresight studies) as well as the interviews and focus groups carried out for this evaluation. The goal is providing a framework for the future orientation of Structural Fund investments in innovation and knowledge.

5.1 Factors influencing regional innovation potential

As it was stressed in chapter 2, RTDI poles are key assets for regional development. They may represent the basic endowments on which to capitalise in order to establish a knowledge-based economy. Poles contribute to explain the innovation potential of different geographical areas and hence may guide policy making. Where these concentrations exist and are coupled with developed human and social capital, there are opportunities for future knowledge-based development.

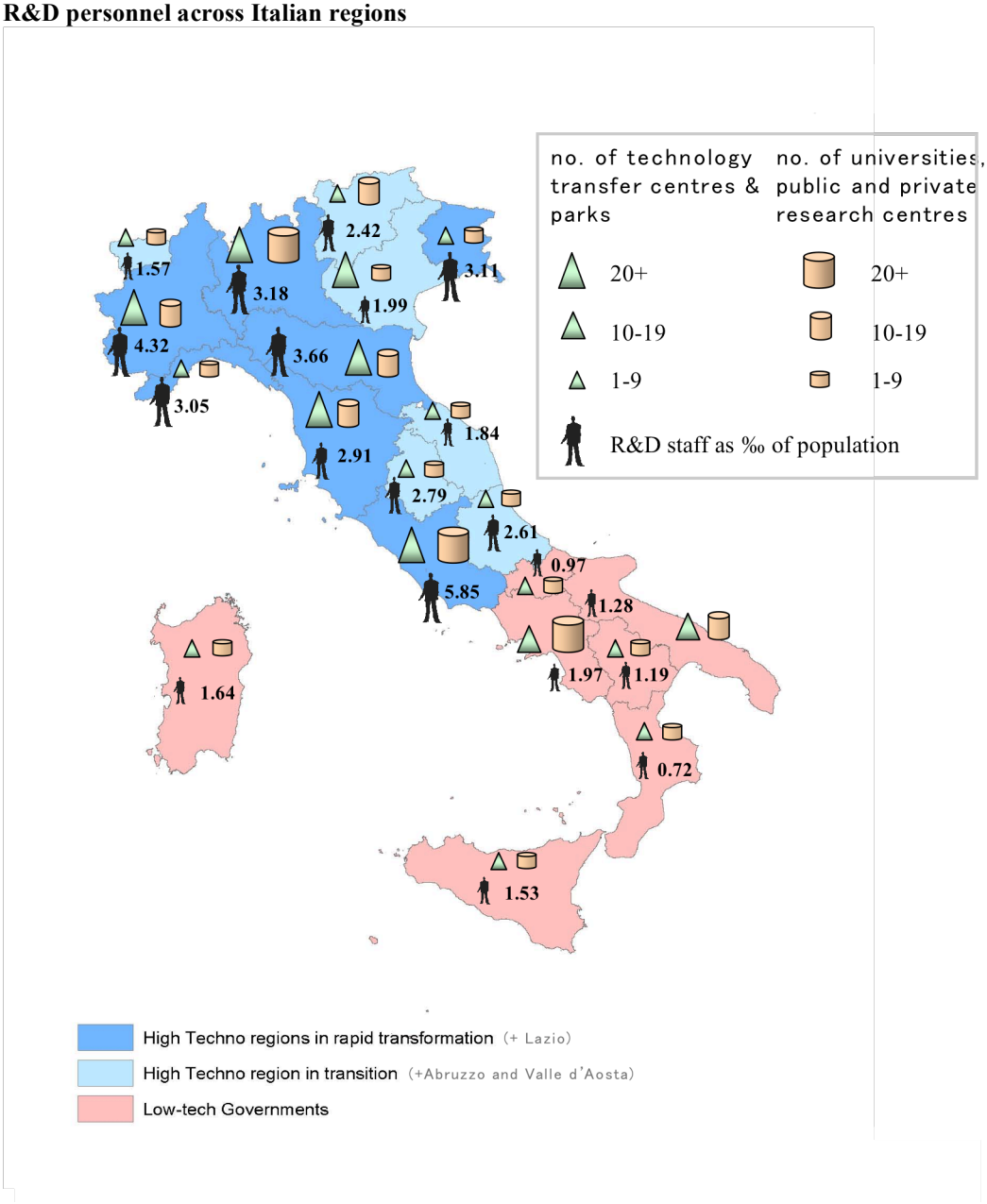
The following map (exhibit 14) summarises potential of Italian regions by distinguishing the groups identified in chapter 2 and presenting some of the endowments of each region in terms of R&D staff, research centres and university departments, knowledge and technology transfer service centres and technology parks.

Exhibit 14 provides a snapshot of some relevant RTDI concentrations. In order to foresee opportunities and potentials of Italian regions, sophisticated and more exhaustive tools should be employed. In Italy, the use of advanced and future oriented methods for identifying the factors influencing innovation potential is still marginal and not systematic. The results of a National technology foresight[67] were published in October 2005, almost ten years later than the first attempt to identify priorities of industrial research. In synthesis, the main conclusions of the prospective study are:

- Italian universities and public research bodies are characterised by a good capacity to carry out scientific research in several technological areas (e.g. ICT, Biotech). However, the industrial capacity to translate scientific research performed in these areas into successful innovation is very limited.
- Few exceptions to this situation exist and are related to the presence, often isolated, of particularly important industrial actors. For instance, ST Microelectronics in the field of advanced components, Finmeccanica Group with respect to aerospace. Only in the biotech sector the possibility of using the outcomes of scientific research as a basis for the establishment of new knowledge-based firms (also SMEs) is relatively straightforward.

[67] Fondazione Rosselli (2005), Second report on National Priorities of Industrial Research, Guerini e Associati.

Exhibit 14: Concentrations of advanced service centres, public and private research structures, R&D personnel across Italian regions



Source: Ismeri Europa

Some important recommendations emerged from the foregoing conclusions. These are:

- In general, the strategic approach to support RTDI should be based on models which take into account the systemic nature of innovation processes and applications. Long term co-operation between universities, research bodies, enterprises, financial institutions and technology transfer agencies should be promoted. Moreover, actions aimed at transferring knowledge and technology already available in universities and public research bodies to firms should be a priority. In particular this would help pushing product and process innovation in traditional sectors (e.g. textile, footwear, furniture) which suffer most from international competition.
- In terms of the sectors where resources should be concentrated because they are more likely to have the strongest growth potential in Italy, it is worth mentioning:

Microelectronic components; advanced ICT applications (e.g. ambient intelligence regarding mobility, health, education and e-commerce); biotech applications in textiles, environment, agro industry and pharmaceuticals; advanced materials (e.g. nanotech) to be used in traditional sectors; advanced technologies for managing production (e.g. rapid prototyping, process simulation); civil application (e.g. in logistics, environment and mobility) of space technologies.

These recommendations are already taken into account by policy makers. Some of the most relevant conclusions and orientations of this foresight report have been included in the National Research Plan 2005-2007 drafted by MIUR. Obviously, the specific national strengths in business sectors and leading technology fields are not equally distributed across regions. The sub-clusters of Italian regions, which have been identified, emphasise the importance of concentrations of R&D activities in specific areas or cities.

Exhibit 15: Factors influencing innovation potential by type of region

Type of region	Main factors influencing future innovation potential
High Techno in rapid transformations (including Lazio)	➢ Concentrations of RTDI activities in both traditional and leading technological fields ➢ Strong interaction between poles and productive system ➢ Important and innovative large firms ➢ Strong international opening up and excellent export capacity ➢ Existence of large and dynamic cities which fuel the demand of new products and advanced services ➢ Competitive market of advanced services ➢ Strong institutional capacities and good regional governance of research and knowledge system ➢ Weak capacity to attract qualified human capital from abroad
High Techno in transition (including Abruzzo and Valle d'Aosta)	➢ Active industrial districts and good performance of SMEs ➢ High-quality manufacturing industry ➢ High degree of openness to external trade ➢ Diffuse entrepreneurial culture and strong managerial capacities ➢ Good infrastructural endowments ➢ Limited concentration of RTDI activities ➢ Few large firms which are able to haul local SMEs ➢ Strong productive specialization in traditional sectors ➢ Fragile interaction between public and private sectors ➢ Still unclear regional strategies in R&D and weak governance to manage innovation and research policies
Low-tech Government	➢ Large availability of resources thanks to Community and National policies (limited to objective 1 regions) but heavy dependence of regional policy upon these. ➢ Supply of skilled human resources ➢ In some areas, isolated concentration of RTDI activities around large innovative firms or highly productive research nodes (Universities, public or private research centres) ➢ Isolated cities which are able to stimulate a strong demand of advanced services ➢ Weak integration between high-tech poles (where present) and the rest of productive system and, generally, low cooperation between public and private sectors ➢ Poor social background and scarce propensity to innovate ➢ Feeble productive fabric and low degree of openness ➢ Absence of adequate infrastructures ➢ Strong productive specialization in traditional sectors ➢ Weak governance to define and manage innovation and research policy ➢ Lack of coordination between State and Regions in the implementation of research and innovation measures ➢ Lack of policy actors in industry and university to boost economic and cultural change towards innovation

Exhibit 15 summarises the main factors which may influence the innovation performance of the groups of regions. The table merges the results of the analysis carried out in previous chapters, the key interviews and the relevant prospective literature synthesised in the present paragraph.

5.2 A prospective SWOT appraisal of regional innovation potential

The analysis of this section is based on an overall appraisal of innovation potential of the groups of regions which have been analysed so far. The SWOT matrices are built on the basis of the preceding sections of the report and aim at pointing out what are the major strengths and weaknesses (factors which can be more directly influenced or amended), as well as opportunities and threats (factors on which there is little direct hold), in terms of innovation and knowledge in each type of regions. Specific economic, sectoral, research or human resource-related factors are considered according to whether they offer high to low potential.

Exhibit 16: Innovation and knowledge SWOT

High Techno regions in rapid transformations (including Lazio)	**Opportunities**	**Threats**
Strengths	▪ Concentrations of RTDI supply and demand around large firms (Lombardy, Piedmont, Emilia Romagna etc.) or around public research bodies, universities and parks (in Tuscany, Friuli Venezia Giulia, Lazio). Poles often excel in specific business sectors or technology fields (e.g. software in the area of Pisa, biomedical equipment in the area of Modena). ▪ Highly performance R&D activities represent a productive sector in its own right, capable of networking and establishing business relationships in the world market ▪ Strong institutional capacities and good regional governance which can be used to define a long-term strategy for research and development	▪ Financial interventions, especially those supporting the early-stages of life of enterprises and in general access to credit of SMEs, are still inadequate ▪ High-quality supply of skilled human resources. However, capacity to retain high-skilled human resources and attract human capital from abroad is weak due to uncompetitive wages and immigration constraints ▪ Large cities are the hot spots of these regions. Little attention has been devoted to social and housing issues in the outskirts of cities and concerning mainly young families and immigrants
Weaknesses	▪ Scarcity of public resources which may be devoted to RTDI. This requires concentration on existent excellences and support network as well as systematic international alliances in strategic sectors ▪ Prevalence of small firms and the low propensity to innovate requires actions aimed at transferring knowledge and technology from public bodies and universities to firms. This in order to support product and process innovation also in traditional sectors where it is nowadays fundamental to compete on innovation content rather than costs	▪ Low level of innovation in employment rich sectors is a threat if traditional business, exposed to international competition, are not upgraded and structural change is opposed. Long-term employment growth can be safeguarded by investing in education and knowledge accumulation.

In general, a radical change in the conception of RTDI policy should be pursued by High Techno regions. Support should not only focus on funding industrial transformations, but also on developing RTDI as a productive sector *per se*.

In High Techno regions in rapid transformation, poles of excellence should pursue a more aggressive strategy, and reinforce their capacity of promoting spill over effects and technology transfer.

High Techno regions in transition (including Abruzzo and Valle d'Aosta)	**Opportunities**	**Threats**
Strengths	▪ Very successful industrial districts with important know-how in the production of "made in Italy". There is an ongoing evolutionist selection among them and only firms competing on innovation rather than on costs will survive. Purposeful initiatives to encourage the dimensional growth of the enterprises (e.g. mergers, networking) are important. ▪ Openness of these regions, together a diffuse entrepreneurial culture and strong managerial capacities, are assets to be used to leverage foreign/external investments, particularly by innovative large firms	▪ Competitiveness in traditional sectors, based on cost reductions, is not sustainable and innovation is the only way forward. However, there is a risk related to delocalization and outsourcing of activities previously performed in industrial districts. It is crucial to retain control of strategic activities and delocalizing only marginal phases of production
Weaknesses	▪ No concentration of RTDI activities due to the lack of large firms and public research poles. Local universities need to be more open and strengthen their linkages with productive sector ▪ The local system of advanced services is weak and should be strengthened by guaranteeing a stronger competition	▪ Sluggish innovation in employment rich sectors is a threat if structural change is opposed. Long-term employment potential should be safeguarded by investing in education and knowledge accumulation. ▪ Still unclear regional strategies in R&D and weak governance to manage innovation and research policies. However, the lack of public resources requires a design of a long-term strategy for research and development and an improvement of regional governance capacity

In High Techno regions in transition, the development of excellence poles is a priority, which can be pursued by supporting public-private networking, reinforcing advanced services, opening University to enterprises and international competition, introducing long term regional RTDI strategies.

Low-tech Government regions	**Opportunities**	**Threats**
Strengths	▪ Some isolated concentrations of RTDI activities around poles of excellence (e.g. microelectronics in Catania, polymeric materials near Naples). These have a huge potential to generate a "domino effect" through the creation of spin-offs and innovative start-ups ▪ Lagging behind areas have an inner potential to catch-up by growing quicker than leaders, given also their favourable demographic trends. They should exploit maximally their limited assets rather than starting from scratch ▪ Strategic position in the Mediterranean Sea and unique natural resorts. The application of new technologies to traditional business activities (e.g. tourism and agro industry) is an important prospect.	▪ Knowledge and technology spill over are critical in order to use poles as a basis for a diffused development. If this is not recognised, it will not be possible to turn deserts surrounding cathedrals into grazing lands and sustain the creation of new high-tech enterprises. ▪ Waste of available resources might be a threat without the adoption of targeted regulative actions able to create a clear cut division of competences in respect to national government in order to avoid the duplication of effort and to improve the effectiveness of programmed actions ▪ Universities and catching up potential may deliver expected outcomes provided that the resistance against adjustment is overcome. Systematic introduction of sophisticated best practices for a meaningful future-oriented planning is necessary. ▪ Good supply of skilled human resources but brain drain is an issue in these regions.
Weaknesses	▪ No robust familiarity with RTDI policy. Considerable Community resources represent an opportunity for introducing systematic and long-term strategic guidelines. ▪ The supply of knowledge and technology transfer services is weak. In order to support the creation of new poles or the positive "contamination" of areas around poles, the local system of advanced services to enterprises needs to be strengthened by guaranteeing a stronger competition	▪ Still weak governance to manage innovation and research policies. It is necessary design a long-term strategy for research and development and promote the systematic use of innovative planning tools by regional administrations.

Low-tech Government regions can count on considerable Community resources. This opportunity must be accompanied by an increased capacity in defining strategies and implementing interventions. In these regions, RTDI policy should simultaneously pursue two general aims: establishing research and innovations poles, for instance by attracting external investments or strengthening local supply (e.g. universities); accelerating technological upgrading with demand-oriented interventions on technology transfer and organisational innovation.

5.3 Conclusions: Regional innovation potential

The key conclusions that can be drawn from the analysis are summarised in this paragraph. Some conclusion concern all Italian regions, others highlight levels and factors of innovation potential in specific geographical areas.

Policy headline 1: Promote long-term co-operation between universities, research bodies, enterprises, financial institutions and technology transfer agencies.

The primary target of a first set of policies must be the full exploitation of RTDI potential already produced in our universities and research centres. Actors such as universities, research centres and firms should therefore co-operate and integrate their activities in a systematic manner and on a medium-long term perspective. Support schemes should selectively fund those who incorporate such operating methods successfully in their current activities. Technology parks and districts, competence centres or any other structure must be assessed and funded on the basis of their measurable results. Evaluation should orientate specific policy choices and current project management.

Actions aimed at transferring knowledge and technology, already available in universities and public research bodies, to firms should be a priority. In particular technology transfer and networking would simultaneously boost product and process innovation in traditional sectors (e.g. textile, footwear, furniture) and the change of the universities operating methods.

Policy headline 2: Increase concentration of resources in the strongest growth potential technological areas –with particular attention on regional excellences -

A limited set of national priorities should be supported on a long term basis and resource allocation should be concentrated accordingly. Priorities stem from existent excellence poles RTDI supply potential. In Italy, some of the most promising sectors are: Microelectronic components; advanced ICT applications (e.g. ambient intelligence regarding mobility, health, education and e-commerce, tourism); life sciences and biotech applications in textiles, environment, agro industry, health and pharmaceuticals; advanced materials (e.g. nanotech) to innovate manufacturing districts; advanced technologies for managing production (e.g. rapid prototyping, process simulation); civil application (e.g. in logistics, environment and mobility) of space technologies. Obviously, the poles and their specialisation help to identify the sectors that should be prioritised in different territories; their reach must however be widened to other regions with less advanced supply potential. A foresight exercise is essential to define priorities carefully.

Policy headline 3: Exploit RTDI poles as vehicles to spread innovation and as a basis for long-term development

High Techno regions in rapid transformation, well equipped and successful, have an important competitive advantage related to the presence of either research-based or industry-fuelled RTDI concentrations (e.g. poles located in the areas of Turin, Milan, Trieste, Pisa, Bologna and Modena). To maintain these advantages, resources should be concentrated on funding the existent poles. These represent the basis that may trigger a “domino” effect and encompass the rest of the regional economy. Existent

poles of RTDI supply can support innovation of local or national firms but can also act as an exporter of advanced services in the World market. This opportunity is at present unexploited in High Techno regions mainly trying to match their supply potential with the low profile innovation demand of SME.

Policy headline 4: Facilitate structural change in manufacturing, leading towards a more innovation-based productive fabric, when restructuring traditional productions

High Techno regions in transition host important industrial clusters (e.g. districts in Veneto and Marche). Their specialization in traditional sectors is characterised by insufficient innovation and cost competition. Maintaining these obsolete specialisation patterns is not effective in the long term. Policy should support change by concentrating aid schemes on the industrial leaders and on the highest value added productions while the rest must be dismissed or delocalized (e.g. outsourcing of marginal activities while maintaining control of strategic production phases). In these regions, characterised by nearly full employment of manpower and full utilization of the other resources, industrial restructuring will also create opportunities for developing new high-tech productions.

Policy headline 5: Reinforce system of knowledge transfer and create preconditions for innovation in regions without concentrations of RTDI activities

In weak regions in the South (e.g. Campania, Apulia and Sicilia), concentrations of RTDI supply and demand are isolated from the rest of the productive fabric (e.g. Naples, Catania, Bari). These poles may be a basis for competing in globally integrated markets and resources must be employed to strengthen them and reduce their isolation. In regions where RTDI concentrations do not exist in any significant manner (e.g. Calabria, Molise, Sardegna), policy should primarily focus on creating the preconditions for innovation by reinforcing high quality human resources supply.

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

This Chapter draws upon the analysis of regional innovation performance, the scrutiny of national and regional policy mix and the prospective investigation of regional potential in order to provide useful recommendations for steering Structural Funds support. Moreover, proposed recommendations are based on interviews with key stakeholders and the Focus Group, undertaken as part of the evaluation.

6.1 Strategic orientations for Structural Fund investments in innovation and knowledge

Key conclusion 1: Overlapping between national and regional intervention constrains the effectiveness of RTDI policies

The division of responsibilities between central State and regions has not been clearly defined. This has prevented the definition of a coherent and comprehensive national strategy. Despite the recent improvements, the intervention has been characterised by duplication and fragmentation of RTDI initiatives. The next programming period requires a clear and pragmatic definition of the governance as well as of the instruments to be implemented to carry out institutional tasks.

Key recommendation 1: Promoting a clear-cut division between national and regional interventions.

Suggestions stemming out from previous programming experience:

- National high-tech priorities should be managed at a central level, funding large projects to support:
    - strategic sectors, throughout the whole country
    - breakthrough innovation and frontier research not limited to a particular sector
- Regional resources should focus on industrial research applied to marginal innovation and to the restructuring of the productive base. Access to these funds should be granted on the basis of National tenders or calls for proposals rather than local competition. They should also fund interventions to improve the innovative environment and territorial marketing.
- Human resource funding as well as knowledge and technology transfer activities, direct investment attraction should be addressed in a co-ordinated way by national and regional levels and in a wider (not local) competitive environment.

Key conclusion 2: National and regional RTDI policy need a European dimension and a long-term strategic focus

RTDI is a long-term policy exercise and systematic and longstanding action are necessary to reap the benefits of intervention. Its financing and strategic orientation must be coordinated at a national and an European level, stable and consistent in its focus. Resource allocation must be multi-annual to allow the private sector to make its investment choices. This comprehensive strategic frame will lead to task division between national and regional authorities and prevent overlapping and fragmentation.

Recommendation 2: Introducing a clear and specific RDTI programme which identifies sectoral priorities at the national level

- A new generation of RTDI interventions is required with long term national and regional plans supported by definite resources.
- Accurate foresight exercises should help national and regional plans to focus on and set up national priorities. RIS should be revised accordingly.
- National strategy must have a clear focus and an European, rather than a local dimension, involving large firms and excellence poles in the whole Community.
- Reduce technological priorities of PNR (2005-07) to 4-5 areas, to create scale and critical mass effects. Increase time span of plans to 5 years.
- Reduce number of proposed technological districts, especially in weak regions, and define quantitative and qualitative standards.
- Increase trans-regional RTDI initiatives, especially those North-South to help weak regions research and innovation system to grow.

Key conclusion 3: Regional differences in terms of RTDI concentration are critical to policy design

High Techno regions in rapid transformation are characterised by poles of excellence in research and innovation while High Techno regions in transition, despite a robust industrial fabric, do not have the same supply potential. Low-tech Government regions also lack polarized supply of RTDI, except for some isolated cases (e.g. Catania in Sicily, Naples in Campania, some other territories in Apulia). Polarisation conditions the nature and effectiveness of public interventions in terms of scale, critical mass, matching of demand and supply. It is worth stressing that regions cannot implement RTDI policies, irrespective of their potential supply capacity and demand.

Recommendation 3: Use RTDI poles and favour "polarisation effects" as leverage for growth and development

Concentration of "resources" in specific priority technological areas and clustering in space of RTDI supply should be reinforced. Each regional clusters ask for a specific intervention.

- High Techno regions in rapid transformation, endowed with poles of excellence should be strengthened by:
    - focusing resources (especially of national programmes) on excellence (e.g. frontier and breakthrough research);
    - supporting the participation in national and international networks;
    - developing the supply of innovative financial tools (in particular those supporting early life stages of firms and, in general, access to credit);
    - favouring the diffusion of their research activities in different sectors and areas of the country;
    - attracting new high-tech firms
- Supporting the polarisation effect in High Techno regions in transition and in Low-tech Government regions, characterised by a significant productive structure, by:
    - attracting innovative firms (territorial marketing and agreements with large companies; incentives for mobility of researchers and promoting the establishment of spin-off)
    - reinforcing local supply (e.g. universities, public research agencies);

    - concentrating public demand (concentrating resources on industrial districts leaders and on the most innovative firms).
- In areas without poles and unfavourable conditions for RTDI policies (especially in certain Low-tech Government regions), intervention should concentrate on creating the pre-conditions for a knowledge-based economy rather than waste resources in unrealistic RTDI activities:
    - Innovation friendly environment (e.g. ICT diffusion in enterprises, provision of innovative services, diffusion of an innovation culture by means of knowledge clubs);
    - Funding of projects dealing with marginal innovation rather than frontier R&D initiatives;
    - Strengthening of high quality human resource supply;

Key conclusion 4: Low private R&D expenditure

Whilst public R&D in Italy does not diverge substantially from the European average, private R&D is extremely poor. Notwithstanding the difficulties in assessing R&D by small firms in traditional sectors, the private effort is considerably lower than in other advanced countries.

Recommendation 4: Supporting private investments in RTDI with demand oriented initiatives

- Existing aid schemes to support applied research and industrialisation can be maintained in the subsequent programming period subject to improvements in their management, strategic focus and coordination.
- Aid schemes should support only research and innovation activities by beneficiary firms; other general purpose aid should be discouraged.
- In traditional industrial areas exposed to international competition (especially in High Techno regions in transition), industrial policies should support the transformation and renovation of the productive structure (e.g. favouring delocalization and outsourcing but maintaining control of strategic activities). In addition to this, creation of high-tech SMEs and spin-off, both local and from outside, must be supported to generate opportunities for the development of new sectors.
- Technological audits and foresights, in order to identify sectors, value chains and technologies which are of greatest relevance to territories, should be systematically required (see also recommendation 6).
- Promoting cooperative research projects involving SMEs to overcome problems of scale which prevent a surge in national private sector R&D. Funds must support networking of firms, research labs, parks and service centres.
- Funding to firms should be subject to the condition that high skilled human capital is structurally absorbed by enterprises. Initiatives which reduce labour cost of researchers could contribute to the achievement of this goal.

Key conclusion 5: The Italian system of knowledge and technology transfer is weak and the outcomes of forefront public research are not adequately exploited in the market.

Italian universities and public research bodies are characterised by their ability to carry out state-of-art scientific research in several technological areas (e.g. ICT and biotech applications to either traditional or innovative sectors, advanced materials, space technology applications). However, the industrial capacity to transform

scientific research outcomes in these areas into successful innovation is very limited. Universities must be pushed to increase their specialisation and revise their operating methods and organization through their link with market demand and private external financing.

Recommendation 5: Support development of RTDI as a productive sector in its own right and favour knowledge transfer from universities to firms

- Funding of universities, research centres and service agencies linked to the tangible achievement of positive results of their knowledge/technology transfer activities.
- Reorganisation of the public and semi-public bridging agencies created in the past. These are too numerous (i.e. roughly 300), too small and hence mostly unable to supply any efficient and competitive advanced services. In order to support and upgrade their RTDI poles, policy makers should avoid creating new structures, rationalize existing supply and fund only networks involving the most performing agencies (ranked by means of evaluation) .
- Priority to be given to funding of structures which bring together private and public agents.
- European wide tenders should become compulsory for all advanced service provisions, including those of universities and public innovation agencies.

6.2 Operational guidelines to maximise the effectiveness of Structural Fund interventions for innovation and knowledge

Key conclusion 6: Public management of RTDI policies needs drastic improvement.

National and regional institutions often lack dedicated staff with the technical competences and knowledge to carry out efficient and focused RTDI policies effectively. This is particularly true in objective 1 regions. As a consequence, project selection, control, monitoring and evaluation procedures are often unclear and fragmented. At all institutional levels, the governance standstill has hampered the necessary upgrading of management and planning. Lack of management skills prevents the public administration from exploiting results and from creating a knowledge base of project outcomes and impacts to guide and refine future interventions.

Recommendation 6: Use of management control tools and foresight is a necessary condition for funding .

- Improve quality of procedures of selection, monitoring and control of projects through:
    - the establishment of a management structure, equipped with adequate staff and competences. This upgrading is a necessary and preliminary condition to increasing resources in RTDI policy areas.
    - the employment of an adequate information system to allow the timely diffusion of information about the projects' state to evaluators and policy makers. This systems would also allow beneficiaries to communicate in "real time" with evaluators and negotiate possible adjustments of research plans.

- Use of tools, such as technological foresight and feasibility studies, to allow the focusing of strategic priorities and to improve efficiency, especially in aid policies financing industrial research, is a necessary condition for funding. This is essential in order to understand where to invest, within the production process, within sectors and productions.
- Promotion of trans-regional and trans-national co-operation programmes to exchange best practices in policy management and implement European-wide joint strategic plans.
- Increase the use of evaluation regarding existent operating structures, policies, programs and projects, starting with the 2007-13 programs.
- Condition aid to industry (individual or clusters) to foresight exercises carried out by internationally recognised research organisations.

Key conclusion 7: Absorption capacity of RTDI measures is poor, but objective 2 regions express an enormous potential demand.

Despite a potential absorption significantly higher than available funds, in most regions (e.g. NOP aid schemes for industrial research), the analysis underlined an insufficient expenditure capacity related to RDTI measures, which is lower than the Structural Funds average. This is especially true of regional initiatives and is due to the inefficiency of local public administrations and lengthy procedures. University administrative procedures are equally unable to guarantee a quick and efficient absorption of resources.

Recommendation 7: Simplification of bureaucratic procedures is urgent

- Simplify and standardize selection procedures and administrative requirements (especially regarding joint research projects involving universities and public bodies). This can be achieved through:
    - on-line short-listing and evaluation of projects eligible for funding. This approach may imply submission of proposal in electronic format and possibly the availability of a portal gathering all the available information of projects competing for funding. For instance, the Region Emilia Romagna used an online management system for the evaluation of research projects as part of PRRIITT;
    - Adoption of *ad hoc* parameters to measure administrative quality and the setting of a maximum time-limit for selection and contracting procedures (set quality standards of PA).
    - Simplify and streamline university procedures of decision making and expenditure, actually unable to allow good project management.
- Procedures to be customised according to the financial weight of a project. Resource-consuming projects should be assessed with greater attention .

Key conclusion 8: Weak competition in service markets and lack of innovation in the financial sector

Advanced service markets are still operating in a weak competitive setting, especially in the area of regional consultancy for innovation. In this context, the backwardness of the financial sector is particularly serious and prevents from creating an innovation friendly environment for high-tech projects, spin-off and breakthrough research involving high risks.

Recommendation 8: Promotion of a know how in technological rating and opening up to international competition

- Ability of banks to evaluate risks embodied in high tech projects must improve. A know how in technological rating is needed, in order to be able to assess the prospects and risks of funding innovative initiatives as well as high tech start-ups. At present, bank foundations could take on this role but, so far, they have not fulfilled this mission in a satisfactory way.
- Open to external venture capitalist aid to create and manage venture as well as seed capital funds, specially in High Techno regions (see, for example, "Ingenium" case study in paragraph 4.2.2.).

Exhibit 17: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
High Techno	Support development of RTDI as a productive sector in its own right and fully exploiting of human capital	– **Improving governance of innovation**, (new strategies and a new generation of RTDI policies focusing on concentration of financial resources, strengthening skills and tools in RTDI policy management)	– **10-20%** of total SF in the strict definition (i.e. EU intervention codes 181, 182, 183, 184); – **30-50%** of total SF in the case of a more comprehensive definition of measures geared towards research and innovation (see the "measure by measure" definition used in chapter 4).
	Speeding up competitive adjustments and increasing private investments in RTDI	– **Boosting applied research and product development & Innovation friendly environment** (more resources for RTDI, promotion of innovative services and investments in SME, increasing RTDI investments of enterprises, favouring market competition on innovative services) – **Support to creation and growth of innovative enterprises** (especially university spin-offs)	
High Techno regions in rapid transformation (including Lazio)	Concentration of resources on excellence poles (e.g. molecular biomedicine S&T park in Trieste, Biomedical district in Modena, ICT and pharmaceuticals in Pisa) to produce spill-over effects and develop new productive branches	– **Boosting applied research and product development** (promotion of large projects in frontier and applied research, identification of technological platforms, support for breakthrough innovations, investing on key sector/technological priorities)	– High expenditure capacity in poles and nearby.
High Techno regions in transition (including Valle d'Aosta and Abruzzo)	Reinforcing linkages among Universities, research centres and enterprises	– **Innovation poles and clusters** (networking; opening universities, local services and enterprises to international co-operation/competition; develop new productive branches)	– Medium-high expenditure capacity in enterprises.

Low-tech Government	Creation of pre-conditions for RTDI development (e.g. promotion of innovation services rather than frontier research initiatives)	– **Innovation friendly environment** (support to technological transfer and innovation in local SME, creation of innovative enterprises, opening innovation market to international actors and competition)	– **Around 10%** of total SF in the strict definition (i.e. EU intervention codes 181, 182, 183, 184); – **Around 25%** of total SF in the case of a more comprehensive definition of measures geared towards research and innovation (see the "measure by measure" definition used in chapter 4); – **50-60%** of total RTDI resources in **multiregional interventions**; – **Regional allocation** of resources conditioned by governance improvements.
	Implementation of an efficient governance of RTDI policy	– **Improving governance of innovation and knowledge policies** (more competition among local actors, Universities and service providers, reinforcing principles of independence and efficiency, allocation of funds tied to efficiency/effectiveness indicators)	
	Development of existing excellence poles (e.g. electronics in Catania, composite materials and aerospace in Naples, Bari and the industrial districts of Barletta and Casarano, agro-biotech in Basilicata) and attracting innovative investments	– **Boosting applied research and product development** (support to large projects, involvement of external large firms, "packages" for RTDI investments: human resources + feasibility studies + incentives, etc.)	

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.

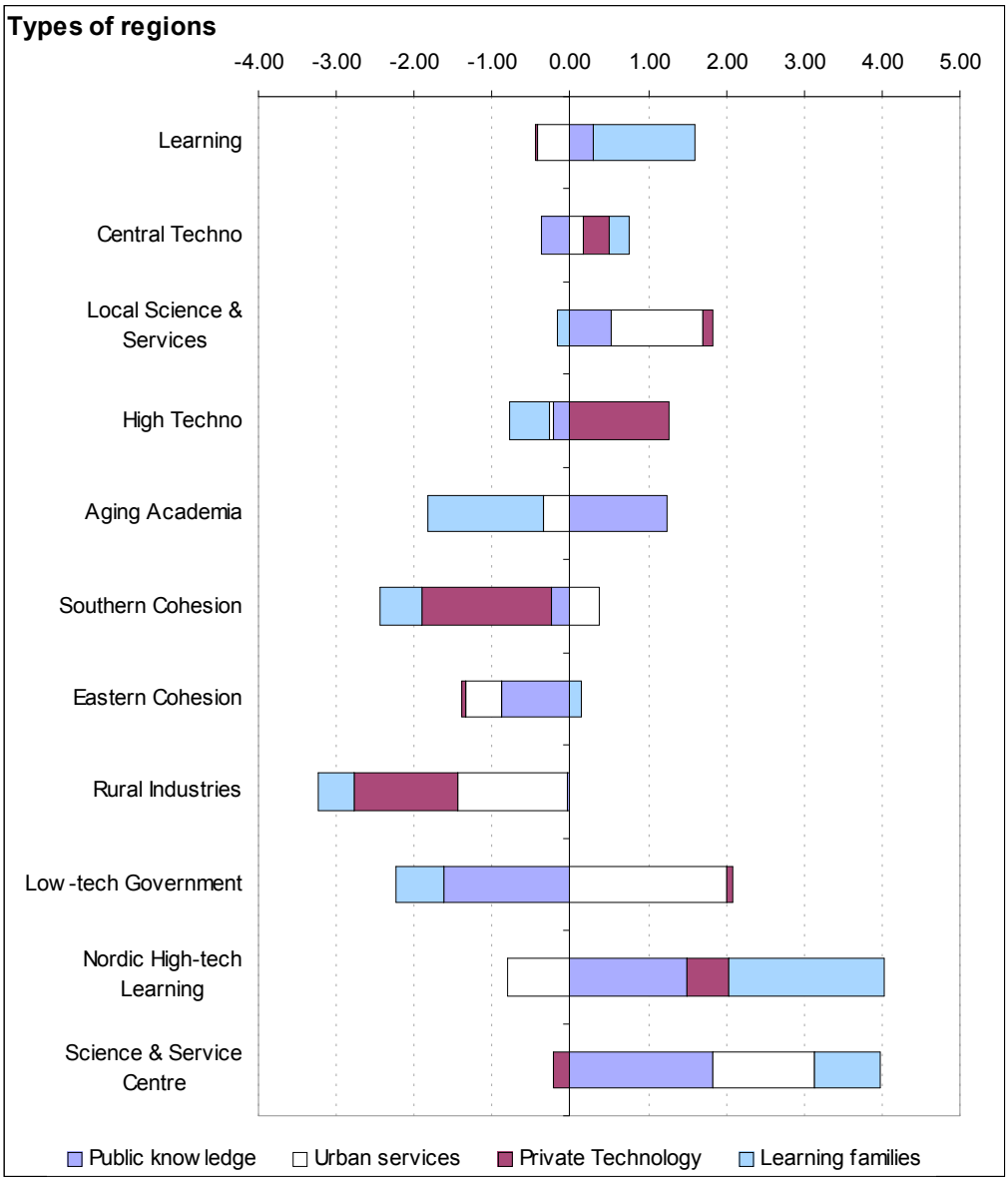
One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding Science-Industry linkages. Public R&D and higher education seems especially related to high-tech services, whereas Business 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. Lombardy 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. Besides regions in Bulgaria and Romania

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.

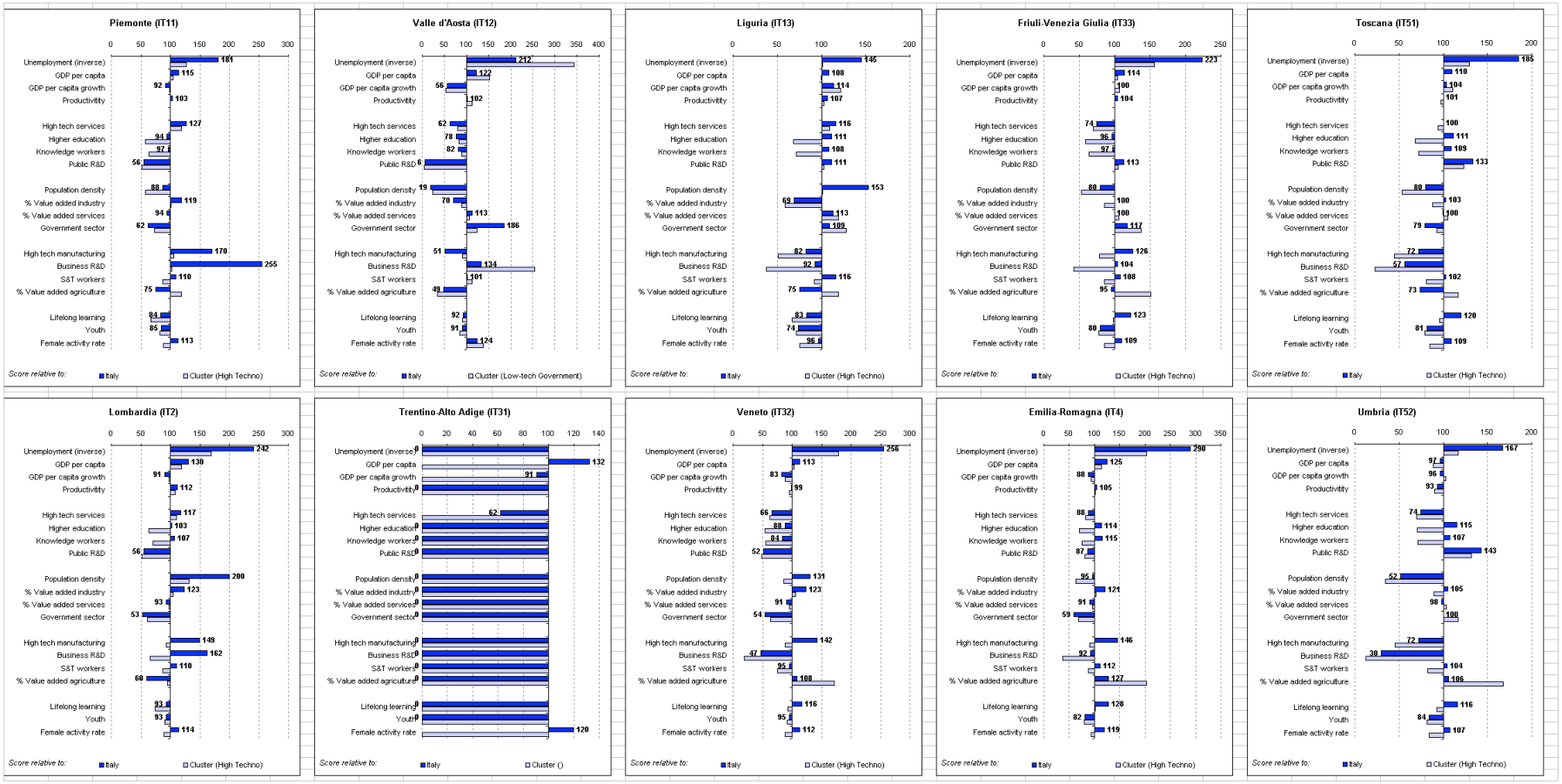
An overall synthesis report of all has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

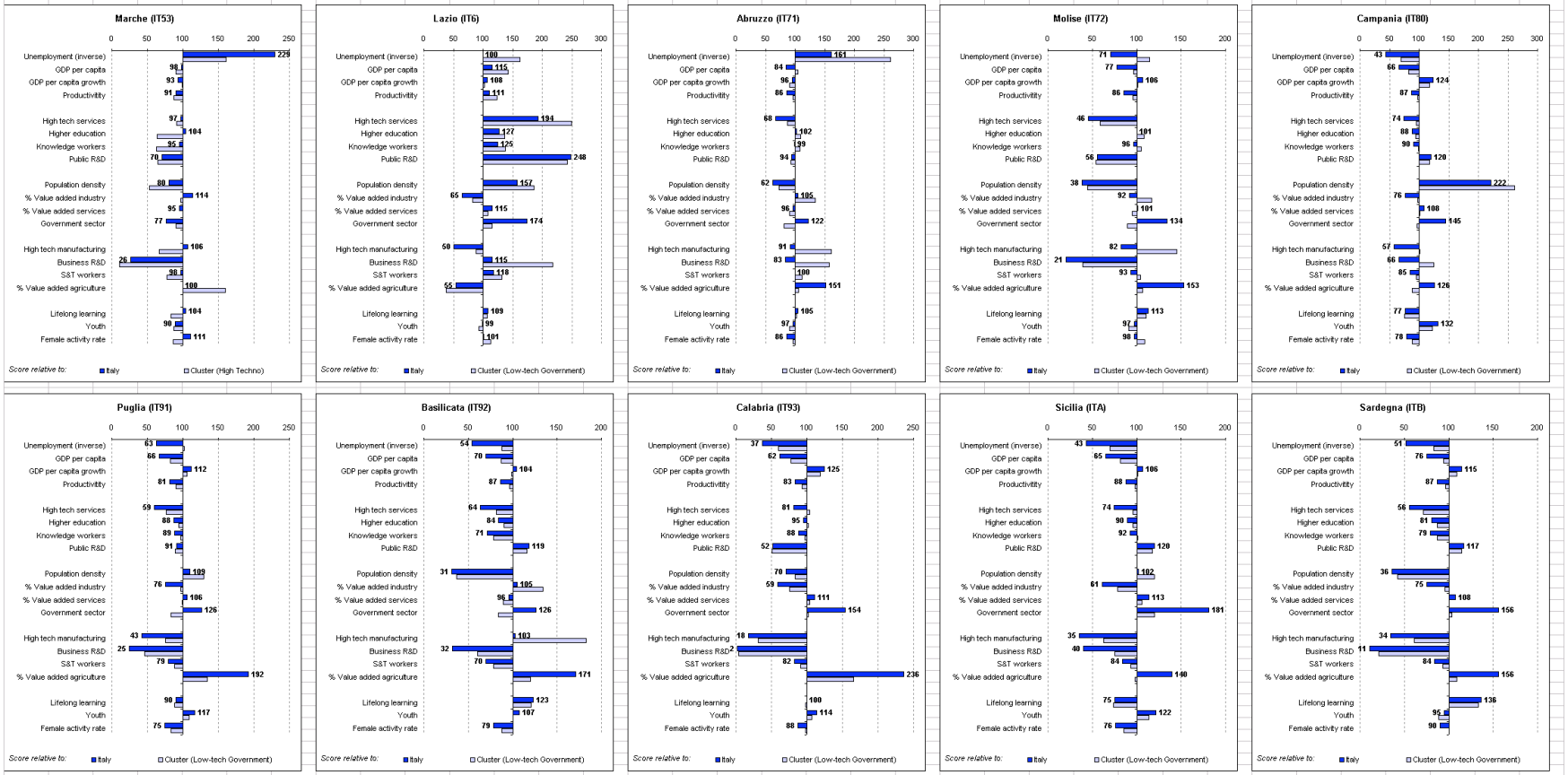
Appendix B Statistical tables and regional scorecards

B.1 Overall quantitative analysis per region (Italy)

			Economic performance				Public knowledge				Urban services				Private technology				Learning families		
		Cluster	Unemployment	GDP per capita	GDP per capita growth	Productivity	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	1996-2002	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	2003
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
Italy	IT		8,7	23083	3,9	5398	2,9	10,8	6,8	0,54	190	27,1	70,3	8,6	7,4	0,53	18,1	2,6	4,5	9,4	36,2
Relative to EU25			106	109	81	118	92	52	59	78	162	100	99	114	112	43	87	123	51	87	75
Piemonte	IT11	4	4,8	26473	3,6	5565	3,7	10,1	6,6	0,30	166	32,1	65,9	5,3	12,6	1,35	19,9	1,9	3,8	8,0	40,9
Valle d'Aosta	IT12	9	4,1	28137	2,2	5498	1,8	8,4	5,6	0,03	37	18,9	79,8	15,9	3,8	0,71	18,3	1,3	4,1	8,6	44,8
Liguria	IT13	4	6,0	25039	4,4	5754	3,4	12,0	7,4	0,60	290	18,6	79,4	9,4	6,1	0,49	21,0	1,9	3,7	7,0	34,8
Lombardia	IT2	4	3,6	30028	3,5	6042	3,4	11,1	7,3	0,30	380	33,3	65,1	4,5	11,1	0,86	19,9	1,5	4,1	8,8	41,2
Trentino-Alto Adige	IT31	--	0,0	30545	3,5	0	1,8	0,0	0,0	0,00	0	0,0	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	43,4
Veneto	IT32	4	3,4	26108	3,2	5340	1,9	9,5	5,7	0,28	248	33,3	63,9	4,6	10,6	0,25	17,3	2,8	5,2	9,0	40,7
Friuli-Venezia Giulia	IT33	4	3,9	26288	3,9	5587	2,2	10,4	6,6	0,61	151	27,0	70,6	10,0	9,3	0,55	19,6	2,5	5,5	7,5	39,6
Emilia-Romagna	IT4	4	3,0	28870	3,4	5666	2,6	12,2	7,9	0,47	181	32,7	64,0	5,0	10,8	0,49	20,2	3,3	5,7	7,7	43,2
Toscana	IT51	4	4,7	25335	4,0	5430	2,9	12,0	7,4	0,72	153	27,8	70,3	6,8	5,3	0,30	18,5	1,9	5,4	7,7	39,4
Umbria	IT52	4	5,2	22280	3,7	5046	2,2	12,4	7,3	0,77	98	28,4	68,9	8,6	5,4	0,16	18,9	2,7	5,2	8,0	38,9
Marche	IT53	4	3,8	22728	3,6	4891	2,8	11,2	6,5	0,38	152	30,8	66,6	6,6	7,9	0,14	17,6	2,6	4,7	8,5	40,1
Lazio	IT6	9	8,7	26482	4,2	5990	5,7	13,7	8,6	1,34	298	17,5	81,1	14,8	3,7	0,61	21,3	1,4	4,9	9,4	36,7
Abruzzo	IT71	9	5,4	19442	3,7	4660	2,0	11,0	6,8	0,51	117	28,4	67,7	10,5	6,8	0,44	18,1	3,9	4,7	9,1	31,3
Molise	IT72	9	12,3	17863	4,1	4635	1,3	10,9	6,6	0,30	72	24,8	71,2	11,5	6,1	0,11	16,9	4,0	5,0	9,2	35,3
Campania	IT80	9	20,2	15226	4,8	4722	2,2	9,5	6,2	0,65	420	20,6	76,1	12,4	4,3	0,35	15,4	3,3	3,4	12,4	28,4
Puglia	IT91	9	13,8	15341	4,3	4373	1,7	9,5	6,1	0,49	208	20,5	74,5	10,8	3,2	0,13	14,3	5,0	4,0	11,0	27,0
Basilicata	IT92	9	16,1	16181	4,0	4676	1,9	9,0	4,9	0,64	60	28,4	67,2	10,8	7,7	0,17	12,7	4,4	5,5	10,2	28,5
Calabria	IT93	9	23,4	14336	4,8	4493	2,4	10,3	6,0	0,28	133	16,0	77,9	13,2	1,3	0,01	14,8	6,1	4,5	10,8	31,7
Sicilia	ITA	9	20,1	15095	4,1	4757	2,2	9,6	6,3	0,65	193	16,6	79,8	15,5	2,6	0,21	15,2	3,6	3,4	11,5	27,6
Sardegna	ITB	9	16,9	17429	4,4	4679	1,6	8,7	5,4	0,63	68	20,3	75,6	13,3	2,6	0,06	15,1	4,0	6,1	9,0	32,6

B.2 Regional Scorecards




Marche (IT53)
Unemployment (inverse) 229
GDP per capita 98
GDP per capita growth 93
Productivity 91
High tech services 97
Higher education 104
Knowledge workers 95
Public R&D 70
Population density 80
% Value added industry 114
% Value added services 95
Government sector 77
High tech manufacturing 106
Business R&D 26
S&T workers 98
% Value added agriculture 100
Lifelong learning 104
Youth 90
Female activity rate 111
Score relative to: Italy Cluster (High Techno)
Lazio (IT6)
Unemployment (inverse) 100
GDP per capita 115
GDP per capita growth 108
Productivity 111
High tech services 194
Higher education 127
Knowledge workers 125
Public R&D 248
Population density 157
% Value added industry 65
% Value added services 115
Government sector 174
High tech manufacturing 50
Business R&D 115
S&T workers 118
% Value added agriculture 55
Lifelong learning 109
Youth 99
Female activity rate 101
Score relative to: Italy Cluster (Low-tech Government)
Abruzzo (IT71)
Unemployment (inverse) 161
GDP per capita 84
GDP per capita growth 96
Productivity 86
High tech services 68
Higher education 102
Knowledge workers 99
Public R&D 94
Population density 62
% Value added industry 105
% Value added services 96
Government sector 122
High tech manufacturing 91
Business R&D 83
S&T workers 100
% Value added agriculture 151
Lifelong learning 105
Youth 97
Female activity rate 86
Score relative to: Italy Cluster (Low-tech Government)
Molise (IT72)
Unemployment (inverse) 71
GDP per capita 77
GDP per capita growth 106
Productivity 86
High tech services 46
Higher education 101
Knowledge workers 96
Public R&D 56
Population density 38
% Value added industry 92
% Value added services 101
Government sector 134
High tech manufacturing 82
Business R&D 21
S&T workers 93
% Value added agriculture 153
Lifelong learning 113
Youth 97
Female activity rate 98
Score relative to: Italy Cluster (Low-tech Government)
Campania (IT80)
Unemployment (inverse) 43
GDP per capita 66
GDP per capita growth 124
Productivity 87
High tech services 74
Higher education 88
Knowledge workers 90
Public R&D 120
Population density 222
% Value added industry 76
% Value added services 108
Government sector 145
High tech manufacturing 57
Business R&D 66
S&T workers 85
% Value added agriculture 126
Lifelong learning 77
Youth 132
Female activity rate 78
Score relative to: Italy Cluster (Low-tech Government)
Puglia (IT91)
Unemployment (inverse) 63
GDP per capita 66
GDP per capita growth 112
Productivity 81
High tech services 59
Higher education 88
Knowledge workers 89
Public R&D 91
Population density 109
% Value added industry 76
% Value added services 106
Government sector 126
High tech manufacturing 43
Business R&D 25
S&T workers 79
% Value added agriculture 192
Lifelong learning 90
Youth 117
Female activity rate 75
Score relative to: Italy Cluster (Low-tech Government)
Basilicata (IT92)
Unemployment (inverse) 54
GDP per capita 70
GDP per capita growth 104
Productivity 87
High tech services 64
Higher education 84
Knowledge workers 71
Public R&D 119
Population density 31
% Value added industry 105
% Value added services 96
Government sector 126
High tech manufacturing 103
Business R&D 32
S&T workers 70
% Value added agriculture 171
Lifelong learning 123
Youth 107
Female activity rate 79
Score relative to: Italy Cluster (Low-tech Government)
Calabria (IT93)
Unemployment (inverse) 37
GDP per capita 62
GDP per capita growth 125
Productivity 83
High tech services 81
Higher education 95
Knowledge workers 88
Public R&D 52
Population density 70
% Value added industry 59
% Value added services 111
Government sector 154
High tech manufacturing 18
Business R&D 2
S&T workers 82
% Value added agriculture 236
Lifelong learning 100
Youth 114
Female activity rate 88
Score relative to: Italy Cluster (Low-tech Government)
Sicilia (ITA)
Unemployment (inverse) 43
GDP per capita 65
GDP per capita growth 106
Productivity 88
High tech services 74
Higher education 90
Knowledge workers 92
Public R&D 120
Population density 102
% Value added industry 61
% Value added services 113
Government sector 181
High tech manufacturing 35
Business R&D 40
S&T workers 84
% Value added agriculture 140
Lifelong learning 75
Youth 122
Female activity rate 76
Score relative to: Italy Cluster (Low-tech Government)
Sardegna (ITB)
Unemployment (inverse) 51
GDP per capita 76
GDP per capita growth 115
Productivity 87
High tech services 56
Higher education 81
Knowledge workers 79
Public R&D 117
Population density 36
% Value added industry 75
% Value added services 108
Government sector 156
High tech manufacturing 34
Business R&D 11
S&T workers 84
% Value added agriculture 156
Lifelong learning 136
Youth 95
Female activity rate 90
Score relative to: Italy Cluster (Low-tech Government)

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[68];
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.

[68] 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

C.4 Italian Regional laws and strategic RTDI programmes

Regione	Leggi Regionali	Programmi Principali
EMILIA ROMAGNA	• **L.R. n. 7/2002** - Promozione del sistema regionale della ricerca industriale, dell'innovazione e del TT • **L.R. n. 11/2004** – Sviluppo Regionale della Società dell'Informazione	PRIITT – Programma Regionale per la Ricerca Industriale, l'Innovazione e il Trasferimento Tecnologico 2002-2005 Piano Telematico Regionale 2002-2005
VENETO	• **L.R. n. 8/2003 –** Disciplina dei distretti produttivi ed interventi di politica industriale locale (nel 2006 Rinnovamento della L.R. n. 8/2003) • **L.R. 54/1988 –** Iniziative per la costituzione di sistemi informativi e l'informatizzazione degli enti locali	Piano di Sviluppo Informatico e Telematico del Veneto Piano di Sviluppo della Società veneta dell'Informazione
UMBRIA	• **L.R. 12/1999 –** Politiche pubbliche a favore delle PMI in materia di promozione industriale, servizi finanziari, promozione e diffusione dell'innovazione tecnologica e del trasferimento tecnologico • **L.R. n. 33/2002 –** Promozione della conoscenza nel sistema produttivo agricolo • **L.R. n. 27/1998 -** Assetto istituzionale ed organizzativo del complesso informatico e telematico del Sistema informativo Regionale (S.I.R.) della regione dell'Umbria	Programma per lo sviluppo e la diffusione dell'innovazione 2003 Piano Regionale per la SI e della Conoscenza 2002 Piano di e-government della Regione Umbria 2002
TUSCANY	• **L.R. n. 35/2000** – Disciplina degli interventi regionali in materia di attività produttive • **L.R. n. 1 26/2004 –** Promozione	Piano eTuscany – programma straordinario di investimenti 2003-2005

	dell'amministrazione elettronica e della Società dell'Informazione e della Conoscenza nel sistema regionale	
PIEDMONT	• **L.R. n. 4/2006 –** Sistema Regionale per la ricerca e l'innovazione • **L.R. n. 56/86 –** Interventi regionali per la promozione e la diffusione delle innovazioni tecnologiche nel sistema delle imprese minori	Piano per l'ITC Piano Regionale e-government (2001)
MARCHE	• **L.R. n. 20/2003 –** Testo Unico delle norme in materia industriale, artigiana e dei servizi alla produzione	Piano di azione regionale per l'e-government Piano di azione regionale per la Società dell'informazione e della conoscenza 2000-2003 Piano delle Attività Produttive 2003-2005
LOMBARDY	• **L.R. n. 34/1985 –** Primi interventi regionali per la promozione dell'innovazione nel sistema delle imprese minori • **L.R. n. 7/1993 –** Interventi per l'innovazione e lo sviluppo delle piccole imprese • **L.R. n. 35/1996 –** Interventi regionali per lo sviluppo delle imprese minori	Documento Strategico per la ricerca e l'innovazione Piano di azione della Società dell'Informazione in Lombardy 2002-2005
LIGURIA	• **L.R. n. 43/1994 –** Interventi per il sostegno delle PMI	Piano di azione territoriale e-government eLiguria Piano operativo triennale di Informatizzazione 2003-2005
LAZIO	• **L.R. n. 23/1986 –** Fondo regionale per l'assistenza tecnica e finanziaria a PMI operanti nel Lazio • **L.R. n. 20/2001 -** Norme per la promozione della costituzione della società regionale per l'informatica	Piano regionale per lo sviluppo dell'innovazione e della SI (2003)
FRIULI VENEZIA GIULIA	• **L.R. n. 26/2005 –** Disciplina generale in materia di Innovazione, ricerca scientifica e sviluppo tecnologico	Piano Strategico 2005-2008 Piano regionale di sviluppo 2004-2006 Piano regionale territoriale di azione e-government (PRTAEG)
ABRUZZO	• **L.R. n. 25/2000 –** Organizzazione del comparto sistemi informativi e telematici	Piano di azione per lo sviluppo della Società dell'Informazione e dell'e-government (2001)
PA TRENTO	• **L.P. n. 14/2005 –** Riordino del sistema provinciale della ricerca e dell'innovazione. Modificazioni delle leggi provinciali 13 dicembre 1999, numero 6, in materia di sostegno all'economia, 5 novembre 1990, n. 28, sull'istituto agrario di San Michele all'Adige, e di altre disposizioni connesse	Programma Pluriennale della Ricerca E-society: linee guida per lo sviluppo della Società dell'Informazione Piano pluriennale degli investimenti per lo sviluppo del sistema informativo elettronico regionale (IV Aggiornamento)
VALLE D'AOSTA	• **L.R. n. 84/1993 –** Interventi regionali in favore della ricerca, dello sviluppo e della qualità nel settore industriale (ultima modifica L.R. n. 28/2004) • **L.R. n. 19/2000 –** Interventi a favore di imprese industriali per la realizzazione di insediamenti produttivi nell'area industriale • **L.R. n. 13/1996 –** Programmazione, organizzazione e gestione del sistema	Piano Regionale per la Ricerca e l'Innovazione Piano triennale 2004-2006 per lo sviluppo della società dell'informazione e per l'e-government.

	informativo regionale	
PA BOLZANO	• **L.R. n. 4/1997 –** Interventi della Provincia Autonoma di Bolzano-Alto Adige per il sostegno all'economia	E-Sudtirol: Piano di Azione
APULIA	• **L.R. n. 3/2001 –** Disciplina dei regimi regionali di aiuto	Strategia Regionale per l'Innovazione Piano Regionale della Società dell'Informazione (2001) Primo programma di attuazione del Piano della società dell'informazione e il Piano di azione territoriale per l'e-government
SICILY	• **L.R. n. 32/2000 –** Disposizioni per l'attuazione del POR 2000-2006 e di riordino dei regimi di aiuto alle imprese	Strategia Regionale per l'Innovazione per la Sicily
SARDINIA	• **L.R. n. 37/1998 –** Norme concernenti interventi finalizzati all'occupazione e allo sviluppo del sistema produttivo regionale e di assestamento e rimodulazione del bilancio	Strategia Regionale per l'Innovazione Strategia per lo Sviluppo della società dell'informazione in Sardinia
BASILICATA	• **L.R. n. 4/2003 –** Disciplina delle attività di ricerca, sviluppo tecnologico ed innovazione • **L.R. n. 53/1996 –** Promozione e sviluppo della Società dell'Informazione e del telelavoro	Strategia Regionale per l'Innovazione Piano regionale telematico per lo sviluppo della società dell'informazione BASITEL+
CAMPANIA	• **L.R. n. 5/2002 –** Promozione della ricerca scientifica in Campania	Strategia Regionale per lo sviluppo dell'innovazione Piano strategico sulla Società dell'Informazione (2001)
CALABRIA		Strategia Regionale per l'Innovazione P.A.T. – Piano di Azione Territoriale
MOLISE	• **L.R. n. 27/2000 – R**iordino della disciplina in materia di industria	Piano strategico di attuazione Sistema Telematico Molise (STM)

C.5 Resources disbursed by FAR and FIT (MEUR)

Regions	1999- 2004	%
Piedmont	442,2	12,0%
Valle D'Aosta	2,6	0,1%
Lombardy	980,6	26,7%
Trentino Alto Adige	14,1	0,4%
Veneto	336,8	9,2%
Friuli Venezia Giulia	90,1	2,5%
Liguria	119,6	3,3%
Emilia Romagna	533,8	14,5%

Tuscany	272,7	7,4%
Umbria	48,1	1,3%
Marche	83,3	2,3%
Lazio	235,7	6,4%
Abruzzo	49,1	1,3%
Molise	8,2	0,2%
Campania	214,9	5,8%
Apulia	80,5	2,2%
Basilicata	19,2	0,5%
Calabria	22,2	0,6%
Sicily	103,2	2,8%
Sardinia	19,3	0,5%
ITALY	3676,2	100,0%

Source: Met (monitoring economy and territory) report 2005

C.6 Resources devoted to human capital development by MIUR

Target of expenditure	**Allocated resources (MEUR)**	**Committed resources** (as per 30.09.2005)		
		Objective 1	**Objective 2**	**Total**
University system – programming period 2000-2006				
Scholarships (EU)	43.4	32.3	0.0	32.3
Training for teachers	43.4	10.0	12.4	22.4
S&T degrees	6.5	0.0	0.0	0.0
PhD courses	54.7	5.5	26.3	31.8
Orientation and training	22.3	2.0	5.3	7.3
Strengthening of networks for higher education	28.0	0.0	6.4	6.4
e-learning	2.2	0.1	2.0	2.1
Sectoral laws				
Scholarships for researchers (assegni di ricerca)	151.1	33.3	117.8	151.1
PhD	93.7	19.3	43.3	62.6
Undergraduate scholarships and Erasmus	636.9	201.8	435.1	636.9
Incentive for employment of researchers in universities and public research bodies	69.6	26.7	42.9	69.6

Source: "Documento di Orientamento Programmatico del MIUR per il Quadro Strategico Nazionale 2007-2013", 30 November 2005.

C.7 Industry and RTDI disbursements on the basis of regional laws (MEUR)

Regions	Industry	Research & Innovation	RTDI as % of Industry
Piedmont	111,24	43,57	39,2%
Valle d'Aosta	4,37	2,61	59,7%
Lombardy	99,45	25,71	25,9%
P.A. Bolzano	60,87	0,47	0,8%
P.A. Trento	45,75	4,37	9,6%
Veneto	59,86	1,30	2,2%
Friuli Venezia Giulia	31,65	0,00	0,0%
Liguria	47,89	2,24	4,7%
Emilia Romagna	58,23	0,62	1,1%
Tuscany	50,24	13,15	26,2%
Umbria	11,97	0,00	0,0%
Marche	31,01	0,00	0,0%
Lazio	29,74	4,99	16,8%
Abruzzo	35,49	6,64	18,7%
Molise	4,18	0,00	0,0%
Campania	33,14	0,00	0,0%
Apulia	35,43	0,00	0,0%
Basilicata	4,83	0,00	0,0%
Calabria	51,20	0,00	0,0%
Sicily	26,50	0,04	0,2%
Sardinia	79,78	0,00	0,0%

Source: Met (monitoring economy and territory) report 2005

C.8 Key national RTDI initiatives

Policy area	Key national initiatives
Improving governance capacities for innovation and knowledge policies	• The Permanent Conference for the Relationships between State and Regions, whose goal is improving coordination in policy making • The Science and Technology Policy Guidelines (defined within the National Research Plan 2003-2006) • The E-Government Action Plan, approved in June 2003 • Committee for Research Evaluation (CIVR), established in 1998, promotes quality and effective usage of the outcomes of national research
Innovation friendly environment	• At a national level and in terms of initiatives related to e-government, in 2002 the Ministry of Technological Innovation produced a series of Guidelines for the Development of the Information Society which indicated the 10 main objectives to be achieved during the next 4 years (e.g. e-procurement concerning at least 50% of P.A. expenditure, email to be used as the only mean for internal written communications, distribution of 30 million digital ID cards, diffusion of digital signature etc.). In relation to these basic guidelines, MIT publishes annually (since 2002) the Guidelines for Digitalisation of Public Administration which specify objectives to be fulfilled in the short run and the implementation modes • The Second Plan for Digital Innovation in Firms was drafted by MIT and MAP in 2005. Its main objectives are: Support the usage of innovative solutions in private companies, especially SMEs working in traditional sectors; favour the development of high and medium high-tech sectors; Re-launch the IT sector in Italy • A tax relief was introduced for investment programmes aimed at the development of IT solutions concerning e-commerce and e-learning. • 20 Regional Competence Centres(CRC) have been created since 2002 by MIT. These promote and facilitate the development of the information society and of e-government at regional level • Reform of public research bodies such as CNR, ASI, INAF, ENEA, which

	took off in 2001 and was accompanied by the establishment of new institutes (IIT- Istituto Italiano di Tecnologia- e l'Istituto Nazionale di Ricerca Metrologica); Important new regulations, introducing meritocracy, were also introduced with respects to recruitment of researchers and lecturers by Universities • Concerning the development of human capital, the National Research Programme includes two broad lines of intervention. On one hand, the programme aims at strengthening the performance of the system of higher education with a view to increase the total number of S&T graduates, PhD courses etc. On the other hand, the interventions seek to reverse brain drain and attract foreign researchers by means of a tax relief initiative (D.M. 501/2003). • With respect to objective 1 regions, it is worth emphasising that the third axis of the NOP Research is fully devoted to this policy area. A total budget of over 700 MEUR has been devoted to higher education and training both in private and public sectors • Integrated Support Packages ("PIA Formazione") have been included in the NOP Industry. In this case, an unsecured loan is granted for training expenditure related to an investment programme funded by the instrument 488/92. A required condition for the award is that, in relation to the programme, beneficiaries foresee a minimum employment increase of 30 people • Integrated Support Packages for Innovation ("PIA Innovazione") also devote resources (a maximum of 250 Keuro per project) to education and training related to the projects carried out in the beneficiary firms • Other initiatives, which are worth mentioning, include bilateral research agreements and establishment of permanent joint-labs with other countries (e.g. US, Japan, India), internationalisation of higher education. As part of university cooperation, 15 MEUR have been allocated to joint research programmes, in particular to PhD courses in European and international universities, attraction of Chinese and Indian researchers and support to national participation to FP6 • Italy is also expected to participate in Technology Platforms set up by UE. In 2004, 43 MEUR were allocated for the first three research platforms on compound materials and polymers, innovative production system and bioinformatics.
Knowledge transfer and technology diffusion to enterprises	• As part of the NOP Research, a specific measure funds the establishment of industrial liaison offices in universities, particularly those located in objective 1 regions. The goal of these structures is bridging public research endeavours and firms, especially SMEs, in order to promote technology transfer processes and creation of spin-offs • MIUR is also committed to establishing Centres of Technological Competences • In 2005, MIUR has also promoted the creation of 11 laboratories based on partnerships between private and public actors in strategic fields such as high-tech medical instruments for diagnosis, energy, ICT platforms, biotech etc. A total budget of 212 MEUR, drawing upon FAR, was devoted to these labs • The Second Plan for Digital Innovation, includes a specific measure (no. 2.2) concerning technology transfer and IPR managements of the outcomes of public funded research. For instance, the measure fosters the creation, in the universities, of technology transfer offices in charge of the marketing of research outcomes. The measure also grants incentives to firms willing to license their IP assets
Innovation poles and clusters	• Introduction of Technological Districts foreseen in the new PNR. These are areas which gather enterprises belonging to a certain sector (only seldom high tech). The goal is creating networks of public and private agents (e.g. Regions, enterprises, universities, financial institutions) engaged in collaborative processes related to knowledge sharing, support for spin-offs and territorial

	promotion. CIPE devoted 130 MEUR to the establishment as well as to the reinforcement of Technological Districts in objective 1. To date, there are 22 Technological Districts in Italy, concerning fields such as: Aerospace and defence, biotech, ICT, logistics, advanced mechanics. etc • "Agevolazioni per i distretti digitali" (i.e. support to digital districts), sponsored by both MIT and MAP. The aim is providing innovative services bases on ICT such as promotion of virtual networks, internationalisation through e-commerce etc. This initiative will be combined with specific projects targeted to the reinforcement of connectivity in the industrial districts of textile and footwear
Support to creation and growth of innovative enterprises	• The Second Programme for Digital Innovation has set up an High-tech Fund for SMEs. It promotes the development of venture capital market with a budget of 100 MEUR over the period 2005-2007 • Indirect support is granted by means of funding incubators in order to provide high level technical assistance, training and logic support to new enterprises in the start-up phase. Provided funds in the past to 11 projects for a total budget of 21MEUR. An additional contribution of 30 MEUR is foreseen for the coming years • Within this policy area and since 2003, the law 388, managed by MAP, funds the establishment and consolidation of newly-born high-tech firms as well as related technical assistance initiatives • In 2004, MIT has also set up a fund aiming at easing the access to credit of SMEs, with a budget of 160 MEUR • MIUR, in partnership with Sviluppo Italia, has set off a framework programme for the activation of financial engineering instruments for high-tech firms (40 MEUR) • Innovation financing, devoted to developing innovative enterprises, is also addressed by D.Lgs 297/99 which introduced support for seed capital to be employed for the creation of academic spin-offs • In 2004, the European Investment Bank (EIB) and MIUR signed a framework agreement to finance research projects. The collaboration will focus on the analysis of investment needs for new spin-offs from public system research (universities and public research centres) and on financing opportunities for incubators of innovative enterprises
Boosting applied research and product development	• MIUR has recently singled out ten strategic sectors (e.g. quality of life measured in terms of health, safety, environment) and set up related macro programmes ("Grandi Progetti Strategici") combining objectives which concern simultaneously basic research, applied research, pre-competitive development and higher education and training. Their beneficiaries are both private and public sectors. 196 projects have been selected and may draw upon a total amount of over 1.200 MEUR (new rotational fund for support to enterprises, FAR, FIRB) • The entire Axis I of NOP Research is devoted to industrial research and strategic sectors. Total committed resources amount to about 1.400 MEUR and concerned bottom-up research projects, cluster projects, top-down strategic projects, research procurement, etc • One of the major novelties within the NOP Industry are the Integrated Packages for Innovation Support (i.e. "PIA Innovazione"). PIA unify, in a single instrument, all the activities involved in the development of new products and services, from research to industrialisation. In the current programming period, the first PIA tender mobilized approximately 840 MEUR, considering public and private resources together • A initiative on the border between applied and basic research concerns the Centres of Excellence established by MIUR. Currently, there are 55 approved Centres concerning various sectors such as biotech, new materials, ICT, environment, logistics etc. 65 MEUR have been committed so far

Appendix D Financial and policy measure tables

D.1 Additional financial tables

D 1.1 RTDI plus business (innovation technology) support

Overall allocation of resources at an objective 1 and 2 level (Euro)

Objective	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	3.549.286.021,21	1.786.135.985,40	1.780.356.185,40	5.779.800,00	1.452.877.004,81	310.273.031,00
Objective 2	1.182.116.963,59	411.968.864,02	411.968.864,02	0,00	700.767.247,71	69.380.851,86
TOTAL COHESION POLICY						
Objective 1	46.021.649.359,00	23.946.682.281,00	15.918.088.813,00	4.440.111.635,00	21.513.698.856,00	561.268.222,00
Objective 2	7.204.854.556,00	2.721.000.000,00	2.721.000.000,00	0,00	4.276.915.204,00	206.939.352,00
** the two digit code 16 (obj 1 Molise - obj.2 Emilia-Romagna) was not taken into accout to avoid overestimates due the inclusion of code 161.						

Source: Ismeri Europa elaboration on EC data

Regional allocation of resources (Euro)

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
OBJECTIVE 1						
Basilicata ob.1	14.921.195,00	14.921.195,00	-	848.035.000,00	433.885.000,00	220.900.000,00
Calabria ob.1	119.056.628,00	119.056.628,00	-	2.131.043.000,00	1.258.742.000,00	424.883.000,00
Campania ob.1	321.123.810,00	321.123.810,00	-	4.280.561.000,00	2.775.703.660,00	702.462.340,00
Puglia ob.1	244.171.000,00	244.171.000,00	-	2.946.517.000,00	1.721.827.000,00	604.090.000,00
Sardegna ob.1	53.562.000,00	53.562.000,00	-	2.118.293.000,00	1.300.490.000,00	372.214.000,00
Sicilia ob.1	131.166.301,90	125.386.501,90	5.779.800,00	4.283.580.000,00	2.524.128.000,00	846.469.000,00
Molise ob.1	5.582.113,20	5.582.113,20	-	201.000.000,00	128.183.503,00	28.569.664,00
OBJECTIVE 2						
Abruzzo ob.2	35.257.657,45	35.257.657,45	-	193.509.363,00	193.509.363,00	-
Bolzano ob.2	1.000.000,00	1.000.000,00	-	33.819.823,00	33.819.823,00	-
Emilia Romagna ob.2	16.790.344,80	16.790.344,80	-	128.033.372,00	128.033.372,00	-
Friuli-Venezia Giulia	14.413.844,75	14.413.844,75	-	100.728.038,00	100.728.038,00	-
Lazio Ob.2	39.697.543,60	39.697.543,60	-	387.641.244,00	387.641.244,00	-
Liguria Ob.2	31.776.267,55	31.776.267,55	-	201.443.238,00	201.443.238,00	-
Lombardia Ob.2	1.750.000,00	1.750.000,00	-	209.091.853,00	209.091.853,00	-
Marche Ob.2	19.710.990,87	19.710.990,87	-	130.709.071,00	130.709.071,00	-
Piemonte Ob.2	110.667.028,80	110.667.028,80	-	509.755.570,00	509.755.570,00	-
Toscana Ob.2	38.935.499,59	38.935.499,59	-	336.429.061,00	336.429.061,00	-
Trento Ob.2	742.650,80	742.650,80	-	17.607.702,00	17.607.702,00	-
Umbria Ob.2	29.897.238,00	29.897.238,00	-	157.029.427,00	157.029.427,00	-
Valle d'Aosta Ob.2	571.219,23	571.219,23	-	16.772.964,00	16.772.964,00	-
Veneto Ob. 2	70.758.578,58	70.758.578,58	-	298.429.274,00	298.429.274,00	-
Total Regional OPs	**1.301.551.912,12**	**1.295.772.112,12**	**5.779.800,00**	**19.530.029.000,00**	**12.863.959.163,00**	**3.199.588.004,00**
OBJECTIVE 1						
ONP Technical Assistance Ob.1	-	-	-	372.591.000,00	196.473.650,00	176.117.350,00
ONP Education Ob.1	-	-	-	537.084.000,00	109.816.000,00	427.268.000,00
ONP Industry Ob.1	175.650.475,30	175.650.475,30	-	2.247.505.281,00	2.181.369.000,00	66.136.281,00
ONP Research Ob.1	720.902.462,00	720.902.462,00	-	1.323.227.000,00	814.125.000,00	509.102.000,00
ONP Safety Ob.1	-	-	-	630.604.000,00	568.704.000,00	61.900.000,00
ONP Fisheries Ob.1	-	-	-	122.000.000,00	-	-
ONP Transport Ob.1	-	-	-	1.904.642.000,00	1.904.642.000,00	-
Total Multiregional OPs	**896.552.937,30**	**896.552.937,30**	**0,00**	**7.137.653.281,00**	**5.775.129.650,00**	**1.240.523.631,00**

Source: Ismeri Europa elaboration on EC data

Absorption capacity of RTDI interventions (Euro)

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	1.786.135.985,40	767.820.986,61	43,0%
Objective 2	411.968.864,02	185.783.641,93	45,1%

Source: Ismeri Europa elaboration on EC data

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

Overall allocation of resources at an objective 1 and 2 level (Euro)

Objective	Total cost	SF			NF	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 1	5.020.497.377,20	2.526.101.749,26	2.516.821.949,26	9.279.800,00	2.172.063.196,93	322.332.431,00
Objective 2	1.494.445.779,69	463.540.497,39	463.540.497,39	0,00	960.426.412,23	70.478.870,06
TOTAL COHESION POLICY						
Objective 1	46.021.649.359,00	23.946.682.281,00	15.918.088.813,00	4.440.111.635,00	21.513.698.856,00	561.268.222,00
Objective 2	7.204.854.556,00	2.721.000.000,00	2.721.000.000,00	0,00	4.276.915.204,00	206.939.352,00
** the two digit code 16 (obj 1 Molise - obj.2 Emilia-Romagna) was not taken into accout to avoid overestimates due the inclusion of code 161.						
*** the two digit code 32 is not detailed (PO OBJ 1 EDUCATION, Molise, Sardegna, Emilia-Romagna) but has been included. There might be a slight overestimate						

Source: Ismeri Europa elaboration on EC data

Regional allocation of resources (Euro)

Programs	RTDI INTERVENTIONS			TOTAL		
	Total SF	ERDF	ESF	Total SF	ERDF	ESF
OBJECTIVE 1						
Basilicata ob.1	22.753.895,00	22.753.895,00		848.035.000,00	433.885.000,00	220.900.000,00
Calabria ob.1	130.392.827,60	130.392.827,60		2.131.043.000,00	1.258.742.000,00	424.883.000,00
Campania ob.1	362.500.110,00	362.500.110,00		4.280.561.000,00	2.775.703.660,00	702.462.340,00
Puglia ob.1	371.661.000,00	368.161.000,00	3.500.000,00	2.946.517.000,00	1.721.827.000,00	604.090.000,00
Sardegna ob.1	115.147.500,00	115.147.500,00		2.118.293.000,00	1.300.490.000,00	372.214.000,00
Sicilia ob.1	193.896.505,25	188.116.705,25	5.779.800,00	4.283.580.000,00	2.524.128.000,00	846.469.000,00
Molise ob.1	14.847.644,20	14.847.644,20		201.000.000,00	128.183.503,00	28.569.664,00
OBJECTIVE 2						
Abruzzo ob.2	35.257.657,45	35.257.657,45	-	193.509.363,00	193.509.363,00	-
Bolzano ob.2	1.000.000,00	1.000.000,00	-	33.819.823,00	33.819.823,00	-
Emilia Romagna ob.2	28.812.713,90	28.812.713,90	-	128.033.372,00	128.033.372,00	-
Friuli-Venezia Giulia	14.465.573,81	14.465.573,81	-	100.728.038,00	100.728.038,00	-
Lazio Ob.2	45.414.821,65	45.414.821,65	-	387.641.244,00	387.641.244,00	-
Liguria Ob.2	49.414.294,55	49.414.294,55	-	201.443.238,00	201.443.238,00	-
Lombardia Ob.2	1.750.000,00	1.750.000,00	-	209.091.853,00	209.091.853,00	-
Marche Ob.2	20.964.527,93	20.964.527,93	-	130.709.071,00	130.709.071,00	-
Piemonte Ob.2	119.832.778,80	119.832.778,80	-	509.755.570,00	509.755.570,00	-
Toscana Ob.2	44.658.442,69	44.658.442,69	-	336.429.061,00	336.429.061,00	-
Trento Ob.2	742.650,80	742.650,80	-	17.607.702,00	17.607.702,00	-
Umbria Ob.2	29.897.238,00	29.897.238,00	-	157.029.427,00	157.029.427,00	-
Valle d'Aosta Ob.2	571.219,23	571.219,23	-	16.772.964,00	16.772.964,00	-
Veneto Ob. 2	70.758.578,58	70.758.578,58	-	298.429.274,00	298.429.274,00	-
Total Regional OPs	**1.674.739.979,44**	**1.665.460.179,44**	**9.279.800,00**	**19.530.029.000,00**	**12.863.959.163,00**	**3.199.588.004,00**
OBJECTIVE 1						
ONP Technical Assistance (	-	-		372.591.000,00	196.473.650,00	176.117.350,00
ONP Education Ob.1	109.816.000,00	109.816.000,00		537.084.000,00	109.816.000,00	427.268.000,00
ONP Industry Ob.1	175.650.475,30	175.650.475,30		2.247.505.281,00	2.181.369.000,00	66.136.281,00
ONP Research Ob.1	793.258.862,00	793.258.862,00		1.323.227.000,00	814.125.000,00	509.102.000,00
ONP Safety Ob.1	236.176.929,91	236.176.929,91		630.604.000,00	568.704.000,00	61.900.000,00
ONP Fisheries Ob.1	-	-	-	122.000.000,00	-	-
ONP Transport Ob.1	-	-	-	1.904.642.000,00	1.904.642.000,00	-
Total Multiregional OPs	**1.314.902.267,21**	**1.314.902.267,21**	**0,00**	**7.137.653.281,00**	**5.775.129.650,00**	**1.240.523.631,00**

Source: Ismeri Europa elaboration on EC data

Absorption capacity of RTDI interventions (Euro)

OBJECTIVES	ALLOCATED	DISBURSED TOTAL SF	EXPENDITURE CAPACITY
Objective 1	2.526.101.749,26	1.031.690.536,94	40,8%
Objective 2	463.540.497,39	203.200.781,74	43,8%

Source: Ismeri Europa elaboration on EC data

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

Exhibit 18: main measures in favour of innovation and knowledge

Identified RTDI measure or major project			Focus of intervention (policy area classification)*	Main instruments**	Main beneficiaries***
programme	no. of measure	name of measure			
ROP Basilicata ob.1	III.1.C.2	Formazione superiore	2	3	1/3
	III.1.D.4	Miglioramento delle risorse umane nel settore della ricerca e sviluppo tecnologico	2	3	1/2
	III.2	Sistema regionale per la ricerca e l'innovazione	3/6	2	1/2
	IV.3	Sostegno alla creazione di nuove imprese (misura disattivata a seguito della Revisione di metà percorso)	5	2	2
	IV.4	Aiuti ai servizi alle imprese	3	2	2
	VI.2	Reti immateriali	2	1	1/2
ROP Calabria ob.1	3.7	Formazione superiore ed universitaria	2	3	
	3.16	Sistema regionale per la ricerca e l'innovazione	3/5	1/2	1/2/3
	6.3	Società dell'informazione	2	1	1/2/3
ROP Campania ob.1	3.07	Formazione superiore e universitaria	2	3	1
	3.13	Miglioramento delle risorse umane nel settore della ricerca e dello sviluppo tecnologico	2	3	1/2
	3.16	Promozione della ricerca e del trasferimento tecnologico nei settori connessi alla crescita ed allo sviluppo sostenibile del sistema Campania	3/5	2	1/3
	3.17	Sostegno ai programmi di ricerca, di innovazione e di trasferimento tecnologico promossi dal tessuto imprenditoriale regionale	6	2	1/3

	3.22	Promozione dello sviluppo della società dell'informazione attraverso il rafforzamento del potenziale umano, lo sviluppo dell'imprenditorialità e il miglioramento della competitività delle imprese. Promozione dell'internazionalizzazione	2	2	1/2
	4.03	Promozione del sistema produttivo regionale	4	2	1/2
	6.02	Sviluppo della società dell'informazione	2	1	1/2
	6.03	Sostegno allo sviluppo della società dell'informazione nel tessuto produttivo	2	2	2
ROP Apulia ob.1	3.07	Formazione superiore	2	3	1/3
	3.12	Miglioramento delle risorse umane nel settore della ricerca e sviluppo tecnologico	2	3	1/3
	3.13	Ricerca e Sviluppo tecnologico	3/6	2	1/2
	6.02	Promozione della Società dell'informazione. Promozione dell'internazionalizzazione	2	1/2	1
	6.03	Sostegno all'innovazione degli Enti locali	2	1	1
	6.04	Risorse umane e società dell'informazione	2	3	1
ROP Sardinia ob.1	3.7	Formazione superiore ed universitaria	2	3	
	3.13	Ricerca e sviluppo tecnologico nelle imprese e territorio	3/6	1/2	2
	3.18	Formazione per la Società dell'Informazione	2	3	1
	4.2	P.A. per l'impresa: animazione, servizi reali, semplificazione, infrastrutturazione selettiva	2	2	1/2/3
	4.3	Sostegno alla nascita e allo sviluppo di nuove imprese	5	2	2
	6.3	Società dell'Informazione	2	1	1
	6.4	Formazione per la Società dell'Informazione	2	3	1/2
ROP Sicily ob.1	3.07	Promozione di un'offerta adeguata di formazione superiore e universitaria	2	3	1
	3.13	Formazione per la ricerca	2	3	1/2

	3.14	Promozione e sostegno al sistema regionale per la ricerca e l'innovazione	5/6	2	2/3
	3.15	Reti per lo sviluppo della ricerca scientifica	3	2	1/2
	6.05	Reti e servizi per la Società dell'Informazione	2	1	1/2
Molise ob.1	3.12	Ricerca e sviluppo	2/3/6	2	1
	4.1	Aiuti alle PMI industriali	5	2	2
	4.3	Promozione del sistema produttivo regionale	2/5	2	2
	4.4	Fondo di Garanzia	2	2	2/3
	6.3	Società dell'informazione	2	1	2/3
	C3 (3.6)	Formazione superiore e universitaria	2	3	
	D1 (3.8)	Sviluppo della competitività delle imprese pubbliche e private con priorità	2	3	
NOP Scientific research, technological development and higher education - ob.1	1.1	Progetti di ricerca di interesse industriale	6	2	2
	1.2	Promozione innovazione sviluppo tecnologico	2	2	2
	1.3	R&S nei settori strategici	6/4	2	2
	2.1	Rafforzamento sistema scientifico	3	1	
	2.2	Società dell' informazione per il sistema scientifico	3	1	
	2.3	Centri di competenza tecnologica	3	1	
	3.1	Miglioramento delle risorse umane nel settore R&S.T.	2	3	
	3.2	Formazione di alte professionalità nelle PM	2	3	
	3.3	Formazione di alte professionalità nella P.A. in R&S.T.	2	3	
	3.4	Formazione superiore e universitaria	2	3	
	3.5	Adeguamento formazione professionale istruzione	2	3	
	3.6	Promozione partecipazione femminile al mercato del lavoro	2	3	
NOP Industry - ob.1	2	Pacchetto Integrato di Agevolazioni	6/2/3/5	2	2
	3	Interventi di formazione per il P.I.A.	2	3	2

SDP Abruzzo ob.2	1.3	Sviluppo della Società dell'Informazione	2	1	1/2/3
	1.4	Promozione del sistema produttivo ed internazionalizzazione	5	2	2
	2.1	Ammodernamento, consolidamento ed ampliamento del tessuto produttivo	2	2	2
	2.3	Ricerca e sviluppo, innovazione e trasferimento tecnologico	1/4	2	2/3
SDP Bolzano ob.2	2.2	Diffusione della tecnologia dell'informazione in ambito rurale	3	2	2
	3.2	Aiuti per attività di ricerca e sviluppo a favore delle PMI	4	2	2
	3.3	Creazione di incubatori di impresa	5	1	2
SDP Emilia Romagna ob.2	1.02	Reti e servizi per la Società dell'Informazione	3	2	2
	1.05	Sostegno allo start up di imprese innovative	5	2	2
	1.06	Sviluppo di progetti di innovazione e ricerca	6	2	2/3
SDP Friuli Venezia G. ob.2	1.3	Competitività ed attrattività delle infrastrutture per lo sviluppo attività produttive	4	1	2/3
	2.2	Servizi finanziari per il rafforzamento del capitale sociale	2	2	2
	2.3	Servizi reali alle imprese e animazione economica	3/5	2	2
	2.4	Ricerca e diffusione dell'innovazione	5	2	1/2
	2.5	Sostegno allo start up di nuova imprenditorialità	5	2	2
SDP Lazio ob.2	2.3	Marketing territoriale	2	2	2/3
	2.4	Reti Immateriali	3	1	1/2/3
	2.5	Innovazione tecnologica	3	2	2
	4.2	Strumenti finanziari per l'innovazione	2	2	2
	4.3	Internazionalizzazione	5	2	2/3
SDP Liguria ob.2	1.3	Sostegno all'innovazione degli Enti locali	2	2	2
	1.4	Risorse umane e società dell'informazione	3/6	2	2
	3.6	Potenziamento della Società dell'Informazione	3/4	1	1/2
	3.7	Animazione economica e tecnologica	2	2	2

SDP Lombardy ob.2	1.1	Incentivi agli investimenti delle imprese	3/6	2	2
	1.2	Sostegno alla domanda di servizi qualificati all'impresa	2	2	2
	1.4	Interventi d'ingegneria finanziaria	2	2	2/3
	1.5	Sostegno alla creazione di nuove imprese	5	2	2
	1.9	Animazione economica	2	2	1/2
	2.4	Supporto alla riqualificazione dei servizi commerciali e sviluppo di servizi di prossimità	3	1	1
SDP Marche ob.2	1.2	Servizi di ingegneria finanziaria	2	2	2
	1.3	Incentivi per il miglioramento della qualità ed il rafforzamento della competitività delle PMI	2/5	2	2
	1.4	Infrastrutture per il sistema produttivo	1/2	1	1/2/3
	3.4	Società dell'informazione	2	1	2
SDP Piedmont ob.2	1.2	Supporto all'internazionalizzazione del sistema economico del Piedmont	5	2	2
	2.2	Sistemi finanziari e di consulenza per lo sviluppo e la creazione di imprese	2	2	2
	2.4	Valorizzazione della ricerca scientifica al fine di promuovere il trasferimento tecnologico e sviluppo della società dell'informazione	6	1/2	2
	2.6	Incentivi alle PMI per progetti di ricerca e per investimenti a finalità ambientale	3	2	2
SDP Tuscany ob.2	1.3	Ingegneria finanziaria	2	2	2
	1.7	Trasferimento dell'innovazione alle PMI	3	2	3
	1.8	Aiuti alla ricerca industriale e precompetitiva	6	2	2
	2.7	MKT territoriale strategico	2	2	1/2/3
	2.8	Azioni a sostegno SI	3	1	1
SDP Umbria ob.2	1.2	Promozione del territorio, marketing d'area	5	2	2
	1.4	Sviluppo della società dell'informazione	3	1	1/2/3
	2.2	Servizi alle imprese, innovazione, animazione economica	2/3/5/6	2	2
	2.3	Servizi finanziari alle imprese	2	2	2

SDP Valle d'Aosta ob.2	1.2	Sviluppo e consolidamento della cultura di impresa	3	2	2
SDP Veneto ob.2	1.5	Servizi alle imprese	5	2	2
	1.6	Interventi di animazione economica	2	2	2
	1.7	Contributi per la ricerca e l'innovazione	6	2	2
	2.1	Aree attrezzate per l'ubicazione di servizi alle imprese	5	1	2
	2.3	Attività di ricerca e trasferimento di tecnologia	3	2	2/3
	2.5	Sviluppo della Società dell'Informazione	3	1	1

* Policy area key:	1= Improving governance capacities for innovation	4= Innovation poles and clusters
	2= Innovation friendly environment	5= Support to creation and growth of innovative enterprises
	3= knolowedge transfer and technology diffusion	6= Boosting applied research and product development
** Instrument key:	1= Infrastructures and facilities	
	2= Aid schemes	
	3= Education and training	
*** Beneficiary key:	1= Public sectors	
	2= Private sectors	
	3= Networks	

* Classification of RTDI interventions: Improving governance capacities for innovation and knowledge policies; Innovation friendly environment; Knowledge transfer and technology diffusion enterprises; Innovation poles and clusters; Support to creation and growth of innovative enterprises; 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, evaluation reports, annual implementation reports, etc.

Appendix E Case studies

INGENIUM	
Title of measure/project:	"**Fondo Ingenium**". Measure 1.5 – Support to innovative start-ups (Sostegno allo start-up di imprese innovative).
Description :	Seed capital fund for innovative enterprises
Zone:	Objective 2
Policy framework:	SPD Emilia Romagna
Brief history and main features	
Ingenium is the first Italian seed capital fund which provides financial support on the basis of a purely market based assessment of applicant potential. In terms of policy area, the initiative can be classified as support to creation and growth of innovative enterprises and, at the same time, creation of an innovation friendly environment. The fund, controlled by a joint venture specialised in fund management, allows to acquire minority stakes in firms characterised by very high growth potential and high quality managerial staff. The managing authority has been identified through a European call for tenders. It involves an Italian (Meta Group) and a Dutch (Zernike Group) fund management consultancy. This joint venture also provides consulting services on complementary funding schemes, support to the penetration of foreign markets, and a network of contacts and partners. Thanks to Ingenium, firms are supported in their seed and start up phases. Equity stakes are acquired on the basis of an assessment of market potential and business sustainability of companies as well as considering the reputation of the management team. Co-investments, in partnership with external actors, may be allowed to sustain specific projects. Enterprises that are in the phase to be established and existing firms may both apply for Ingenium. In the latter case, the date of foundation should not exceed 36 months before the date of application. Beneficiaries should not be public limited companies and must be locate or willing to locate in objective 2 areas. There are no constraints concerning the investments which might be funded.	
Main results	
Ingenium can count approximately on 15 MEUR. This amount includes 4 MEUR directly invested by the joint venture. The procedure to access Ingenium is quite quick. An application form can be sent by fax or email, then the managing authority carries out a first document based selection and finally, id needed, it may arrange purposeful meetings. The launch of Ingenium experienced a delay (the contract with the joint venture has been signed in December 2004) due to complexity and novelty of the initiative relatively to previous regional experiences. The fund became operational at the beginning of 2005. So far, over 40 applications were submitted. The business plans which have been received were prepared by regional SMEs but also by Dutch, Spanish, Slovenian, Indian and Argentina companies. Most projects concern ICT and, to a lesser extent, biotech, energy, aeronautics etc. Eight firms have already passed the initial scouting and are nearing the final stage leading to access to the fund.	

Reasons of success and conditions for repeatability
The initiative is considered a best practice mostly because of its degree of novelty. It resembles a successful partnership between the private and public sectors. Ingenium, thanks to a European call for tender, allowed to identify a joint venture which is able to carry on assessments of applicants based on actual market potential. In this way it allows to overcome a common bottleneck characterising the venture capital market. Ingenium was an innovative and courageous initiative of the highly competent staff in charge of managing RTDI policy in the region Emilia Romagna. In theory, the experience may be easily replicated elsewhere, However, transferring the concept behind Ingenium to other Italian contexts, especially weak regions, may be encounter opposition of short sighted administrations.

CRdC – Regional Competence Centres	
Title of measure/project:	Measure 3.16, ROP Campania – Promotion of research and technology transfer in the most relevant sectors for growth and sustainable development (Promozione della ricerca e del trasferimento tecnologico nei settori connessi alla crescita e allo sviluppo sostenibile del sistema Campania)
Description :	Identification and implementation of governance tools (action 3.16.a); creation of a regional network of research centres providing technology transfer services.
Zone:	Objective 1
Policy framework:	ROP Campania
Brief history and main features	
(CRdC), introduced by Campania region, capitalise on existent regional structures rather than create new ones. Each centre includes the main regional actors active in the public research system (e.g. universities, technological parks). They operate in sectors of strategic importance for the region, due to presence of innovative enterprises or leading public research centres. CRdC promote knowledge and technology transfer from public research to firms. Moreover, they encourage the participation of enterprises in the design and implementation of R&D activities. Finally, they contribute to attracting private investments in forefront high-tech sectors. In terms of policy area, the initiative can be classified as knowledge transfer and technology diffusion to enterprises and, at the same time, creation of an innovation friendly environment. In addition CRdC contribute to improv governance capacities for innovation and knowledge policies. CRdC represent a real novelty of the regional innovation system. The aspects of selecting strategic sectors and attracting investments represent a unique experience for local policy makers. An international panel of knowledge management experts has been employed during the phase of project selection. The experts did not only assess the project proposals but also contributed to improve them.	

Main results
Over 200 MEUR have been allocated to CRdC. At the end of 2005, approximately 160 MEUR were committed to the initiative. The absorption capacity is 41%, well above objective 1 average (36%). 10 CRdC have been set up. They operate in seven scientific fields which reflect local potential. For example, CRdC address the following themes: Analysis and monitoring of environmental risk, advanced biology, agro-industry, new composite materials etc. Over 2000 people are involved in the initiatives and about 600 scholarships have been granted.
Reasons of success and conditions for repeatability
The initiative is considered a best practice mostly because it succeeded to a certain extent in reorganizing the local system of agents providing technology transfer services, promoting private-public partnerships. The partnership between CRdC and private enterprises led to the establishment of several consortia.

Appendix F Further reading

Annual Execution Reports (where available) of NOPs, ROPs and SPDs 2000-2006.

Bank of Italy (2005), Sintesi delle note sull'andamento dell'economia delle regioni italiane nel 2004, Rome, July.

Brancati, R. (2004) eds., Le politiche industriali nelle regioni italiane, Rapporto MET 2003-2004, Donzelli, Rome.

Brancati, R. (2005) eds., Le politiche per la competitività delle imprese, Rapporto MET 2005, Donzelli, Rome.

Complements of Programming 2000-2006 (all objective 1 and 2 regions).

European Commission (2003), Third European Report on Science and Technology Indicators, Luxembourg.

European Commission – DG Enterprise (2005), Annual Innovation Policy Trends and Appraisal Report. Italy 2004-2005.

Filas (2005), Lazio Region Innovation Scoreboard - RLIS 2005, July.

Fulani, A. and Lucas, R. (2005), Annual Innovation Policy Trends and Appraisal Report – Italy 2004-2005, European Trend Chart on Innovation, DG Enterprise.

Magnatti, P. (2005), L'intervento del FESR nelle politiche regionali per l'innovazione, Turin, September.

Mid Term Evaluation and Updated Mid Term Evaluation reports (where available) of ROPs and SPDs 2000-2006 (all objective 1 and 2 regions).

Ministry of Education, University and Research (2002): Guidelines for Science and Technology policy of Italian Government

Ministry of Education, University and Research: National Research Programme 2005-2007.

Ministry of Industry (MAP), Ministry of Technological Innovation (MIT) (2005): Second plan for digital innovation in firms.

MTE of NOP Research and NOP Industry 2000-2006 (objective 1).

Piccaluga, A. (2001), La Valorizzazione della Ricerca Scientifica, FrancoAngeli, Milan.

Preliminary National Strategic Document 2007-2013 (December 2005).

Preliminary Regional Strategic Plans 2007-2013 (where available).

Regional Operating Programmes 2000-2006 (all objective 1 regions).

RIDITT – IPI (2005), Indagine sui centri per l'innovazione ed il trasferimento tecnologico in Italia.

Single Programming Documents 2000-2006 (all objective 2 regions).

Sirilli, G. (2004), "Will Italy meet the ambitious European target for R&D expenditure? Natura non facit saltus", in Technological Forecasting and Social Change, vol.71/5, pp. 509-523.

Appendix G Stakeholders consulted

List of all individuals interviewed

Name	Position	Organisation
Ambrogio Angelo Brenna	Councillor for productive activities and innovation	Region Tuscany
Silvano Bertini	Director of development policies	Region Emilia Romagna
Lorenzo Muller	Officer at Regional Cabinet	Region Piedmont
Valter Galante	Officer at the Department for research and innovation	Region Piedmont
Claudia Galletti	Director of operational programmes for developing areas co-funded by SF	MIUR

Participants to focus group

Name	Position	Organisation
Luciano Criscuoli	Director General DG Co-ordination and Development of Research	MIUR
Fabrizio Cobis	Director of promotion of research and innovation in firms	MIUR
Francesco Beltrame	Consultant and officer in charge of co-ordinating technology platforms	University of Genova and MIUR
Enrico Wolleb	Director General and senior consultant	Ismeri Europa
Andrea Naldini	Director of Evaluation Studies	Ismeri Europa
Vanna Denari	Former Manager of Fiat Research Centre and senior technology consultant	Freelance consultant