

Next generation innovation policy

The future of EU innovation
policy to support market growth

In collaboration with:

 **ERNST & YOUNG**
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Foreword



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The future of European organizations and corporations is interlinked with the ability of Europe's policymakers to create the environment for innovation to flourish.

Innovation is key to long-term growth. It has been a priority for European policymakers since the Lisbon strategy was launched in 2000, and a number of EU initiatives have been developed over the past decade. However, now is the time to take a fresh look at a dynamic and renewed policy to drive innovation. Why? Because profound social and economic shifts, such as the rising economic power of the emerging markets and an aging population in many developed markets, demand a new, more competitive approach.

In order to generate growth and prosperity, Europe needs a policy that is market driven and firmly supports an environment of innovation, and transforms these new ideas into new businesses and new solutions.

Together with the Centre for European Policy Studies (CEPS), a renowned think tank based in Brussels, we have undertaken a study among industry experts that focuses on EU innovation initiatives and identifies changes that would lead to more responsive and dynamic innovation policy.

Our report asks, what would this policy look like? What needs to be changed for policy to be more effective and create growth? How can innovation policy

better consider industry needs and evolving market trends at a very early stage of formulation?

Understanding the causes of the current "innovation gap" in Europe is the first step toward finding an acceptable solution. But, because markets and technologies constantly evolve, it makes little sense to look at only the economy of today. Governments also need to strengthen their engagement with and understanding of future market developments. This can be achieved through continued dialogue with European companies to understand the rapid changes that are occurring in the markets of tomorrow, and the competitive position that European organizations must maintain to meet future industry and consumer needs.

The future of European organizations and corporations is interlinked with the ability of Europe's policymakers to create the environment for innovation to flourish. We look forward to participating in the discussion.

Further information can be found at www.ey.com/government-innovation.

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Executive summary: Towards smart, sustainable and inclusive innovation



This report demonstrates that innovation policy around the world is becoming increasingly complex, and such complexity is even more visible in a multi-level government framework such as the European Union.

However, it would be unfair to state that the European Union – and in particular the European Commission – have paid insufficient attention to the problem of the “innovation gap” between the EU and other regions of the world. The proliferation of initiatives in support of innovation has been breathtaking in the past decade, but notwithstanding the efforts devoted at EU and national level, EU competitiveness in the global economy is falling backwards, with the US and Japan consolidating their lead, and BRIC countries quickly catching up.

As we state in this report, an analysis of the emerging trends in markets and industries shows that a well-conceived innovation strategy must use a broader set of tools compared to what has traditionally been the domain of innovation policy. Specifically:

- ▶ **Some of the existing tools must be revised**, including:
 - (i) financial instruments to support innovative SMEs;
 - (ii) public-private partnerships for the deployment of infrastructure and other enabling products and services;
 - (iii) university-industry technology transfer schemes that aim to foster the commercialization and marketability of the results of research that takes place in European Centers of Excellence; and
 - (iv) a pan-European strategy to promote the development of new skills for new jobs.

- ▶ **New tools have to be conceived and implemented.** This is the case of (i) permanent platforms for early-stage and ongoing industry consultation; (ii) demand-side policies, especially relate to the use of public procurement to created demand for innovative products; (iii) the creation of “innovation ecosystems”, or platforms dedicated to facilitating the

cooperation between different players along the value chain, including intermediaries and Open Innovation Accelerators; (iv) the full exploitation of European excellence by promoting the creation of pan-European clusters, connected with related clusters and industries in other regions of the world.

- ▶ **Innovation policy should be better coordinated between the EU and the national level.** Our analysis revealed the need to centralize EU innovation policy in a number of domains in which the minimum scale of innovation incentives is too large for mere national policy. A thorough subsidiarity test is needed to identify the areas in which the existing fragmentation of national innovation policies is hampering EU competitiveness and growth. (Subsidiarity is a principle of EU law that states that EU may only act where action of individual countries is insufficient.)

The results of our survey of industry experts confirmed the need for an “innovative innovation policy.” This report aims to kick-start this debate by illustrating a number of avenues for reform. When coupled with adequate regulatory reform and simplification of investment-related legislation, these proposals show the potential to bring Europe back on track in the quest for international competitiveness. Countries such as the US and Japan are already leading the way towards these developments and it is partly reassuring that the European Commission, despite its limited powers, seems to understand the imperative to move in the direction of a more coordinated, dynamic and technology-neutral innovation policy as the only chance for Europe to achieve the long-term targets set by the EU 2020 Agenda.



Introduction: why is innovation so important?

All around the world, governments are looking for opportunities to foster economic recovery in the aftermath of one of the deepest economic crises of modern times. **Everywhere, innovation is evoked as the main avenue for achieving economic growth and competitiveness.** For example, in his 2011 State of Union Address, US President Barack Obama warned of a “Sputnik moment” in calling for the US to confront international economic competitiveness and innovation policy challenges. Similarly, European Commission President Jose Manuel Barroso stressed the need to speed-up investment in future prosperity through new sources of growth, in particular by “supporting business and investing in the growth industries of the future like green energy, innovative start-ups and advanced manufacturing.” Throughout the European Union, awareness of the need to shift gear to regain competitiveness is mounting: heads of large states such as the chancellor of Germany Angela Merkel and the French president Nicolas Sarkozy have recently called for boosting economic recovery, especially through energy policy and innovation.

This should come as no surprise: **economic theory is unanimous in concluding that technological innovation is a key contributor to long-term well-being.** Innovation improves well-being and benefits future generations in several ways: biological innovation mitigates disease and hunger and thus contributes directly to health; innovation in communications and the organization of information fosters educational, political, and social development; innovation in smart grids leads to more efficient and sustainable energy consumption, and so on. And most importantly, innovation is the engine of economic growth, which is central to increasing well-being, particularly to the extent that the fruits of this economic growth flow in some measure to the least well-off. More specifically, innovation fuels economic growth by creating new markets and reaching new productivity levels: to quote Nobel Prize winner Paul Krugman, “productivity isn’t everything, but in the long run it is almost everything.”¹

At the same time, **innovation is a very difficult subject for public policy: it is at once a pervasive and elusive subject.** It is pervasive since it entails both government and private investment; it is pervasive since it permeates all areas of public policy, from tax to labor, from telecoms to energy, from competition to industrial policy, from education to intellectual property, from immigration to health and agriculture, from

supply-side to demand-side policies; and also, because it requires actions at the global, EU, national, regional and local level. At the same time, innovation is a very elusive subject because it is hard to define (if not as “the process by which individuals and organizations generate new ideas and put them into practice”); and also because there is no easy mix, no one-size-fits all solution to unleash the potential of innovation in a given country: as will be argued in more detail below, when it comes to innovation policy, quality is as important as quantity, and control as important as speed. This is why every government wants innovation, but no government can be sure of how to boost its full potential.

This first Government and Innovation Report from Ernst & Young, in collaboration with the Centre for European Policy Studies, CEPS, will demonstrate that the greatest difficulty in innovation policy is **anticipating current developments and crafting forward-looking policy actions that will not be obsolete when they finally enter into force.** This is a tough challenge, especially in the EU where multi-level governance often significantly slows down the policy process. And it becomes tougher every day: looking at current developments, we see innovation accelerating, going “global” and becoming more “open”. At the same time, it requires more sophisticated skills, more global collaboration between public and private players, and a more constant monitoring of societal needs.

We will discuss the state of innovation in Europe from a global perspective, as well as the evolving features of innovation in the globalized world. We examine EU innovation policy, especially in light of the current policy debate on the “Innovation Union” flagship initiative recently launched within the new EU 2020 agenda of the European Union. And we discuss the results of our survey of industry experts and propose a number of policy recommendations that, in our opinion, would contribute to boosting EU competitiveness in the years to come, casting new light on the future directions that innovation policy might take to ensure economic recovery and a better business environment in the EU.

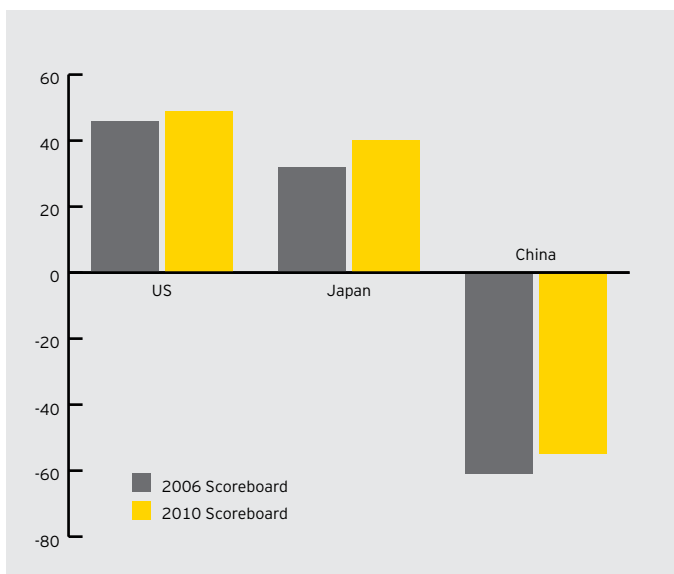
Europe and the world: larger lags, smaller leads



Over the past two decades, the gap between Europe and other regions of the world in terms of growth and competitiveness has been constantly widening. Recent data published by the European Commission in the “Innovation Union Scoreboard 2010” confirmed this trend, showing that the United States and Japan are far ahead of EU member states along several dimensions of innovation. At the same time countries that used to lag behind, such as the BRIC economies, are quickly catching up and seem likely to overtake the EU in the next few years. This is not simply a sign of decadence in Europe, but also a very undesirable development in terms of sustainable development and, overall, of the progress and prosperity that will be enjoyed by European citizens and businesses in the years to come. Even more importantly, **EU efforts in the direction of encouraging innovation, growth and productivity in member states have so far failed to prevent the emergence of a remarkable fragmentation in the innovation performance of the 27 member states of EU.**

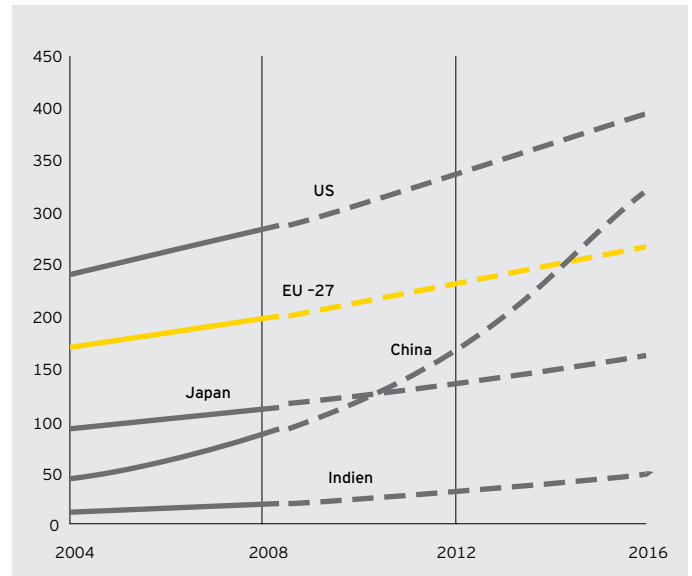
In its report on “The World in 2025”, the European Commission forecasted that **“if the recent trends continue, in 2025, the United States and Europe will have lost their scientific and technological supremacy for the benefit of Asia.”**² In particular, the US and EU will lose their primacy in terms of R&D investments, with India and China providing 20% of the world’s R&D. In 2014, China will overtake the EU in terms of R&D spending (see figure 2).

Figure 1
Research and innovation performance: US, China and Japan innovation performance in 2006 and 2010



Source: European Commission (2011)

Figure 2
R&D spending forecasts, major economies*



Source: European Commission (2011)

* € billion in PPS at 2000 prices and exchange rates, 1995-2008 (China excluding Hong-Kong)

Specific indicators: education

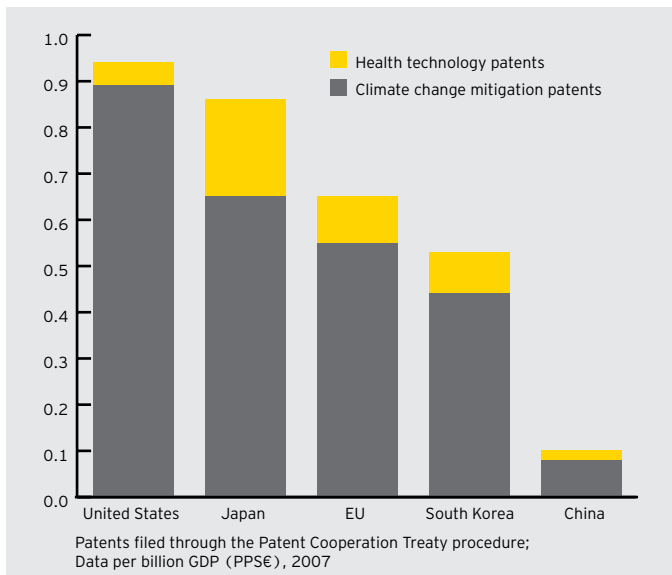
The picture becomes even less reassuring for Europe if one observes the evolution of key indicators of future innovation, such as the trends in university education and patented inventions. For example, while the EU has almost 40% of the universities in the top 500 of the Shanghai ranking, the top end is clearly dominated by the US (17 of the top 20 institutions are located in the US). **Total spending on tertiary education in the EU (as a % of GDP) is less than half the US level, mainly as a result of lower private spending in Europe.** For example, while it is estimated that 645,000 Chinese students and 300,000 Indian students will study abroad in 2025; at the same time, the number of EU citizens studying abroad is likely to remain far more limited. Today in the EU, one person in three aged 25-34 has completed a university degree, compared with more than 50% in Japan and 40% in the US³.



Specific indicators: patents

On average, European countries lag behind the US and other regions of the world in terms of number of patents as well as in license and patent revenues.⁴ The limited ability of European countries to generate innovation for future prosperity is dramatically visible in available data on patented technologies that aim at matching future needs of our ageing and environmentally unstable society. As shown in figure 3 below, health-related patents are largely dominated by the United States, whereas Japan has taken the lead on climate-friendly technologies. As these technologies are projected to grow in importance over time, Europe's competitive position is likely to become even weaker in the decades to come. This also means that, **while Europe has taken the lead in proposing ambitious emission reduction targets, the technologies that Europe and other regions of the world will employ to achieve these target will not be European.**

Figure 3
Patents on emerging technologies



Source: OECD (2010)

Private R&D spending

Besides education and patent trends, Europe's weakest link in the complex chain that contributes to innovation is private spending in R&D. Although Europe, the US, Japan and China all feature similar levels of public R&D spending on GDP, where the difference becomes enormous is in private spending. The latter is so high that in the US Google alone spends 70% more on R&D for information and communication technology, ICT, than what the whole EU spent for ICT in its Seventh Framework Program for Research (FP7) - approximately €2 billion versus €1.3 billion. Why is this? **In Europe, several obstacles seem to hamper private R&D spending.** Europe features a lack of mature venture capital markets, a very fragmented legal landscape for the development of pan-cross-border investment; a lack of scale and minimum size for innovative ventures; high levels of taxation and difficulties in hiring the best talents; never-ending problems in filing patent claims; and many others.

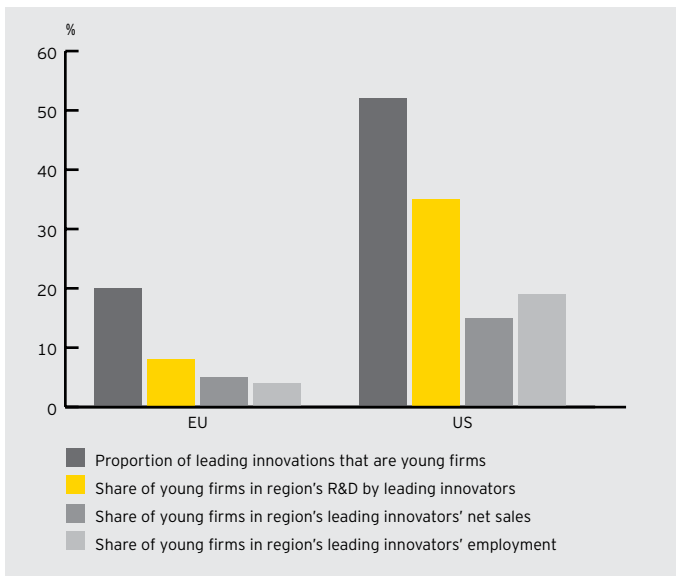
Likewise, the legal uncertainty that surrounds technology and knowledge transfer between university and industry has led Europe to a situation in which basic research still competes, in many traditional sectors, with other regions of the world. However, **in terms of bringing innovative products to market, Europe compares poorly when compared to its global competitors.**



Europe and the world: larger lags, smaller leads

Available data shows that around the world, it is mostly small companies and young, leading innovators (so-called “yollies”) that contribute to growth and innovation through their talent and risk-loving attitude, which makes them “move” the market economy. Unfortunately, in this respect Europe also seems to perform quite badly compared with other regions of the world. **US yollies contribute almost 40% of the R&D expenditure and sales of the top 1,400 R&D investing firms worldwide, while EU ones only contribute approximately 7%.⁵**

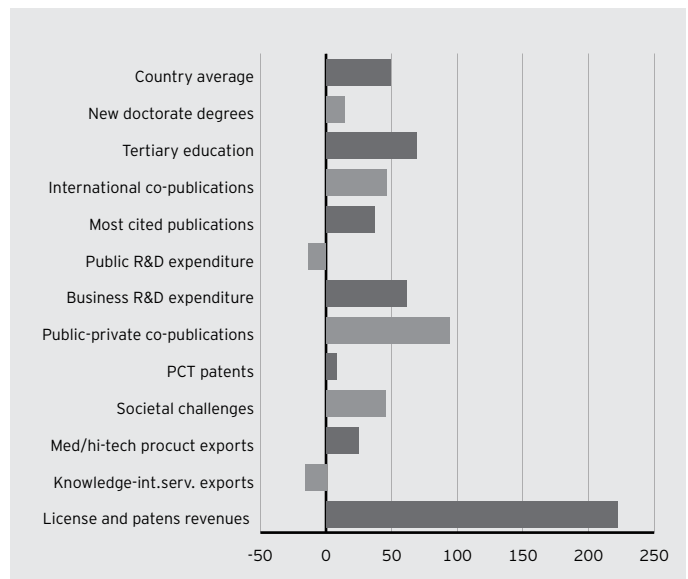
Figure 4
R&D intensity and Yollies, EU vs. US



Source: Bruegel/European Commission (2010)

Following these tendencies **Europe, absent a massive effort of both public and private players, risks being simply wiped away from the “innovation map.”**

Figure 5
EU vs. US - key indicators



Source: European Commission (2011)



EU innovation: past mistakes, current prospects

The EU innovation gap has a multitude of concurring causes, most of which have been extensively studied and highlighted in the literature, as well as in official documents released by the EU and other institutions.⁶ The level of public support to R&D and innovation investments does not seem to be the real issue. It is not the quantity of public funding of R&D and innovation, but rather its quality that hampers EU's economic recovery.

As a matter of fact, over the past few years there has been no shortage of initiatives on innovation policy in Europe. After a decade dominated by the Lisbon Agenda, the Framework Programs for research, the 2001–2005 Multi-Annual Program for SMEs, the Competitiveness and Innovation Framework Program (CIP), the use of structural and cohesion funds, the i2010 and several other initiatives, EU institutions have realized that the ambitious goals set in 2000 had not been reached, and decided to put innovation even more at the forefront of EU policies for the years to come.

This undesirable result can be seen as a combination of several factors.

- ▶ First, **responsibility for innovation policy is badly distributed between Brussels and national capitals.** In several key sectors in which innovation policy would require a coordinated and even harmonized approach at the EU level (such as cluster policy or targeted policies that stimulate venture capital and R&D investment), national governments still retain their prerogatives.
- ▶ Second, **regional policy funded by the EU budget has been insufficiently geared towards innovation**, and coordination of this policy with mainstream research and innovation policy in the European Commission has remained loose at best. One must add to this that the governance of regional policy, especially in terms of member states' reporting of the way in which regional funds are spent, has been rather poor in the past years.
- ▶ Third, even within the European Commission, **several Directorates General, DGs, and sub-offices have been sharing policy portfolios linked to innovation policy:** in particular, DG Enterprise and Industry has held responsibility for actions in support of SMEs and entrepreneurship (such as the Competitiveness and Innovation Framework Program, CIP); DG Research has retained responsibility for the funding of research up to the commercialization of innovation; DG Internal Market still manages the policy portfolio on intellectual property protection such as patent and copyright law of the European Union; DG Competition is responsible for state aids and the rules on technology ventures such as patent pools and other forms of R&D collaboration.

- ▶ Fourth, **a similar fragmentation was reflected also in the availability of budget instruments for the funding of innovation.** There are so many different programs for the funding of innovation that companies wishing to receive funding may have problems in realizing where to go and for which line of budget to apply. This overlap of budget instruments, managed by different units and sometimes different EU institutions, leads to sub-additively – i.e. the total is worth less than the sum of individual components.

Recently, with the second Barroso Commission, these problems were addressed through attempts to centralize innovation policy in the hands of a new Directorate General (DG) for Research, Innovation and Science, chaired by Commissioner Máire Geoghegan-Quinn. The new DG will face major challenges. For example, in the aftermath of the financial crisis, which wiped away a decade of economic growth, the EU has given itself even more ambitious goals compared with the Lisbon ones. The EU2020 strategy aims to reach unprecedented levels of smart, sustainable and inclusive growth, putting Europe in the driver's seat in the race for global competitiveness. But even if the new DG will to some extent, solve the problem of excessively fragmented competences within the European Commission – which is not guaranteed, given that DG Enterprise is maintaining its control on entrepreneurship and innovation – the problem of streamlining governance between the Commission and other EU institutions, as well as the need to efficiently allocate competences between the EU and national governments, will remain. In other words, **getting governance right in the Commission is important, but only means fixing a piece of a much bigger puzzle.**

Moreover, the new EU2020 strategy has been endowed with a dedicated flagship initiative (“Innovation Union”), accompanied by other innovation-related initiatives, such as “Digital Agenda”, “An Industrial Policy for the Globalization Era,” and “An Agenda for New Skills and Jobs”. This is leading to a new generation of even more ambitious policies, which seem likely to lead to an increase in the already egregious levels of public spending, and at the same time appear constrained, if not frustrated, by the lack of EU competence on issues that still pertain to national governments.

EU innovation: past mistakes, current prospects



The successor to the Competitiveness and Innovation Program, the renewed Entrepreneurship and Innovation Program (EIP), will serve as another cross-cutting instrument aimed at boosting entrepreneurship and innovation in Europe. Addressing as many as 11 different components, the EIP will focus on cluster policy and emerging industries, public procurement and many more issues. A carefully targeted initiative, this is not.

Although the Commission's commitment is undisputed, it remains to be seen whether in this case, once more, a "wealth of information" will create a "poverty of attention."

This proliferation of initiatives does not guarantee that EU innovation policy will shift gear in the years to come, leading Europe back towards becoming a leader in research, development and innovation. The reasons why this is unlikely to happen are manifold, and include the following:

- ▶ **A lack of a truly EU internal market for innovation** including lack of a Community Patent, but even more importantly a lack of clear EU rules on technology transfer and a persisting lack of standardization. The fragmentation of performance in innovation is also a mirror image of the persisting absence of a real internal market for many of the most innovative sectors, including, most notably, the services sector. Financial markets are fragmented and the level of regulation and taxes varies across countries. While a degree of diversity is required, total lack of harmonization prevents cross-border venture capital investment and the creation of funds in areas where financing for innovation is needed. Furthermore, the obstacles to individuals' mobility (in terms of taxation, portability of pension benefits, etc.) prevent professionals and businesses from reaching new markets and establishing their operations where opportunities are still unexploited. This calls for urgent action at the EU level to ensure that the free movement of capital and services are finally achieved.

The Innovation Scoreboard 2010 has highlighted that EU member states can be divided into at least four different groups: (i) Denmark, Finland, Germany and Sweden all show a performance well above that of the EU27: these countries are the **Innovation leaders**; (ii) Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands, Slovenia and the UK are termed **Innovation followers**; (iii) the Czech Republic, Greece, Hungary, Italy, Malta, Poland, Portugal, Slovakia and Spain are below average in terms of innovation and are called **Moderate innovators**; (iv) finally, Bulgaria, Latvia, Lithuania and Romania perform significantly worse than average and are termed **Modest innovators**. At regional level, the situation is even more fragmented. The level of innovation in regions varies considerably across almost all EU countries.

Insufficiently targeted financial instruments for innovative SMEs: many of the financial instruments used by the European Investment Bank are unfit for the typical small company that wishes to market innovative products or services. In most cases, the minimum size of the loans that can be granted by the EIB or other institutions is too big for small innovative companies. This is a major problem, since it is statistically demonstrated that small companies are the ones that most often prove able to implement disruptive innovation in emerging markets.

- ▶ The fact that **innovation patterns have changed enormously in the past years, evolving toward "open innovation" and more regular cooperation between enterprises in the form of collective innovation efforts**. As recently reported by the OECD, "the organization of innovative activities (technological as well as non-technological) across firm boundaries is clearly on the increase, with more balance between internal and external sources of innovation. Industries such as chemicals, pharmaceuticals and information and communication technology⁸ (ICT) typically show high levels of open innovation."

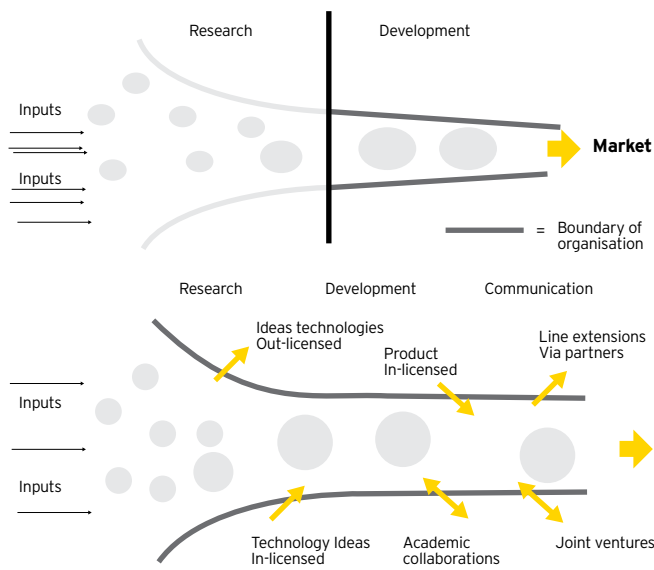


Open innovation refers to the use of internal and external R&D sources; openness to external business models, a variety of IP generators and collaborations (SMEs, academics, etc.); and proactive IP asset management. This is leading to an increase in the number of companies collaborating in innovative activities. At EU level, this new concept poses a number of challenges, such as clarifying the scope and enforcement of IPRs to reduce transaction costs in creating collaborative networks; coordinating and tailoring public support schemes to reflect the evolving nature of innovative endeavors; and removing barriers to the circulation and licensing of ideas across EU Member States. The role of patents, technology transfer and standardization is key in this respect, as will be discussed below.

► **The fact that research, development and innovation (R&D&I) activities are increasingly internationalized, while innovation policy in the EU remains essentially national in scope.** Available data shows an increased desire to have R&D closer to customers in foreign markets.⁹ Companies are internationalizing their research and innovation activities following two broad strategies: (i) an asset-exploiting strategy where firms seek knowledge about new markets to customize products and extend the expertise generated at home; and (ii) an asset-seeking strategy, whereby firms gather new knowledge and tap into the resources of a host country.

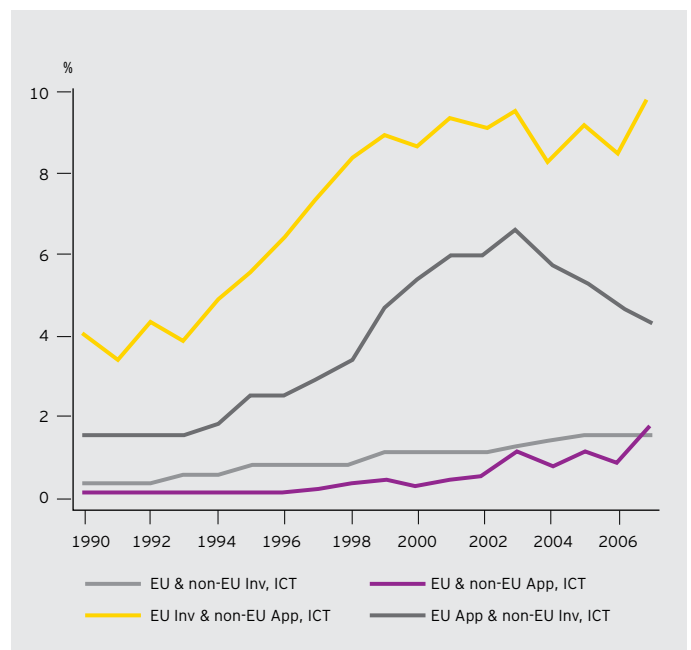
Examples of R&D internationalization include the creation of overseas R&D centers; alliances with local companies and universities; mergers and acquisitions of local firms; and increasing research intensity of foreign production facilities. In this context, data shows clearly that in international collaborations in ICT, US firms seem to be more active than EU ones: EU-Asia inventive collaboration in ICT R&D is still relatively low, while US-Asia collaboration is significantly higher than, particularly after 2000. In 2006, the Aho Report observed that the net imbalance of R&D investment by EU firms in the US compared with US firms in Europe increased fivefold between 1997 and 2002; and several major European firms no longer site new R&D initiatives in Europe.

Figure 6
Traditional vs. open innovation



Source: Chesbrough (2009) - quoted by CEPS (2010).

Figure 7
Evidence of the internationalization of R&D



Source: Daniel Nepelski, JRC from EPO PATSTAT and own calculations

EU innovation: past mistakes, current prospects



- ▶ The fact that **patterns of collaboration and research are gradually moving towards the online world**. The emerging importance of “co-innovation” initiatives, which exploit the potential of social networking and mutually beneficial cooperation between individuals belonging to different groups, is a first important example of the potential of online collaboration tools in the IT era. What was previously considered as the unique advantages of physical proximity in R&D&I (such as sharing tacit knowledge) is now being entirely transposed in the online environment.¹⁰ As a result, co-innovation is seen as the next generation of a phenomenon that was previously termed “coopetition,” emerging along with the IT revolution.¹¹ Also, traditional policies such as those on clusters and actions in support of industrial districts are heavily affected by this changing pattern of innovation.
- ▶ **The fact that innovation value chains are becoming increasingly complex**. In an increasing number of markets, different complementary goods have to be assembled together to let end users benefit from the use of a product. These markets are often fraught with network externalities: the value of a product increases along with the number of its users, and along the number of applications or additional products that can be accessed through it. At the same time, service innovation has become as important as product innovation. Finally, the need to compete on a global scale has led to the growing importance of adopting a “value chain” approach, i.e. a holistic approach aimed at locating the weakest links in the value chain, and supporting them through dedicated policies.¹²
- ▶ **The persisting tendency to “pick the winners”** that characterizes EU innovation policy in a number of fields, and especially in standardization policy. Quite often, EU policy has focused on supply-side support for specific technologies and markets: the EU seldom lets industry and consumers decide which products and technologies are likely to lead to the best outcomes for society. In this respect, there seems to be a lasting “GSM syndrome” in Europe, determined by the firm belief that harmonizing the 900 MHz spectrum band for the GSM technology in the late 1990s ultimately determined Europe’s leadership in the field of wireless telephony. The problem is that this industrial policy initiative has granted Europe a competitive advantage in the short term, but left the wireless market vulnerable to non-EU technologies as markets moved to 3G and now 4G phones: for example, in the Long Term Evolution, LTE, patent pool that is shaping the technology of 4G telephony, European companies have virtually disappeared.¹³



What innovation policy?

In the previous section, we have shown that the current “European gap” in innovation policy is likely to widen, regardless of how much of the EU budget is dedicated to innovation-related initiatives. The quality of innovation policy is clearly much more important than the quantity. For example, the EU spends more public money than the US in promoting research, development and innovation, R&D&I, but the overall result is poorer. This has an even more important consequence, outlined in a recent Task Force on Innovation Policy run by CEPS: there is a widening gap between the direction of public policy and the needs of the industry.

In addition, the current innovation landscape suggests that understanding the causes of the current “innovation gap” in Europe might well be a necessary step towards finding an adequate solution, but is not likely to be enough to restore Europe’s leadership in innovation. As markets, technologies and innovation constantly evolve, conceiving a forward-looking innovation policy for today’s economy makes very little sense – it would merely guarantee that the policy actions would be old and obsolete when finally implemented. On the contrary, a really “innovative innovation policy” requires that governments devote massive efforts to anticipating market developments by strengthening the dialogue with market players and enabling information sharing between private parties in order to gather information on market trends and future industry and consumer needs.

At the EU level, additional problems emerge since: (i) **new forms of innovation require an ever-growing scale**, and the absence of a fully-fledged internal market does not guarantee scale; (ii) **new forms of innovation require an holistic and collaborative approach**, and EU innovation policy is not geared towards that approach; and (iii) **speed is nothing, without control**: a massive effort in the direction of funding R&D and innovation does not guarantee results if not coupled with well-targeted actions, the ability to meet industry demand, an approach geared towards filling the gaps in the value chain, and a more widespread reporting and monitoring of policy actions by public authorities.

In this section, we look at the current policy mix adopted at EU and member state level on R&D&I, and then explore emerging policy alternatives for the 21st Century.

I. The current portfolio of policy tools: a critical look

Perhaps the most important problem in shaping innovation policy around the world is the fact that innovation patterns change even more quickly for policy-makers, and by the time a new generation of innovation policy reaches the market, it is already obsolete. Current policies that seek to stimulate innovation are

the result of what we understood about innovation since the 1960s. These are **mostly supply-side innovation policies**, which look at the financing of new ventures by coupling public and private resources. Also, EU innovation policy is often fraught with untargeted supply-side initiatives, and only recently started to devote more attention to the demand side.

First, the greater part of EU initiatives in support of innovation relies on the **use of financial instruments** such as loans and grants, mostly managed by the European Investment Bank, which stands as the largest lender in the world (even larger than the World Bank), through the European Investment Fund. Over the past few years there has been a proliferation of these types of funding tools in support of R&D&I. Since the late 1990s, financial resources amounting to almost €1 billion have been provided by the EU budget under three successive programs, namely: the Growth & Employment Initiative (GEI) (€ 174 million during 1998-2001); the Multi-annual Program for Enterprise and Entrepreneurship (MAP) (€ 289 during 2001-2006); and (iii) the current EIP I (€ 506 million during 2007-2013). These resources are managed by the European Investment Fund (EIF) and are used to issue guarantees to credit institutions and, more commonly, counter guarantees to existing credit Guarantee Schemes (CGS). Based on these mandates, during 2009, the EIF issued a total of € 2.2 billion of guarantees. Additional resources for credit guarantee operations are provided by the Structural Funds. Part of these funds is managed by European Investment Fund (EIF) under the Joint European Resources for Micro to Medium Enterprises (JEREMIE) initiatives. At the end of 2009, the value of the JEREMIE mandates devoted to credit guarantees was in the order of about € 770 million. The EIF has been very active in the SME Securitizations market, participating in more than 50 transactions. EIF operations typically concern tranches of up to €50 million, consisting of investment grade portfolios (minimum rating BB), with an average life of 10 years. Finally, support to SME Securitizations can in principle be provided under the current EIP, through the Securitization Window, which however has so far remained non operational. Therefore, so far EIF has been operating exclusively on its own account, charging commercial rates.

Similarly, EU support for the financing of innovation has been carried out through a variety of initiatives, including: (i) almost €1 billion already allocated to seed and start-up financing and technology transfer under the GEI and MAP (ETF Start Up, €324 million); the GIF (€623 million) and the Technology Transfer Accelerator Pilot Project (€2 million); (ii) Initiatives financed under the Structural Funds; and (iii) resources managed by EIF on behalf of the European Investment Bank (EIB).



What innovation policy?

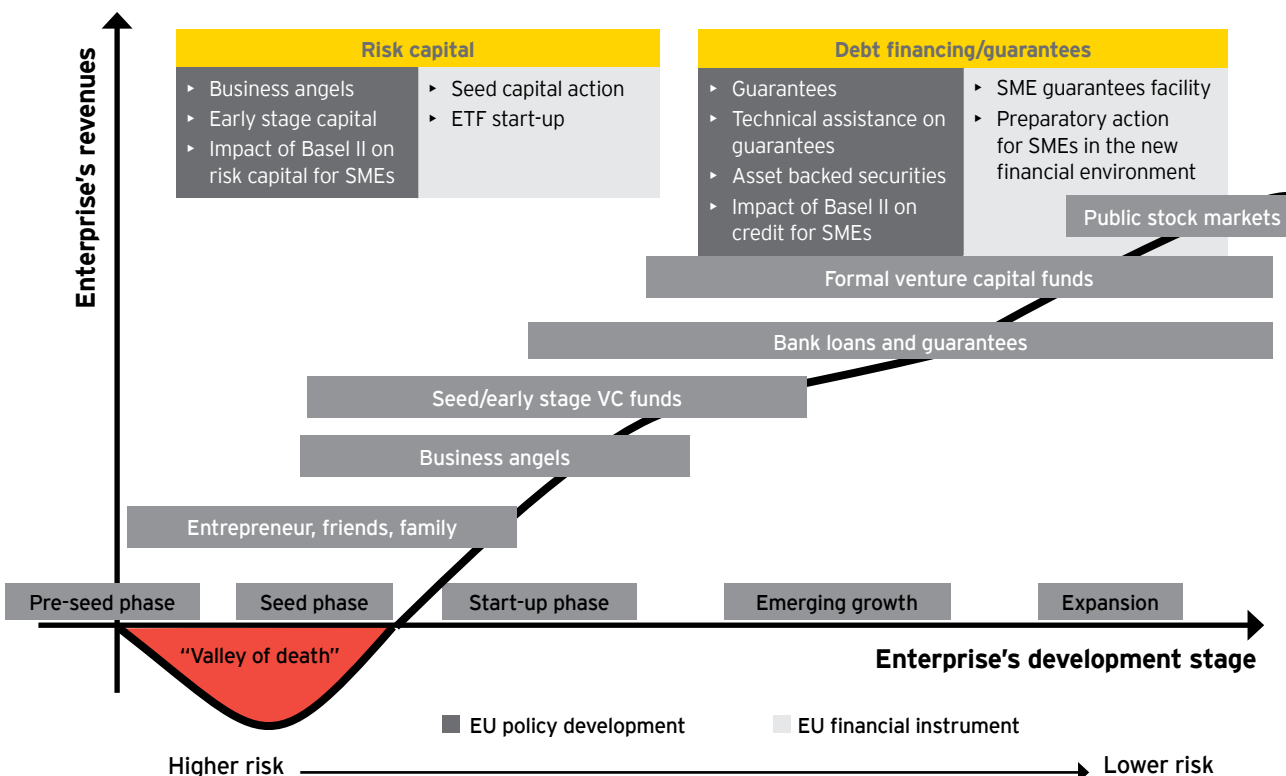
Most of the budget available in the Competiveness and innovation program, CIP, is dedicated to the use of funding instruments such as equity funding and the risk sharing finance facility (RSFF), aimed at bridging the so-called "valley of death": the latter tries to solve the typical problem faced by EIP tools in support for SMEs - i.e. the large size of loans, which is unfit to serve SMEs - by relying on credit lines set up with commercial banks that have a retailing role for SME financing. Figure 8 below shows the major instruments available during the different phases of the life of SMEs and in particular for the so-called "valley of death" i.e. from the time when a start up firm receives an initial capital contribution to when it begin generating revenues.

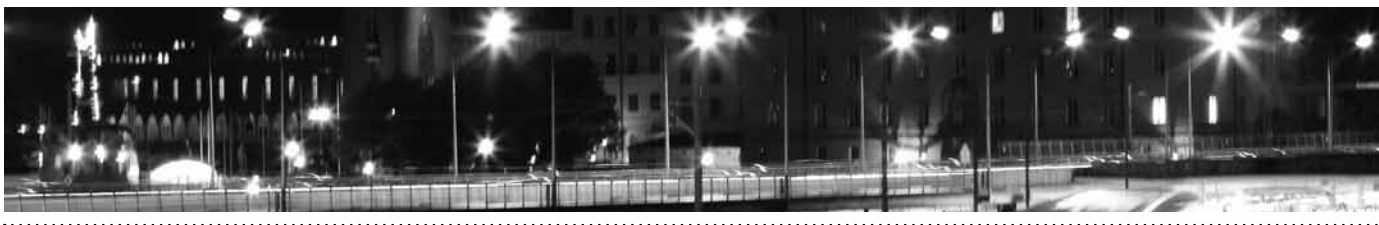
Despite this proliferation of initiatives, today the number of SMEs facing problems in accessing bank financing can be estimated at between 2 and 3.5 million. Even assuming that only in 20% of the cases the difficulties experienced are not attributable to fundamental weaknesses but rather to the lack or insufficiency of collateral, the number of SME facing a financing gap can be estimated at between 400,000 and 700,000. This is a quite

significant number, greater than the number of SMEs that benefited from the support of Credit Guarantee Schemes (CGS) in 2009, which, as indicated above, was a record year for credit guarantee activities.

Apart from the financial support for generic innovation activities, more specific types of innovation (e.g. eco-innovation, space-related innovation, key enabling technologies) and specific types of innovators (e.g. SMEs), the competence held by the European Union in the promotion of innovation still appears rather limited, and heavily constrained by a rather strict application of the subsidiary principle. Currently, in a number of areas, the EU institutions cannot be very active in stimulating innovation, as their competence is limited to encouraging the exchange of leading practices and/or cooperation across borders. For example, in cluster policy, public procurement, key enabling technologies, eco-innovation and even venture capital the Commission most often has tied hands. On the contrary, innovation and key enabling markets crucially need supranational coordination and governance to work.

Figure 8
SME development and funding instruments
Source: Renda et al. (2006)





The future evolution of Competiveness and innovation program, CIP, after the 2007-2013 multi-annual Financial Framework is likely to entail as many as 11 different lines of action: Financial instruments; the Enterprise Europe Network, Eco-innovation, Clusters and emerging industries, Public procurement for innovation, Key enablers: Technologies, ICT and Skills, Support for innovative SMEs, Space-related initiatives, SME support abroad, Tourism and Targeted actions for competitiveness.

II. Major obstacles towards a more innovative Europe

Looking at the areas of activity of EU innovation policy, and even neglecting the fact that financial instruments represent the greater part of all support activities, what emerges clearly is that **supply-side policies are still the dominant way of engaging with innovation for public policy-makers in Europe.**

However, availability of public funds is probably the least important of the problems faced by European businesses seeking innovative research and innovation paths. Merely increasing public funding is unlikely to represent an option as the EU is already above the levels of public R&D funding on GDP observed in the US or Japan. At the same time, EU financial markets are mature enough to support innovative ventures when they have a potential market in Europe and beyond. Certainly, the fragmentation of EU financial markets hinders the development of well-developed and pervasive venture capital. However, **European businesses face a set of important constraints**, which go well beyond the mere availability of equity funds. For example:

- (i) The lack of an internal market limits the incentive to develop new products, due to differences in technical standards, legal fragmentation and divergent conditions for market access;
- (ii) The lack of clear and effective rules on technology transfer limits European firms' potential to exploit Europe's excellence in basic research;
- (iii) The predominance of national interests in EU innovation policy limits the size of accessible markets and the possibility for European firms to engage in profitable cross-border co-innovation initiatives, which would bring together the most productive and innovative European companies from all member states;
- (iv) The lack of a comprehensive view of the innovation value chain leads policymakers to over-invest in funding instruments and under-invest in cheaper policy instruments such as demand-side policies.

Besides failing to capture the demand-side potential of innovation policy, current tools also fail to adopt a **business model approach** to innovation. This, in turn, leads Europe to

forego important opportunities. For example, in some cases public support that ultimately aims to favor SMEs should be directed at financial intermediaries, which are best placed to select the most innovative SMEs in which to invest. The absence of efficient and informed gatekeepers and investors is a chronic disease of the European economy. What's needed is helping investors invest, rather than SMEs signalling themselves as more innovative than others.

Finally, **EU innovation policy is still insufficiently targeted at the services sector**, which represents approximately 70% of the EU economy. Recently, the Expert Panel on Services Innovation chaired by Allan Mayo released an insightful report recommending that the European Commission develops a European Service Innovation Center (ESIC) to strengthen the links between policy-makers, business and academia in the field of services innovation. The ESIC would act as a central hub of expertise, and would support the activity of a proposed High Level Group on Business Services, which the European Commission proposed to establish in its recent document "An Integrated Industrial Policy for the Globalization Era: Putting Competitiveness and Sustainability at Centre Stage." Importantly, the Expert Panel's report looks at specific types of services that significantly contribute to the framework conditions in which business activity takes place. These are major drivers of innovation as they potentially change the way in which innovation is achieved by businesses. These so-called "transformative services" include:¹⁴

- ▶ Networking, connecting and brokerage services which link consumers, firms and supply chains and improve the allocation and distribution of goods and information in society
- ▶ Utilities and infrastructure services, such as telecoms, energy and waste disposal, that increasingly provide higher value-added services for their customers
- ▶ Knowledge Intensive Business Services (KIBS) that collaborate closely with their customers to help upgrade their technology, organizational processes, and business models as well as transfer knowledge and experience across sectors

Growing emphasis on these types of services is highly consistent with the idea that EU innovation policy should take a more "value-chain-oriented" approach and improve the conditions for innovation to flourish in European universities, research centers, businesses, public administrations and even among customers. Based on these insights, it is time to broaden the mindset of policymakers: **innovation policy should take a holistic approach**; it is currently too one-sided, too supply-sided, too narrow, not efficiently multi-level, obsolete, and too slow.

Towards innovative innovation policy



The previous sections have highlighted that EU innovation policy needs to be updated to fully consider industry needs and evolving market trends at a very early stage of formulation. Possible ways to accomplish this goal include the following:

1 Use ongoing consultation of industry stakeholders through permanent platforms.

New technologies that can be used to enable this ongoing exchange include the use of expert panels and wiki-government; public clearing-houses; and prediction markets.¹⁵ These initiatives would help policymakers establish policy directions and prioritize interventions and industrial policy actions in order to achieve the most effective results. Currently “obscure” concepts such as key enabling technologies (KETs) could be updated over time in light of these exchanges of information; and, more generally, policy-makers would have the possibility of adding “control” to speed, by securing the possibility to fine-tune their policy actions on the basis of market developments, and target their actions in order not to waste public money, or deploy public funding where private investment is possible and likely.

2 Enable more effective technology transfer in Europe.

The empirical literature reveals an outstanding lag between the US, Japan and Europe in technology and knowledge transfer, especially between universities and industry. The causes are manifold, but essentially reside in the need for a less fragmented internal market (i.e. a larger potential demand for university-driven innovative products), more legal certainty and a business environment that is more conducive to co-investment. One option might be to transform the role of the government to that of mere “command and control” regulator to that of “facilitator” of private-private partnerships and “Co-innovator” in the context of public-private partnership (see #5 below). In addition, governments can enable more effective technology transfer by creating innovation platforms and promoting open and interoperable environments to the benefit of all SMEs (see #4 below). Finally, governments have the more general task of creating an environment that is conducive to a speedy and frictionless trading of technology and information - i.e. reducing, to the extent possible, transaction costs to boost private exchange and sharing of intellectual property and technology.

3 Exploit the wealth of networks.

As observed in the past years by scholars such as Harvard Professor Yochai Benkler, networks have become the dominant way of producing innovation in a number of sectors, where creativity and cooperation have become much more important than capital markets and competition as key drivers of innovation. Currently, EU innovation policy does not rely on the concept of network, but rather on financial support of the promotion of geographically concentrated clusters. However, the information revolution seems to be departing from the concept of cluster to embrace a wider model of networks of clusters or networks of innovators, which share part of their R&D and exploit network externalities and economies of scale when marketing their products. The EU27 is the ideal setting for working on networks, and past experience in research policy (for example, FP7 cooperation projects) has shown that, when carefully managed, R&D&I networks can bring important results.

4 Invest in innovation platforms.

Innovation policy meets industrial policy whenever emerging platforms are considered as a whole, and the business case for investing in those platforms is taken as the starting point to develop policy strategies. The growing importance of multi-sided markets in industries dominated by standardization suggests that whoever is able to solve the “chicken and egg” problem typical of multi-sided markets wins the game. Policymakers should look at markets according to their inherent economics, before they decide to regulate them or to intervene through untargeted policy actions.

5 Facilitate co-innovation.

Co-innovation has emerged as a way to extend the scale and scope of external partnerships and alliances to access and exploit new technologies, knowledge and markets. This term has also recently been used to refer to cases in which clients cooperate in the development of innovation, communicating their needs and specific requirements so that they are factored into the R&D process at an early stage. Co-innovation labs have been established by companies especially in emerging economies, where they are able to establish important contacts with local markets in order to gain a competitive edge in hugely attractive countries such as China, India and Brazil. At the same time, co-innovation was used by some governments as a form of PPP for innovation, as was the case in Singapore last year, with the



launch of the Public-Private Co-Innovation Partnership (CI Partnership), a platform for the Singapore Government and local companies to co-develop innovative approaches to meet government needs.

The central idea behind the CI Partnership is that “Government can better serve the public through innovations borne out of public-private partnership.” Singapore companies can also grow their innovation capability in the process, while building a valuable track record at the same time. For the development of promising innovation ideas – from conceptualization to implementation – the Government provides more than \$1.75m in funding for each company at three critical stages.

Funds are also available for projects involving demonstrating Proof of Concept, projects demonstrating Proof of Value and projects involving test bedding of prototypes. For each of these, the CI partnership entails that companies co-share a small part of the cost to ensure that they have a stake in the project, with SMEs getting greater support compared with non-SMEs.

6 Strengthen demand-side policies.

The times of “governments as obstacles” should be put to an end. Governments can stimulate innovation in many ways, creating unprecedented opportunities for European markets. These include, most notably, the use of pre-commercial and early-commercialization procurement, which can help make the most of a sector (public procurement) that accounts for as much as 17% of the EU economy. The US and Japan have already shown how profitable use of demand-side policies can boost innovation.

7 Innovative financial instruments.

As already mentioned, the proliferation of various types of financial instruments, from credit guarantee schemes to the RSFF and equity funds did not succeed in unleashing the potential for innovation in Europe to date. More targeted financial instruments are likely to be decisive in this respect, and include, among other things IP-backed finance, cooperation between governments and commercial lenders to develop standards for the use of intangible assets as collateral. Allowing IP to be used as collateral will increase the amount of funds a company, such as one in the high-tech sector, would qualify for.

8 Unleash the hidden power of PPPs.

Public private partnerships have proven at once beneficial and risky in Europe in the past. The variety of contractual schemes and governance modes that can be put in place has led to an inefficient allocation of risks and the undesirable use of public funds for services and investment that could have been provided by private parties only. Efficient PPPs today are needed for all those enabling technologies that are supposed to generate positive externalities that will not be internalized by the private investor.

9 Rethinking subsidiarity.

In a globalized world, where superpowers speak of joining forces towards common interests, the fact that innovation policy is still prey to national interests in Europe sounds increasingly odd. While US, Indian and Chinese companies’ team up to link their research efforts and create world leading products, the European Commission is still struggling to retain some power in cluster policy or in stimulating innovation networks. In most cases, Europe can only enable the sharing of leading practices and, of course, give money.

10 Improve the governance of EU innovation.

Last but not least, the governance of EU innovation policy must be carefully revisited. Although the second Barroso Commission has sought to streamline governance, there seem to remain important margins for improvement, not only in terms of subsidiarity, but also in terms of consistency between actions adopted at the EU level, in order to add consistency and coherence to EU actions in support of innovation.

Government 2.0: anticipating society's needs



In recent years, scholars and public administration experts have frequently spoken of an upcoming "Government 2.0" era, in which citizens can be involved not only as taxpayers and customers of public services, but as co-creators and co-regulators, thanks to the use of modern services to stimulate the participation of individuals in public policies. In the United States, for example, Barack Obama announced in his first speeches as President that his objectives included creating a more open government ("A clear commitment changing the way government works with its citizens: government should be transparent, participatory and collaborative".) The former Head of the Open Government Initiative in the Obama administration, Professor Beth Simone Noveck, inspired this transition with the definition of Wiki Government.¹⁶

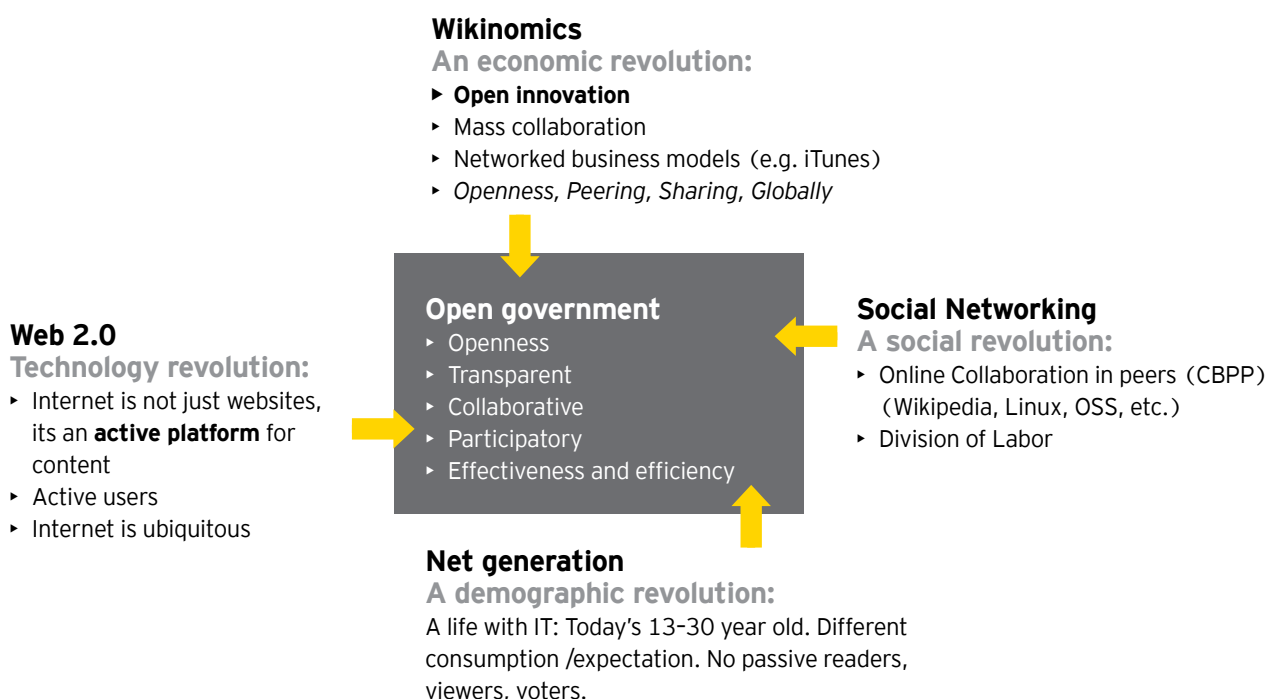
In a recent article, Hilgers and Piller (2011) define Government 2.0 as the combined effect of four concomitant revolutions: an economic revolution (Wikinomics); a technology revolution (Web 2.0); a social revolution (social networking) and a demographic revolution (the Net generation, or the generation of "digital natives").¹⁷ These four forces call on national governments and the EU to revisit the ways in which they interpret their role towards citizens and also businesses.

The same authors highlight that new ideas and insights into the directions public policy should take are already being drawn from citizens in a growing number of cases. For example, the City of Boston has developed its own iPhone App, establishing a useful bilateral channel to communicate with citizens. Big initiatives such as RebootBritain have confirmed that also in the UK the use of the web and "crowdsourcing" techniques to empower citizens and administrations is more than simply a promise. Examples are becoming countless also in Europe, and especially in the UK, where citizens' participation in local public policy has become widespread through initiatives such as askbristol.com, the Birmingham's "Open City" project and the Berlin-Lichtenberg participatory budgeting initiative.

If these options can be implemented to enable the participation of citizens to public policy, why shouldn't they be applied to innovation policy? The secret might lie in providing innovative businesses, researchers and citizens with a common platform aimed at exchanging ideas and technological solutions to better identify society's needs. Co-designing policies, co-delivering of results and co-evaluating existing policies are possible avenues of reform for an administration that is traditionally (and so far, almost inevitably) distant from civil society such as the European Commission.

Figure 9
Forces that transform government

Source; Hilgers and Piller (2011)





This possible channel of communication is even more promising as the European Commission is investing in the creation of a public “cloud” and on a European strategy for Cloud computing.¹⁸ In this context, the European Commission could organize contests for developing applications that improve public services in the years to come. As reported by Hilgers and Piller (2011), during the contest “Apps for Democracy,” 47 software programs entered the platform within 30 days: with prize money amounting to USD 50,000, software development expenses of more than USD 2 million were saved (www.appsfordemocracy.org). This is crowdsourcing: an open, constant, creative competitive dialogue for the development of innovative services through collective intelligence.

Next generation technology transfer



Technology transfer has traditionally been one of the key engines of innovation in industrialized countries, especially where education systems are well developed, and universities produce a wealth of innovative solutions through basic and applied research. In Europe, knowledge and technology transfer between university and industry is still a missing link in the innovation value chain. Among the factors that have hindered the development of university-industry partnerships and academic spinoffs, the most evident are the absence of an entrepreneurial culture in many European universities, the lack of a full-fledged, pan-European patent and the limited development of innovation markets and intermediaries.

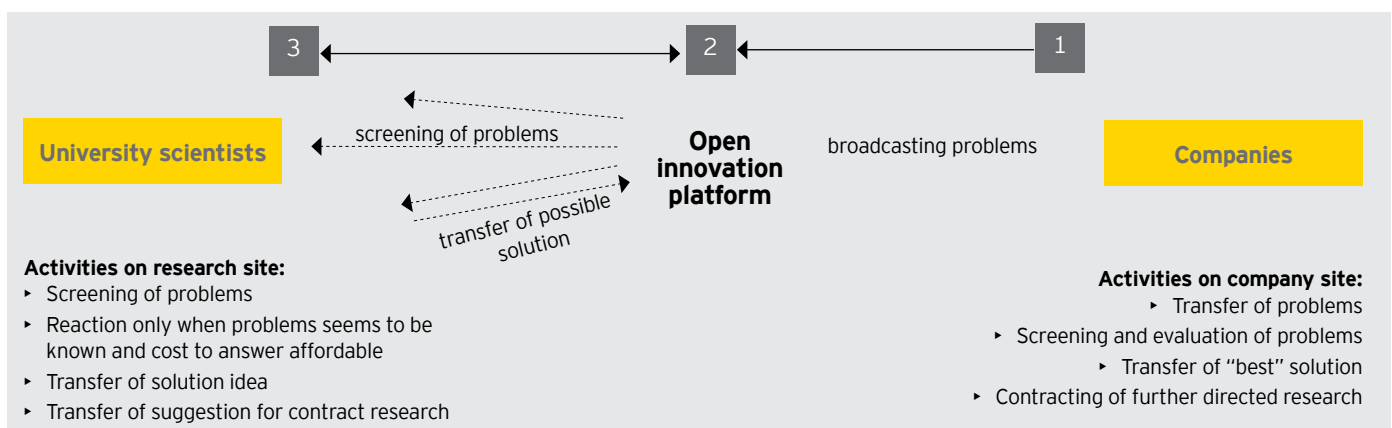
In the US, royalties from licensed inventions pay more than 3% of universities' research bill, while in the UK it is only 1%, and in many European countries much less. US institutions such as the Massachusetts Institute of Technology in Cambridge, MA, started licensing patents back in the 1940s, and the 1980 Bayh-Dole Act has boosted the creation of technology transfer institutes in US universities. While in 1972 there were only 30 universities with a dedicated institute for tech transfer, in 2003 they were more than 300. The issue of promoting more technology and knowledge transfer in Europe is even more crucial since the commercialization of innovation and the promotion of venture capital are evident, urgent problems. And tech transfer is particularly needed in key enabling technologies, such as photonics and nano-technologies, where universities hold the core of the scientific knowledge that could be usefully applied at the industrial level. The time is ripe to discuss an EU-style Bayh-Dole Act, tailored to the needs of European universities and industry. Accordingly, the European Commission has announced an ad hoc communication on the future of technology transfer and the European Research Area for June 2011.

But the problem of technology transfer is not only related to the mere exchange of IPRs and information between university and industry. Academic spinoffs and direct licensing to young innovative companies crucially need a fully functioning ecosystem, which includes the **promotion of venture capital and the emergence of open innovation intermediaries**. Innovation intermediaries are actors specialized in the articulation and selection of new technology options; in scanning and locating of sources of knowledge; in building linkages between external knowledge providers; and in developing and implementing business and innovation strategies (Bessant & Rush 1995; Howells 2006; Lopez-Vega 2009.)

In particular, recent work by Diener and Piller (2011) usefully refers to the role of emerging actors defined as **Open Innovation Accelerators (OIA)**, i.e. innovation intermediaries that operate on the behalf of organizations seeking to innovate in cooperation with external actors from their periphery. Their mission is to bridge structural disconnected knowledge pools caused by the lack of diversity within a firm. OIAs offer one or several methods of open innovation (e.g. idea contests, broadcast search, co-creation toolkits) and complementary services for the innovation process.

In short, OIAs engage in scanning and gathering information, and facilitating communication and knowledge exchange. But next generation technology transfer needs the creation of innovation platforms and hubs, where intermediaries can operate in search for valuable new ideas and opportunities, closing the gap between universities and industry. The form of those new platforms and hubs is discussed in the next section.

Figure 10
Open innovation accelerators
Source: Piller (2011)





From markets to platforms, networks and hubs

Traditional innovation models are based on the idea of markets and firms. The market economy has determined the emergence of complex, internalized value chains in which the R&D activity of firms took place mostly as an intramural set of tasks. The need to preserve trade secrets or the technical information and tacit knowledge embedded in patented products has been the driving force of this development, with businesses replacing the risks and transaction costs of market exchanges with hierarchies in which information and knowledge was kept within the boundaries of the firm (Williamson 1975).

Alternative governance mechanisms that emerged in the past century could also entail the participation of a multitude of firms. However, this was mostly a “one-to-many” type of governance, with a single undertaking retaining control over the whole value chain and related industrial results. Even in IT industries, at the outset, prevailing business models were based on the externalization of certain functions, but always tied to non-disclosure agreements.

Today, the development of new technologies, the prominent role of network externalities in many innovation markets, the advent of Web 2.0 and the increasing sophistication of industrial customers and households have made those business models obsolete. Even in traditional innovation-intensive and patent-intensive sectors such as pharmaceuticals, companies have embarked in a radical transformation of their business models. And the role of the government, from that of regulator and enforcer, has become increasingly one of “facilitator” and “co-innovator”.

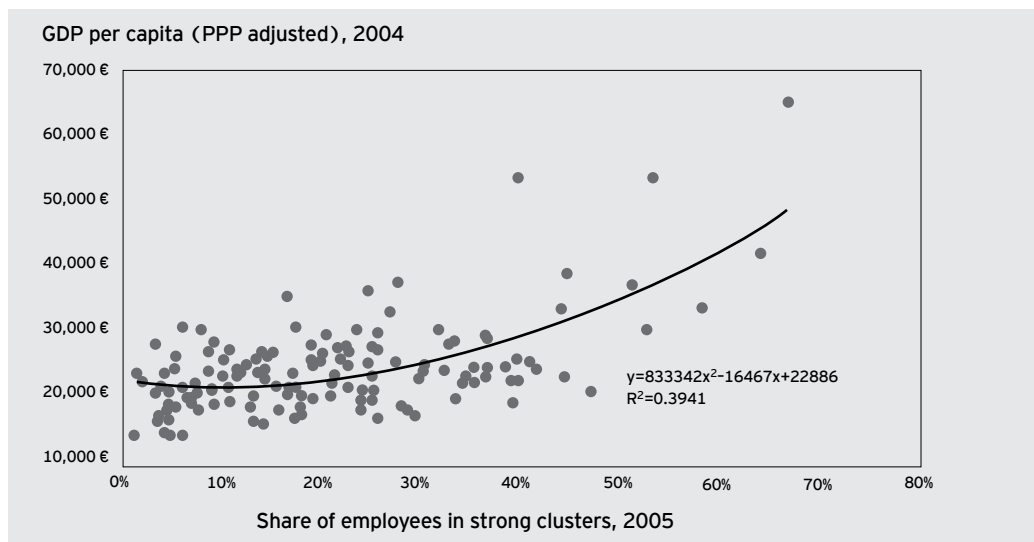
In order to fully exploit the potential of new technologies, it is necessary to move from a concept of “market” to a more value-chain-oriented approach. Economic theory has begun to move away from the concept of market when Michael Porter introduced the idea of “cluster policy”, drawing also on existing industrial realities, such as that of industrial districts in 20th Century Italy. Porter’s ideas were ground-breaking for innovation economics and policy. Today, it is widely acknowledged that the cluster form has a very important impact on transaction costs and knowledge-sharing, and can prove very important for innovation and competitiveness, skill formation and information, growth and long-term business dynamics. A recent study published by the Metropolitan Policy Program at Brookings emphasizes the potential of clusters run by well grounded strategies to accelerate sustainable growth and employment. Figure 11 below shows the positive relationship between employment in clusters and GDP per capita for regions of Europe.

Given that 38% of European employees work in industries that concentrate regionally, clusters are extremely important for the EU economy. Recent studies have found that companies that belong to industry clusters achieve greater productivity and innovation, and those new firms that belong to clusters exhibit higher survival rates and growth¹⁹.

Despite the fact that Porter’s ideas have permeated innovation policy in many EU member states, there is evidence that Europe is lagging behind other regions of the world in terms of the dynamism of clusters and the organization of a full-

Figure 11
Clusters and prosperity

Source: European Commission, *Innovation Clusters in Europe: A statistical analysis and overview of current policy*, 2007.



From markets to platforms, networks and hubs



fledged cluster policy. Specifically, clusters – defined as regional agglomerations of co-located industries and services – are too fragmented and need to be consolidated in order to emerge as true competitors with other world regions.

The European Commission is today heavily committed to help achieving world-class clusters in the EU:²⁰ however, so far subsidiarity constraints have limited the possibility for Europe to successfully stimulate and foster the emergence of such global-scale clusters. More centralization at the EU level, today, would certainly enable a more efficient and effective cluster policy.

Economists and industry experts seem to agree on one fact: geographical proximity belongs to the past of cluster policy, while **modern clusters are community-driven, not geography-based**. As reported in a recent study by Cisco (2011), modern clusters and so-called “innovation hubs” should be characterized as “digital communities of interest, cohering through close intellectual proximity, and not solely through geographic proximity,” also due to the growing power of online social networks and collaboration tools in the business sphere.²¹

But this is only part of the story. Besides becoming more community-driven and increasingly digital, clusters are also heavily affected by the changing structure of certain markets, and the complex dynamics of competition in many industries. Many new markets, including those for new enabling technologies and transformative services, are characterized by the following features:

- ▶ **Modularity:** products are composed of several “complementary units”, often produced by different companies, which must interoperate to enable use of the product. In many cases, there is a need to pool different patents and other IPRs (intellectual property rights) in order to enable the creation and marketing of those products.
- ▶ **Interoperability.** The increasing complexity of value chains in many markets and the modularity of modern system goods lead mostly to the predominance of incremental innovation over disruptive innovation. “Innovating together” is a lot easier whenever businesses and researchers share common themes and objectives, something that can be achieved only through **innovation platforms**.

- ▶ **Complexity/convergence.** The challenge in many markets is to merge inventions and technological solutions developed for sectors that were previously separate. Ideally, the cluster of the future may merge competences and skills developed in different areas of specialization, and different geographic regions.

The consequences of the changing nature of clusters for EU innovation policy are dramatic. Several governments have already understood the potential of creating communities conducive to joint innovation and sharing of ideas on priorities and technological solutions by government, industry, clients, academia and citizens.

- ▶ **In the UK, the Technology Strategy Board (TSB)** was established at the end of 2004 to ensure the technology and innovation priorities for the UK reflected business needs and had a clear market focus leading to wealth creation. To support this approach, in **November 2005 the TSB introduced the concept of Innovation Platforms**, i.e., a new way of working for Government and business that is seen as an opportunity to generate more innovative solutions to major policy and societal challenges. The TSB is currently investing, along with business and public sector partners, in five Innovation Platforms: (i) assisted living; (ii) low carbon vehicles; (iii) intelligent transport systems and services; (iv) low impact buildings; and (v) network security. Over the next three years the UK government plans to introduce a further five Innovation Platforms, in areas that address other major societal challenges.²²
- ▶ **In the United States, innovation platforms have been put at the center of the Obama administration's innovation program.** The 2011 Strategy for American Innovation specifically cites the need to “catalyze innovation hubs and encourage development of entrepreneurial ecosystems,” looking for new opportunities to bring talented scientists and entrepreneurs together to support innovation in cutting-edge areas. This concept underlies the Department of Energy's Energy Innovation Hubs program and is also driving the Startup America initiative's focus on building connections between established and new entrepreneurs, including those making the leap from lab to industry.²³ Several innovation



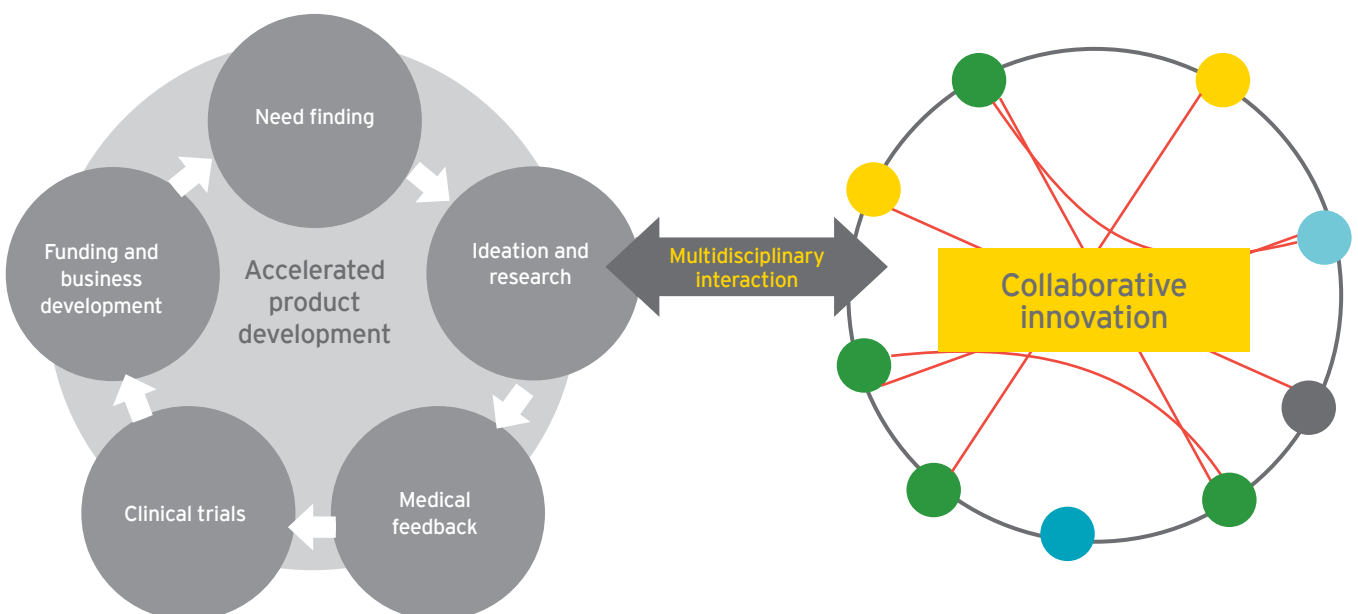
platforms have been created in recent years also by universities to bridge the gap between academia and industry, civil society and government. For example, MIT's Innovation in Informational health (IIH) platform has partners in the United States, Nicaragua, Honduras, Peru, Tanzania, India and Pakistan. Figure 12 below shows the model adopted by the IIH: the Accelerated Product Development (APD) framework (shown at far left) is informed by the collaborative innovation and takes those research ideas into hands-on projects. The IIH APD can take an idea from inception, into medical feedback, through clinical feasibility studies and trials and provide assistance in funding.

- **The concept of innovation platforms is also being adopted at EU level, in particular through the work of the European Institution of Innovation & Technology (EIT).** Since 2010, the EIT has worked intensively on the creation of a number of Knowledge and Innovation Communities (KICs), which are de facto innovation platforms characterized by co-location of innovation centres, and a multitude of interconnected

communities. In December 2009, the first three KICs were launched in the fields of Climate Change Mitigation and Adaptation (Climate-KIC); Sustainable Energy (InnoEnergy) and Future Information and Communication Society (EIT ICT Labs). One example of the types of players involved and the geographic coverage throughout the territory of the EU, is InnoEnergy KIC. The community involves 13 companies, 10 research institutes and 13 universities. Half of the partners are from the industry, and the KIC features strong connections with the industry and venture capitalists.

The initiatives launched by the EIT are indeed promising, because they also take a pan-European perspective in a setting in which national prerogatives tend to prevail over an otherwise obvious case for centralization. With a strengthened EU legal framework for venture capital, cross-border investment and dispute resolution, Intellectual Property protection and university-industry partnerships, these types of knowledge communities can really bring Europe to higher levels of competitiveness.

Figure 12
MIT's IIH platform
Source: MIT



Harnessing the power of demand-side policies



Recently, President Obama announced that he has directed “agencies to purchase 100% alternative fuel, hybrid, or electric vehicles by 2015”, in order to reduce the environmental impact of the federal fleet. By doing this, the US Government will also stimulate innovation in the field of green vehicles.

This is a perfect example of how governments can stimulate innovation by acting not only as facilitators and regulators, but also as customers in need of new products and services. By expressing their needs for innovative products and solutions, governments can become engines of new investment and the application of innovative technological solutions. As stated i.a. by the Aho report in 2007, demand-side innovation policy is at once the most promising and the most under-represented approach in EU innovation policy. The EU2020 strategy and, in particular, the Innovation Union flagship initiative, contains some elements of demand-side policy, but a lot more seems to be needed to make public procurement an engine of innovation and growth.

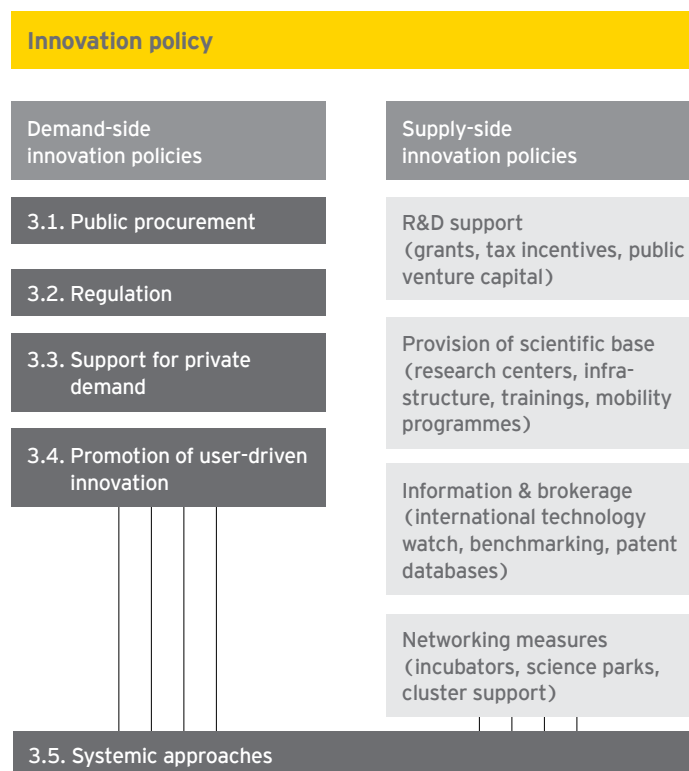
Europe should also boost public procurement of innovative solutions, in particular through pre-commercial procurement.

Public procurement in the EU represents around 19.4% (€2,200 billion) of the EU's GDP. Public authorities have a substantial purchasing power that they could use to stimulate innovation. However, in contrast to other countries, only a few innovations are supplied or demanded by public procurers in Europe. In Japan, a long tradition of demand-side policy is now being consolidated in the 4th Science and Technology plan, which is mostly based on the idea of prioritization of R&D for sustainable development and the creation of Innovation Platforms. In the US, public procurement - including through the Small Business Innovation Research initiative (SBIR) - plays a substantial role both in developing technology and providing innovative solutions to societal challenges if they cannot be addressed with existing products and services. The US public sector procurement of R&D is about 20 times bigger than in the EU. However, it should be noted that a large amount of the US public sector procurement of R&D relates to defence and space budgets.

Public procurement is insufficiently used to stimulate innovation in Europe for several reasons. These include the wrong incentives (procurers tend to favor low cost, low risk solutions); lack of knowledge and capabilities of public procurers; no strategy that links public procurement with public policy objectives (e.g. health, environment, transport) and research, development and innovation (R&D&I) support initiatives (typically grant funded); fragmentation in demand; barriers to access to public contracts as SMEs cannot cope with public procurement at the first stage, they often act as subcontractors. This hampers the access of public authorities to the innovative potential of SMEs, who play a key role in creating innovations and innovative solutions.

Figure 13
Innovation policy: taxonomy of measures

Source: Orange (2010)



Public procurement networks and LMI

In 2006, the European Commission launched the Lead Market Initiative (LMI) to boost the use of public procurement for innovation. A “lead market” is the market of a product or service in a given geographical area, where the diffusion process of an international successful innovation first took off and is sustained and expanded through a wide range of different services.

The long-term goals of the Lead Market Initiative were clearly stated in the conclusions of the May 2008 Competitiveness Council: (i) to remove obstacles to enable European enterprises to enter new and fast growing global markets and (ii) to facilitate the faster uptake of new products, services and technologies. The six lead markets chosen were sustainable construction, technical textiles for intelligent personal protective clothing and equipment, bio-based products, recycling, eHealth and renewable energy. These markets are highly innovative, provide solutions of broader strategic, societal, environmental and economic challenges; and have a strong technological and industrial base in Europe. Under the LMI, three public procurement networks became operational in September 2009:



- ▶ **The Sustainable Construction and Innovation Network (SCI-NETWORK)** brings together a strong group of public authorities and other key stakeholders wishing to drive sustainable innovations in public construction and regeneration projects across Europe. The network hopes to help combat the cross-border fragmentation of the sector and ensure the spread of good ideas. Specific working groups will focus on three topics: renovation of existing building stock, innovative building materials, and the use of life-cycle analysis (LCA) and life-cycle costing (LCC).²⁴
- ▶ **The Low Carbon Building (LCB) - healthcare network** will create a platform for a network of public procurement stakeholders that wish to be proactive in stimulating innovative low-carbon building solutions for the health care sector. A platform for a network of public procurement stakeholders that wish to be proactive in stimulating innovative low-carbon building solutions for the healthcare sector will be created. Demonstration pilots will take place in all consortium countries aiming at collating, testing and developing further the tools created and enabling the spread of leading practices.²⁵
- ▶ **ENPROTEX** seeks to spark innovation of protective textiles through public procurement to meet the future needs of

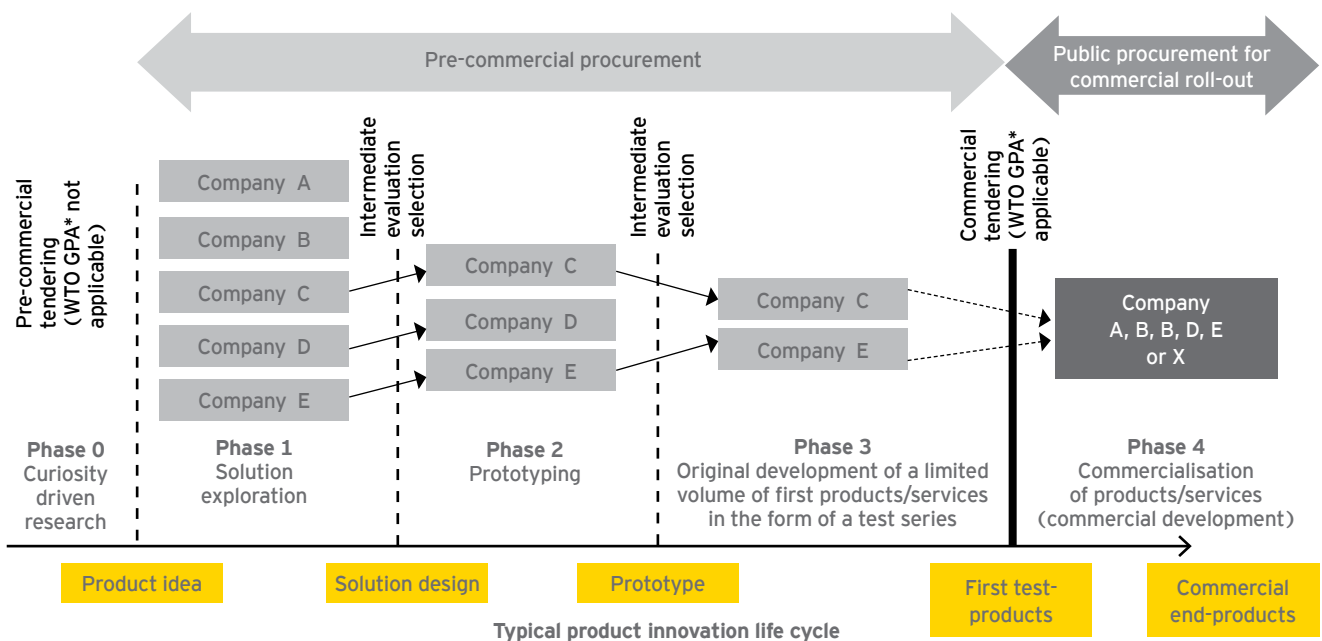
fire and rescue services using a number of methodologies including; establishing and sustaining a specialized platform of European Network of Public Procurement Organizations; developing cooperation among public procurers; providing an interface with both end-users and manufacturers. In particular, the project will aim to provide industry with forward commitments for the procurement of protective textiles products to encourage innovation in the sector.²⁶

The SBIR experience

In the 1980s, the US launched the Small Business Innovation Research (SBIR) and Small Business Research Initiative (SBRI), which focus on using the procurement of public authorities to foster R&D and innovation. The main objectives are to stimulate technological innovation, to use small business to meet federal R&D needs, to foster and encourage participation in technological innovation by minorities and disadvantaged persons, and to increase private sector commercialization of innovation derived from federal R&D. These initiatives are especially targeted at SMEs and offer a way of connecting innovative new enterprises with public authorities to explore new ideas and bring forward technologies and services. Public authorities run a competition for innovative ideas, and winning

Figure 14
Pre-commercial procurement: a scheme

Source: European Commission (2008)



*GPA = Government Procurement Agreement



Harnessing the power of demand-side policies

enterprises receive contracts (not grants) for R&D. The UK and the Netherlands developed SBIR/SBRI-initiatives based on the US SBIR policy, which has the longest history.

Since 1982, 17,500 enterprises have been involved with US SBIR for an amount of USD 27 billion. The projects have resulted in 68,000 patents and more than USD 36.5 billion of additional equity. Almost half of the SBIR projects that passed through the two phases of the selection have reached the market.

In 1999, Joshua Learner of Harvard Business School compared 500 companies that had received SBIR contracts with 900 matched companies which hadn't and concluded that the SBIR firms had created five times as many jobs over a 10 year period. In regions with high levels of entrepreneurial activities, such as Silicon Valley and Boston, the difference was 17 times. An analysis of companies receiving National Science Foundation contracts tells a similar story.

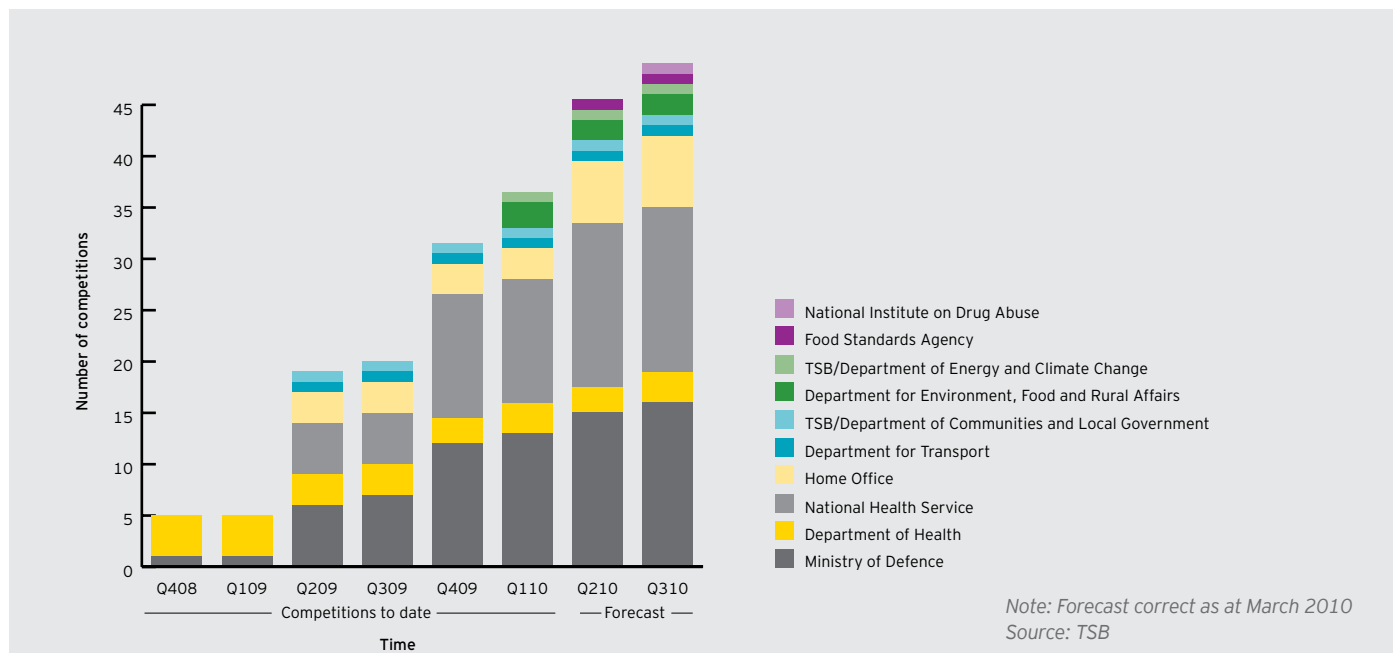
In the UK, a similar initiative was established in 2001 and had a very slow start because only a few departments adopted it. In fact, the SBRI wasn't successful in the period 2001–2008 for a number of reasons, including lack of focus on innovation in spending departments, but also lack of legal certainty as regards the need to apply EU procurement or state aid legislation. In 2008, the UK SBRI was remodelled in a way that resembles more the US SBIR.

The Netherlands introduced a twofold SBIR-like scheme, one departmental SBIR and one managed by the Netherlands Organization for Applied Scientific Research (TNO). Eighty project ideas from TNO have been put forward within the Dutch SBIR, which resulted in 299 requests for background information. In total, 142 proposals for feasibility studies were submitted, of which 27 were carried out, and 10 successfully moved on the next phase of R&D. So far, only four have been completed. Out of the total number of companies that put forward a proposal, 95% were SMEs. In 2010 a first evaluation of the Dutch SBIR was carried out, mostly as regards the project selection process, with overall positive and reassuring results.

Green Public Procurement

One area where public procurement can prove decisive for the future of European competitiveness is certainly eco-innovation, part of which is the so-called "green public procurement." This is defined at the EU level as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."²⁷ Areas where green public procurement is being launched at EU level include "white goods" (energy-efficient refrigerators, ovens, washing machines and tumble dryers); components (high-efficient motors);

Figure 15
Competitions launched in the UK SBRI





housing (energy-efficient water mixer); office blocks (control and monitoring systems, sun shading technology and lighting system); public transportation (hydrogen buses); the transport sector (hydrogen powered fuel cell, electric car, electric motors, city buses); wastewater treatment (environmental biotechnology); chemical components (DEHP-free component); healthcare products (e.g., continence care products); and energy-efficient components (pumps).

So far, available studies have shown that using public procurement in support of eco-innovation can bring substantial benefits to the EU economy, such as a 25% reduction in CO₂ emissions from certain activities, with no significant additional financial burdens for the taxpayers.²⁸ However, once again the lack of an internal market is hampering the attempts of the European Commission in the direction of a strong uptake of green procurement in the EU27. Some countries speak of “sustainable procurement,” whereas other countries are aligned with the EU definition of “green” procurement; and other countries have not defined any strategy in this respect. Furthermore, countries use different taxonomies of products and different “green” criteria, making it very difficult to compare national experiences and coordinate the advancement towards reaching environmental policy goals. Finally, attempts to steer the EU toward green public procurement have so far focused on a limited set of products.

Beyond traditional procurement: the promise of prizes

Besides incorporating innovation and other policy goals in the procurement process of EU public administrations, there is much more that governments can do to stimulate innovation in the procurement process. As observed in the previous sections, crowd sourcing practices can be used effectively during the procurement process for public services, especially when coupled with prizes and awards. The use of these tools has increased enormously in the past years. Recently, the UK government has announced a £1 million prize for the best technology platform proposed by citizens that would be able to tackle “common problems.” In April 2010, the US White House Office of Science and Technology Policy (OSTP) began requesting public input on how to implement President Obama’s innovation strategy, under the slogan “Government does not have a monopoly on the best ideas.” A website called **challenge.gov** was developed to host all government challenges that could be solved by citizens and stimulate participation. But many other websites already exist. As an example, NASA scientists trying to devise a formula for predicting solar flares decided to post their problem online and offered a USD 30,000 prize to anyone who could solve it. The contest was posted on

InnoCentive.com, and out of 579 examiners a retired radio frequency engineer from New Hampshire won the prize.

Examples are countless: The European Commission has also been experimenting with stable consultation platforms such as “Your Voice in Europe,” but these initiatives have so far seldom pushed themselves towards the creation of a real collaboration between the private sector and government in the development of innovative solutions to tackle socially relevant problems. This is, in our opinion, the next step in several countries around the world. As recalled also recently by a report of the European Internet Foundation “Digital World in 2025,” the future that can be envisaged is one of mass collaboration, in which consumers become producers (or “pro-sumers”) and governments and businesses open up their boundaries and production processes to citizens and civil society. After all, we have already seen disruptive innovation coming from mass collaboration efforts and community-driven innovation such as open source software products and creative commons licensing.

Recently, the launch of the “Social Innovation Europe” initiative in March 2011 was encouraging. The use of mass collaboration, “government as a platform” concepts and “government as a customer” concepts has permeated the European Commission’s plans for social innovation in a way that promises interesting developments.

In the future, crowd sourcing and similar variants will become a more important way of conceiving innovative solutions, and, most importantly, for societal challenges faced by EU’s ageing and increasingly multi-cultural society. This is why achieving broadband penetration throughout the European Union as quickly as possible is becoming a priority. Investing in key infrastructure is the first turning point of modern innovation policy. Europe has no time to wait for competition to lead to long-term investment when it comes to modern communications technologies. The time is already ripe to go beyond consultation and centralize innovation-related crowd sourcing into a common EU platform. Every day spent waiting for investment in high-speed broadband is a day of delay in the global context for innovative solutions, competitiveness and growth.

Views from industry stakeholders

Results of a survey among industry experts, scholars and civil servants



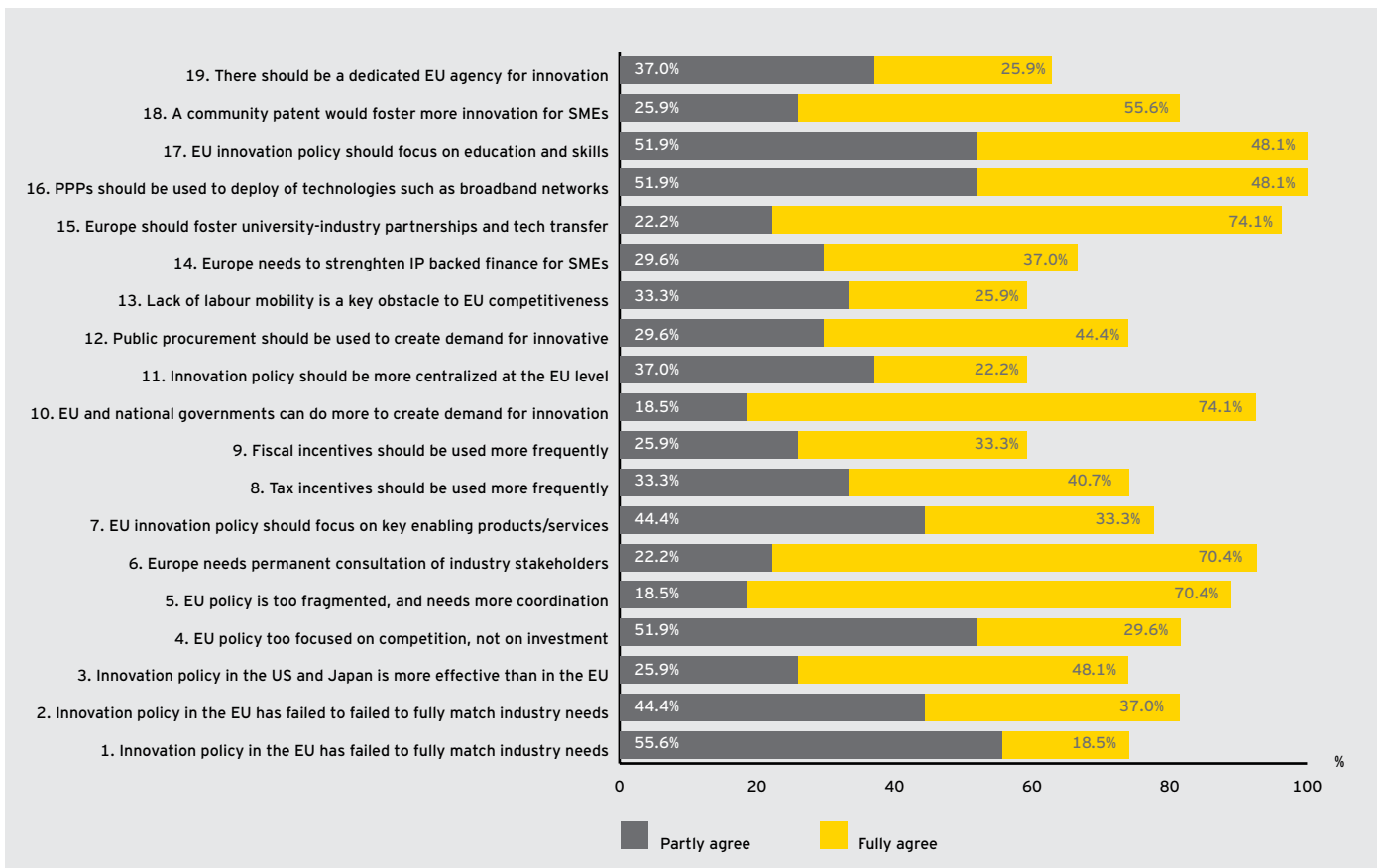
In the past sections, we have explored possible ways to improve EU innovation policy by finding new ways to involve stakeholders in the dialogue on the future direction and priority of innovation policy. In light of this approach, we surveyed a limited number of industry experts, scholars and civil servants to gather their perceptions on where EU innovation policy should be improved in the years to come. The focus has been towards the view of industry stakeholders who have innovation as part of their agenda. In order to get a timely and recent input, we performed this task during a number of events held at CEPS during February-March 2011, as well as by disseminating a questionnaire (see the Annex to this Report) to CEPS Corporate Members, a number of industry association at EU level (Busesseurope) and in some member states (The Netherlands, Italy, Sweden). We have collected 54 responses, which provide a first set of views on the main problems perceived by stakeholders with respect to EU innovation policy.

Figure 16 below shows the percentage of respondents that either partly or fully agreed with the proposed questions. As shown in the figure, the questions that met the strongest favour of the respondents were the need to focus on innovation and skills and the need to use PPPs in support of deployment of enabling technologies such as broadband. At the same time, a number of key questions were answered positively by the respondents.

In particular, the following results can be highlighted:

- ▶ **96.3% of respondents agree that university-industry partnerships and technology transfer should be further stimulated in Europe.** Looking at the current state of knowledge and technology transfer in the European Union, the fact that this statement was one of the mostly agreed in our survey may not be unexpected.

Figure 16
Percentage of respondents who agreed with the questions (all 54 respondents)



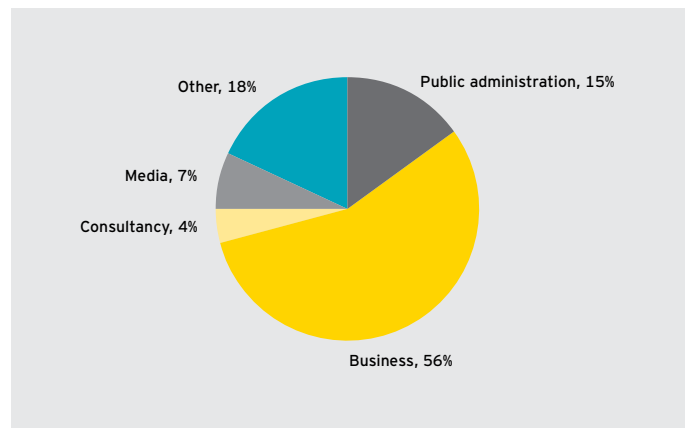


- ▶ **92.6% of respondents think that EU and national governments should do more to create demand for innovation.** This confirms the need to move towards stronger use of demand-side innovation policy, in line with what we have envisaged in the previous sections. Another related result of our survey is also the fact that 74.1% of respondents considered that public procurement should be used to create demand for innovation.
- ▶ **92.6% of respondents also think that industry stakeholders should be consulted on a regular basis and as a permanent measure.** This, as we have remarked in the previous pages, can be seen as a useful way to collect views on industry needs and organize innovation policy in a more targeted way. This view is also partly matched by the fact that 74.1% of respondents considered EU innovation policy has failed to fully match industry needs.
- ▶ **88.9% of respondents are in favour of stronger coordination of innovation policy at the EU level.** Innovation policy is seen as too fragmented at national level. This view is in line with the idea that subsidiarity should be reconsidered when it comes to innovation policy. If one considers that 81.5% of respondents replied that EU innovation policy should be thoroughly reformed, there seems to be room to advance ground-breaking changes in the way innovation is promoted in Europe. At the same time, the centralization of EU policy at the EU level and the creation of an EU agency have met with less support on the side of respondents. It therefore seems that coordination, even more than centralization, is the most supported option for the future of EU innovation policy.
- ▶ **81.5% of all respondents think that EU innovation policy has been so far too focused on competition, and not enough on providing investment incentives.**
- ▶ **However, the expansion of traditional innovation tools such as fiscal incentives was subject to a broader disagreement among the respondents.** Perhaps this could be an indication that these tools are considered to be only partly effective in promoting real innovation, due to the fact that they have been in use for a long time in the European Union, and with limited results.

In addition, the great majority of respondents think that a community patent would foster more innovation for SMEs, and that EU innovation policy should focus on key enabling technologies and services.

Figure 17 below shows the breakdown of our respondents.

Figure 17
Breakdown of respondents (n = 54)



Annex 2 to this report provides all the results of our survey, broken down by type of respondent.

As mentioned in the beginning of this section, these results are representative of a selected group of industry experts, as representatives of the business community. The responses received seem to fully confirm what we have described as the future prospects of innovation policy at the EU level for the years to come. Respondents - and in particular business representatives seem to expect a more coordinated policy, with better use of demand-side policy actions, tighter cooperation between academia and industry, renewed efforts in education and a permanent dialogue between government and industry.

Annex I: Questionnaire



This questionnaire has been designed for the purpose of collecting industry views on the future directions that public policy should take in order to stimulate innovation and progress in European countries. We highly value your ideas and your time: accordingly, we have designed a short set of 20 questions for you to answer. Should you have more time to dedicate to the questionnaire, we would highly appreciate if you could express your views also in the text box we have included in Part III.

PART I - LOOKING BACK

1. Innovation Policy in the EU has failed to fully match industry needs

I fully disagree I partly disagree I partly agree I fully agree Not sure

2. Innovation Policy in the EU should be thoroughly reformed

I fully disagree I partly disagree I partly agree I fully agree Not sure

3. Innovation Policy in the US and Japan is more effective than in the EU

I fully disagree I partly disagree I partly agree I fully agree Not sure

4. EU policy so far has focused too much on competition, and not enough on investment incentives

I fully disagree I partly disagree I partly agree I fully agree Not sure

5. EU policy is too fragmented, and needs more coordination

I fully disagree I partly disagree I partly agree I fully agree Not sure



PART II - LOOKING FORWARD

6. Europe needs forms of permanent consultation of industry stakeholders to identify industry needs and act accordingly

I fully disagree I partly disagree I partly agree I fully agree Not sure

7. EU innovation policy should focus on key enabling products/services

I fully disagree I partly disagree I partly agree I fully agree Not sure

8. Tax incentives should be used more frequently to stimulate the supply of innovation (e.g. through tax credits)

I fully disagree I partly disagree I partly agree I fully agree Not sure

9. Fiscal incentives should be used more frequently to stimulate the demand for innovative products (e.g. through tax exemptions or rebates for consumers of new technologies)

I fully disagree I partly disagree I partly agree I fully agree Not sure

10. EU and national governments can do more to create demand for innovation

I fully disagree I partly disagree I partly agree I fully agree Not sure

11. Innovation policy should be more centralized at the EU level

I fully disagree I partly disagree I partly agree I fully agree Not sure



12. Public procurement should be used to create demand for innovative products and services

I fully disagree I partly disagree I partly agree I fully agree Not sure

13. Lack of labour mobility is a key obstacle to EU competitiveness

I fully disagree I partly disagree I partly agree I fully agree Not sure

14. Europe needs to strengthen IP-backed finance for SMEs (i.e. financing of innovation that relies on patents as a collateral)

I fully disagree I partly disagree I partly agree I fully agree Not sure

15. Europe's innovation policy should encourage more university-industry partnerships and technology transfer

I fully disagree I partly disagree I partly agree I fully agree Not sure

16. Public-private partnerships should be used to accelerate the deployment of enabling technologies such as broadband networks

I fully disagree I partly disagree I partly agree I fully agree Not sure

17. EU innovation policy should focus on education and skills

I fully disagree I partly disagree I partly agree I fully agree Not sure

18. A Community patent would foster more innovation for SMEs

I fully disagree I partly disagree I partly agree I fully agree Not sure

19. There should be a dedicated EU agency for innovation

I fully disagree I partly disagree I partly agree I fully agree Not sure



PART III - YOUR VIEWS

20. Below, you can express your suggestions for the future of EU innovation policy in Europe, with neither limits nor space constraints

Annex II: results of our survey



Results for all respondents

	Full disagree, %	Partly disagree, %	Partly agree, %	Fully agree, %	Not sure, %	Total, %
1. Innovation Policy in the EU has failed to fully match industry needs	0.0%	18.5	55.6	18.5	7.4	100
2. Innovation Policy in the EU should be thoroughly reformed	3.7	11.0	44.4	37.0	3.7	100
3. Innovation Policy in the US and Japan is more effective than in the EU	0.0	7.4	25.9	48.1	18.5	100
4. EU policy so far has focused too much on competition, and not enough on investment incentives	3.7	11.1	51.9	29.6	3.7	100
5. EU policy is too fragmented, and needs more coordination	0.0	11.1	18.5	70.4	0.0	100
6. Europe needs forms of permanent consultation of industry stakeholders to identify industry needs and act accordingly	0.0	7.4	22.2	70.4	0.0	100
7. EU innovation policy should focus on key enabling products/services	3.7	14.8	44.4	33.3	3.7	100
8. Tax incentives should be used more frequently to stimulate the supply of innovation (e.g. through tax credits)	0.0	22.2	33.3	40.7	3.7	100
9. Fiscal incentives should be used more frequently to stimulate the demand for innovative products (e.g. through tax exemptions or rebates for consumers of new technologies)	7.4	18.5	25.9	33.3	14.8	100
10. EU and national governments can do more to create demand for innovation	0.0	0.0	18.5	74.1	7.4	100
11. Innovation policy should be more centralized at the EU level	3.7	33.3	37.0	22.2	3.7	100
12. Public procurement should be used to create demand for innovative products and services	11.1	7.4	29.6	44.4	7.4	100
13. Lack of labour mobility is a key obstacle to EU competitiveness	7.4	25.9	33.3	25.9	7.4	100
14. Europe needs to strengthen IP-backed finance for SMEs (i.e. financing of innovation that relies on patents as a collateral)	0.0	11.1	29.6	37.0	22.2	100
15. Europe's innovation policy should encourage more university-industry partnerships and technology transfer	3.7	0.0	22.2	74.1	0.0	100
16. Public-private partnerships should be used to accelerate the deployment of enabling technologies such as broadband networks	0.0	0.0	51.9	48.2	0.0	100
17. EU innovation policy should focus on education and skills	0.0	0.0	51.9	48.1	0.0	100
18. A Community patent would foster more innovation for SMEs	0.0	0.0	25.9	55.6	18.5	100
19. There should be a dedicated EU agency for innovation	11.1	11.1	37.0	25.9	14.8	100



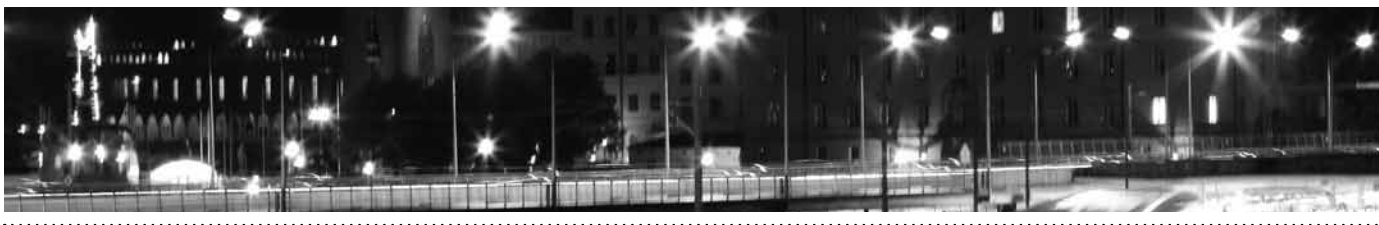
Results for business respondents only

	Full disagree, %	Partly disagree, %	Partly agree, %	Fully agree, %	Not sure, %	Total, %
1. Innovation Policy in the EU has failed to fully match industry needs	0.0	6.7	66.7	13.3	13.3	100
2. Innovation Policy in the EU should be thoroughly reformed	6.7	13.3	46.7	26.7	6.7	100
3. Innovation Policy in the US and Japan is more effective than in the EU	0.0	0.0	26.7	46.7	26.7	100
4. EU policy so far has focused too much on competition, and not enough on investment incentives	0.0	6.7	46.7	40.0	6.7	100
5. EU policy is too fragmented, and needs more coordination	0.0	13.3	26.7	60.0	0.0	100
6. Europe needs forms of permanent consultation of industry stakeholders to identify industry needs and act accordingly	0.0	6.7	20.0	73.3	0.0	100
7. EU innovation policy should focus on key enabling products/services	6.7	20.0	40.0	33.3	0.0	100
8. Tax incentives should be used more frequently to stimulate the supply of innovation (e.g. through tax credits)	0.0	20.0	40.0	40.0	0.0	100
9. Fiscal incentives should be used more frequently to stimulate the demand for innovative products (e.g. through tax exemptions or rebates for consumers of new technologies)	13.3	20.0	20.0	33.3	13.3	100
10. EU and national governments can do more to create demand for innovation	0.0	0.0	13.3	73.3	13.3	100
11. Innovation policy should be more centralized at the EU level	6.7	26.7	26.7	33.3	6.7	100
12. Public procurement should be used to create demand for innovative products and services	13.3	6.7	20.0	53.3	6.7	100
13. Lack of labour mobility is a key obstacle to EU competitiveness	13.3	13.3	40.0	26.7	6.7	100
14. Europe needs to strengthen IP-backed finance for SMEs (i.e. financing of innovation that relies on patents as a collateral)	0.0	6.7	33.3	33.3	26.7	100
15. Europe's innovation policy should encourage more university-industry partnerships and technology transfer	6.7	0.0	20.0	73.3	0.0	100
16. Public-private partnerships should be used to accelerate the deployment of enabling technologies such as broadband networks	0.0	0.0	40.0	60.0	0.0	100
17. EU innovation policy should focus on education and skills	0.0	0.0	33.3	66.7	0.0	100
18. A Community patent would foster more innovation for SMEs	0.0	0.0	33.3	46.7	20.0	100
19. There should be a dedicated EU agency for innovation	13.3	20.0	26.7	26.7	13.3	100

Footnotes and list of references



- 1 Paul Krugman, *The Age of Diminishing Expectations*, MIT Press, Cambridge (MA), 1994.
- 2 See "The World in 2025: Rising Asia and Socio-Ecological Transition," available online at http://ec.europa.eu/research/social-sciences/pdf/the-world-in-2025-report_en.pdf
- 3 See European Commission, *Background Information for the European Council, February 2011*, available at http://ec.europa.eu/europe2020/pdf/innovation_background_en.pdf.
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- 7 See OECD (2008), *Open Innovation in Global Networks*, at www.oecd.org/dataoecd/48/35/41721342.pdf.
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- 9 See, for a more detailed description and references, Granieri and Renda (2010), *A new Approach to Innovation Policy in the European Union*, cit.
- 10 See i.a. Bossink, B. "The development of co-innovation strategies: stages and interaction patterns in inter-firm innovation," *R&D Management* 32(4), 311-320.
- 11 See Brandenburger and Nalebuff (1999), *Co-opetition. A Revolution Mindset That Combines Competition and Cooperation: The Game Theory Strategy That's Changing the Game of Business*. Doubleday Business 1996.
- 12 Perhaps the most important feature of new forms of innovation is "modularity," as intended in the early contributions of scholars such as Richard Langlois. Increasingly complex products populate our markets: competition "for the market" pushes firms towards the exploitation of direct and indirect network effects by adopting semi-open and open architectures, which foster interoperability between products and a degree of standardization that helps producers of complementary goods to innovate within a given dominant platform. All IT markets, but also manufacturing sectors are interested by this development - think about emerging clusters. See i.a. Langlois, Richard N. 2002. "Modularity in Technology and Organization," *Journal of Economic Behavior and Organization* 49(1): 19-37. Langlois, Richard N., and Paul L. Robertson. 1992. "Networks and Innovation in a Modular System: Lessons from the Microcomputer and Stereo Component Industries," *Research Policy* 21(4): 297-313. See also Garud, Raghu, Arun Kumaraswamy, and Richard N. Langlois, (eds) 2002. *Managing in the Modular Age: Architectures, Networks and Organizations*. Oxford: Blackwell.
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- 14 See the Report of the Expert Panel on Service innovation in the EU, "Meeting the Challenge of Europe 2020. The transformative power of service innovation," available online at http://www.europe-innova.eu/c/document_library/get_file?folderId=383528&name=DLFE-11303.pdf
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- 17 See Gotze, J./Pedersen, C. (2009), *Government 2.0 and Onwards*. State of the eUnion. Download unter: <http://21gov.net/wp-content/uploads/e-book.pdf>. Hilgers, D. / Ihl, C. (2010), *Citizensourcing - Applying the Concept of Open Innovation to the Public Sector*, *International Journal of Public Participation (IJP2)* Vol. 4, No. 1, Jan. 2010, S. 67-88. Howe, J. (2008), *Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business*. New York.
- 18 See the speech by Commissioner Neelie Kroes, *European Cloud Computing Strategy needs to aim high*, SPEECH/11/199 of 22 March 2011.



- 19 See Europe INNOVA/PRO INNO Europe Paper n. 9, "The concept of clusters and cluster policies and their role for competitiveness and innovation: main statistical results and lessons learned," available online at http://ec.europa.eu/enterprise/policies/innovation/files/clusters-working-document-sec-2008-2635_en.pdf.
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- 21 See, Lange, A. et al. (2010), "Next-Generation Clusters: Creating Innovation Hubs To Boost Economic Growth," Cisco White Paper, at http://www.cisco.com/web/about/ac79/docs/pov/Clusters_Innovation_Hubs_FINAL.pdf.
- 22 Source: Technology Strategy Board.
- 23 See "A Strategy for American Innovation: Securing Our Economic Growth and Prosperity," by the National Economic Council, the Council of Economic Advisors, and the Office of Science and Technology Policy, February 2011.
- 24 Partners: ICLEI - Local Governments for Sustainability (Europe), Transport for London TFL (UK), City of Torino (IT), Department for Environment, Food and Rural Affairs (UK), Dutch National Procurers Association PIANOo (NL), Culminatum, Helsinki Region Centre of Expertise (FI), University of Klagenfurt (AT), Motiva, National Agency for Energy Efficiency and Renewable Energy (FI).
- 25 Partners: Department for Business, Innovation and Skills BIS (UK), Dutch Centre for Health Assets TNO (NL), Norwegian Directorate for Health Affairs (NO), Rawicz Hospital (PL), Department of Health DH (UK), European Health Property Network EuHPN (NL)
- 26 Partners: Firebuy, the National Procurement Agency for the fire and rescue service in England (UK), Belgian Ministry of the Interior IBZ (BE), Dutch national Disaster Response Agency LFR (NL)
- 27 Green Public Procurement (GPP) is defined in the Communication (COM (2008) 400) "Public procurement for a better environment." The general objective of the Communication is: "to provide guidance on how to reduce the environmental impact caused by public sector consumption and how to use Green Public Procurement (GPP) to stimulate innovation in environmental technologies, products and services." Innovative solutions can contribute to the solution of environmental challenges. Public procurement can be used to stimulate innovation to solve environmental problems. On the next pages some possible initiatives (public procurement networks and SBIR-like initiatives) are discussed which can contribute to environmental policy objectives.
- 28 See i.a. the COWI Report for the European Commission, Dg Environment, "Bridging the Valley of Death: public support for commercialization of eco-innovation," Final Report May 2009.

About the report

This Report is based on a combination of academic research, stakeholder consultation and a survey of industry experts conducted through the targeted dissemination of questionnaires. The author of this study has written extensively on topics related to emerging new business models, Intellectual Property Rights, competition and regulation and industrial policy.





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