

INNO-Policy TrendChart –  
Innovation Policy Progress Report

Italy

**2009**

## PREFACE

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States.

**PRO INNO Europe®** is an initiative of the Directorate-General for Enterprise and Industry (DG ENTR) which aims to become the focal point for innovation policy analysis, learning and development in Europe, with the view to learning from the best and contributing to the development of new and better innovation policies in Europe. Run by the Innovation Policy Directorate of DG ENTR, it pursues the collection, regular updating and analysis of information on innovation policies at national and European level.

**INNO-Policy TrendChart** serves the 'open method of coordination' approach laid down by the Lisbon Council in March 2000. It supports policymakers and innovation support measure managers in Europe by providing summarised and concise information and statistics on innovation policies, performances and trends. It is also a European forum for benchmarking and the exchange of good practices in the area of innovation policy.

### INNO-Policy TrendChart products

INNO-Policy TrendChart, previously the TrendChart on Innovation, has been running since January 2000. It currently tracks innovation policy developments in all 27 EU Member States, plus Brazil, Canada, China, Croatia, Japan, Iceland, India, Israel, Norway, Switzerland, Turkey and the US. The INNO-Policy TrendChart website (<sup>1</sup>) provides access to the following services and publications, as they become available:

- a database of innovation policy measures in the 39 countries;
- a news service and related innovation policy information database;
- annual policy monitoring reports for all countries covered;
- the European Innovation Progress Report, an annual synthesis report bringing together key points in the INNO-Policy TrendChart.

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<sup>1</sup> See <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=52&parentID=52> online.

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## Executive Summary: Public support for innovation – a snapshot

### 1. Main trends in the National Innovation System

The financial crisis spreading at international level is affecting the Italian real economy in the same way that it is unfolding in other EU countries. The sharp reduction in revenue, the slowdown in lending and the deterioration in consumer and business confidence are holding back demand and output, creating economic contraction and significant job losses.

In 2008, Italy's economy contracted by 1% following growth of 1.6% in 2007. Production fell by 3.1% and the trend continued in the first part of 2009. Most industrial sectors are in difficulty. Those which have suffered first from the contraction of the international demand have been the metal-mechanic and textile industries, the two pillars of the 'made-in-Italy' industries. Since September 2008 other sectors such as agro-food, construction, commerce and the chemical industry have also seen their investments and confidence in innovation reduced. The IFIIT index which measures the confidence for investments in technological innovation decreased from 78 to 65 points between June 2008 and March 2009. However, sectors such as energy, credit, insurance, telecommunications and luxury goods keep showing special attention towards innovation and new technologies, where investments are not expected to fall.

In terms of innovation performance, Italy is below the EU average and its relative position has not significantly improved over the past five years (SII was 0.314 in 2004 and is 0.354 in 2008). According to the European Innovation Scoreboard (EIS), Italy positions itself in the group of 'moderate innovators', showing slow progress and registering a below-average annual growth rate (1.8 in 2008 versus 2.3 EU average).

According to the EIS 2008, Italy performs well (slightly above or around the EU average) in the following indicators: (1) R&D activities and employment in medium-high, high technology and knowledge-intensive services sectors. Such performance is mainly attributed to the importance of the Italian medium-technology industrial base (especially industrial areas of mechanics), (2) Community trademarks and design, a sign of the traditional country leadership at international level in sectors marked by the 'made-in-Italy' production, design creativity and invention, which have contributed and can further boost the consolidation of the Italian products in several key markets, and (3) Non R&D innovation expenditure.

On the contrary, low performance is registered for indicators such as Human resources, Finance and Support, and Linkages & entrepreneurship. The EIS indicators reflect the main traditional weaknesses of the country, namely: (1) insufficient supply of knowledge base for high-technology solutions and dissemination of new technologies (still low number of university educated people, inadequate average level of skills and know-how among the adult and young population, low number of researchers employed), (2) shortage of finance both from public and private sources and inefficient capital market (inadequate development of the domestic capital market, poorly performing financial sector and slow growth of companies through third-party capital, credit market still managed according to rigid and traditional criteria), (3) low level of inter-firm collaboration and still weak system of consolidated public-private partnerships. These factors strongly affect the Italian innovation system and the ability of the country to gain on other EU countries in terms of innovation and competitiveness.

Based on the analysis of indicators from several sources such as the EIS, Organisation for Economic Cooperation and Development (OECD) and International Institute for Management Development (IMD), as well as on national policy debates, publications, and on the analysis of the press, three main challenges can be identified in the Italian innovation system: (1) innovation financing (especially venture capital), (2) mobility of talents (especially brain drain), and (3) improvement of technology transfer mechanisms.

## 2. Main developments in public support for innovation

Despite the fact that in recent years policies have been more geared towards the recovery of the national finances than to the promotion of innovation, since 2006 there has been a clearer political willingness to establish a new research and innovation policy framework. New directions have been given both in terms of governance and policy instruments. This includes, for example, the introduction of automatic incentives (tax credit for R&D) and the concentration of strategic guidelines, both for research and innovation policies, on selected strategic priorities (e.g. 12 research strategic programmes), thematic fields (e.g. Industria 2015), sectoral, and in some cases also on territorial excellence (e.g. technology districts). This has resulted in a new approach compared to the previous experience that was characterised by a more generalised and barely selective policy intervention. Signs of change in this direction include:

- creation of a specialised agency (ANVUR) to evaluate the results of research activities carried out by universities and research centres and – for the first time in Italy – allocation of funds to the university system on the basis of the performance obtained,
- establishment of a National Innovation Agency,
- modernisation of public administration through the introduction of ICT (e-government plan 2012 launched in January 2009).

This also includes the launch of several measures between July 2008 and July 2009 such as:

- National Fund for Innovation to promote innovative projects based on strengthening and exploitation of industrial property,
- risk capital fund for SMEs to favour the influx of risk capital in southern Italy and support the creation and development of SMEs involved in investment programmes related with product and process innovation through the use of digital technologies,
- tax exemption on capital gains from start-ups,
- funds dedicated to finance innovation projects proposed by start-ups operating in medium/high-tech sectors,
- 'brain return' measure,
- funds for research and innovation in the energy sector
- measures introduced for the re-qualification of patents

## 3. Appraisal of national innovation policy

The Italian innovation system is characterised by the presence of many policymaking entities undertaking innovation policy tasks that are sometimes fragmented and uncoordinated. Also innovation support instruments suffer from fragmentation and are often conceived as short-term or even *una tantum* initiatives. A key priority of innovation policy in Italy is therefore to hold a strong strategic vision, both at national and regional level, and a clear perspective to ensure long-term planning and long-standing impact results.

Despite the recent efforts to make policy intervention more effective and responsive to the country's innovation challenges, there is still considerable room for improvement. Innovation policy and the implementation of specific measures are still influenced by several structural problems that affect their effectiveness and potential impact. Although the economic and financial crisis calls for prompt intervention to address urgent short-term challenges, research and innovation policies should remain central in the policy agenda to guarantee development and growth. These are key factors to come out of the crisis and face the recovery. A clear strategic view for innovation policy is required at central level, while ensuring full commitment to the set objectives, coordination and clear allocation of responsibilities among national and regional dedicated entities.

The effects of the crisis, the structural factors affecting the national innovation system, and the scarcity of resources to be allocated to the different priorities, all call for a further rationalisation of the Italian innovation policy mix, which is still characterised by a high number of instruments and measures, as

well as lack of coordination, weak targeting and inefficient application. Efforts should be directed to reducing the number of incentives to avoid fragmentation and overlapping between the national and regional level, revising the policy mix in favour of more selective and finalised incentives, and allowing for easier access to automatic incentives. In addition, continuity, financial availability and stability have to be ensured for national and regional policy schemes, through the design of medium- to long-term plans. Policy implementation, the allocation of resources and the design of new schemes should rely on effective and systematic policy monitoring and evaluation processes allowing measurement of performance against objective criteria and 'learning by doing' practices in policy development.

The following areas of intervention are suggested to ensure growth to the national innovation system:

1. Focus on strategic key areas: the concentration of policy intervention on selected key technology priorities and areas of excellence should be further pursued. Technological themes transversal to sectors and geographical attraction areas should be identified and addressed through ad hoc measures.
2. Public-private partnerships, cooperation among companies and promotion of network-based schemes: new and more effective measures ensuring systemic exchange and cooperation between public-private research and enterprises should be fostered, allowing successful technology transfer processes. National or regional measures to stimulate cooperation among companies could be launched to achieve a critical mass for projects of broad interest. Cluster leveraging policies should be further sustained to valorise national 'areas of technology excellence' (technology districts, innovation poles), as well as boosting cooperation and synergies between public and private systems. Consistency and effectiveness of the running structures (e.g. technology districts) should be appropriately appraised to select and sustain only successfully performing structures.
3. Cooperation schemes among Northern and Southern regions should be encouraged to reduce territorial unbalances.
4. Accelerate innovation in the public sector as a driving force for the whole country innovation system: the modernisation of the PA should be further pursued to increase investments in R&D activities, to develop the digital capital within the public sector, to enhance the ICT know-how and promote enabling technologies and infrastructures which may support leading public-private sectors of the country. In this sense, the effort made by the present Government through the e-Gov 2012 Plan launch should be further supported and appropriate resources should be allocated to render the plan feasible and really effective.

## 1. Main trends and challenges in the National Innovation System

### 1.1 Recent economic trends and market developments

The global financial crisis is affecting the Italian real economy in the same way that it is unfolding in other EU countries. The sharp reduction in wealth, slowdown in lending and deterioration in consumer and business confidence are holding back demand and output, creating economic contraction and significant job losses.

In 2008, Italy's economy contracted by 1.0% following growth of 1.6% in 2007. During the year, the decline in GDP growth, which began in spring, worsened as tensions heightened in the financial markets, and became more pronounced in the last quarter of 2008, with a fall of 1.9% from the previous quarter, the largest since the 1974-75 recession <sup>(2)</sup>. Italian production fell in 2008 by 3.1%. The trend continued in the first part of the 2009 (in the first two months activity fell by an average of about 5% with respect to the preceding period). Most industrial sectors are in difficulty. The proportion of sectors in which activity has contracted for at least two consecutive quarters is above that registered in the recession of the early 1990s and not far below the historic peak of 1975. The slump in exports (reduction by 7.4% in the last three months of 2008) and in investments (decrease of 8.9%, especially in machinery, equipment and transport equipment) contributed.

The decline in employment that began in the third quarter of 2007 has continued, showing a reduction in the number of the employed falling by 0.1% in the fourth quarter of 2008 compared with the previous period, with an increase in the recourse made to the wage Supplementation Fund. On a seasonally adjusted basis, the number of unemployed has increased almost without interruption since the third quarter of 2007 (the unemployment rate increased from 6.1 to 6.8 in the period 2007-08). The contraction was more marked in terms of standard labour units. In the first few months of 2009, the evident increase in the number of applications for unemployment benefit made to INPS and the hours authorised by the ordinary Wage Supplementation Fund signals a further deterioration in labour market conditions.

In 2008 as a whole, the inflation rate rose by 3.5%, compared with 2.0% in 2007 <sup>(3)</sup>. However, the index is expected to substantially decline. A rapid decline in inflation in the last part of 2008, driven by sharp falls in the prices of raw materials, continued at the beginning of 2009 falling to 1.2% in March, with the trend expected to rise only to 1.6% in 2010. In addition, the uncertainty over employment prospects is affecting household consumption that also fell by about 1.0% and has not been positively influenced by the inflation declining in the first part of 2009. Households are still very cautious in their spending decisions, reflecting fears of a further worsening of conditions in the labour market and in the overall economic frame.

According to Eurostat data, unit labour costs in the whole economy rose by 1.3% on average in 2008. This substantial increase was due to the last major round of labour contract renewals, which produced per capita wage gains of 3.3% for the year as a whole, up from 2.2% in 2007, and to the marked deterioration in productivity, which after the 0.7% gain of 2007 fell by 0.8%, reflecting a decline in value added and broadly stable employment. In 2009, however, there should be a marked deceleration in unit labour costs as the impact of contract renewals fades away against the backdrop of a weak labour market. Businesses' gross fixed investment is registering a persisting contraction from 1.8% in the third quarter of 2008 to 6.9% in the fourth.

The recession is also worsening the public finances. In 2008 the deficit began to grow again, to 2.7% of GDP. Total revenue slowed sharply, while indirect tax receipts diminished. The ratio of the public

<sup>2</sup> Economic Bulletin N° 52, Banca d'Italia, April 2009.

<sup>3</sup> Source: Eurostat Data.

debt to GDP rose (from 103.8 in 2007 to 103.5 in 2008), returning to its level at the end of 2005. In February this year the Government estimated a further increase of 1% in the deficit for 2009, due to the worsening economic situation. In the first three months of the year tax revenue on a cash basis diminished by 5.4% compared with the same period of 2008. The size of the public debt limits the scope for discretionary measures to support aggregate demand. In February the Government strengthened these measures by introducing demand-side incentives, especially for durable goods, and tax reductions for firms. For the most part, the measures are financed by reducing other expenditures.

Financially, bank lending is continuing to slow in response to demand factors and, in the case of lending to firms, of supply factors as well. Loan quality is being influenced by the worsening of economic conditions. Funding is slowing. Starting last year, the Government and Parliament have adopted measures to protect depositors, support banks' liquidity and capital and strengthen intermediaries' ability to satisfy the demand for credit. The financial slowdown involved all sizes of firms and all parts of the country. In February bank lending to small firms remained practically flat. With the slackening of economic activity, there was also an abrupt slowdown in lending against the transfer of trade credits. Also, lateness of payment on these credits increased considerably over the previous year.

Estimates based on the national accounts indicate that the downward trend in firms' operating profit, underway since 2004 and steepening in 2008, intensified further in the fourth quarter of 2008. Corporate self-financing continued to shrink, owing in part to the increase in net financial costs. Self-financing fell below 10% of value added, the lowest ratio in 15 years. The reduction in self-financing was more pronounced than that in investment, so the borrowing requirement (defined as the difference between gross investment, including stocks, and self-financing) rose sharply, especially in the second half of the year. Owing in part to the contraction in output, at the end of the year the financial debt of firms came to 76.2% of GDP, about 1% higher than at the end of the third quarter. By comparison with 2007, corporate debt increased by more than 3% in relation to GDP, but the ratio is nevertheless significantly below the euro-area average of 94%. The rate of growth in firms' debt to banks, which had continued to be high over the first three quarters of 2008, fell significantly in the fourth, to an annual rate of 7% in December.

Mergers and acquisitions remained rare and small in size. Thomson Reuters reports that 23 M&A transactions were announced in the fourth quarter of 2008 for a total value of EUR 1.6 billion, and in the first part of 2009 this activity diminished still further.

Making an overall assessment and summing up the above observations through some major structural indicators, the national performance of Italy in the last five years, compared to the EU-27 average, is shown in the Exhibit 1 below.

## Exhibit 1: Comparable indicators of economic performance

Indicator	National performance			EU 27 average		
	2004	2007	2008	2004	2007	2008
GDP per capita in PPS (EU-27=100)	106.7	101.9	100.5	100	100	100
Real GDP growth rate (% change previous year)	1.5	1.6	-1.0	2.5	2.8	0.9
Labour productivity per person employed (EU-27=100)	112.0	108.5	108.2	100	100	100
Total employment growth (quarterly % change)	0.4	1.2	0.3	0.7	1.8	0.9
Inflation rate (average annual)	2.3	2.0	3.5	2.0	2.3	3.7
Unit labour costs (growth rate)	-0.5	-0.7	1.3	-1.4	-0.8	0.5
Public balance (net borrowing/lending) as a % of GDP	-3.5	-1.5	-2.7	-2.9	-0.8	-2.3
General government debt as a % of GDP	103.8	103.5	105.8	62.2	58.7	61.5
Unemployment rate (as % of active population)	8.1	6.1	6.8	9.0	7.1	7.0
Foreign direct investment intensity	1.0	3.1	n.a.	0.9	3.4	n.a.
Business investment as a percentage of GDP	18.1	18.9	18.7	17.2	18.8	18.5

Source: Eurostat – Structural Indicators and Long-term Indicators (see <http://epp.eurostat.ec.europa.eu> online).

Key: (\*) EU-25 average, (^) or latest available year (for example: 2005); (·) not available.

In a context characterised by the reduction of GDP, increasing inflation and unemployment rates as well as liquidity constraints and difficulties in access to credit, firms are seeing their orders fall and are cutting expenses they believe not crucial for survival, which are in most cases R&D and innovation. The business sector in Italy is characterised by a large number of very small firms (more than 98% of Italian firms have less than 20 employees), and a small number of large companies. Although small firms have traditionally been a source of dynamism, their limited financial resources hamper the ability to invest in new R&D activities, innovation enhancement and human capital improvement. Evidence shows that small size impacts negatively on R&D and investment, particularly in a period of unfavourable economic conditions. In addition, the country is specialised in sectors (mature/traditional sectors) that are not R&D and innovation-intensive.

Within this macro-economic scenario some Italian districts are switching from a 'traditional district model' (headquarters and manufacturing facilities in the same geographic area) to a 'new value chain model' (headquarters in Italy, manufacturing facilities in areas or countries with lower labour costs) in order to face global challenges. This has been adopted by the North-East district textile and shoe manufacturers, for example. This aggregation model can significantly help small and medium companies achieve greater critical mass that can improve innovative capacity and stimulate key activities including R&D, technology enhancement and internationalisation.

Regarding the current recession, as in the rest of the euro area, the downturn is continuing into this first part of 2009. Over the first months export sales were still weak. Cyclical indicators point to the continuation of the contraction in economic activity in the first quarter, the fourth in succession.

Firms are still rather pessimistic. The deterioration of the outlook for world growth and the uncertainty about the timing of the recovery are making firms more sceptical on economic improvements and are discouraging investments. Their assessments of the level of orders, both domestic and export, have worsened further in the last months, as have their short-term output expectations. Nevertheless, although expectations remain still negative for the majority of firms, some initial signs of an attenuation of pessimism on the short-term outlook are visible. The recent survey of firms conducted by the Bank of Italy in cooperation with Il Sole 24 Ore <sup>(4)</sup> shows signs of a prospective easing of the force of the recession although not yet sufficient to foretell an end to the fall in output. The global nature of the recession makes the timing of a return to a growth path uncertain, which according to the main international organisations and private forecasters may only begin in 2010 <sup>(5)</sup>.

## 1.1.1 The credit crisis and its effect on innovation activity

In Italy industry has been hard hit by the crisis. According to the quarterly survey conducted in March 2009 by the Bank of Italy and 'Il sole 24 ore' <sup>(6)</sup>, 88% of the respondent firms found the overall economic situation to be deteriorating with respect to the previous quarter. The contraction in businesses' gross fixed investment worsened significantly from 1.8% in the third quarter to 6.9% in the fourth (and to 8.9% for machinery, equipment and transport equipment). Uncertainty over the timing of recovery, idle capacity at historic high levels and financial strains underlie the very poor prospects for investment this year <sup>(7)</sup>. A poll <sup>(8)</sup> conducted in 2008 among the adult population in several EU countries and the US revealed that in Italy almost 30% of the interviewed declared that the

<sup>4</sup> *Survey on Inflation and Growth Expectations*, Banca d'Italia and Il Sole 24 ORE, January 2009.

<sup>5</sup> The analysts interviewed in mid-March by Consensus Economics expect an average contraction of economic activity of 2.8% in 2009 (with downside risks) and barely positive growth (0.3%) in 2010. OECD forecasts published at the end of March '09 indicate a fall of 4.3% in 2009 (assuming an unprecedented reduction in world trade) and of 0.4% in 2010.

<sup>6</sup> Bank of Italy, *Economic Bulletin No 52*, April 2009.

<sup>7</sup> The recent document to plan economic and financial policies by the Ministry of Economic Development (DPEF 2010-14) is envisaging a recovery by 2010 with a reversal in the GDP growth expected at +0.5% and a further increase until 2013 of +2% on a two-year basis.

<sup>8</sup> *Financial Times/Harris Poll* conducted online by Harris Interactive among a total of 6 478 adults aged 16 to 64 within France; Germany, Great Britain, Spain, the United States, and adults aged 18 to 64 in Italy, between February 27 and March 6, 2008.

financial crisis has had a major impact and an additional one-third (33%) that it has had a moderate impact on their personal financial situation.

Regarding how the government is handling the economy today, a plurality of Italians (44%) are not happy with the government's job and 62% do not agree that it is the government's responsibility to intervene to save struggling financial institutions, such as banks. From June 2008 to March 2009 the index measuring confidence for investments in technological innovation (IFIIT)<sup>9</sup> which measures the sentiments/feelings of Italian entrepreneurs towards innovation decreased from 78 to 65 points. The sectors which have suffered first from the contraction of the international demand have been the metal-mechanic and the textile sectors, the two pillars of the 'made-in-Italy' industries. From September 2008, also other sectors such as agro-food, construction, commerce and chemical have seen their investments and the confidence in innovation reduced (this is particularly true for SMEs operating in these sectors).

According to the Italian entrepreneurs interviewed for the construction of the IFIIT index, electro-mechanic, mechanic, textile and *orafo* (goldsmith) sectors risk cutting down by 50% the number of plants/workshops in the next months. However, sectors such as energy, credit, insurance, telecommunications and luxury goods keep showing special attention towards innovation and new technologies, as well as their budgets, have been only slightly re-adjusted. Managers of insurance and credit companies as well as telecommunications have announced their intention not to reduce investments in security, client assistance and customer satisfaction (Generali and Zurich are two examples of companies that have increased the budget dedicated to client assistance). In the energy sector, the budget devoted to training both at managerial and technical levels is increasing. Efforts are devoted to the search for new/alternative energy sources and for better service offerings. Firms with a high propensity for R&D such as IT, telecommunications or biotechnologies are not expected to reduce investments in research and innovation.

Other sectors, such as the automotive, might be subject to a productive reorganisation, i.e. reduce consumption and environmental impact of new cars, which will imply continuous investments in R&D and innovation. The sector has shown an uncertain trend – a fall in confidence and investments during the summer and fall of 2008 followed by recovery by the end of the year. An explanation is that a big car manufacturer (Audi) has involved several Italian suppliers (Marelli, Brembo, Brugola amongst others) in a 'revolutionary' project in the transport sector for which a big dose of innovation will be necessary. The rebound might also come about thanks to the introduction of incentives for the purchase of ecological vehicles (from mid-February through the rest of the year), which caused an upswing in new car registrations starting in February and a substantial rise in new orders to dealers. Also the Fiat-Chrysler merger agreement might have created positive expectations in the sector.

Last but not least, the editorial field is another sector under rapid transformation in Italy moving from a model based on paper to a multimedia one. Therefore, investments in information technologies are also expected here.

Since the summer 2008, when the crisis started to show its first negative signals on the world economy the government announced the adoption of several measures to sustain the national economy. The measures adopted by the Italian government are overall similar to the rest of the European countries. The first set of measures was adopted through the legislative decree 185/2009 which contained measures to support families, workers and enterprises. A second bill (Legislative Decree 5/2009) was approved for directly supporting certain industrial sectors: automotive, electric household appliances and furniture.

With an amendment to Decree 5/2009 the government acted in the labour market introducing measures to help workers who lost their jobs. Also several measures have been put in place to guarantee the liquidity in the system and avoid a serious credit crunch on the part of banks that have suffered from serious losses over this period (the measures include granting state aid to troubled

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<sup>9</sup> IFIIT- indice di fiducia sugli investimenti in innovazione tecnologica. Index developed by P.Gila based on a sample of 250 managers from manufacturing, service, insurance, credit and public administration interviewed on a monthly basis. All interviewees are top managers, CEOs or those directly responsible for buying and/or development strategies departments. Source: Forum dell'Innovazione Digitale 2009. '*Innovazione, sviluppo umano e competitività sistema paese*', IDC report.

banks, also through buying stakes in the banks, guaranteeing new bank loans, increasing the amount of liquidity in the market and making it easier for banks to lend money to each other at lower rates).

The government has also announced the financing plan for infrastructure programmes, namely the bridge over the strait of Messina, the Milan 2015 Expo and the Underground in Rome, totalling EUR 16 billion. Note that in Italy these projects have always been faced with political and administrative resistance that delay their effective implementation, therefore there remain some doubts regarding the real impact that this may have on the economy in the short run.

One of the measures contained in the anti-crisis decrees is the introduction of an anti-crisis export promotion plan with an overall allocation of EUR 185 million in 2009, managed by the Institute for Foreign Trade (ICE) <sup>(10)</sup>. New tax benefits have been granted to enterprises, with an allocation amounting to circa EUR 2 900 million for the 2009-11 period. The benefits include tax exemptions for productivity contracts aimed at boosting labour productivity, and deduction of 10% of the regional tax from company income tax and personal income tax. In January 2009 a refinancing of the Central Guarantee Fund for SMEs was put in place (EUR 1.6 billion), and a State guarantee as a last-resort guarantee has been provided to this Fund.

According to Confindustria – the country's major entrepreneurs' association – the measures and the budget (EUR 4 billion) foreseen in the anti-crisis decree are not sufficient to face the crisis. Confindustria calls for structural reforms and also urges entrepreneurs to invest in research, innovation and new technologies. The actions taken by the government to re-launch the economy do not seem to have fully convinced the workers' associations either, since the resources to protect the poorest segment of the population and workers that lost their jobs due to the crisis are deemed insufficient.

There are other measures launched by the government that might give a boost to firms in specific sectors where new and innovative technologies are applied:

1. Industrial innovation projects launched in 2007 under the Industria 2015 programme which are focused on strategic fields such as energy efficiency, sustainable mobility, new technologies for the made-in-Italy sectors, cultural heritage and life science technologies.
2. The government's recent allocation of EUR 210 million for research and innovation in the energy sector <sup>(11)</sup>. The resources will be assigned to research centres and universities to strengthen research in the production, rationing and savings of electricity, as well as nuclear energy and environmental protection. The Ministry of Economic Development has declared that the availability of funding has a two-fold objective: to boost innovation in the energy sector and contribute to the alleviation of the difficulties in this particular moment of crisis.
3. Incentives for the elimination or reduction of substances of very high concern (CE 1907/2006, REACH). The total amount of available resources is EUR 120 million to substitute substances of very high concern with less dangerous substances or technologies that are feasible from both a technical and economic point of view and create a virtuous circle that will take into account the concern for the protection of health and the environment, as well as the competitiveness and innovative capacity of the industrial sector.

Last but not least, the Italian e-government plan 'E-gov 2012', has been launched in January 2009 with the intention not only to generate important savings (circa EUR 40 billion in 4-5 years) from an increase in productivity in the public sector and the reduction of the administrative burden, but also to encourage growth. For the government this Plan can act as an anti-cyclic manoeuvre to counter the crisis and stimulate a virtuous circle, with the creation of qualified demand for advanced technological infrastructure and innovation in the ICT. However, this will only happen if the necessary resources to

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<sup>10</sup> Internationalisation support services provided by ICE to Italian companies will benefit from up to a 50% discount on fees, and special payment conditions aimed at small companies will be made available.

<sup>11</sup> Piano triennale 2009-11 per la ricerca nel settore dell'energia (Plan for research in the energy sector 2009-11).

launch the projects are quickly obtained <sup>(12)</sup> and spent on well-chosen projects to guarantee concrete results.

So far, the current crisis has not led to cuts in public R&D expenditure and business support. However, the uncertain climate and the focus on other priorities caused by the crisis have led to a slowdown in the launch and implementation of some instruments and programmes (especially instruments that support research). Nonetheless, since the second half of 2009 we are witnessing signs of recovery (e.g. the launch of several FIT calls and the launch of the new regional framework 2007-13 with several instruments).

## 1.2 Recent trends in the national innovation performance

With innovation performance below the EU average and a relative position that has not significantly improved over the past five years (SII was 0.314 in 2004 and is 0.354 in 2008), according to the European Innovation Scoreboard Italy falls in the group of 'Moderate innovators' countries, showing slow progress and registering a below-average annual growth rate (1.8 in 2008 against the 2.3 EU average). Italy's position in the middle range of the EU-27 SII ranking list (19<sup>th</sup> position) provides a picture of a still underperforming national innovation system confirmed by other international economic observatories: the Global Innovation Scoreboard (GIS) ranks the country at 26<sup>th</sup> place among 48 countries at world level. In the World Competitiveness Yearbook by the International Institute for Management Development (IMD) the overall ranking places Italy at 46<sup>th</sup> place among 57 countries, while the Global Competitiveness Index by the World Economic Forum ranks Italy at 49<sup>th</sup> place among 134 countries.

The above rankings are obtained by measuring input and output indicators. Data and records on Italy cite structural gaps as major factors for insufficient performance. However, it has to be stressed that the specific nature of the Italian production system (prevalence of small firms whose investments in R&D are often 'hidden' and not appropriately recorded in official statistics) and the peculiarities of the innovation processes (frequently occurring in 'creative industries' where production is strongly characterised by aesthetic and design components, such as fashion and the 'made-in-Italy' sectors) are often hardly detected by the traditional R&D and Innovation assessment instruments.

In addition, the analysis conducted on a yearly basis by Fondazione Rosselli <sup>(13)</sup> to measure and compare the innovation potential of 19 major industrialised countries ranks Italy at 16<sup>th</sup> place in 2008 with a score of 3.97 which is still far from the threshold (Score 5) to be moved from the group of 'barely innovative' countries to the 'moderate innovative' countries. With respect to results that emerged in 2007, Italy jumps by one place. However, despite the total score being the highest registered in the last five years (from 2.43 in 2004 to 3.97 in 2008), during this period Italy has always fell between 16<sup>th</sup> and 17<sup>th</sup> place, without showing significant progress from one year to the other.

The System Innovation Index of Fondazione Rosselli places Italy in the last positions in many of the 28 innovation indicators assessed in the study and grouped in seven main macro-areas <sup>(14)</sup>. The analysis, comparing Italy with other 18 developed countries, registers low indicators for:

- technical-scientific knowledge (efficiency in the technology transfer processes between universities and enterprises),
- investments in ICT,
- human capital (population with university degrees, number of researchers, brain drain phenomenon),
- financial support to R&D activities (public/private expenditure in R&D, venture capital funds availability),

<sup>12</sup> Although this is an important move forward for the country, the plan has already revealed its major weakness in the financial side since out of the EUR 1 380 million needed only 248 million have been allocated so far.

<sup>13</sup> *Rapporto Innovazione di sistema 2008*. Fondazione Rosselli and *Corriere della Sera*, 2009.

<sup>14</sup> (1) Technical-scientific knowledge, (2) new ICT exploitation, (3) human capital, (4) financial support to R&D activities, (5) general characteristics of the economic and (6) institutional context, (7) basic infrastructures.

- economic and institutional context (high-tech export, legal support to high-tech diffusion), infrastructures efficiency (energy infrastructures, air transport).

An analogous description emerges through the European Innovation Scoreboard (EIS) comparative analysis for 2008, where Italy registers low performance especially for 'Human resources', 'Finance and Support', and 'Linkages & entrepreneurship' indicators. The EIS indicators for Italy reflect the main traditional weaknesses of the country:

- insufficient supply of knowledge base for high-tech solutions and dissemination of new technologies (still low number of university graduates, inadequate level of skills and know-how among the adult and young population, small number of researchers employed),
- shortage of finance both from public and private sources and inefficient capital market (inadequate development of the domestic capital market, poorly performing financial sector and slow growth of companies through third-party capital, credit market still managed according to rigid and traditional criteria),
- low level of inter-firm collaboration and still weak system of consolidated public-private partnerships.

The above factors strongly affect the Italian innovation system and the ability of the country to gain up on other EU countries in terms of innovation and competitiveness. With reference to the new classification of the EIS indicators, over the past five years, strong growth has emerged in Italy from 'Human resources' (S&E and SSH graduates +8.8%, S&E and SSH doctorate graduates +22.7%) and 'Finance and support' (Broadband access by firms +18.6%), while 'Throughputs' have also been the drivers of the improvement in innovation performance (e.g. Community trademarks +4.7% and Community designs +3.2%). 'Performance in Firm investments' on the other hand has not improved and performance in 'Innovators and Economic effects' have worsened, in particular due to a decrease in 'New-to-market sales' (-7.8%) and 'New-to-firm sales' (-5.3%). In more detail, according to the registered EIS indicators in 2008, Italy shows better performance in the following indices:

- R&D activities and employment in medium-high, high technology and knowledge-intensive services sectors: Such performance, slightly above or around the EU average, should be mainly attributed to the importance of the Italian medium-technology industrial base (especially referring to industrial districts of mechanics).
- Community trademarks and design: more positive figures are recorded for Community trademarks and industrial design, for which Italy registers indicators around or above the EU average. This is a sign of traditional country leadership at international level in sectors marked by 'made-in-Italy' production and design creativity and invention, which have contributed and can further boost the consolidation of the Italian products in several key markets.
- Non R&D innovation expenditure: As observed by the EIS monitoring system, usually a higher percentage of non-R&D innovators have less than 50 employees. They are active in low-medium technology service sectors and are located in European countries with below average innovative performance. Non-R&D innovators, compared to R&D performers, are more likely to focus on process innovation and spend less on innovation than R&D performers. The above aspects characterise the Italian economic structure and innovation system, where in-house R&D activities are still scarce especially at SME level. This explains the indicator being slightly above the EU average.

Indicators showing lower performance include:

- R&D expenditure, especially by the private sector: concerning investments in R&D, private spending is still inadequate in Italy and below the OECD and EU average. In 2005 R&D intensity, or gross domestic expenditure on research and development (GERD) as a percentage of GDP was 1.1% compared to 2.25% for the OECD area and over 1.7% for the EU. The private sector financed only 40% of the total R&D (0.55% of GDP against an EU average of 1.17) compared to OECD averages of 63% (15). The low-performing indicator signals weak investment in R&D that may reflect specialisation of firms in low-tech, labour

<sup>15</sup> Science and Innovation: country notes, OECD Science, *Technology and Industry Outlook 2008*, OECD 2008.

intensive sectors and manufacturing with a medium-high tech output, as well as small firms such as family businesses. In 2005, companies with less than 100 employees, i.e. more than 98% of Italian production, benefitted only from a 10% share in R&D spending.

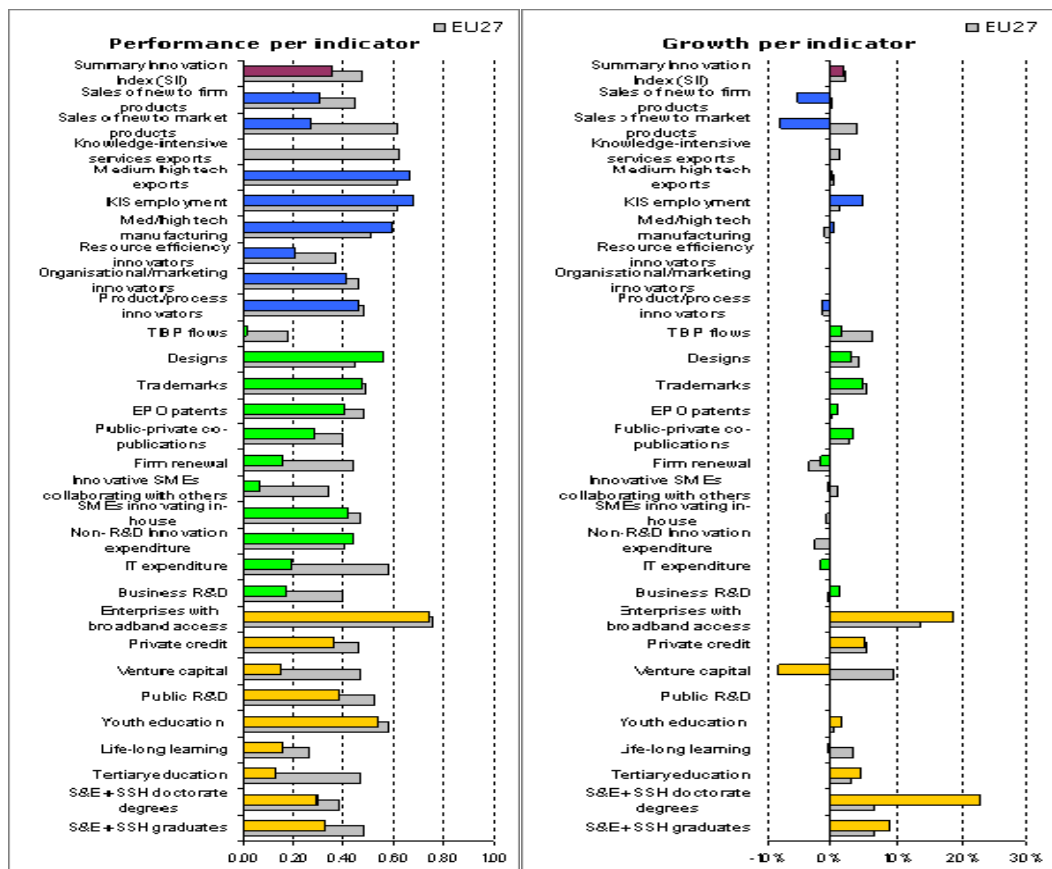
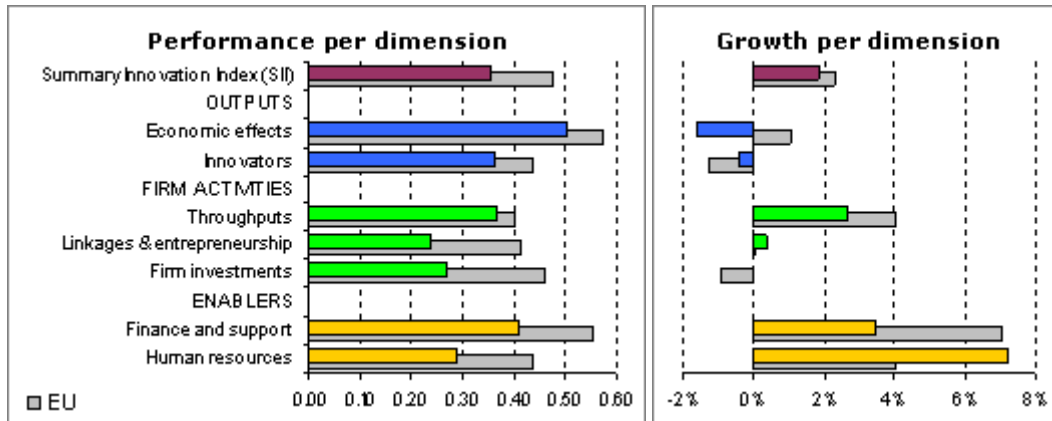
- The low propensity of companies to invest in innovative technologies and undertake organisational change is often also a result of strict regulations affecting certain sectors (scarce liberalisation, entry barriers, price and quantity restrictions). At regional level, R&D activities by the private sector is mainly concentrated in Piedmont, Lombardy, Emilia-Romagna and Liguria.
- Human resources indicators: Like other 'Moderate innovators' countries, Italy has shown an above EU rate of improvement in the Human Resources indicator. However, such progress is still not sufficient to significantly advance Italy in this area towards the rest of EU countries. Science and Engineering (S&E) graduates, tertiary education and life-long learning are all indicators that still position Italy in the lowest levels of the EIS ranking. Italy has one of the lowest proportions of scientific researchers and engineers in total employment across the OECD countries, despite occupations for human resources in science and technology growing strongly from 1996 to 2006 (averaging over 4% a year, compared to around 3% for the EU-19). At regional level, Lombardy, Latium, Piedmont and Emilia-Romagna are the regions with a higher amount of employees in R&D activities (16). Italy has also one of the lowest shares of researchers in total employment in the OECD area, with 3.4 researchers per 1 000 jobs, compared to 7.3 for the OECD area (16). The indicator of number of researchers is improving moderately (it was 3.2 in 1991). Innovation performance measured by the patenting activity (12.3 patents per million inhabitants for Italy against 76.4 patents for Germany) and scientific publications is still below the EU average. Italy positions itself at 8th place in the world ranking with the 3.47% of the total S&E publications, reaching excellence in maths and medicine disciplines. However, in relative figures the number of publications for 1 million inhabitants is still below EU best performers (420.5 in Italy against 1 108.7 in Sweden) (17). At regional level patenting activities show major results in Lombardy and Emilia-Romagna.
- Innovative SMEs collaborating with others: Cooperation attitude between firms or between firms and research centres registers an indicator that is half the EU average (4.3 versus 9.5). This seems contradictory in a country whose economic structure has been since several decades characterised by the districts' dynamics. The indicator is significantly affected by the high number of micro and small firms that cooperate with one another in an informal way.
- Venture capital: The EIS indicator for venture capital is still among the lowest in the EU (0.050 against 0.107 in the EU-27). Industrial system peculiarities, absence of a consolidated and standardised process for new firms creation, the difficult relationship between finance and companies, a conservative attitude of the financial system towards risk, an average deals dimension below the market failure threshold and a still nascent financial engineering system are some of the reasons for low performance. Nevertheless, venture capital – in particular seed and early-stage capital – is growing in Italy and the market has started to show signs of improvement. According to OECD data, venture capital funds invested in Italy increased in 2007 from 0.031 to 0.067 in percentage of the GDP.
- High-tech products exports: Indicators measuring high-tech exports for Italy show weak performance for the country, despite the positive signs emerging since 2006 when the technology balance registered a reversed positive turn. According to World Development Indicators, in 2008 in Italy high-tech exports amounted to the 7.19% of the total export against 34.43% for Ireland or 21.2% for France. On the other hand, Italy boasts the major share in terms of low-tech exports compared to the other EU countries.
- IT expenditures and ICT distribution: Despite relevant growth in recent years, in 2006 ICT expenditure reached only 4.8% of the Italian GDP (where major growth was due to expenditures in communication technologies since Italy boasts first place in Europe for mobile phone usage). ICT expenditure for hardware, software and other related services acquisition, on the other hand, is only equal to 1.7% of GDP against an EU average of 2.7%. Investments in ICT count for 10.7% of total investment in Italy, while in UK they represent 25.8% and in

<sup>16</sup> According to 2007 ISTAT data: Lombardy (18.4% of total), Latium (17.5%), Piedmont (10.7%), Emilia-Romagna (10%).

<sup>17</sup> OECD, Science Technology and Industry Outlook, 2008.

France the 17.8%. The low degree of ICT dissemination (which regards public administration, business sector and households) affects its emergence and has significant impact on the productivity of the country. Digital innovation is often claimed as the driving force of the country's economic growth. However, public support in favour of digital technologies spreading is often missing. A major change is now expected with the launch of the E-government 2012 plan that, starting from an intervention for ICT diffusion in public administration, should act as a major instrument to stimulate economic recovery.

**Exhibit 2: European Innovation Scoreboard: country pages**



	2001	2002	2003	2004	2005	2006	2007	2008	Growth
<b>SII</b>				0,314	0,320	0,343	0,361	0,354	1,8%
<b>ENABLERS</b>									5,5%
<b>Human resources</b>									7,2%
1.1.1 S&E and SSH graduates	20,1	22,9	26,9	33,3	40,7	32,1	--	--	8,8%
1.2.2 S&E and SSH doctorate graduates	0,31	0,39	0,59	0,77	0,89	--	--	--	22,7%
1.1.3 Tertiary education	--	--	--	11,4	12,2	12,9	13,6	--	4,5%
1.1.4 Life-long learning	--	--	--	6,3	5,8	6,1	6,2	--	-0,4%
1.1.5 Youth education	67,9	69,6	71,0	73,4	73,6	75,5	76,3	--	1,8%
<b>Finance and support</b>									3,5%
1.2.1 Public R&D expenditures	--	--	--	--	0,52	--	--	--	0,0%
1.2.2 Venture capital (3-year average)	--	--	0,071	0,050	0,044	0,062	0,050	--	-8,2%
1.2.3 Private credit	0,80	0,82	0,86	0,87	0,92	0,98	1,06	--	5,3%
1.2.4 Broadband access by firms	--	--	31,0	23,0	57,0	70,0	76,0	--	18,6%
<b>FIRM ACTIVITIES</b>									1,1%
<b>Firm investments</b>									0,0%
2.1.1 Business R&D expenditures	0,53	0,54	0,52	0,52	0,55	0,54	0,55	--	1,4%
2.1.2 IT expenditures	--	--	--	1,8	1,8	1,7	--	--	-1,4%
2.1.3 Non-R&D innovation expenditures	--	--	--	1,10	--	--	--	--	0,0%
<b>Linkages &amp; entrepreneurship</b>									0,4%
2.2.1 SMEs innovating in-house	--	--	--	28,1	--	--	--	--	0,0%
2.2.2 Innovative SMEs collaborating with others	--	--	--	4,3	--	4,3	--	--	-0,3%
2.2.3 Firm renewal (SMEs entries + exits)	2,4	2,3	2,2	2,3	--	--	--	--	-1,7%
2.2.4 Public-private co-publications (2-year avg.)	--	13,1	13,2	13,5	16,0	17,2	--	--	3,4%
<b>Throughputs</b>									2,7%
2.3.1 EPO patents	69,4	72,7	74,9	78,6	76,1	--	--	--	1,1%
2.3.2 Community trademarks	62,7	65,1	84,3	82,8	80,1	105,2	120,0	--	4,7%
2.3.3 Community designs	--	--	100,7	143,6	178,7	180,6	184,2	--	3,2%
2.3.4 Technology Balance of Payments flows	--	0,15	0,15	0,15	0,17	0,16	--	--	1,8%
<b>OUTPUTS</b>									-1,2%
<b>Innovators</b>									-0,4%
3.1.1 Product/process innovators (SMEs)	--	--	--	34,8	--	33,0	--	--	-1,3%
3.1.2 Marketing/organisational innovators (SMEs)	--	--	--	37,5	--	--	--	--	--
3.1.3 Resource efficiency innovators									
3.1.3a Reduced labour costs	--	--	--	18,1	--	--	--	--	--
3.1.3b Reduced use of materials and energy	--	--	--	4,4	--	--	--	--	--
<b>Economic effects</b>									-1,6%
3.2.1 Employment in medium-high/high-tech manuf.	7,43	7,37	7,43	7,47	7,37	7,59	7,59	--	0,5%
3.2.2 Employment in knowledge-intensive services	12,36	12,85	12,88	14,88	15,13	15,25	15,57	--	4,9%
3.2.3 Medium/high-tech manufacturing exports	--	50,9	50,6	51,1	51,1	51,1	--	--	0,1%
3.2.4 Knowledge-intensive services exports	--	--	--	--	--	--	--	--	--
3.2.5 New-to-market sales	--	--	--	6,3	--	4,5	--	--	-7,8%
3.2.6 New-to-firm sales	--	--	--	5,6	--	4,5	--	--	-5,3%

## 1.3 Identified Challenges

Three critical areas within the Italian Innovation System have been identified:

1. innovation-friendly environment
2. human capital
3. innovation financing

In practical terms the creation of an innovation friendly environment means acting on four main fronts:

1. Increasing the amount of funds (both public and private) allocated to R&D activities: the Italian government still devotes an insufficient amount of public funds to sustain research and development. The latest value recorded by the EIS indicators for Public R&D expenditure is 0.52, below the average of EU-27. Also the amount of private funding is well below EU-27 average as shown by the indicator for Business R&D expenditure (0.55).
2. Reinforcing and rationalising the incentive system to foster R&D and innovation within SMEs, as the lack of R&D and innovation within SMEs (that represent 98% of the Italian industrial fabric) is one of the reasons often cited for the drop in competitiveness of the Italian industry. If even in 'normal' economic conditions SMEs need specific policies and programmes, in times of crisis they become even more vulnerable (<sup>18</sup>).

<sup>18</sup> This is due to the following reasons: (1) it is more difficult for them to downsize, as they are already small, (2) they are less diversified in their economic activities, (3) they have a weaker financial structure (lower capitalisation), (4) they have lower or no credit rating, (5) they are heavily dependent on credit, and (6) they have fewer financing options. Source OECD (2009).

3. Improving the existing technology transfer mechanisms to reduce the existing gap between research and the market.
4. Establishing a system based on meritocracy, ensuring that the resources are efficiently allocated and that the 'best' (firms, researchers, projects, universities) receive the (scarce) resources.

The educational attainment of the population is another area where Italy is performing badly as shown by the EIS indicators. Also the survey 'System Innovation 2008' <sup>(19)</sup> states that the most critical area for the country is that of 'Human Capital' <sup>(20)</sup> where Italy ranks in the last position in an international comparison with 19 countries. Finally, limited access to funds is another key challenge for Italian firms (aggravated by the current financial crisis). According to the World Bank statistics <sup>(21)</sup>, Italy has the lowest index of credit access facility together with Portugal, Greece and Russia.

From the areas mentioned above three main challenges can be extracted. The selection of these specific challenges has been made on the basis of several indicators (EIS, OECD, IMD), national policy debates, and publications as well as on the basis of the considerations and judgment of the country correspondents. According to the latter, the challenges described below need to be urgently addressed:

1. Innovation financing (especially venture capital). Shortage of finance both from public and private sources has been recognised as one of the main factors that hinder innovation. If firms' limited access to funds has always been a key challenge for the Italian system, the financial crisis and the credit crunch have exacerbated this difficulty. According to the Bank of Italy <sup>(22)</sup>, borrowing by enterprises, especially by SMEs, slowed down in the last quarter of 2008. Moreover, borrowing costs rose significantly, especially for riskier loans. A tightening of credit conditions occurred since October 2008 <sup>(23)</sup> and the percentage of firms that did not receive a favourable answer to their loan request also rose significantly. Despite the measures adopted to ease the crisis, the stress on credit tightening is expected to continue. The reforms that would be needed in the banking sector to assess the viability of innovative projects and combine the current rating methods with forms of technological rating to allow greater scope for solutions in which banks share the risks with innovative firms, might be delayed due to the current credit-crunch crisis, putting more obstacles to financing innovative projects.

The 2008 study carried out by EVCA and KPMG <sup>(24)</sup> to evaluate the tax and legal frameworks for private equity and venture capital across European countries revealed that over the past five years the Italian tax and legal environment for private equity and venture capital has gradually improved as shown by the country's composite score, which has changed from 1.96 in 2003 to 1.86 in 2004 and to 1.72 in 2006 <sup>(25)</sup>, falling again in 2008 to the same level as in 2003 (1.96). The tax and legal environment in the country has thus worsened significantly since 2006, below the European average of 1.85. The report states that the situation for investee companies is unfavourable, in particular with regard to company incentivisation. Also retaining talent (linked as well to the 2<sup>nd</sup> challenge) in investee companies remains rather difficult in the country, particularly due to the unfavourable taxation of personal income, stock options and carried interest.

However, regardless of this negative scenario, venture capital is starting to grow. Despite the still scarce availability of venture capital funding (EIS 2008 indicator of venture capital 0.050)

<sup>19</sup> Rapporto Innovazione di sistema 2008, Fondazione Rosselli and *Corriere della Sera*.

<sup>20</sup> 'Human capital' is made of the following indicators: Expenditure on education, population with higher education, number of researchers and brain drain.

<sup>21</sup> World Bank, *Doing Business in 2009*.

<sup>22</sup> *Economic Bulletin No 55*, January 2009.

<sup>23</sup> As seen from lending fees, size, contractual clauses and maturity.

<sup>24</sup> EVCA & KPMG (2006 and 2008): Benchmarking study: better tax and legal initiatives needed to support entrepreneurs in private equity and venture capital environment in Europe.

<sup>25</sup> Composite index in the EVCA & KPMG study: 1=more favourable / 3=less favourable. Average index = 1.84.

(<sup>26</sup>) and very low indicators and positions in international rankings and comparisons, the market has started to show some interesting and unexpected signs of change. OECD estimates (2007) showed that in Italy, available venture capital funds were 0.031% of GDP (still very far from countries like Denmark, Sweden or UK where this value is around 0.3% – 0.4%) but the percentage has improved in the last year as the OECD estimates 2008 have recorded a value of 0.067% of GDP (<sup>27</sup>). The OECD Science Technology & Industry Scoreboard 2007 ranked Italy in the 17<sup>th</sup> position (out of 19<sup>th</sup>) in terms of availability of venture capital funds as a percentage of the GDP and in 2008 there has been an improvement from the 17<sup>th</sup> to the 12<sup>th</sup> position. Although the size of the market in absolute value is rather small, the years 2006, 2007 and 2008 have registered the highest values over the past five years. Data from the Italian private equity and venture capital association, AIFI, recorded a total of 292 operations amounting to EUR 3.7 billion invested in 2006, an increase of 22% with respect to the previous year. More than 300 investment operations and almost EUR 4.2 billion invested in 2007 (a growth rate of 12.5% with respect to 2006) and 170 operations amounting to EUR 2.2 billion only in the first semester of 2008 (which is an important figure given the economic and financial difficulties brought about by the crisis in 2008)<sup>28</sup>.

A major drawback remains in the fact that the institutions/actors that support the creation of new firms, although numerous, are often fragmented. Universities, technology parks, incubators, business angels and venture capitalists operate in separate contexts, following their own specific criteria and with low levels of communication. The consequence is that with the current situation it is difficult for example for a venture capitalist to be aware of the investment opportunities offered in the market. Another weakness is that most of the VC initiatives have a local/regional dimension and this fragmentation is an impediment for achieving systemic objectives and reaching a critical mass of funds necessary to stimulate real growth in the number of operators or in the quantity of funds available in the market.

2. Mobility of talents (<sup>29</sup>). The outflow of young researchers, professionals and university graduates may represent a serious and strong obstacle to innovation in coming years as the brightest in human resources are moving away, taking with them high levels of skills and know-how. The country is not appealing either to foreign students (graduates and post-graduates) as shown by the low percentages of foreign students enrolled in the university system. Despite an improvement since the year 2000, in 2006 the percentage of foreign students that obtained a university degree in Italy was only 1.7% and less than 20% of these earn a degree in the areas of science and technology, which confirms the weak attraction of the Italian system, especially regarding the disciplines that are most important for innovation. Also at post-graduate level (Master and Ph.D) the percentage of foreign students is relatively low (5.7% at Master level and 3% at doctorate level in 2005) (<sup>30</sup>). Despite this negative situation at national level, at regional level there are some well-known areas like Trieste with first-rate centres such as the International Centre of Theoretical Physics (ICTP), International School for Advanced Studies (SISSA), Area Science Park, etc. that attract foreign researchers and scientists from all over the world. However, in this case the problem is not the degree of attraction but bureaucratic troubles that delay the entry of foreign nationals into the country, creating not only difficulties among scientists but also and most importantly, holding back research activity.

<sup>26</sup> VC indicator (as a % of GDP) 3-year average: 0.050, a very low with respect to the EU average and far below other European countries such as Sweden (0.28), Finland (0.16) or UK (0.48).

<sup>27</sup> Sources: OECD Science Technology and Industry Scoreboard 2007 & 2008, in *Rapporto Innovazione di Sistema 2007 & 2008*. Fondazione Rosselli and *Corriere della Sera*.

<sup>28</sup> Another sign of improvement concerns the tax and legal environment for private equity and venture capital: a study carried out by EVCA and KPMG in 2006 to evaluate the tax and legal frameworks for private equity and venture capital across European countries revealed that over the past four years the Italian tax and legal environment for private equity and venture capital has gradually improved as shown by the country's composite score, which has changed from 1.96 in 2003 and 1.86 in 2004 to 1.72 in 2006.

<sup>29</sup> Mobility of talents refers to the flow of university graduates, researchers, scientists and high-skilled human capital to and from the country. Talent flows account for the 'brain drain' as well as for the 'brain gain' phenomena. The degree of retention and attraction of skilled human capital are important indicators of the efficiency of educational and labour market systems of the country.

<sup>30</sup> Source: Cotec 2008 *Rapporto annuale sull'innovazione*.

As for the brain drain, it is worth noting that the phenomenon is receiving increasing attention in public debates and in the Italian press. However, despite this interest, there are no accurate officially registered data at national level on the number of researchers that go abroad. It is also frequent to find discordant estimates published in the national press<sup>(31)</sup>. Data from the World Competitiveness Yearbook for the years 2007 & 2008 show that, out of a sample of 19 countries, the brain drain phenomenon has the highest incidence in Italy (only followed by Russia, in the last position of the ranking). The causes of the brain drain phenomenon can be found in the lack of a meritocratic culture that pervades the Italian system, the scarce research opportunities in the country, the low pay received by researchers and the difficulties found by young people to enter in the labour market<sup>(32)</sup>. A recent survey (2009) carried out by Manpower in 27 countries interviewing more than 30 000 workers and entrepreneurs has revealed that 42% of Italian entrepreneurs are worried about the mobility of talents that leave the country and go abroad in search for better job opportunities and 87% have declared that the existing legislative framework does not make the country attractive. According to Almalaurea<sup>(33)</sup> the number of young graduates who leave the country is rising and the percentage in the last year has increased from 3% to 4% totalling 5 000 people. Also Almalaurea in its *XI Report on Occupation of Young Graduates*<sup>(34)</sup> shows that the crisis is having a negative effect on graduates since in the first months of 2009 the request of firms for graduates has decreased by 23%. Also the most demanded degrees (engineering and economic-statistics) are suffering from the downturn (a decrease in demand of 35% and 24% respectively). The report also highlights the urgent need – especially in times of crisis – to guarantee SME access not only to credit but also to young, bright graduates to avoid a brain drain of greater dimensions.

3. Improvement of technology transfer mechanisms. Technology transfer processes should be further promoted since one of the flaws of the Italian system is its difficulty in generating innovation from knowledge and research inputs. An index developed by IMD to measure the efficiency of technology transfer between university and enterprises shows very low levels for Italy (3.60 whereas the same index for countries like Denmark, Finland, Germany, Sweden or the US is around 6.00-6.69). As a consequence, out of 19 countries, Italy is placed in the 17<sup>th</sup> position followed only by Portugal and Russia. The same index in 2008 has improved slightly (3.74) but keeping the same position at 17<sup>th</sup>, now followed by Greece and Russia<sup>(35)</sup>.

The results published in the latest survey (January 2009) carried out by Netval – the Italian network for strengthening university research<sup>(36)</sup> – shows that the technology transfer system put in motion by the university system in 2002 has started to exhibit some progress, albeit slowly. In particular, 90% of universities now have a technology transfer office, while the number and the qualification of the personnel working in the technology transfer offices has increased, with the average budget amounting to 20 million per university (+50% with respect to 2002). Although most of the measures adopted by the universities to support technology transfer are still based on the protection of intellectual property and creation of spin-offs<sup>(37)</sup>,

<sup>31</sup> Using data from the OECD, Beltrame (2007) estimated that in 2005, 294 767 university graduates have left the country. According to *La stampa* in an article of 11/2/2008 'In fuga dall'universita' the percentage of university graduates leaving the country in search of a brighter future is now running at some 4% of the total. In an article published in *La Repubblica* (10/05/06) 30 000 Italian researchers leave the country every year according to the Dean of the Turin Polytechnic.

<sup>32</sup> The Italian labour market exhibits a combination of institutions and traditions that protect those who already have a job and harm those who are looking for a job (lack of competitiveness and transparency in hiring practices). These features are present also for the highly skilled segment of the labour market.

<sup>33</sup> AlmaLaurea: set up in 1994 following an initiative of the Statistical Observatory of the University of Bologna. It is now run by a consortium of Italian universities with the support of the Ministry of Education, University and Research with the aim to be a reference point for everyone who deals with issues like academic studies, employment and youth conditions.

<sup>34</sup> *XI Rapporto sull'occupazione dei neo-dottori*, Almalaurea (2009)

<sup>35</sup> Source: *System Innovation 2007 & 2008* carried out by Foundation Rosselli and *Corriere della Sera* using survey data from IMD, World Competitiveness Yearbook 2007 & 2008.

<sup>36</sup> La valorizzazione della ricerca nelle università italiane. *Sesto rapporto annuale Netval* (January 2009)

<sup>37</sup> In 2007, 97 new spin-offs have been created by the Italian universities (the number in 2002 was 8 and in 2005 and 2006, 70).

the percentage of universities that have research contracts with enterprises has increased from 67% in 2004 to 77% in 2007, a sign of improved ability to collaborate with industry. The EIS indicators also show poor performance of Italy in the international comparison; the indicators 'innovative SMEs collaborating with others' and 'public-private co-publications' show values that are half of the EU-27 average, exhibiting a persisting difficulty of the Italian SME system to activate efficient exchange processes for acquiring new technologies and developing new applications. Also the indicator for EPO patents is below the EU average. Positive figures are however recorded for Community trademarks and designs, which register indicators around the EU average for trademarks or above the EU average for designs. This is a sign of the traditional leadership in the 'made-in-Italy' sectors where design, creativity and invention have contributed to the consolidation of Italian products in international markets.

With respect to challenges concerning innovation identified in the National Lisbon Reform programme, the Italian National Reform Programme (NRP) explicitly cites among its priorities the promotion of scientific research and technological innovation and the reinforcement of education and training. In particular, the importance of technology transfer as one of the most important tools for achieving economic growth in the long-term and the need to strengthen networks of relations and cooperation between universities, laboratories and enterprises have been significantly emphasised in the document. The NRP foresees several interventions to encourage technology transfer such as the implementation of the technology districts and industrial innovation projects foreseen in Industria 2015. The question of mobility of talents, although mentioned in the NRP – one of the actions envisaged in the reform of the university system foresees 'empowering support for university internationalisation programmes, which contemplate mobility of students, teachers, Ph.D candidates and research grant-holders' – is not one of the central issues of the reform of the education and training systems. A specific measure on brain drain (fiscal incentives to attract Italian researchers living abroad) can be found however in the anti-crisis decree of November 2008. The issue of innovation and financing is also mentioned in the NRP, which contemplates the need to 'rationalise, coordinate and update market-oriented venture capital instruments' and to create a fund for investment in risk capital of high-tech enterprises. The NRP 2008-10 also foresees the creation of a Fund for Enterprise Financing to promote investments in the risk capital of SMEs whose implementation is still pending. In sum, out of the three challenges, technology transfer is the one that has received more attention in the National Reform Programme.

### Exhibit 3: Main innovation policy challenges

Description of challenge	Relevant indicators and trends
1. Innovation financing (especially venture capital)	<ul style="list-style-type: none"> <li>EIS- venture capital (very low level; downward trend from 2003 to 2005, slight recovery in 2006, decrease in 2005)</li> <li>Venture capital market in value and number of operations (very low levels but positive increases since 2006) (AIFI)</li> <li>Availability of VC funds (% of GDP) (very low levels, since 2005 but improvement in the last year) (OECD STI Scoreboard 2007 &amp; 2008)</li> <li>Composite index tax and legal environment for private equity and venture capital (gradually improved from 2003 to 2006, but fell again to 2003 levels in 2008) (EVCA-KPMG)</li> </ul>
2. Mobility of talents	<ul style="list-style-type: none"> <li>Number of foreign students in the Italian university system (graduate and post-graduate). Growing since 2000 but still low numbers (Statistics from Ministry of University and Research)</li> <li>Number of researchers/scientists abroad (no precise estimates).</li> <li>Incidence of the brain drain phenomenon. Data for 2006, 2007 and 2008 reveals high incidence. IMD World Competitiveness Yearbook 2007 and 2008</li> </ul>
3. Improvement of technology transfer mechanisms	<ul style="list-style-type: none"> <li>Index of TT efficiency between University and enterprises (Data for 2006, 2007 and 2008 available. Very low levels for Italy. Slight improvement from 2006 to 2008) (IMD World Competitiveness Yearbook 2007 and 2008)</li> <li>EIS indicators: Innovative SMEs collaborating with others (very low level. Data only available for 2004 and 2006).</li> <li>Registration of EPO patents (values below the EU average but improving since 2001). Community trademarks and Community designs (high levels, upward trend)</li> </ul>

## 2. Public Support to Innovation

### 2.1 Main objectives for innovation policy

The main innovation policy priorities and lines of action followed by the current government can be summarised in the following points:

- Modernise and digitalise of the public administration. For the current government innovation is strongly linked to innovation in public administration sector (see e-government 2012 below).
- Intensify cooperation and favour the creation of public-private partnerships to carry out 'big' research and innovation projects (e.g. the industrial innovation projects of Industria 2015; the public-private laboratories foreseen in the National Research Plan).
- Create clusters in order to reach critical mass, especially at regional level, taking advantage of the existing regional competences and 'excellences' (e.g. technological districts, high technology poles, centres of competence).
- Re-launch R&D investments in the energy sector.

R&D policy objectives at national level are formally outlined in a 'National Research Plan', in which the strategic lines of action are illustrated in detail. The next National Research Plan for 2008-10 is expected by autumn 2009. These objectives are complemented and reinforced in other documents such as the National Reform Programme, Industria 2015 and the recently approved e-government plan 2012, as well as the research plan for the energy sector.

The National Research Plan for the years 2005-07 foresaw three main lines of action:

1. reinforcing the scientific base of the country, looking for excellence, merit, internationalisation, economic growth and strengthening human capital,
2. strengthening the technological level of the Italian productive system to maintain competitiveness, focusing on 10 strategic industrial research programmes involving also the participation of universities and research centres,
3. supporting active participation in EU programmes and international agreements.

The new National Research Plan containing the main strategic priorities for the country, accompanied by instruments, programmes and measures to achieve the goals set, should be finalised and published by autumn 2009. In order to draft the plan, 16 technical committees (*tavoli tecnici*) have been established. The first thirteen are sectoral committees (e.g. ICT, energy, health, environment, aerospace, etc.). In addition, one committee deals with technology platforms, clusters and districts, while another is about technology transfer and public-private partnerships and the last one deals with research governance issues.

National Reform Programme: Approved on 14 October 2005, the National Reform Programme (NRP) foresaw five strategic policy objectives<sup>(38)</sup> of which priority No 2 was specifically dedicated to the promotion of research and innovation. The 2005 NRP, the update on progress reports (2006 and 2007) and the latest 2008-10 NRP contain interesting measures for the Italian system such as tax credits to encourage R&D and business cooperation with research institutions, tax exemptions for high-growth enterprises and the launch of Industrial Innovation Projects, amongst others<sup>(39)</sup>.

<sup>38</sup> 1) extending the area of free choice for citizens and companies; (2) granting incentives for scientific research and technological innovation; (3) strengthening education and training; (4) upgrading infrastructure and (5) protecting the environment. These priorities have now been complemented with the inclusion of budget-stabilisation and active labour market policies.

<sup>39</sup> *The Lisbon national reform programme and innovation: an appraisal*

Industria 2015: Industrial innovation programme launched in September 2006 by the former Ministry of Economic Development. The most important line of action of Industria 2015 is the enhancement of the competitiveness of the productive system through the implementation of Industrial Innovation Projects (big industrial projects in strategic technology areas) to promote the creation of partnerships among universities, research centres and enterprises. Three industrial innovation projects in the field of energy efficiency, sustainable mobility and new technologies for the 'made-in-Italy' sectors are already under way whereas two other projects on cultural heritage and life-science technologies are expected soon. The current government has declared its intention to continue with these types of projects and to expand the choice to other strategic areas in the near future.

e-government 2012 Plan: Launched in January 2009 with the declared to remedy the accumulated delay with respect to the implementation of the Lisbon strategy by modernising public administration. The e-government 2012 plan is expected to generate important savings (circa EUR 40 billion in 4-5 years) from the increase in productivity in the public sector, to reduce the public administration's administrative burden, and to encourage growth. Potentially the plan can combat the crisis and stimulate a virtuous circle through the creation of a qualified demand for advanced technological infrastructure and innovation in ICT.

Research Plan in the energy sector (2009-11): the plan launched by the Ministry of Economic Development in March 2009 foresees the allocation of funds (EUR 210 million) to boost research and innovation in the energy sector. The resources will be allocated to research centres and universities in order to strengthen research in the fields of production, rationing and savings of electricity, nuclear energy and environment protection.

It is also worth mentioning the regional policy planning document, i.e. the National Strategic Framework (2007-13), which aims to implement a unified policy scheme at country level, pulling together structural funds, national funds for underdeveloped areas and other regional resources for local development. A significant contribution to the growth of spending on research is coming from the National Strategic Framework, which has allocated more than EUR 20 billion to research and innovation.

#### Exhibit 4: Main innovation policy documents

Title of document (in English)	Date (of approval, publication, etc.)	Organisation responsible (Ministry, etc.)	Legal status (Law, Government Decision, strategy (white paper, action plan, etc.)
National Research Plan 2005-07	2004	Ministry of University and Research	National Plan
Industry 2015	2006	Ministry for Economic Development	National Plan
National Reform Programme and up-date on progress reports	2005	CIACE (Inter-Ministerial Committee for EU Affairs)	National Plan
e-government 2012	2009	Ministry for Public Administration and Innovation	National Plan
Research Plan in the energy sector 2009-11	2009	Ministry for Economic Development	National Plan
National Strategic Framework (2007-11)	2007	Ministry for Economic Development	Regional Plan

## 2.2 Innovation governance system

The Italian governance system has been characterised by the presence of many policymaking entities that are sometimes fragmented and uncoordinated. A key priority of innovation policy in Italy is to hold a strong strategic vision both at national and regional level, and a clear perspective to ensure long-term planning and long-standing impact results.

Although in recent years policies have been more geared towards the recovery of the national accounts than to the promotion of innovation, since 2006 there is a clearer political willingness to establish a new research and innovation policy framework. The first attempt to break with the previous regime came with Prodi's government in 2006 which tried to give a new direction to the system both in terms of governance and policy instruments <sup>(40)</sup>. In more detail (see also past reports for more in-depth information) the government tried to:

1. overcome the 'rivalry' between the Ministry of Economic Development and the Ministry for Universities and Research, assigning clearer directives to the latter and include it in the Inter-ministerial Committee for economic planning, while conferring the leadership in innovation policy to the former,
2. reform the Ministry of Economic Development and strengthen the role of IPI (Institute for Industrial Promotion),
3. strengthen collaboration and coordination among the several ministries involved in R&D and innovation,
4. establish ANVUR, an agency to evaluate the results of the research activities carried out by universities and research centres,
5. establish the National Innovation Agency to evaluate the innovation projects included in Industria 2015.

The current government is largely concentrated on innovation with respect to the modernisation of the public administration through the introduction of ICT. It has launched the e-government 2012 plan and continues with the implementation of the industrial innovation projects of Industria 2015. It has also reorganised the Ministry for Public Administration and Innovation with its two departments (department for Public Function, and Digitalisation and Technological Innovation).

The government has reunified the Ministry for Education, University and Research, and launched a thorough reform of the education system. For the first time in Italy, the Ministry has decided to assign a part of the funds <sup>(41)</sup> destined to universities according to the results obtained in terms of quality of research and quality of teaching. This represents a first step towards the evaluation of results and the establishment of a meritocratic system.

A novelty with respect to the past refers to the upcoming National Research Plan which has been drafted taking into account the views of all stakeholders (i.e. ministries, industrial associations, regions) and which will concentrate on chosen strategic priorities trying to create a 'unified system' to avoid acting in many fronts.

At the time of writing, the government announced that the establishment of ANVUR is in the pipeline and its role – somewhat modified with respect to the previous legislature – will be to evaluate the quality of research using international criteria to allocate funds on the basis of the performance obtained.

Finally, as a consequence of the financial crisis, the government has set up several committees to deal with specific issues that are of concern to the Italian system <sup>(42)</sup>. The issue of innovation is dealt with in a committee that is also concerned with energy and the environment (*Tavolo sull'energia, l'innovazione e l'ambiente*). Another interesting committee is the SMEs one <sup>(43)</sup>, specifically created to enact the Small Business Act and to present practical measures of immediate action to combat the crisis (e.g. the guarantee fund for SMEs).

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<sup>40</sup> This refers to the new policy mix based on horizontal and automatic incentives on the one hand (tax credit) and on vertical and selective interventions in key areas considered to be critical for the future of the country – Industria 2015 programme.

<sup>41</sup> Representing 7% of the Ordinary Fund for Universities (EUR 525 million).

<sup>42</sup> Up to now there are seven sectoral committees in the fields of: automotive, chemistry, fashion, ceramics, pharmaceuticals, agrofood, energy, innovation and environment, SMEs, made up of ministries, industry representatives, workers' associations, central/regional administrations etc.

<sup>43</sup> Made up of different Ministers (economic development, economy and finance, public function, environment), regions, chambers of commerce, representative of the banking system, representatives of industry and SMEs, etc.

## 2.2.1 Governmental bodies

The main ministries involved in research and innovation in Italy are the following:

- The Ministry of Economic Development (MSE) <sup>(44)</sup>, in charge of promoting strategic industrial research and innovation and responsible for the management and implementation of several support programmes and funds (e.g. FIT, Riditt, Industria 2015 and industrial innovation projects). The ministry also oversees the research carried out by specialised agencies such as the National Agency for New Technologies, Energy and Environment (ENEA) <sup>(45)</sup>.
- The Ministry of Education, University and Research (MIUR), which is in charge of determining R&D and education policy developing plans for universities and scientific institutions, promoting scientific and technological research, and forging international ties especially in consultation with representative bodies of other EU member states. The MIUR also supervises a large number of research organisations such as the National Research Council (CNR).
- The Ministry for Public Administration and Innovation, whose main mission is the modernisation of public administration through information and communication technologies. The Ministry's main departments are the Department for Public Function and the department for digitalisation and technological innovation.

The Ministry of Economy and Finance (MEF) <sup>(46)</sup> also plays a role in the R&D and innovation system since it is in charge of drafting the Budget Law. Other ministries involved in innovation are the Ministry of Environment and the Ministry of Health. The main science and technology organisations coordinated by these Ministries are the Institute for research and environmental protection (ISPRA) <sup>(47)</sup> and the National Institute of Health (ISS) <sup>(48)</sup> respectively. Since 2006, the Department for EU Policies, through a technical committee called CIACE, has been appointed by the government to give political direction to the Lisbon Strategy and has been in charge of drafting the National Reform Program 2006-2008. Another important organisation of the Italian innovation system is the Inter-ministerial Committee for Economic Planning (CIPE) <sup>(49)</sup>, a high-level committee in charge of coordinating and planning the national economic policy and responsible for the approval of the PNR <sup>(50)</sup> together with the coordination of other research activities and the allocation of funds.

## 2.2.2 Main bodies managing implementation of policies

The bulk of government-sponsored scientific and technological research in Italy is delivered through the CNR and ENEA <sup>(51)</sup>. The CNR was set up in 1923 and has been supervised by the MIUR since 1989. Presently, the CNR has over 100 research institutes and centres all over Italy, most of which are closely connected to universities. The CNR's main objectives are to:

- support scientific and technological research (basic and mission-oriented) through its research establishments and the financing of research carried out by scientific institutes and individual researchers,
- transfer research results to industry, services and government,
- provide advice to the government,
- grant scholarships for training in research.

<sup>44</sup> Former Ministry for Productive Activities (MAP). With the new government, the MAP has become the Ministry for Economic Development (Ministero Sviluppo Economico - MSE).

<sup>45</sup> *Ente per le nuove tecnologie, l'energia e l'ambiente.*

<sup>46</sup> Ministero dell'Economia e delle Finanze.

<sup>47</sup> Istituto Superiore per la protezione e la ricerca ambientale.

<sup>48</sup> Istituto Superiore di Sanità (ISS).

<sup>49</sup> CIPE: Comitato Interministeriale per la Promozione Economica.

<sup>50</sup> PNR: Programma Nazionale della Ricerca.

<sup>51</sup> Other public agencies that perform high-level research are the Italian Space Agency; ASI, the Italian Aerospace Research Centre (CIRA); the National Institute for Nuclear Physics (INFN); and the Italian Institute of Technology (IIT), based in Genoa and established in 2004.

Until 1989 the CNR was in charge of the coordination and the support of public R&D in Italy. In the 1990s its coordination function was progressively moved to the Ministry of Education, Universities and Research. The CNR has been under reform for several years. It was initiated in 2003 to optimise the allocation of resources, simplify the programming and management of research activities and administrative procedures, promote international joint collaborations, valorise research results, strengthen links with the productive system and universities, and evaluate research results. The CNR is mainly funded by the Italian Government, but also receives funds from the EC and other national and international organisations through participation in public R&D projects calls.

The National Agency for new Technologies, Energy and the Environment (ENEA) directly engages in a wide range of research projects, with special emphasis on alternative energy, environment and biotechnology. ENEA's primary mandate is to conduct applied research, which can then be transferred to the Italian industry. It also conducts contract research in some areas (such as material testing) for Italian and foreign organisations. ENEA also promotes and participates in research consortia at both the national and international levels and owns shares in a number of high-tech companies. The major focus of research activity in these consortia and companies is on renewable energy, environmental protection and agri-biotech. ENEA also provides training and technical support to SMEs and start-up companies. Like CNR, ENEA is mainly funded by the Italian Government, but it also receives funds from the EC and other national and international organisations through participation in public R&D project calls.

The IPI-Institute for Industrial Promotion is an in-house body of the Ministry of Economic Development whose objective is to offer technical assistance and support to the Ministry in order to plan and implement programmes and interventions. In particular, it offers support in 'analysing, planning, implementing and assessing policies and interventions to develop, innovate and provide competitiveness in the national production system'.

IPI is involved in the following activities:

- Industrial policies: provide technical advice in the definition and implementation of industrial and commercial policies.
- Incentive instruments and policies: provide technical advice in activities concerning EU co-funded programmes, technical advice in the field of support measures and training experts in SME support measures,
- Technology transfer networks: offer technical support for the implementation of a network of intermediaries in the Italian production system, in technology transfer to the benefit of SMEs, and promote and realise an international interconnection system among national and regional networks for technology transfer.
- Multilateral and bilateral international cooperation efforts: give support and technical advice to the Administrations in the field of consultation, design and implementation of multilateral cooperation programmes and initiatives promoted by the EU, OECD, UN and other international organisations, including technical assistance to the governments of partner countries to plan and realise industrial development programmes as well as technical advice to the Regions in the design and implementation of industrial cooperation programmes.

Since 2007 IPI also supports the Ministry in monitoring and evaluation activities through a specific department with the mission to evaluate – *ex ante*, *in itinere*, and *ex post* – the support instruments managed by the Ministry of Economic Development. Invitalia, the inward investment agency entrusted by the Italian government also offers technical assistance and support to boost innovation and local industrial development and to upgrade local competitiveness.

At regional level, there is no unique model to manage and implement innovation policy, as regions have some discretionary power in this field. Many regions have created Regional Innovation Agencies with the role to fund and implement innovation policy measures. Others have specific departments for innovation, or in some cases innovation is dealt with within departments that have a broader scope (e.g. economic development), where innovation policy might be less decisive.

Another important body recently operative is the National Innovation Agency, based in Milan. It will be in charge of promoting innovation in the country, as well as carrying out studies, statistics and forecasting. It will also be an instrument for the transfer of know-how from universities and PROs to public and private actors, also through training and IP assistance. In addition, the agency will be responsible for the evaluation of innovation projects.

Apart from the public organisations cited above, innovation policy is also influenced by other institutional actors, for example Confindustria – the leading organisation representing the manufacturing and service industries, which has played an important role in articulating and presenting concrete proposals to the government to reinforce and promote research and innovation in the country (<sup>52</sup>).

## 2.3 Public funding to innovation

### 2.3.1 Review of the current range of support measures for innovation

The Italian Innovation Policy Support Fact-sheet containing TrendChart and ERAWATCH policy measures reveal that the majority of support measures are concentrated in the Research and Technologies category (<sup>53</sup>), in particular under the following sub-categories:

- 2.3.1 Direct support of business R&D (grants and loans) with 32% of the total policy measures,
- 2.2.3 R&D cooperation (joint projects, PPP with research institutes), with the same share as the previous one (32%),
- 2.1.1 Policy measures concerning excellence, relevance and management of research in Universities (24%),
- 2.1.2 Public Research Organisations (16%),
- 2.1.4 Research Infrastructures (12%).

In the category Governance and Horizontal research and innovation policies, subcategory 1.2.2 Innovation strategies accounts for 28% of policy measures, while 1.2.1 Strategic research policies and 1.3.1 Cluster framework policies account for 20%. Some measures are meant to sustain the creation and growth of innovative enterprises, especially under two sub-categories: 4.1.1 Support to sectoral innovation in manufacturing with 16% of the total, and Support to innovative start-ups including gazelles, which accounts for 12%. The policy measures under Human Resources and Markets and innovation culture account for less than 10% and 5% respectively.

Direct public support to companies through grants and loans has been the traditional approach to finance research and innovation activities. Although still prevailing, the system has changed since 2006 with the reform of the public incentive system which introduced private banks to the scene to allow for a transition from capital subsidies to a system which hinges on risk-taking by banks. The reform consisted of the introduction of grants plus loans at low interest rates plus loans at market interest rates to be given by the private banks. The novelty of the reform was the presence of private banks and the need to comply with the conditions applied by the private banking sector in order to obtain the loan. Failure to comply with these requirements also implied automatic exclusion to opt for public grants.

With this measure, the government was trying not only to involve the private banking sector in the financing of innovation, but also to implement a system based on merit (*merito creditizio*) to avoid the

<sup>52</sup> Moreover, every year since 2004 Confindustria organises 'the day of innovation', which is the institutional aspect of a much broader initiative launched by Confindustria in 2004 called 'Enterprises for Innovation'. Within this framework, seminars, workshops, training courses and awareness raising activities aimed at Italian managers and entrepreneurs are organised throughout the country to raise awareness of innovation management and organisational solutions that reinforce the competitiveness of the Italian firms.

<sup>53</sup> Note that percentages have been calculated allowing for multiple choice in the sub-categories.

misallocation of public funds (<sup>54</sup>). Although in terms of number of measures, with one third allocated under this category, the percentage of the total estimated budget is somehow low (12%). An explanation is the fragmentation and dispersion that have long characterised the public incentive system, based on many measures but of small size (launch of several calls with relatively small budgets). This trend is now changing and efforts are directed to concentrate the resources to finance 'big' projects on specific key strategic areas/sectors (e.g. industrial innovation projects). In recent years, the system has witnessed a shift from direct support mechanisms based on grants and loans to indirect support, mostly based on tax incentives to R&D (see IT 93).

Measures to improve R&D cooperation between public/academic sector research institutions and enterprises under category 2.2.3 R&D cooperation (joint projects, public-private partnerships with research institutes) are also numerous. In recent years there has been clear policy orientation towards the intensification of links between research and industry, reflected in the number of support measures that foresee such collaboration. Participation of public research organisations (PROs) is almost a compulsory requirement in the majority of the call for tenders launched. In other measures, such as tax incentives on R&D, incentives/benefits are becoming more favourable with the involvement and/or participation of PROs.

The Italian system has traditionally supported public research, with universities and public research centres/organisations being the main beneficiaries of public funding. Several specific funds have been created such as FIRB, FISR, COFIN, FAR (<sup>55</sup>). Public support to universities and research centres has created many excellent initiatives in the country although these institutions have not managed to establish links with the industry, and the research carried out in these organisations does not always satisfy the demands of the industry. The university system has been often accused of being self-referential and closed to the market.

Measures to promote entrepreneurship and the creation and growth of innovative enterprises are rather limited. The scarce number of measures in the Human Resources category reveals the low level of attention that education and skills receive in the Italian system (fiscal incentives have been introduced only recently to encourage the recruitment of researchers by firms and to avoid brain drain).

Although in the category Markets and innovation culture the number of measures is also very limited, there have several activities such as workshops and conferences. Examples include the Innovation Forum organised by IDC, the Innovation Day organised by Confindustria, and the Research to Business (R2B) expo organised by Emilia Romagna region (<sup>56</sup>), which have all become regular annual appointments, showing increased interest in innovation topics. Another means to promote innovation has been through the launch of prizes (National Innovation Award, regional innovation prizes), as well as the organisation of 'Innovation weeks' (e.g. Apulia, Sicily, Friuli) and new measures that have just been introduced to support/reinforce IPR.

The analysis of the policy measures contained in the database also shows that in general the measures do not target specific research or technology fields. They are for the most part broad-spectrum. Although this has been so in the past, recent developments are reversing this trend and now efforts and resources tend to be concentrated in key specific strategic sectors (e.g. energy, transport/mobility, health, technologies for the made-in-Italy, ICT, materials). The target group of the support measures are predominantly firms of all sizes (68%) and higher education institutions/

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<sup>54</sup> Although a thorough systematic evaluation to assess the impact of the reform is not available yet, an evaluation carried out in 2007 to assess the effectiveness of Law 488/92 (which finances many types of investments, including R&D) revealed that with the reform, SMEs and micro-enterprises have had the opportunity to access funds to finance innovation reduced, as the requirements/conditions imposed by the private banks cannot be easily fulfilled by these type of enterprises.

<sup>55</sup> FIRB (Basic Research Investment Fund), FISR (Special Integrative Fund for Research), COFIN (Fund for the co-financing of research activities), FAR (Fund for the promotion of research).

<sup>56</sup> R2B: Research to Business is an initiative launched by the Emilia Romagna region since 2005 to favour the collaboration between research and industry both at national and international level. It is organised as a fair (expo-forum) lasting 2-3 days with events, workshops, meetings etc. to attract researchers, scientists and firms.

research centres (52%). Only 12% of the total number of support measures is specifically targeted to SMEs (in EU-27 the percentage is almost double).

In a productive system characterised by the presence of a multitude of SMEs and micro-enterprises (circa 98% of firms) one would expect support measures to be specifically targeted to the needs of these firms. However, most of the current measures that target all firms seem, in many cases, more suitable for larger enterprises. The administrative/bureaucratic burden in terms of eligibility, access conditions, delays in publication of calls, evaluation of proposals and the effective provision of funds to beneficiaries, together with the uncertain continuity of measures, often discourage SMEs from using these instruments.

The main aspects of innovation processes targeted by the measures in the database are awareness-raising amongst firms on innovation (a very general statement included in the ToRs of most call for tenders), applied industrial research, innovation management tools and development/ prototype creation. The promotion of entrepreneurship/start up is only addressed by 4% of the measures.

As for the forms of funding, grants represent the dominant way of funding support measures (64%). This is also true in the EU-27 where the percentage is even higher (72%). As mentioned at the beginning of the section, the reform of the incentive system has recently introduced a scheme consisting of grants plus loans at low interest rates plus loans at market interest rates to be given by private banks. Also automatic incentives have been lately introduced (e.g. tax credit for R&D) following frequent requests of several stakeholders such as Confindustria. Venture capital is scarce (4% in Italy and 5% in EU-27).

Regarding the estimated budget per policy priority it is worth noting that almost 38% of the total budget has been allocated to one priority (in particular to 1.1.1 Strategy policy documents). The elevated budget (EUR 6.2 billion distributed over the period 2007-13) can be attributed to the National Operating Programme-Research and Competitiveness <sup>(57)</sup> which is a framework scheme articulated in several support measures/instruments and calls for tenders addressed to southern regions. Priorities 2.2.3 R&D cooperation, 2.1.1 Policy measures concerning excellence, relevance and management of research in Universities and 2.3.1 Direct support of business R&D represent the largest share of the total estimated annual budget. On the contrary, support to innovative start-ups has a low share, just above 4%.

When comparing the shares of estimated annual budget devoted to a policy priority and the number of support measures supporting this policy priority <sup>(58)</sup>, it can be observed that 12% of the measures in category 4.1.1 Support to sectoral innovation in manufacturing receive less than 4% of the total budget, indicating that despite the importance of the manufacturing sector in the country, measures to support innovation are scarce in terms of financial resources allocated to them. The category 'other' also shows the fragmentation of the support system, characterised by many measures not always properly defined (24%) with very low budgets (2,9%). The sub-categories under priority 2, Research and Technologies are relatively well balanced: R&D cooperation measures which account for 16% in terms of quantity receive the same share in terms of budget. Direct support of business R&D measures, which account for 8% of the measures receive 12% of the budget and Policy measures concerning excellence, relevance and management of research in universities (8% in terms of quantity) receive 13% of the budget.

In absolute figures, the estimated annual volume of public support to research and innovation based on the budgetary data in the fact-sheet amounts to EUR 2.34 billion. Data from the annual report on support instruments from the Ministry of Economic Development <sup>(59)</sup> reveal that the amount allocated to the objective R&D and innovation for national and regional measures during 2003-08 was EUR 14

<sup>57</sup> The NOP is part of the Strategic National Programme concerning Italian regional policies. Its purpose is to promote the competitiveness of the Southern regions (Mezzogiorno) and improve their scientific, technological and economic position.

<sup>58</sup> Only main policy priorities have been taken into account (one priority per measure).

<sup>59</sup> *Ministero dello Sviluppo Economico: Relazione sugli incentivi di sostegno alle attività economiche e produttive* (Giugno 2009)

billion <sup>(60)</sup> (circa EUR 2.33 billion) per year. When the allocated funding is presented year by year, it reveals substantial growth from 2007 to 2008 (from EUR 1.16 billion in 2007 to EUR 3.32 billion in 2008). The introduction of the tax credit for R&D incentive has contributed to this growth.

Having in mind the challenges that the country is facing, the most important innovation policy measures are the tax credit for R&D (IT 93), industrial innovation projects for energy efficiency (IT 94), sustainable mobility (IT 95) and 'made-in-Italy' sectors, the recently launched risk capital fund for SMEs (IT 99), and the brain-return measure. Also in addition, the FIT scheme (Fund for Technological Innovation) is running again <sup>(61)</sup> with a thematic focus, including chemical-REACH (IT 102) and start-ups (IT 109). The most important non-financial innovation policy measures relate to intellectual property. A first attempt to reinforce the patent and IP systems started with the launch of the new Industrial Property code (IT 56), an important piece of legislation for the Italian system since it simplified the procedures for obtaining or transferring industrial property rights. Recently the patent and IP system has been further strengthened (IT 108) through the introduction of the anteriority search/novelty assessment (operative since 1 July 2008) left up to the European Patent Office (EPO). The introduction of this new element has been flanked by other developments <sup>(62)</sup> to ensure the efficiency of the process.

Measures that could have a leverage effect, even though not directly connected to innovation, are the 'Set up a business in one day' included in the e-government 2012 plan, providing a single online point of contact for business to comply with the necessary requirements (registrations, modifications, authorisations, etc.) and the rise in the age of young entrepreneurs (up to 35 years old) together with the elimination of specific categories of beneficiaries, goals and types of intervention to have access to favourable credit conditions.

### 2.3.2 New or modified support measures

The new support measures introduced during the period July 2008 – July 2009 are the following:

**Tax exemption on capital gains from start-ups (IT 100):** This measure is oriented to reinforce the role of private investors, especially business angels. In a national context characterised by scarce funds for innovative SMEs this is an incentive to attract funds to finance new entrepreneurial initiatives. The measure establishes that capital gains are exempted from personal income taxes in compliance with the following: (1) shares are from young companies (no older than seven years), (2) they have been possessed for at least three years and (3) capital gains obtained are reinvested in the next two years on young start ups that operate in the same sector as the first company.

**National Fund for Innovation (IT 101):** This fund is endowed with EUR 60 million and has been created by the Ministry of Economic Development to promote innovative projects based on strengthening and exploitation of industrial property. The Fund's main goal is to support SMEs and to reinforce Italian patents. It will act as an instrument to reduce investment risk for banks and financial intermediaries that participate in the funding/financing of innovative projects based on strengthening and use of patents.

**Incentives for the elimination or reduction of substances of very high concern (IT 102):** The Ministry for Economic Development will finance experimental development projects regarding product or process innovation to reduce or eliminate chemical products/substances defined by the EC as 'of very

<sup>60</sup> National measures: EUR 11.67 billion. Regional measures: EUR 2.36 billion.

<sup>61</sup> The Fund for Technological Innovation has traditionally funded innovation in Italy since the 80s. It was implemented as a horizontal measure covering many sectors. It has been recently modified and currently has a thematic/sectoral nature.

<sup>62</sup> Reinforcement of the Italian Patents and Trademarks Office with the addition of technical examiners; automatic translation of national patents from Italian into English; security of the information flows between the Italian Patents and Trademarks Office and the EPO; change of procedures within the EPO; and availability of Italian patent documentation for feeding the automated translation system.

high concern' under CE 1907/2006 (REACH). Its resources amount to EUR 120 million <sup>(63)</sup>. With the launch of this measure, the intention is to create a positive initiative that will take into account, on the one hand the concern for the protection of health and the environment and, on the other hand, the innovative capacity of the chemical industry.

Risk capital fund for SMEs (IT 99): the Ministry for public administration and innovation has launched the fund for risk capital for the SMEs located in the South of Italy. This is one of the measures included in the e-government 2012 Plan and its objective is to favour the influx of risk capital in the region, as well as in Abruzzo and Molise. The fund – endowed with EUR 160 million <sup>(64)</sup> – will support the creation and development of SMEs involved in investment programmes related to product and process innovation through the use of digital technologies. Since shortage of finance both from public and private sources has been recognised as one of the main factors that hinder innovation in Italy, this measure is an important step towards increasing the availability of venture capital funding.

Strengthening patents and intellectual property (IT 108): The Italian Patents and Trademarks Office coordinates a project for the re-qualification of national patents, thanks to the introduction of the anteriority search/novelty assessment left up to the European Patent Office (EPO). The introduction of this new element has been flanked by other developments to ensure the efficiency of the process, including, reinforcement of the Italian Patents and Trademarks Office with the addition of technical examiners, automatic translation of national patents from Italian into English, security of the information flows between the Italian Patents and Trademarks Office and the EPO, change of procedures within the EPO, and availability of Italian patent documentation for feeding the automated translation system.

'Brain-return' measure: The 'anti-crisis decree' launched by the Italian government last November 2008 foresees the introduction of fiscal incentives to attract Italian researchers living abroad. This measure will try to counteract the brain drain phenomenon, which is posing a serious threat in the Italian R&D system. The measure consists on a tax incentive (10% tax applied to personal income) during the first five years of fiscal residence in Italy as of 10 January 2009.

Funds for research and innovation in the energy sector: the new plan for the research in the energy sector (2009-11) launched by the Italian Ministry of Economic Development has allocated EUR 210 million to research centres and universities to strengthen research in the fields of production, rationalisation and electricity savings, as well as nuclear energy and environmental protection. This measure is expected to have a two-fold objective: boost innovation in the energy sector and contribute to the alleviation of the difficulties posed by the current crisis.

Funds for innovation projects in start-ups (IT 109): with the introduction of this measure, the Ministry for Economic Development finances innovation projects proposed by start-up firms operating in medium and medium-high sectors in the following areas: biotech, ICT, materials, robotics and energy. The funding allocated EUR 55 million to this initiative.

## Exhibit 5: New Innovation Policy Support Measures (since the last report)

IPM N°	Title	Innovation policy framework category	Organisation responsible
IT 100	Tax exemption on capital gains from start-ups	4.3.1 Support to innovative start-ups including gazelles	Italian Revenue Agency (Agenzia delle Entrate)
IT 101	National Fund for Innovation	5.3.2 Consultancy and financial incentives to the use of IPR	Ministry of Economic Development
IT 99	Risk capital fund for SMEs	4.3.2 Support to risk capital	The Ministry for the public administration and innovation
IT 108	Strengthening patents and intellectual property	5.3.1 Measures to raise awareness and provide general information on IPR	Italian patent office
IT 102	Incentives for the elimination or reduction of substances of very	2.3.1 Direct support of business R&D (grants and loans)	Ministry of Economic Development

<sup>63</sup> EUR 80 million come from the rotating fund for technological innovation, FIT, whereas the remaining 40 million come from National Operating Programme 2007-13 (PON Ricerca e Competitività) for the regions' objective 'convergence' (i.e. Campania, Calabria, Apulia and Sicily).

<sup>64</sup> Of which EUR 80 million come from public funds.

	high concern (102)	4.1.1 Support to sectoral innovation in manufacturing	
	Funds for research and innovation in the energy sector	2. Research and Technologies (Erawatch)	Ministry of Economic Development
	'Brain-return' measure	3.2. Research personnel (EraWatch)	Italian Revenue Agency
IT 109	Funds for innovation projects in start-ups	4.3.1 Support to innovative start-ups including gazelles	Ministry of Economic Development

### 2.3.3 Strengths and weaknesses in the innovation policy support system

The current set of policy measures is highly concentrated on Priority 2 aimed at Research and Technologies, in particular at measures that provide direct funding (mostly grants) to firms engaged in applied industrial research, product development and prototype creation as well as on measures to improve R&D cooperation between public/academic/sectoral research institutions and enterprises. There is a substantial amount of public funding for academic research institutions (universities) that concentrate efforts on research issues that are not always specifically attractive to firms. Measures to encourage technology transfer should be further promoted and generous budgets should be allocated if these initiatives are to have a real impact, since one of the pitfalls of the Italian system lies in the translation of research results into effective market/industry applications. The number of policy measures addressing SMEs' specific needs should be augmented since the productive system is made basically of SMEs and micro-enterprises. The number of measures to improve education and skills and to promote entrepreneurship and the growth of innovative enterprises should be increased.

With respect to human resources, measures to stimulate the number of S&T graduates<sup>(65)</sup>, increase the number of Ph.Ds, encourage a more secure and longer-term employment perspective for researchers in universities and support the recruitment of skilled personnel (researchers, engineers, designers) by firms – especially by SMEs – should be introduced. It would also be very valuable to introduce measures to ensure the continuous development of skills through training schemes aimed at staff involved in innovation. Steps to combat brain drain and attract highly skilled personnel have been taken in the anti-crisis decree which foresees the application of fiscal incentives (see section 2.3.2 above).

In addition, the current set of policy measures should also be enriched with new measures to encourage entrepreneurship and the creation of new firms (e.g. financial support for the creation and early development phase of innovative enterprises, service provision to spin-offs, gazelles, support to risk capital etc).

For policy measures to have a real impact it is necessary that they comply with certain requirements such as administrative simplicity, flexibility, multi-annual horizons and certainty (regarding timing and budget). Delays in the launch of calls or in the implementation of the measures, sporadic or *una tantum* measures, long/slow evaluation procedures and administrative burdens will all have a negative effect discouraging investment in innovation. Also, excessive fragmentation of the resources and a proliferation of programmes will be harmful as the interventions need critical mass to be effective.

<sup>65</sup> There was a measure to stimulate the number of S&T students 'Scientific Degrees Project (IT 73) that could be re-launched.

## 3. Innovation policy and competitiveness: an appraisal

### 3.1 The ability of policy to address challenges

In a context characterised by the economic and financial crisis, public intervention should favour a qualitative enhancement of the economic offer and the improvement of firms' competitiveness. Two major components that may support such progress are innovation and internationalisation of companies. The crisis has uncovered the need to access new and sustainable technologies, such as to reduce environmental impact and allow raw materials and energy savings, as well as to lower social and urban effects. All these call for prompt investments in R&D and innovation. On the other hand, the competitiveness challenge requires a new business-development paradigm where companies cultivate a renewed ability to operate in open international markets.

In this framework it is important to maintain capacity building policies aimed to create the right conditions such as consolidating human capital skills and developing the research infrastructure for medium- to long-term development process. However, it is also essential to complement the strategic policy agenda with focused interventions addressing knowledge exploitation and strengthening the economy. To be effective, such policies should be concentrated and selected. An effort has been made in this direction at public policy level in Italy in the last few years. Concentration of strategic guidelines, both for research and innovation policies, on selected strategic priorities (e.g. 12 research strategic programmes), thematic fields (e.g. Industria 2015 calls, FIT thematic calls), sectoral and, in some cases, also geographical areas and territorial excellence (e.g. promotion of technology districts) is the major outcome of this political intent. This has resulted in a new approach compared to the previous experience that was characterised by a more generalised and scarcely selective policy intervention. According to data provided by the Ministry of Economic Development, in the last five years, only 29% of interventions in favour of enterprises consisted in focalised/selected support.

In order to render the new deal really effective, however, efforts should be made to ensure highly selective policy choices in medium- to long-term, capable of truly valorising local research excellence and innovation capacities, distributing resources on programmes/projects of high-tech value, and responding to an existent clear industrial and market demand, as well as involving and producing positive impacts especially on the SMEs that constitute the main firm segment in the Italian production system. Standardised and formal methods should be applied to ensure a transparent selection of priorities and target fields. Technology forecasting and road-mapping techniques could be applied to guide decisions and monitor the impact.

The previously mentioned objectives have been addressed in the last 3-5 years through a policy development process more targeted and focused on the mentioned priorities. However, a more effective monitoring and evaluation system should be implemented on a continuous basis, at the different Ministries and implementing entities level, to appropriately assess intermediate impacts and results and further support the strategic intelligence and decision process. Policy learning should become a normal practice, also drawing on foreign and international experiences where applicable.

Conception and design of innovation policy guidelines and specific measures should be formulated with a thorough understanding of innovation national priorities. The priorities include:

- stimulation of private spending in R&D,
- firms' commitment to innovation, especially SMEs,
- TT and research results to strengthen industry,
- public-private partnerships promotion,
- flexibility and renewal in the credit system,
- access to capital – especially for new business creation,
- major system failures (existing gap between research and market, weak cooperation among firms and between public-private research and enterprises, strengthening and exploitation of 'hidden' and 'soft' innovation activities, 'far from perfect' impact evaluation system).

This process should also be supported by an appropriate involvement of the stakeholders to render priority-setting and market-failure identification more realistic and effective. In this sense the growing practice of establishing 'thematic tables', think tanks and consultation circles involving main stakeholders and interested actors in support of strategic intelligence processes and policy design is a clear step forward.

Finally, establishing a decision process addressing national priorities and needs implies a growing ability to systematically identify the system's 'best performers' – universities, firms, researchers, projects, local initiatives, and supporting entities – to allocate projects and resources. In this respect, some steps have been taken such as setting up monitoring and evaluation entities: ANVUR role and recent meritocratic-based approach to distribute resources to universities by the Ministry of Education, University and Research. Nonetheless, more efforts are needed to render such a process systematic and truly effective in supporting the policy design process.

### 3.1.1 How well does policy respond to innovation challenges?

The current policy measures are insufficient to tackle the challenge of innovation financing, considered one of the key weaknesses of the Italian system. Some measures initially planned are still pending, such as the Fund for Enterprise Financing introduced in the 2007 and 2008 Budget Laws to facilitate access to credit by SMEs and rationalise the functioning of public guarantee funds and risk/venture capital funds. This measure has not entered into action yet as it needs the approval of a national mandate to make it operative). Other measures were very slow to take off, such as support to the promotion and development of new innovative enterprises (IT 41), which foresaw a public co-financing scheme for young enterprises wishing to develop innovative projects, but whose results are not satisfactory.

The problem of scarcity of funds to finance innovation at national level has been 'alleviated' through several interesting initiatives at regional level that create funds with public-private participation, such as the Italian Venture Capital Pole in Piedmont, Ingenium Fund in Emilia-Romagna and the Next Fund in Lombardy. However, to reverse the trend and have a real impact, more initiatives at national level are necessary. The measures launched this year, namely exemption on capital gains for start-ups (IT 100), risk capital fund for SMEs (IT 99) (see section 2.3.2) and funds for innovation projects in start-ups (IT 109) represent steps to improve the situation.

In order to face the issue of brain drain, further intervention at government level is needed. If the problem is to be addressed efficiently the first step is to have an accurate quantitative estimation of the number of researchers that go abroad. In our view, the policy response to this challenge has been hitherto insufficient and unsatisfactory as the measures introduced do not seem to have had a noticeable effect on attracting talent or on avoiding the brain drain phenomenon. According to a number of surveys and press releases cited in Beltrame (2007), the effects of the fiscal exemptions introduced in 2003 have been disappointing. In addition, several declarations and interviews revealed that researchers abroad were not very enthusiastic and most of them seemed rather sceptical about the measure<sup>66</sup>). The creation of networks of researchers/scientists abroad such as Davinci<sup>67</sup>) and 'Urania'<sup>68</sup>), rather than being used as a means to foster collaboration or to promote the transfer of knowledge and/or technologies, have had a merely informative character. The tax incentive recently introduced by the government in the 'anti-crisis decree' (see brain-return measure in section 2.3.2) is expected to help counteract the brain drain phenomenon.

The challenge of improving technology transfer mechanisms to reduce the existing gap between research and market has been partly addressed by policymakers through several policy interventions.

<sup>66</sup> Morano-Foadi, and Foadi (2003): Italian scientific migration: from brain exchange to brain drain, research report No 8, University of Leeds in Beltrame, L. (2007): Realtà e retorica del brain drain in Italia: stime statistiche, definizioni pubbliche e interventi politici. Quaderno 35, Università di Trento.

<sup>67</sup> DAVINCI is an Internet accessible database set up by the Italian Ministry of Foreign Affairs that gathers data voluntarily provided by its participants on the activities, research interests and competences of Italian researchers working abroad.

<sup>68</sup> See <http://www.uraniasciences.com/> online.

These include new tax incentives to encourage business cooperation with research institutions, creation of ILOs in the main Italian Universities, promotion of public-private partnerships, etc. <sup>(69)</sup>. The existing policy mix should be further reinforced with new instruments and more resources to respond fully to the challenge because although the government acknowledges the importance of innovation and technology transfer as drivers of economic development and competitiveness <sup>(70)</sup>, in most cases the budgets allocated to these initiatives are small and insufficient to generate considerable impact <sup>(71)</sup>. It is also important that the agents responsible for technology transfer (namely science and technology parks, technology districts and ILOs) are continuously evaluated in order to measure performance, ensure the optimisation in allocating resources and pursue efficiency and effectiveness, avoiding duplication and overlapping of activities and misallocation of public funds <sup>(72)</sup>. The Ministry of Economic Development and IPI have launched a series of training courses and workshops addressed to public operators engaged in technology transfer (RIDITT seminars) and in awareness raising-activities in the field of IP (Valprin Programme).

## 3.2 Effectiveness of policy design

The national innovation system, both in terms of policymakers and public-private innovation intermediaries, is characterised by a large number of actors <sup>(73)</sup> with the mission to support R&D and innovation, which reflects the increasing awareness of the topic. However, the system is also very fragmented and sometimes there is an overlap and duplication of efforts. The system has been characterised by low levels of coordination and cultural barriers to public-private cooperation, mainly affected by the lack of links and interactions between the main players (universities, public research centres and industry) <sup>(74)</sup>. This drawback has been widely recognised by the public administration which is directing its efforts to enhance collaboration between the public and the private sectors.

The increasing number of innovation agencies may be counterproductive for the Italian system that should instead opt for a limited number of specialised and efficient organisations, possibly coordinated by a centralised entity acting also as a supervisor of policies. This would help the country rationalise resources, reduce the bureaucratic burden, streamline the processes while ensuring clients a timely response and added-value services. At central level a dedicated ministry only for innovation policies is still missing, as the current Ministry for Public Administration and Innovation is concentrating innovation policy on the modernisation of the public administration. This is an important sign that targeted and effective public support to innovation is not yet a top priority for the government in terms of concrete actions and funding schemes with a long-term prospect.

Public operators are not usually inclined to adopt a strategic management approach to R&D, going beyond a specific sector/activity and better integrating policies into the wider national system. Also the dissemination and transfer of results is insufficient. To improve the governance system, there is a need to upgrade innovation policy analysis and evaluation skills of policymakers to enhance their capability in assessing ongoing programmes and implemented measures. This will bring forth

<sup>69</sup> Refinancing the measure to promote technology transfer projects in the framework of the Italian Network for the Dissemination of Innovation and Technology Transfer (RIDITT) announced in the past legislature has not been enacted yet (EUR 21 million to finance national technology transfer projects and EUR 8.8 million to finance transnational TT initiatives).

<sup>70</sup> as stated in several policy documents like the National Research Plan, the National Reform Programme, and Industria 2015.

<sup>71</sup> Interesting schemes and policy measures have been implemented at regional level, some of which have proved quite successful and 'attractive' for local companies, including SMEs: technology voucher scheme (especially in Lombardy, Apulia, Calabria) strengthening links between universities and enterprises; TT measures implemented in Friuli Venezia Giulia (e.g. Bertossi Law); measures to support the creation of spin-offs from research centres and universities (FIXO in many regions or voucher spin-off in Apulia); and measures to promote the exploitation of research results (e.g. BusinessLab or Tecnofori in the Lazio Region).

<sup>72</sup> A survey of the centres for innovation and technology transfer in Italy published by IPI in 2005 provides a picture of a system made up of young structures, mainly public, with 15 employees on average (mostly young technicians without much expertise) that offer generic assistance and information services and that are involved in technology transfer activities only to some extent.

<sup>73</sup> Both at national and regional levels.

<sup>74</sup> The needs of the industry and the market are not properly addressed by the public research system, which is often self-referential and lacks real or systematic connection with the needs of society and those of industry.

systematic feedback from their impact and results and allow for designing an effective future policy scenario building on lessons learnt and on previous experiences.

At central level, the lack of coordination among the several ministries involved in R&D and innovation has long characterised the Italian system. This applies in particular to the dualism between the Ministry of Economic Development and the Ministry for Education, Universities and Research, especially concerning innovation policy for enterprises. Some improvements have been achieved, the most important being the identification of the Ministry for Economic Development as the irresponsible body for directing innovation policy (section also section 2.2).

At regional level (<sup>75</sup>), the duality between the central government and regional authorities' intervention is still affecting the Italian system. Scarce availability of financial resources calls for more coordination between the two institutional levels both to better define strategic objectives of industrial policy and territorial balancing, and to establish clear roles, responsibilities and areas of intervention.

The allocation/division of competences in the field of R&D and innovation policy at national and regional level has sometimes been ambiguous and confusing. There is a kind of informal division of tasks and responsibilities that can be summarised as follows: basic, long-term research is decided at central level and the main responsible organisation is the Ministry of University and Research. Industrial research and innovation is shared between the central government and the regions. The informal division of competencies is decided on the basis of the size of the investment. According to this criterion, the Ministries are in charge of bigger investments (e.g. the Ministry of Economic Development finances industrial innovation projects under the framework of Industria 2015). On the other hand, the regions launch call for tenders that require smaller investments.

Technology transfer is a grey topic where both the state and regions play a role, though often un-coordinated. Although the central government supports certain types of interventions that call for collaboration between research and firms (such as the technology districts or competence centres), it is mostly a regional responsibility. This field requires enhanced coordination between the state and the regions as it is a critical area that requires a decisive change in the current mindset of the actors, as well as strong managerial skills in the implementation. Last but not least, financing of innovation is a shared competence where the presence of regions has gradually become more decisive.

Positive developments in regional policy planning (2007-13 Framework) aim at the implementation of a unified policy scheme at country level, pulling together structural funds, national funds for underdeveloped areas and other regional resources for local development. Thus, there is a change in the strategic orientation. A multi-level type of governance is foreseen in the Framework, requiring stronger coordination and cooperation among the different policymaking levels involved in planning and managing interventions. Within the framework of the National Operating Programme-Research and Competitiveness (2007-13) an agreement (<sup>76</sup>) has been recently signed between the Ministry of Education, University and Research and the four convergence regions (Apulia, Sicily, Calabria and Campania) to strengthen cooperation and to design integrated and common actions for R&D. The attempt is an experiment in a multi-level governance model promoting inter-institutional networks where regions can play an active role.

Regional initiatives should be strictly linked to policies for innovation and competitiveness to ensure a coherent industrial policy strategy. This approach is also foreseen in the programming and implementation process for the *Programmi Operativi Nazionali* (PON) usually managed by the central government and now supported by a committee (*Comitato di Indirizzo e di Attuazione*), involving the national government along with all the regional governments concerned with the specific measures. This will allow more effective participation of regions in the planning and implementation process and a stronger role in influencing central government policy decisions addressing specific territories.

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<sup>75</sup> The Italian regions have a high degree of autonomy to plan their own innovation programmes but these have to be first agreed with the government in to ensure that regional objectives are in line with national ones. The permanent body that provides coordination between the state and the regions is the State-Regions Conference. However, policy coordination is not yet fully efficient, and there is room for improvement.

<sup>76</sup> Protocollo d'intesa MIUR-Regioni della Convergenza (25 June 2009).

Another important issue regards the need to favour the creation of support schemes that foster the cooperation and transfer of practices among R&D and innovation actors in Northern and Southern regions in order to reduce regional imbalances (as shown in section 1.2 the majority of indicators of the EIS show higher performance of Northern and even central regions compared to the south).

In summary, there have been several improvements in recent years towards a selective policy intervention approach based on the concentration of R&D and innovation guidelines on selected strategic priorities and thematic fields. This includes increased involvement of stakeholders in strategic intelligence processes and policy design, the setup of monitoring and evaluation entities and the introduction of support instruments to try to address the main challenges. However, there is still the need to further rationalise the different levels of intervention, setting a clearer framework of strategic priorities and operational implementation modalities, reducing the number of players and rendering them more effective towards the achievement of selected goals and objectives.

### 3.2.1 Process of delivery

Innovation policy and the implementation of specific measures are often influenced by several structural problems that affect their effectiveness and potential impact. The first aspect regards the coordination of entitled policy entities that often overlap or barely interact to implement programmes. This applies at national level, but also among the national and regional level. It often affects the efficacy of the measures and reduces the efficiency in efforts and resource allocation among the policy priorities. Problems in implementing policy measures efficiently are related to:

- lengthy times for the evaluation and approval of applications to calls (for measures requiring project ideas submission): in some cases, the go decision and the final formal approval arrive even after 12 months after project presentation,
- shifting of set schedules and deadlines or changes in the application rules for automatic measures and incentives,
- bureaucratic burdens that often discourage potential applicants or cause significant shifting in projects/programmes time schedules,
- uncertainty in applying measures (changes in government orientation or in the country's economic priorities may block some measures, leading to discontinuity),
- uncertainty regarding resource availability in the medium- to long-term to ensure financial support to different policy interventions.

With reference to policy instruments and measures implemented through calls requiring submission of project ideas, a major issue is related to proposal evaluation and selection:

- speeding up procedures, evaluation and selection through external independent evaluators or through external agencies, with supervisory and coordinating role by officers of the financing administration (this is a new direction that applied, for example, to Industria 2015 proposals assessment),
- ensuring harmonised evaluation procedures through standard and formalised rules that may be fixed and broadly applied,
- easing the whole process, completing computerisation of data, projects and administrative documentation as a key priority (online applications and project submission for national and regional measures have been a significant step forward in this direction),
- ensuring a meritocratic-based process through transparent selection conducted by skilled and competent evaluators.

Still missing in the Italian system is a structured monitoring system of implemented measures that support an improvement process of the policy mix through policy learning. To make progress in this respect, more effective monitoring and evaluation systems are required for *ex ante*, *ex post* and intermediate evaluation. *Ex ante* evaluation has only recently been conceived by the Italian policy system as an instrument to improve policy design and better address set priorities. In this sense, the consultation phase that preceded the launch of the Industria 2015 calls (Energy and Sustainable Mobility), aimed at assessing the potential impact on the sector by identifying priorities and technology areas of major interest, representing a first step in this process. Intermediate evaluation, which is already usually performed (also through the assistance of credit institutes for financial and

administrative controls) should be improved and better exploited for policy monitoring and assessment. Success intermediate indicators should be set in the calls to introduce 'go – no go' procedures that may allow only highly successful projects to proceed and be funded until the end of the programme, avoiding resources spending in projects and activities with doubtful results.

*Ex post* evaluation should also be better exploited and conceived not as a merely bureaucratic accomplishment (as often happens both for the evaluating Administration and the beneficiaries), but as a major instrument to assess impact and 'learn by doing'. In this sense, terms for improvement can be to develop a policy evaluation plan since the launch of the new instruments/measures, to set directly in the bid the required statistical data against which projects will be assessed, and to include counterfactual approaches that measure policy instruments effects and confront the impact in their absence.

A procedure that has been more recently introduced in some measures of the Italian innovation policy system is a two-step approach for the call that allows presenting preliminary proposals with separated evaluation procedures for the two stages. The procedures (applied for example for the Industria 2015 'made-in-Italy' call) saves effort and extends resources to proposing consortia whom may invest the bulk of the efforts during the second stage, after having received a preliminary green light on the project idea. The procedures also allow significant cost savings on administration that can weigh on a preliminary screening process, concentrating instead on a thorough evaluation procedure for a more limited number of applications.

A major innovation step has been recently introduced through the reform (decree 05/02/2009) of the FIT instrument (Law 46/1982) in reference to multiple-step procedures that foresee intermediate negotiation phases between project developers and the financing administration, allowing parties to agree on and settle intermediate indicators against which the projects will be measured. The law introduces this procedure for the first time in Italy facilitating procedures to create programmes of experimental development that are of major interest for country-wide economic development (i.e. large-scale projects).

With respect to implementation units for policy measures, there is an increasing practice to appoint specific agencies with the role to implement, monitor and follow up policy instruments that are running. This is what happened, for example, since 2007 with the Institute for Industrial Promotion (IPI), which has strengthened its operative role to support the directions of the Ministry of Economic Development by becoming an in-house agency. This has increased efficiency and provided the Ministry with a pool of young qualified experts able to offer technical assistance, avoiding the recurring employment of costly external consultants. The increasing role has also been extended to evaluation procedures and selection of projects as well as to policy design and conception.

A similar approach is progressively being followed also at regional level, where innovation policy instruments implementation is more often assigned to dedicated structures dealing directly with running programmes, calls launch and evaluation procedures application and supervision (e.g. Aster in Emilia-Romagna, FILAS in Latium and ARTI in Apulia).

What is still missing in Italy, compared to other European countries, is the financial power assigned to such agencies or implementation units. Providing them with responsibility also in the financial management of the incentives could be a means to simplify procedures, avoid bureaucratic burdens and speed up the whole process. Regarding the current capacity and staffing of the policy units responsible for implementation, no significant increases in staff have occurred within the ministries that deal with research and innovation (mainly the Ministry for Economic Development and the Ministry for Universities and Research). The Institute for Industrial Promotion has experienced a slight increase in the personnel involved in innovation policy issues, and the launch of the National Innovation Agency will certainly require the recruitment of new personnel.

### **3.3 Impact of public support for innovation**

Assessing the impact of innovation policies and instruments on macroeconomic variables and structural factors is a complex issue that should build on thorough studies and accurate analyses, counting on relevant data and – where feasible – confronting the outcomes with the relevant policymakers. In Italy, a systematic approach to review tangible effects of innovation policies is still missing. The assessment requires the availability of ad hoc data monitoring systems to collect and elaborate information of a different nature (administrative information on the resources allocated by the funding institutions, economic and technological data on the performance of the beneficiary companies). Without such data for each measure applied, it is difficult to formulate well-founded judgements and appraisals, even at general level. Moreover, this kind of appraisal can be effective only if the batch of policy interventions under examination has a long-term nature and stability. In this sense, the peculiarities of the Italian innovation policy mix present some constraints which can significantly affect the efficacy of an assessment exercise. Fragmentation and short-term duration of many measures do not allow for a proper assessment of how such instruments are contributing to the main structural changes and to the evolution of the macroeconomic scenario. Moreover, the evaluation system should be able to assess the dynamic and structural effects of innovation policies: i.e. how they can modify in the medium/long-term firms' attitude towards innovation, knowledge creation processes, and strategies, and how all this can affect companies' economic results. In this framework it is difficult to make an assessment of the impact of single specific measures. However, some general considerations can be formulated by analysing the results of some studies recently carried out in Italy to launch monitoring and evaluation processes.

The studies have applied different methodological approaches, but the majority of them have concentrated on the 'additionality' effect of innovation policy measures (especially Law 488/92; tax credit for new investments, and some regional incentives for research and innovation). In 2006 the MET Report <sup>(77)</sup> confronted the major outcomes of several studies previously elaborated on this issue. Additionality has been measured mainly on the target variable of employment and turnover or total investments in beneficiary companies. Results show relatively positive effects, even if the additionality index varies in a range from 9% (for law 488/92) to 30% (for tax credit) according to the different methods applied. However, it should be noted that this type of exercise does not usually allow for effectively measuring long-term impact and cannot be assigned with a statistical or absolute value.

Another study conducted in 2006 <sup>(78)</sup> on the basis of CIS/Eurostat data has illustrated an empiric analysis on the innovation policies performance by measuring the correlation between policies and innovation output, and between policies and changes in firms' attitude towards innovation. In general terms, there are no significant correlation between incentives supplied and the companies' output regarding the introduction of new products. This results in an overall limited capability of innovation policies to have any long-term effects on beneficiary companies. In particular, the following considerations have been noted:

- Companies benefiting from public incentives tend to dedicate more efforts and resources to innovation.
- Half of the companies that benefit from public incentives have innovated mostly through the introduction of process innovation (product innovation is quite sporadic).
- The fact that public incentives in favour of process innovation prevail (usually leading to the acquisition of new plant/machinery) is deemed responsible for lowering the number of companies accessing the incentives.
- Public measures financing multi-year projects shift the schedule (sometimes also by years) to exploit project results and time to market. Therefore, a clear correlation between investments and market expansion is often difficult to be measured.
- Effects on companies in terms of increase in new product turnover are more often the result of EU funded projects (under the FP for R&D) or projects funded by regional measures, more than those supported by national programmes.

<sup>77</sup> 'Le politiche per le imprese: l'offerta pubblica e la domanda dei privati', *RAPPORTO MET 2006*.

<sup>78</sup> *La valutazione delle politiche per l'innovazione: un confronto tra Italia e Paesi Bassi*, Elena Cefis, Rinaldo Evangelista, Università di Bergamo e Utrecht University, Università di Camerino, 2006.

- The generalised nature of the majority of the public incentives, on one hand, broadens the potential target of companies that can have access to the incentives, but on the other hand represents a dispersion that reduces the possibility to identify and reward benefiting companies with a high innovation technological capacity, decreasing the chances for knowledge accumulation processes.
- Finally, public incentives do not seem to stimulate properly interaction and cooperation of companies with external entities, especially research ones.

Some qualitative considerations regarding the impact of innovation policies could also be drawn from an observation of the EIS indicators and their evolution over the past years. The improvement in the Human Resources indicators occurred in recent years (increase in S&E and SSH graduates), for example, can be a consequence of university reform of 2004 and the reformulation and rationalisation of university degrees. The increase in broadband penetration rate among companies, which is gradually progressing towards the EU average, is the result of a growing and consistent allocation of resources made by the Government on this initiative.

Further conclusions can be made if we focus on sectoral performance. Substantial public incentives supplied to the aerospace industry have allowed the sector to achieve a top-level position in the global arena. The recent programme of Industria 2015, which focuses on five main technology areas, is a further step for concentrating public incentives on vertical sectors that represent key areas for the innovation national system and on which public efforts have been spent in the last years to sustain their growth and expansion, also at international level. Cluster leveraging policies, promoting the establishment of technology districts and innovation poles, are building on a traditional peculiarity of the country (the industrial districts) and are intended to revitalise and to launch innovate policies in this area supporting an already independent ongoing process of concentration on key technology areas and territorial excellence. Strengthening of local excellence, which is an ongoing process at regional level, is also pursued through decentralised policies and delegation by the central state to Regions boasting several powers in innovation policy design and implementation.

### 3.3.1 Conclusions: possible future actions and opportunities for innovation policy

Although the economic and financial crisis calls for prompt intervention to address urgent short-term challenges <sup>(79)</sup>, research and innovation policies should remain central in the policy agenda to guarantee development and growth, identify key factors to come out of the crisis and face the recovery. A clear strategic view for innovation policy is required at central level, while ensuring full commitment to the set objectives, coordination and clear allocation of responsibilities among national and regional dedicated entities. Analysing the present innovation policy mix, the following areas of improvement have been identified:

- Improvement in the current policy mix: This includes the effects of the ongoing economic and financial crisis, structural factors affecting the national innovation system, scarcity of resources to be allocated on different priorities, selected strategic lines to be addressed, calls for further rationalisation of the Italian innovation policy mix still characterised by a high number of instruments and measures, improved coordination of these measures, and efficient targeting and application. Efforts should be made to reduce the number of incentives avoiding fragmentation and overlapping between the national and regional level <sup>(80)</sup>, and to revise the policy mix in favour of more selective and finalised incentives. The latter, according to recent evaluation conducted by MSE, resulted in more efficiency than the generalised measures (on average, finalised instruments finance bigger investments leading to better performance and more management efficiency) <sup>(81)</sup>. Allowing easier access to automatic incentives that spread their benefits in a short-term period while ensuring steady financial availability of these instruments is also important.

<sup>79</sup> Employment safeguarding, system liquidity, support to national spending.

<sup>80</sup> A total of 251 national and regional measures are running for R&D and Innovation.

<sup>81</sup> *Relazione sugli interventi di sostegno alle attività economiche e produttive*, Ministero dello Sviluppo Economico, June 2009.

- Long-term planning in policy design, continuity in policy implementation, systematic assessment of the policy mix performance: Continuity and stability have to be ensured for national and regional policy schemes through the design of medium- to long-term plans that bring durable effects on the innovation and production system. Policy implementation, resource allocation and new schemes design should rely on effective and systematic policy monitoring and evaluation processes. This will encourage measurement of performance against objective criteria and foster 'learning by doing' practices in policy development.

In terms of priorities set, some areas of intervention are suggested to ensure growth to the national innovation system:

- Innovation-policy focus on strategic key areas for the national system: Concentrating policy intervention on selected key technology priorities and areas of excellence (e.g. the industrial innovation projects of 'Industria 2015' or the strategic programmes promoted by the Ministry of Education, University and Research) should be further pursued. Technological themes transversal to sectors and geographical attraction areas should be identified and addressed through ad hoc measures.
- Public-private partnerships, cooperation among companies and promotion of network-based schemes: New and more effective measures that ensure systemic exchange and cooperation between public-private research and enterprises should be fostered, allowing successful technology transfer processes<sup>(82)</sup>. National or regional measures to stimulate cooperation among companies could be launched to achieve a critical mass for projects of broad interest. Considering successful European schemes like cooperative and collective research projects<sup>(83)</sup> involving groups of firms, a model which is receiving growing interest among Italian companies, could be useful. Cluster leveraging policies should be further sustained to strengthen national 'areas of technology excellence' (technology districts, innovation poles) and boost cooperation and synergies between public and private systems. Consistency and effectiveness of the running structures (e.g. technology districts) should be appropriately appraised to select and sustain only successfully performing structures.
- Cooperation schemes among Northern and Southern regions should be encouraged to reduce territorial imbalances.
- Accelerating innovation in the public sector as a driving force for the whole country innovation system: Modernisation of public administration should be further pursued to increase investments in R&D activities, develop the digital capital within the public sector, enhance ICT know-how and promote enabling technologies and infrastructures which may support leading public-private sectors of the country. In this sense, the effort made by the present Government through the launch of the e-government 2012 plan should be further supported, and appropriate resources should be allocated to render the plan feasible and truly effective.

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<sup>82</sup> According to data provided by the MSE, the tax credit for R&D measure the firms' expenditure for contracts with universities and public research centres is only 1.4% of total spending.

<sup>83</sup> Collective Research is a type of research carried out by RTD performers (for example, research centres, universities, etc.) on behalf of industrial associations or groupings in order to expand the knowledge base and improve the overall competitiveness of large communities of SMEs.

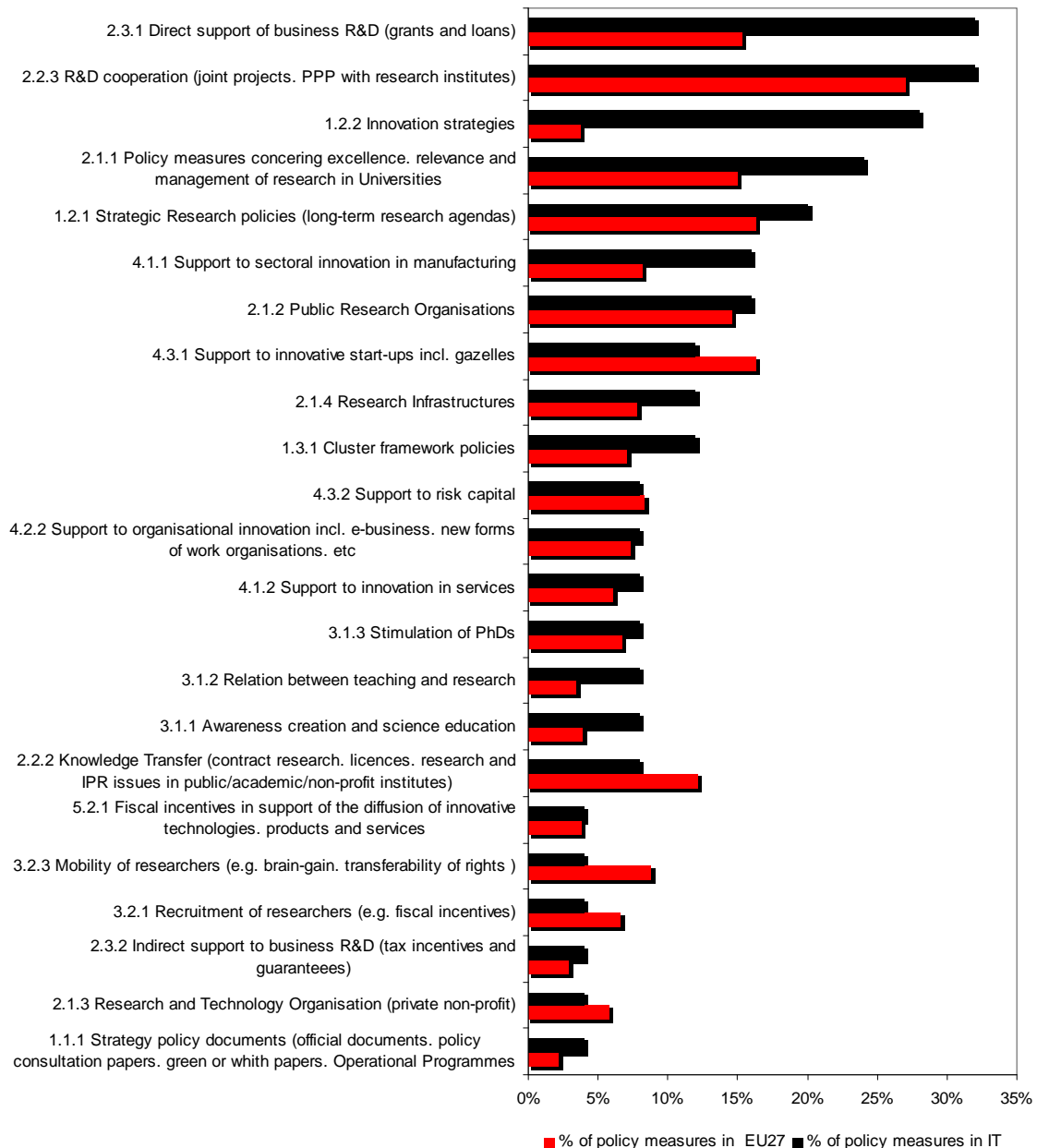
## Annexes

### Annex 1: Country pages – Innovation Policy Support fact-sheet

#### 1. Main policy priorities addressed by the support measures

#### Annex 1.1: Main priorities addressed by the support measures in Italy in a comparative perspective

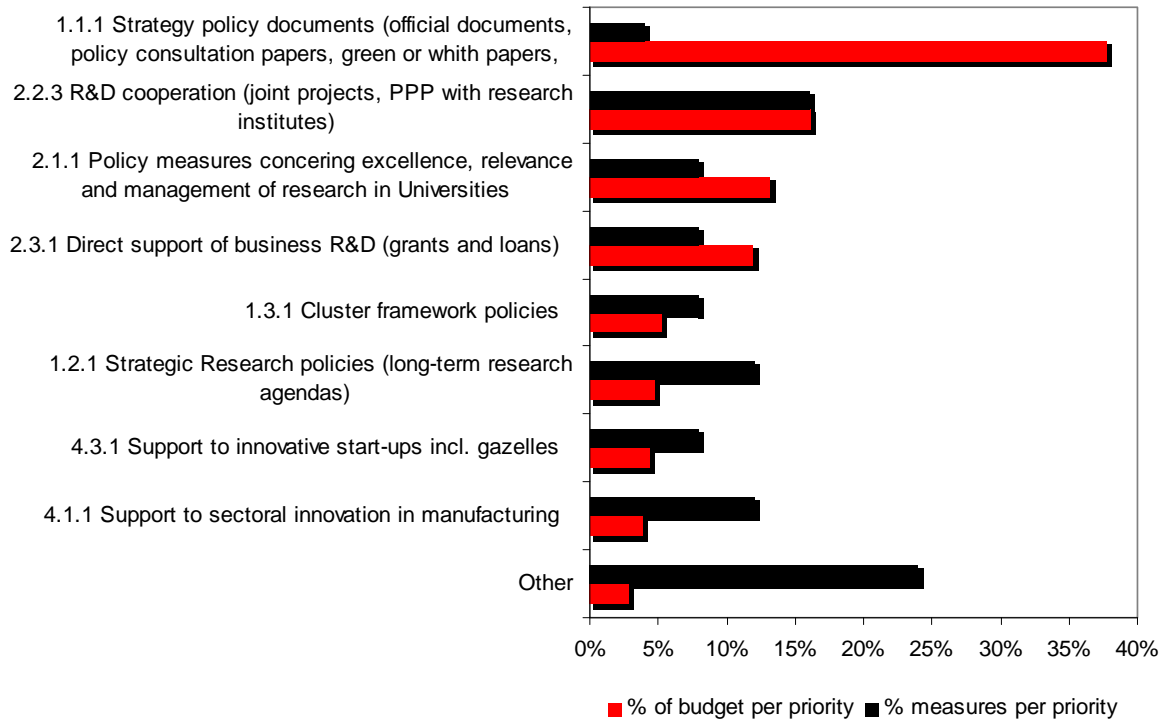
### Policy priorities addressed by the support measures in Italy and EU27



2. Main policy priorities and their estimated budget (CHART)

**Annex 1.2: Estimated annual budget allocations per policy priority in Italy**

**Estimated annual budget spent on policy priority and number of support measures in Italy**

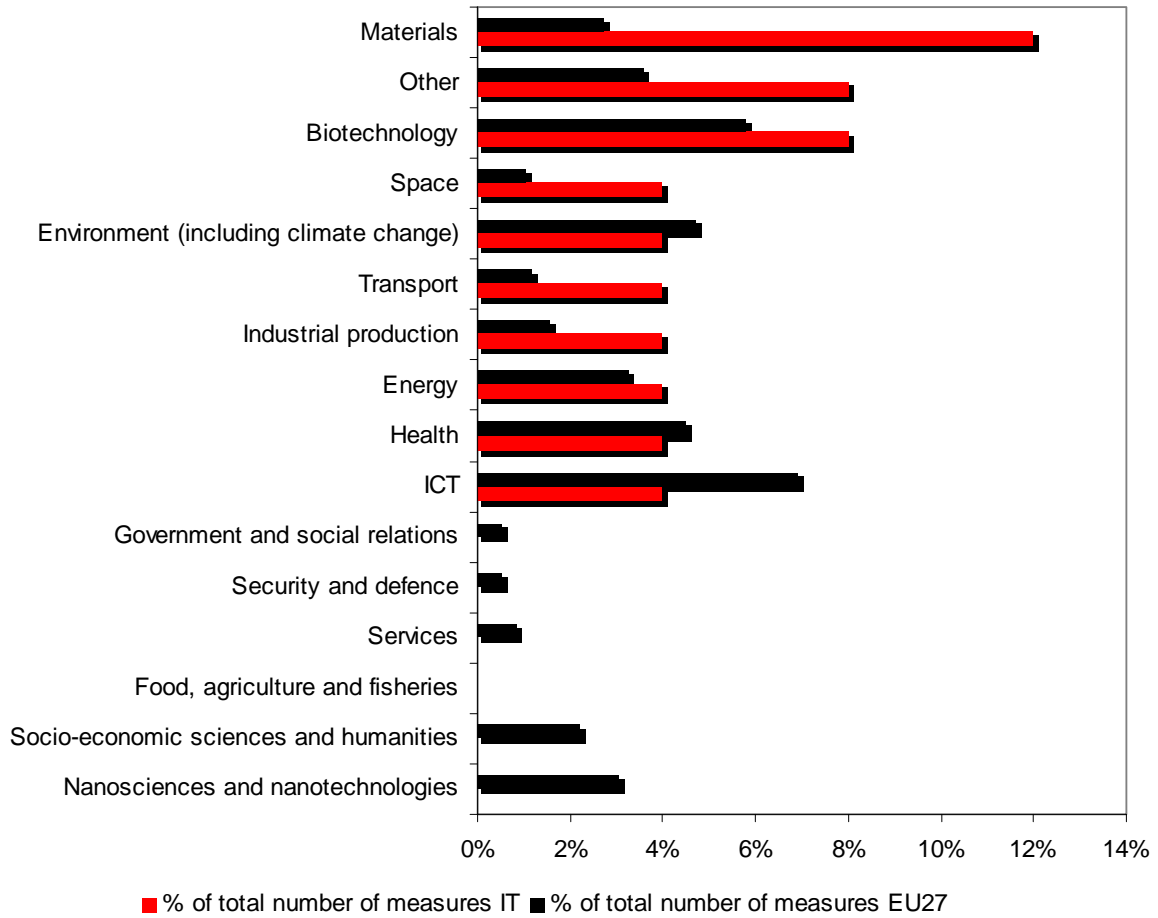


PROFILE OF PUBLIC INTERVENTION IN INNOVATION

3. Targeted research and technology fields

Annex 1.3: Targeted research and technology fields

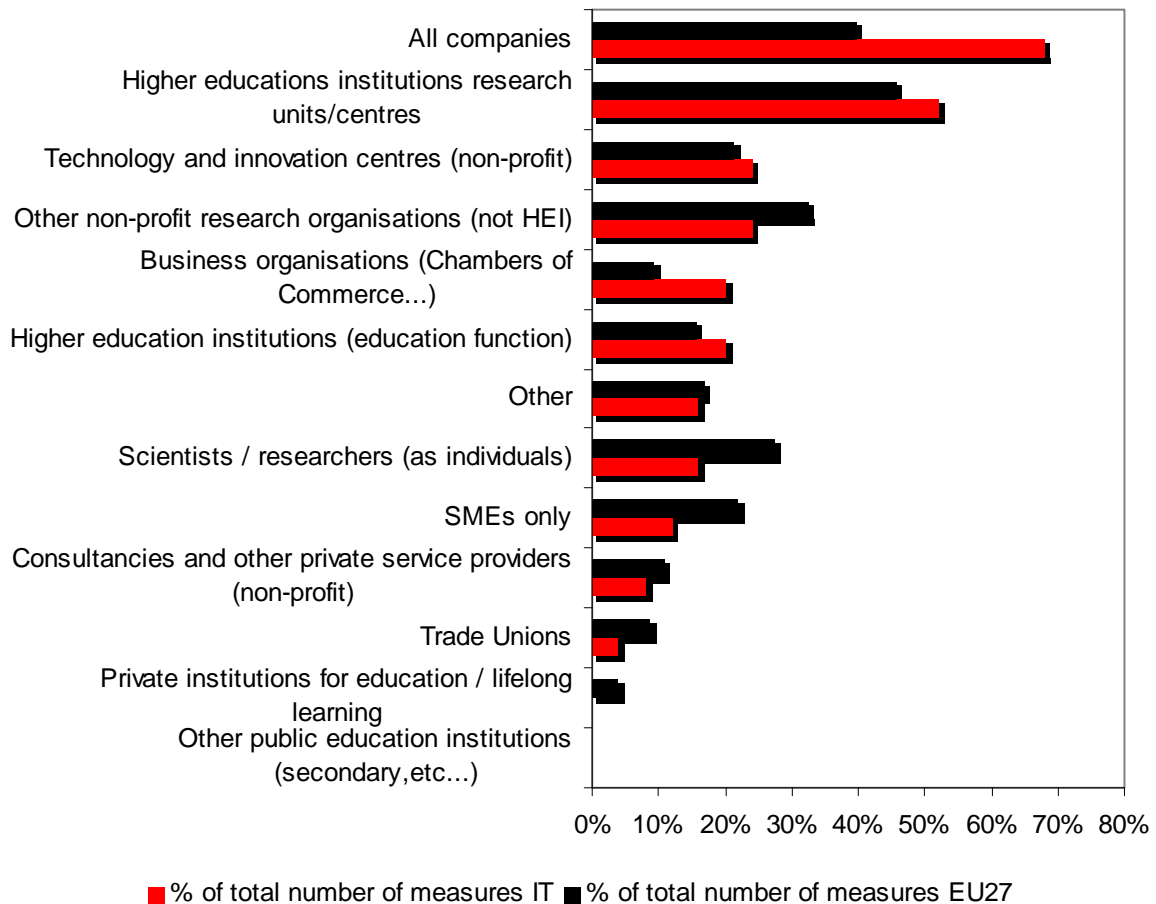
## Targeted R&T fields by support measures in Italy compared to EU27



## 4. Target groups of support measures

### Annex 1.4: Target groups of support measures

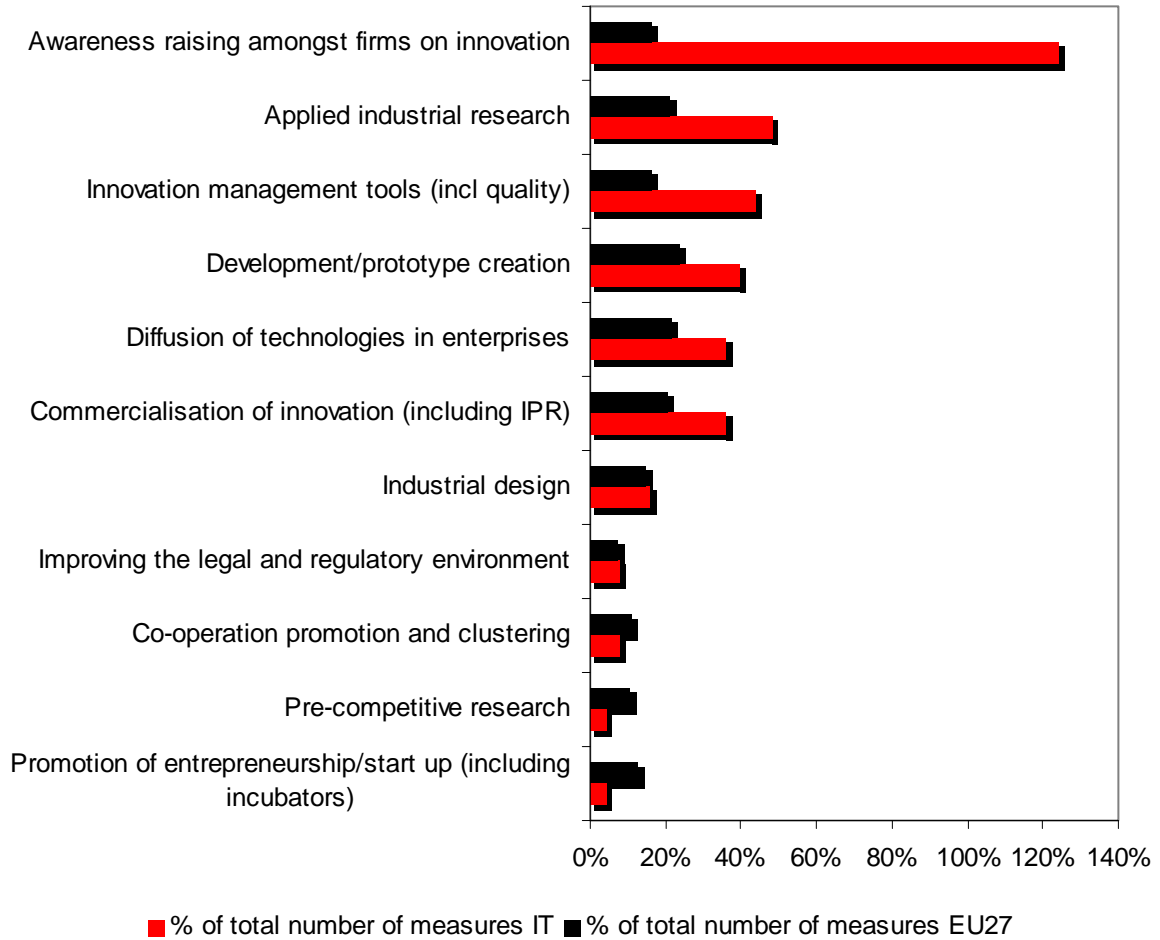
#### Target groups of support measures in Italy compared to EU27



5. Aspects of innovation process targeted by measures

Annex 1.5: Aspects of innovation process targeted by measures

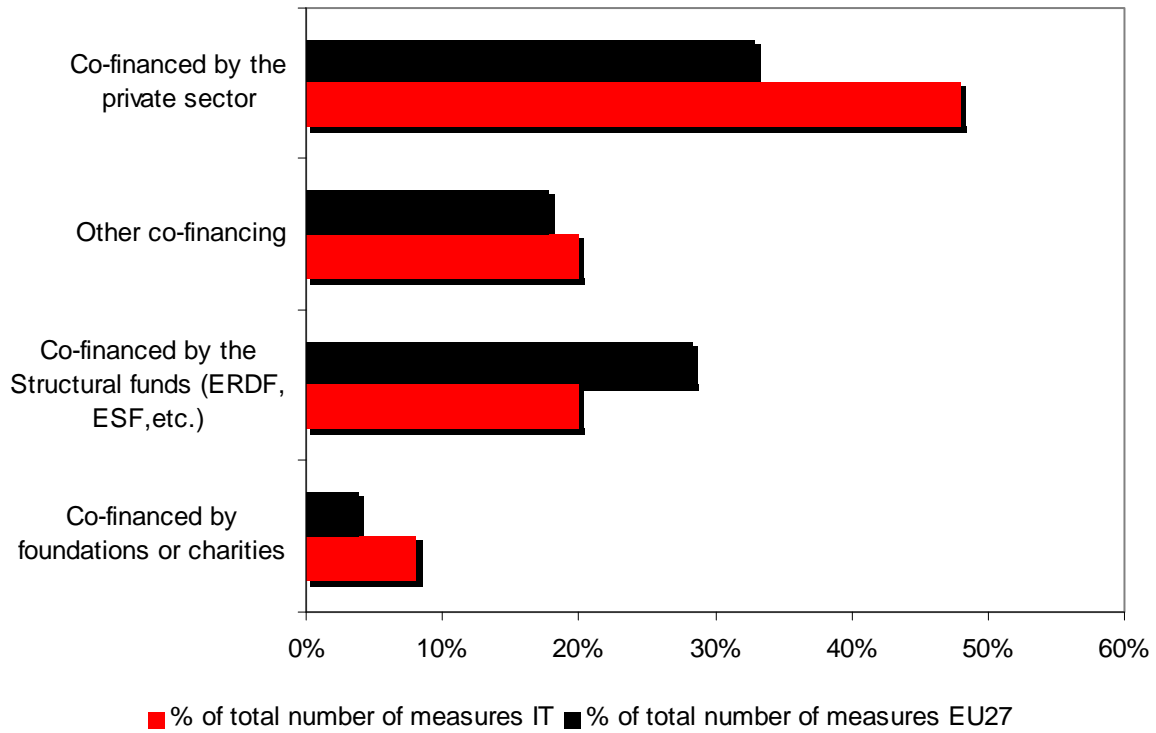
## Aspects of Innovation process targeted by measures in Italy compared to EU27



6. Sources of co-financing of support measures

**Annex 1.6: Sources of co-financing of support measures**

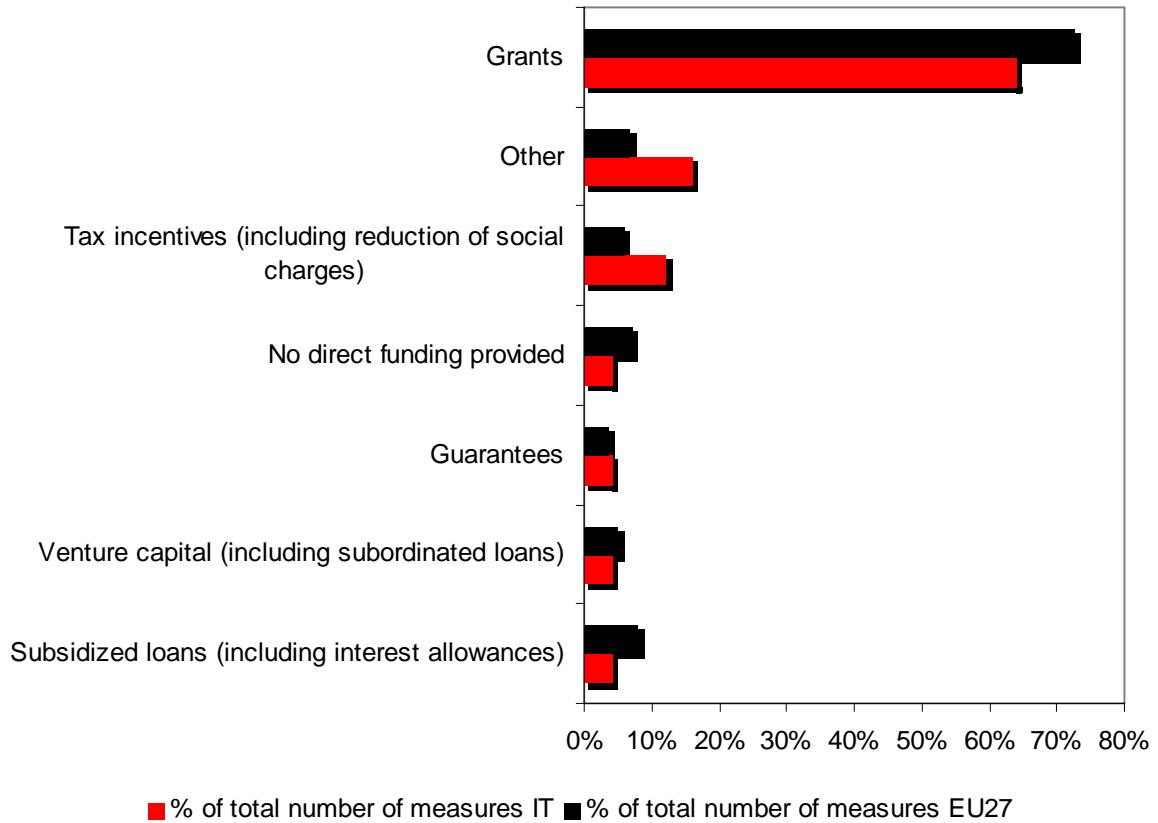
**Sources of co-financing of support measures in Italy compared to EU27**



7. Forms of funding of support measures

**Annex 1.7: Forms of funding of support measures**

## Forms of funding of support measures in Italy compared to EU27



## Annex 2: Bibliography

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## Annex 3: List of abbreviations- Glossary

ADITE (Associazione dei Distretti Tecnologici): Italian Technology Districts Association

AIFI (Associazione italiana del private equity e venture capital): Italian Venture Capital and Private Equity Association

ANVUR (Agenzia Nazionale di valutazione del sistema universitario e della ricerca): National Agency for the Evaluation of University and Research systems

APAT (Agenzia per la protezione dell'ambiente e per i servizi tecnici): Agency for Environmental Protection and Technical Services

ASI (Agenzia Spaziale Italiana): Italian Space Agency

CIACE (Comitato interministeriale per gli affari comunitari europei): Ministerial Committee for EU policies

CIPE (Comitato Interministeriale per la Promozione Economica): Inter-ministerial Committee for Economic Planning

CNR (Consiglio Nazionale delle Ricerche): National Research Council

COFIN: Fund for the co-financing of research activities

COTEC (Fondazione per l'Innovazione Tecnologica): Foundation for Technological Innovation

CRUI (Conferenza dei Rettori delle Università Italiane): Association of the Rectors of Italian Universities

DIT (Dipartimento per l'Innovazione e le Tecnologie): Department of Innovation and Technology

DPEF (Documento di Programmazione Economico Finanziaria): Economic and Financial Planning Document

EC: European Commission

ENEA (Ente per le nuove tecnologie, l'energia e l'ambiente): National agency for the new technologies, energy and environment

EPO: European Patent Office

EU: European Union

EVCA: European Venture Capital Association

FAR (Fondo per le agevolazioni alla ricerca) : Fund for the promotion of research

FIRB (Fondo per gli investimenti in ricerca di base): Basic research investment fund

FISR (Fondo integrativo speciale ricerca): Special integrative fund for research

FIT (Fondo per l'innovazione tecnologica): Fund for Technological Innovation

FP: Framework Programme

GDP: Gross Domestic Product

IBAN (Associazione Italiana Investitori Informali in Capitale di Rischio): Italian Business Angels Network

ICT: Information and Communication Technologies

IPI (Istituto per la Promozione Industriale): Institute for Industrial Promotion

ISS (Istituto Superiore di Sanità): National Institute of Health

ICE (Istituto nazionale per il commercio estero): Italian Institute for Foreign Trade

IFIIT (Indice di Fiducia sugli Investimenti in Innovazione Tecnologica): index measuring confidence on investments in technological innovation

ITT (Istituto Italiano di Tecnologia): Italian Institute of Technology

MEF (Ministero dell'Economia e delle Finance (Ministry of Economy and Finance)

MSE (Ministero dello Sviluppo Economico): Ministry for Economic Development

MUR (Ministero dell'Università e della Ricerca): Ministry for University and Research

NETVAL(Network per la Valorizzazione della Ricerca Italiana): Italian Network for the Valorisation of Research Results.

NRP: National Reform Programme

OECD: Organization for Economic Cooperation and Development

PNR (Programma Nazionale della Ricerca): National Research Plan

PICO (Piano per l'Innovazione, la Crescita e l'Occupazione): National Reform Plan – Plan for Innovation, Growth and Employment

PON (Programma Operativo Nazionale): National Operating Programme

POR (Programma Operativo Regionale): Regional Operating Programme

PRAI (Programma Regionale di Azioni Innovative): Regional Programme of Innovative Actions

PRO: Public Research Organizations

RIDITT (Rete Italiana per la Diffusione dell'innovazione e il Trasferimento Tecnologico alle imprese): Italian Network for Technology Transfer

R2B: Research to Business

R&D: Research and Development

S&T: Science and Technology

UN: United Nations

