

Growing Beyond

The power of simplicity

Toward a smarter and streamlined
innovation policy in the EU

In collaboration with:



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Foreword

Innovation. Around the world, few words enjoy such resonance across the political and business communities. And the European Union is no exception.

Gripped by the grim reality of austerity and the fear that recession may be returning to haunt their economies once more, policy-makers and business leaders are turning to Europe's innovators as the best – and perhaps only – hope for much-needed growth.

A huge range of programs, projects and funding streams have been designed to help stimulate innovative activity across the Member States. But therein lies the challenge. While acting with the best of intentions, the sheer variety of such activities means that the clarity and effectiveness that these times demand can sometimes prove elusive.

Working with the renowned Brussels-based think tank the Centre for European Policy Studies, Ernst & Young has undertaken a cross-Europe survey of 680 business leaders to discover their perception of the EU's innovation policy. The results are striking. Just 27% of respondents are familiar with the work of the European Commission to promote innovation, 82% think that access to EU funds should be made easier, and 82% believe that EU policy is too fragmented and needs greater coordination.

This report suggests that a more streamlined and simplified system can deliver a market-driven innovation policy that will help catalyze growth. We propose a system in which government promotes the development of world-class infrastructure; helps facilitate the transformation of ideas into innovative products and services; and acts as an innovation buyer through the strategic use of public procurement.

This will be an ongoing debate. As rapid-growth economies continue to flourish and compete with more developed markets such as the EU, charting a course for sustainable growth will not come easy. But bridging the disparate worlds of policy and business is a necessary first step. A more effective innovation policy will help drive demand, and put the EU in a better position to derive competitive advantage from the continuing opportunities of globalization.

We hope this report, together with our survey's findings, will help drive this process forward. Further information can be found at www.ey.com/government-innovation.

Jay Nibbe

Ernst & Young Markets Leader – Europe, Middle East, India and Africa



Executive summary

Innovation = economic growth

Innovation is essential for Europe's economic growth – a fact not lost on policy-makers in Brussels and across the Member States. In the aftermath of the financial crisis and aware that the EU is facing increasing competition from the world's rapid-growth markets, recent years have seen a massive increase in public funds, a proliferation of lines of action, the creation of communities, platforms, infrastructures and even a dedicated initiative – Innovation Union.

However, this wide array of actions – all of which have been created with the best intentions – have not generated the expected level of success. Europe will again miss its goal of achieving a level of R&D of 3% of GDP by 2020. And the European Commission's projections to 2050 show that EU Member States' (EU27) share of global patents is set to fall from 40% to approximately 20%. This is all despite the fact that the EU27 forms the world's largest single market. Why is this the case?

The challenges

► Innovation policy is too complicated

Spread across countless programs, actions and strategies, innovation has for years been pursued via intricate decision chains, objectives and proposals. This has resulted in an enormous chunk of public money being deployed by an unprecedented number of decision-makers, agencies and ad hoc institutions. The desire to become more innovative and competitive has led to the creation of new programs that largely overlap with pre-existing ones.

► R&D gap

Between 2005 and 2009 the sources of R&D funding in the EU27 have shifted toward a greater presence of public funding with a reduction, in percentage terms, of private R&D. This contrasts with the US, South Korea and Japan where private R&D spending has been on the increase in recent years. The only European countries where private R&D spending is above 2% of GDP are the ones leading in innovation performance – Sweden, Finland and Denmark. In addition, the fragmentation of innovation levels, already systemic before the economic crisis, seems to have widened in the past months.

► Sectoral competitiveness and IT issues

The low-tech specialization of many EU firms has often been cited by the European Commission as one of the causes of Europe's innovation gap and Europe seems to be faring poorly in terms of information and communication technology (ICT). The overall weak position of the EU27 in ICT is also mirrored by a gap in scientific specialism. Europe is significantly lagging behind Japan in technology-intensive sectors including electric components, audiovisual electronics, and telecommunications – and the US leads by far on medical equipment.

► Inadequate infrastructure

Building resilient and world-class infrastructure in Europe has not proved easy. Although initiatives have been launched to develop network infrastructure across the EU27, 73% of respondents to our survey want the EU to spend more money on building a common broadband infrastructure. There is also currently no European single market for e-communications, further hampering the creation of a pan-European world-class e-infrastructure. Insufficient investment has been directed toward areas such as distributed computing infrastructure systems which would enable round-the-clock access to data and lead to increased productivity for European researchers and would-be entrepreneurs.

► Limited financing options

The absence of a genuinely integrated market for many of the most innovative sectors including, most notably, knowledge-intensive services, is a serious issue. Financial markets are also currently disjointed and the level of regulation varies across borders. The lack of harmonization prevents cross-border venture capital investment and the creation of funds in areas where financing for innovation is most needed.

Recommendations

We propose a new, three-tier approach to EU innovation. It aims to improve its effectiveness and reduce administrative burdens for companies wishing to rely on existing funding tools and other initiatives by EU institutions.

- **Layer 1:** Governments should act as leaders and investors by creating the main building blocks of an innovative environment – world-class infrastructure, a high-performing education system and research and innovation-friendly legal rules.
- **Layer 2:** Governments should create funding and facilitating initiatives to strengthen links between researchers, entrepreneurs and private investors, possibly with the help of public funds and tax credits.
- **Layer 3:** Government has the key task of “nudging” existing innovation efforts toward long-term policy goals. This should mostly occur through the strategic use of public procurement and launching a limited number of partnerships that address key long-term market failures.

We believe there should also be a stronger focus on the EU's “Grand Challenges” and key strategic R&D sectors. As highlighted by industry, European Innovation Partnerships should be promoted in all cases in which strong societal needs are at stake. In those partnerships, market participants have so far been able to avoid the current fragmentation of competences at EU level. This has occurred by involving all relevant Directorate Generals of the European Commission and participants from other EU institutions in a dialogue that has focused on industry, EU citizens and global technology challenges.

Policy-makers should consider innovation at every phase of the policy cycle. In particular, competition policy should be handled by the European Commission in a way that is compatible with innovation. The recent announcement by the Competition Commissioner, Joaquín Almunia, that the state aid regime will be revised and made more growth-friendly is to be strongly welcomed.

While there is no catch-all solution, a smarter and more streamlined innovation policy will underpin a much-needed economic resurgence across the EU.

Introduction: Europe's "innovation emergency"



The world is changing. As new jobs, markets and products ricochet across the rapid-growth markets, the European Union (EU) is struggling to avert the prospect of another recession. EU governments face limited options, however. With debt continuing to accumulate and policy-makers lacking the funds to relaunch their economies, how can Europe stimulate growth, ideally above historical trend?

In our increasingly competitive global economy, EU policy-makers have long understood that stimulating innovation is essential for Europe's economic future. At the same time, however, and despite a massive increase in public funds, a proliferation of lines of action, the creation of communities, platforms, infrastructures and even a dedicated initiative (Innovation Union), they have seen few significant returns.

Recent trends in innovation suggest that a more streamlined, harmonized and coordinated approach to innovation policy across the EU would be more effective than the fragmented landscape that currently exists. Unfortunately, the EU's role is often confined to that of coordinator and provider of financial aid. Accordingly, EU institutions need to become more aware that all of their policies, especially those related to the internal market, need to be tailored to support both economic growth and innovation.

In this, our second report on Government and Innovation, Ernst & Young, in collaboration with the Centre for European Policy Studies (CEPS), has put forward a series of proposals to deliver a simpler and smarter innovation policy for the EU. We focus on:

- ▶ The importance of a world-class R&D infrastructure, from education to open cloud where R&D results could become more visible to entrepreneurs
- ▶ The role of intermediaries and angel investors
- ▶ The prospects of technology markets in the EU
- ▶ The changing role of the state as enabler and buyer, rather than leader of the innovation process

Our analysis is backed by a survey of 680 business leaders from 15 EU Member States. The perceptions of this group underline why a fresh approach is needed:

Limited awareness

- ▶ 27% are aware of the European Commission's efforts to promote innovation
- ▶ 15% understand "smart specialization" – a key strand of current efforts toward a more innovative Europe

Complex programs

- ▶ 82% believe that access to EU funds should be made easier
- ▶ 82% believe EU policy is too fragmented and needs greater coordination

Competitiveness in question

- ▶ 69% view innovation policy in the US and Japan as more effective than in the EU
- ▶ 69% believe innovation policy in the EU has not matched industry's needs

European policy-makers and business leaders need to come together and agree a fresh set of priorities and systems to deliver competitive advantage. This report aims to be a useful tool in driving forward this process.

Survey demographics

We conducted a survey of 680 business leaders to get their perspective on the EU's innovation policy, the role of the private sector in driving forward development, and how the EU and individual country governments can work together to make innovation more effective.

The survey was conducted across 15 EU Member States in January and February 2012, and is split into four groups for analysis:

- ▶ Western Europe: United Kingdom, Germany, Netherlands, France, Ireland and Belgium
- ▶ Northern Europe: Finland and Sweden
- ▶ Central Europe: Austria, Hungary and Poland
- ▶ Southern Europe: Italy, Greece, Spain and Portugal

The business leaders interviewed are senior managers involved in their companies' strategies, including the ranks of president, chief executive, managing director, chief operating officer, chief financial officer, chief information officer, R&D director and strategy director.

The size of the company was classified on the sales' turnover criteria. The sample includes:

- ▶ 33% of companies with an annual turnover under €150 million
- ▶ 44% of companies with an annual turnover between €150 million and €1.5 billion
- ▶ 23% of companies with an annual turnover higher than €1.5 billion

Innovation around the world

In the aftermath of the global financial crisis, advanced economies agreed to prioritize growth. This in turn requires innovation: the ability to invent new ways to serve societal goals and meet the needs of businesses and citizens. What they have not agreed upon, however, is how to create such innovation. Individual countries have therefore chosen different methods in their attempts to stimulate growth and employment.

US

The US is the world leader in science and innovation. It enjoys a world-class infrastructure, top-level education and the most mature market for venture capitalists and business angels. However, slow economic recovery is affecting demand and, in turn, incentives to innovate. The US Government is responding by investing in education ("Educate to Innovate") and infrastructure through a variety of technologies.

European Union

While still the largest global market, the EU is falling further behind the US and Japan, and its lead over China and Brazil is shrinking. Although benefiting from a fairly robust education system, challenges include an aging population, welfare systems under pressure and a reluctance to fully open borders to foreign researchers. A persistent lack of harmonization and economic integration, including in Intellectual Property and network industries, also affects Europe's R&D infrastructure. The EU is still too focused on top-down standardization and public funding: cultural change is needed to boost entrepreneurship.

Saudi Arabia and the gulf area

Projected to be a US\$2t economy by 2020, the Gulf area benefits from strong natural resources, a young population and rising entrepreneurship. Great progress in economic and social integration is also being made by the Gulf Cooperation Council single market project. This will require massive investment in new infrastructure (rail, telecoms and water) and new technologies to be deployed in support of infrastructure, such as desalination.

China

Good and bad news from China. On the one hand, the country is likely to dominate global R&D by 2025 due to improvements in infrastructure, education, the patent system and the coordination of innovation policy. China has also become the leader in key technologies to tackle emerging challenges such as climate change. However, a slowdown of the domestic economy due to declining demand might hamper the viability of current growth plans. Better governance, more transparency and more economic freedom will help this giant economy keep its pace.

Japan

Japan continues to experience some difficulties due to uncertain economic prospects. Like many EU countries, Japan has an aging population. However, Japanese firms still hold a large patent portfolio, and the country features a strong education system and a favorable environment for public and private investment in highly innovative ventures.

Turkey

With half of its population aged under 25, Turkey already has a vibrant economy. As university education improves, infrastructure becomes more advanced, and financial markets become more mature when looking at innovative ventures, the country is expected to become a key player in this field in the next decade. Its geographic location – close to the markets of the Southern Mediterranean, East Africa and Middle East – is also an important strength.

India

India is quickly becoming a leading innovator, especially in advanced manufacturing and ICT. However, there is the potential to make even faster progress. More competition and early-stage funding of innovation would help. Innovation should also be coupled with more openness and competition in order to help tackle the challenges that the country will face in the coming years, including another demographic boom.

South Africa

South Africa has a sophisticated financial market and a 10-year innovation plan launched in 2007, but there is still poor performance in most innovation dimensions. A major effort to improve governance of innovation and partnerships with emerging leaders in specific fields might bring back this country on the innovation map.

Global trends decoded

It is possible to identify at least three major trends in innovation policies as formulated by industrialized and BRIC countries in the past few years, especially in the aftermath of the financial crisis.

1. Governments are gradually realizing that large companies and high-growth SMEs should become integrated participants in the innovation process due to their complementary skills and potential.
2. Infrastructure and education are the two key areas in which government intervention is essential.
3. The term "industrial policy" is no longer taboo. However, the new industrial policy that is now emerging differs to what we have seen in the past. It is a set of consistent competition-friendly, growth-friendly, environment-friendly initiatives that do not aim to "pick winners". Instead, it attempts to facilitate entrepreneurship, improve the flow of information, support the creation and attraction of new talents, and steer innovation efforts toward societal needs that are emerging in the medium to long term.

Europe at a crossroads



Key survey highlights

Limited knowledge

- ▶ 27% are aware of the European Commission's efforts to promote innovation within Europe
- ▶ 20% are aware of the work of the European Institute for Innovation and Technology
- ▶ 15% understand "smart specialization" – a key strand of current efforts toward a more innovative Europe

Future direction

- ▶ 91% believe the EU and national governments can do more to create demand for innovation
- ▶ 75% say there should be a dedicated EU agency for innovation
- ▶ 58% say innovation policy should be more centralized at EU level

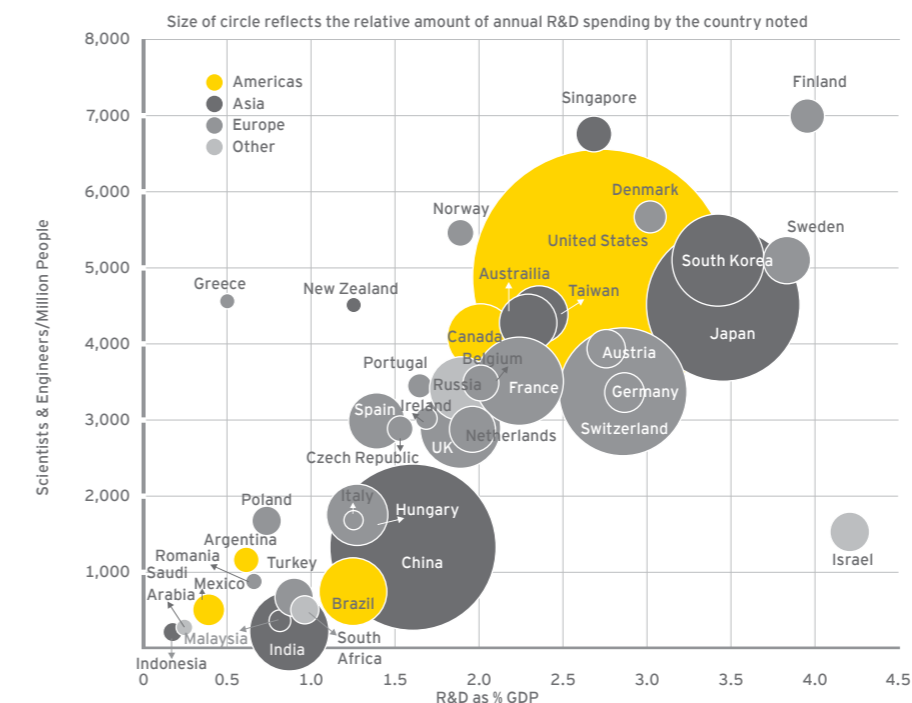
The lingering effects of the financial crisis are hitting Europe harder compared with other regions of the world. With the Eurozone's ongoing struggles well documented, the shadow of recession is once again looming large across many Member States (EU27). With growth down and unemployment up, these remain deeply challenging times for policy-makers, businesses and citizens alike.

Recent data produced by the European Commission also show worrying trends. *The EU's Annual Growth Survey* published in December 2011 confirmed that Europe

will again miss its goal of achieving a level of R&D of 3% of GDP by 2020 – a target that was set by the 2000 Lisbon Strategy for the EU to become the "most dynamic competitive knowledge-based economy in the world". In the past three years, the R&D investment rate has stood at approximately 2% of GDP. In the same report, the Commission pinpointed several causes of this poor performance, from an underperforming education system to the absence of a well-developed venture capital and business angel market in many Member States.

In addition, the fragmentation of innovation levels, already systemic before the financial crisis, seems to have widened in the past months. For example, the recent Innovation Union *Competitiveness Report 2011* confirmed that countries such as Finland and Sweden rank at the top in terms of both number of skilled researchers and scientists, and R&D level on GDP. By contrast, Southern and Eastern European countries lag behind on both dimensions.

Figure 1 – World of R&D in 2011

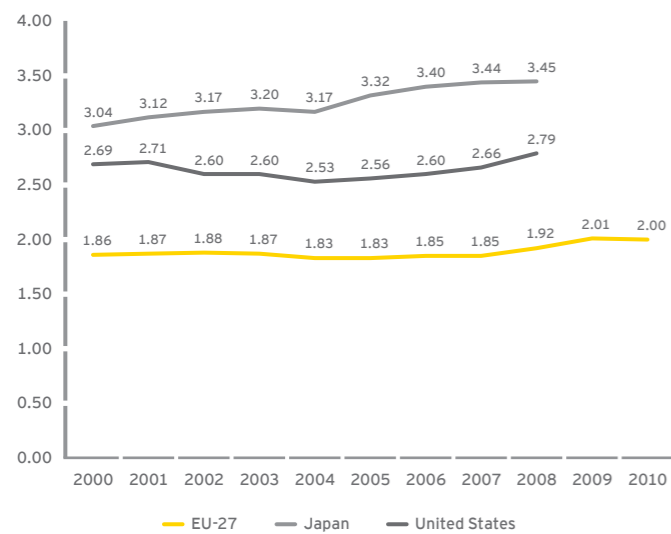


Source: Battelle and R&D Magazine (2012), Global R&D Funding Forecast.

Many of the countries that are currently exhibiting poor macroeconomic performance also rank very low in the innovation performance statistics. Portugal, for example, has reasonably solid scientific education but very low R&D levels. Countries that have opened up their economies to foreign, innovation-intensive investment, such as Israel, feature a completely opposite trend, with less scientists being trained, but levels of R&D that are comparable to world leader Finland.

Another important development is that between 2005 and 2009, the sources of R&D funding in the EU27 have shifted toward a greater presence of public funding with a reduction, in percentage terms, of private R&D. On the other hand, in the US, South Korea and Japan, it is private R&D spending that has been on the increase in recent years (see Figure 2 below).

Figure 2 – R&D % spending on GDP, 2000-10

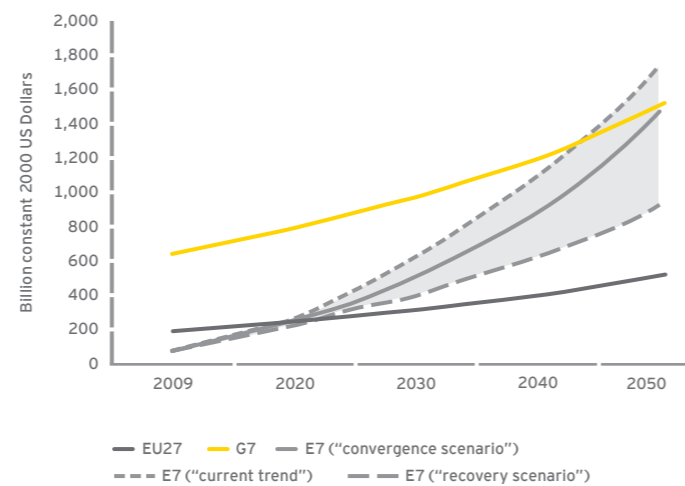


Source: Eurostat (t2020_20), OECD.

With these trends, few would bet on Europe's recovery and revived leadership in industrial R&D and overall innovation. Indeed, the European Commission's projections to 2050 show that the EU27's proportion of global R&D is set to decrease, with its share of global patents falling from 40% to approximately 20%. This is despite the fact that the EU27 forms the world's largest single market.

One of the key findings of the EU's recent *Competitiveness Report 2011* is that "while remaining a top player in terms of knowledge production and scientific excellence, Europe is losing ground as regards the exploitation of research results." Indeed, the data shows that even though the EU has the highest number of peer-reviewed scientific publications in the world, the share of EU Member States' patent applications in the European Patent Office (EPO) has declined and "about half of the Member States do not produce high-tech EPO patents at all." In response, authors suggested reducing the costs of intellectual property rights, in particular patents but, as observed in last year's report, patents cannot do much as a stand-alone tool, especially when it comes to innovation by SMEs.

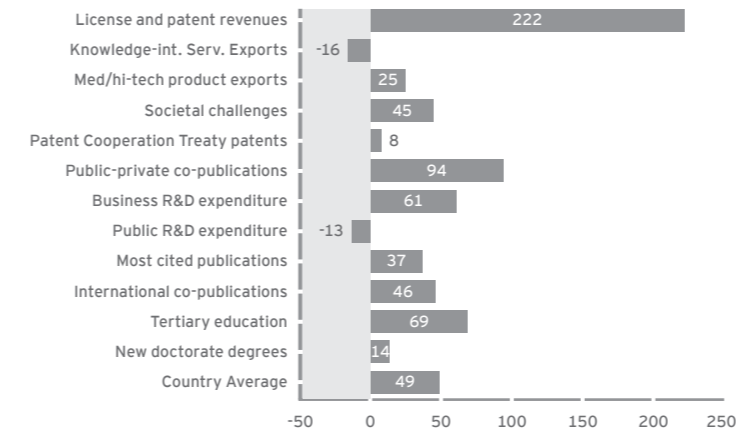
Figure 3 – Long-term trends in R&D, 2009-50



Source: DG Research, Horizon 2020 – The Framework Programme for Research and Innovation, 2011.

Some have argued that comparing individual EU countries (such as Sweden or Finland) makes little sense. A more appropriate comparison would be between the EU27 and individual states of the US, they suggest. Unfortunately, the results are then even more discouraging for the EU. Countries such as Slovakia appear to have a similar (low) R&D intensity to Wyoming or South Dakota, and as many as six US states are more R&D intensive than Europe's leader, Sweden.

Figure 4



Source: European Commission, Innovation Union *Competitiveness Report 2011*.



Innovation in Europe: mind the gap



Key survey highlights

Private sector dynamics

- ▶ 71% believe that private sector spending contributes to technological and scientific innovation in the EU
- ▶ 61% of respondents have a dedicated innovation or R&D department within their organization
- ▶ As a percentage of turnover, an average of 5.1% is allocated on research and innovation within respondents' companies

Private sector expectations

- ▶ 82% consider the EU able to contribute to a collaborative approach in research and innovation
- ▶ Over the past year, 37% say their general perception of EU innovation policy has improved

The role of education

- ▶ 94% agree that Europe's innovation policy should encourage more university and industry partnerships and technology transfer
- ▶ 90% believe that EU innovation policy should focus on education and skills

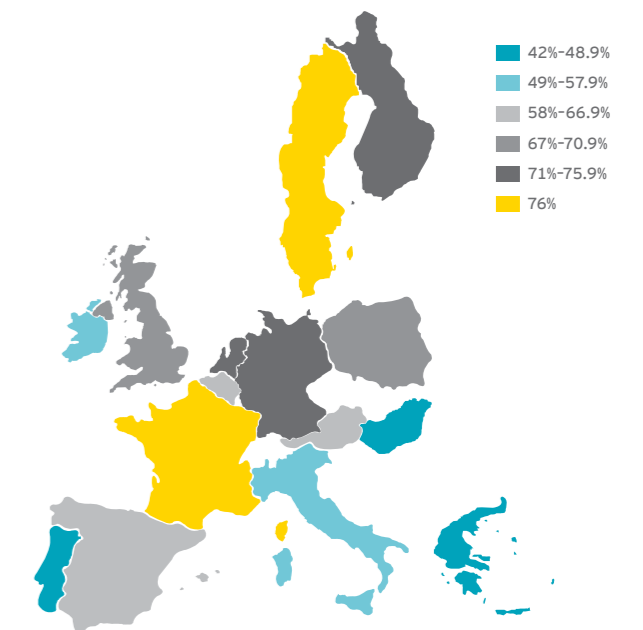
Simply stating that Europe is lagging behind other, more dynamic regions of the world in terms of innovation does not help solve the problem. In this section, we examine some of the myths and real causes of this long-standing issue.

Low spending in R&D

It is undeniable that the EU27 features a low level of R&D spending compared with other regions of the world. However, a more detailed look reveals that those European countries that perform best in R&D receive a substantial level of private funding. Indeed, the only countries where private R&D spending is above 2% of GDP are the ones leading in innovation performance – Sweden, Finland and Denmark.

In countries such as Germany and Sweden most business leaders are aware of the importance of the private sector, whereas in countries such as Spain and Greece, the significance of the private sector's role is less well recognized. The low level of private R&D spending is observable both in terms of equity funding by venture capitalists and angel investors, but also in terms of organizational arrangements, such as the position of a dedicated R&D department within an organization, see Figure 5.

Figure 5 – Respondent firms having an R&D department (average 66%)



Source: Ernst & Young and CEPS survey 2012.

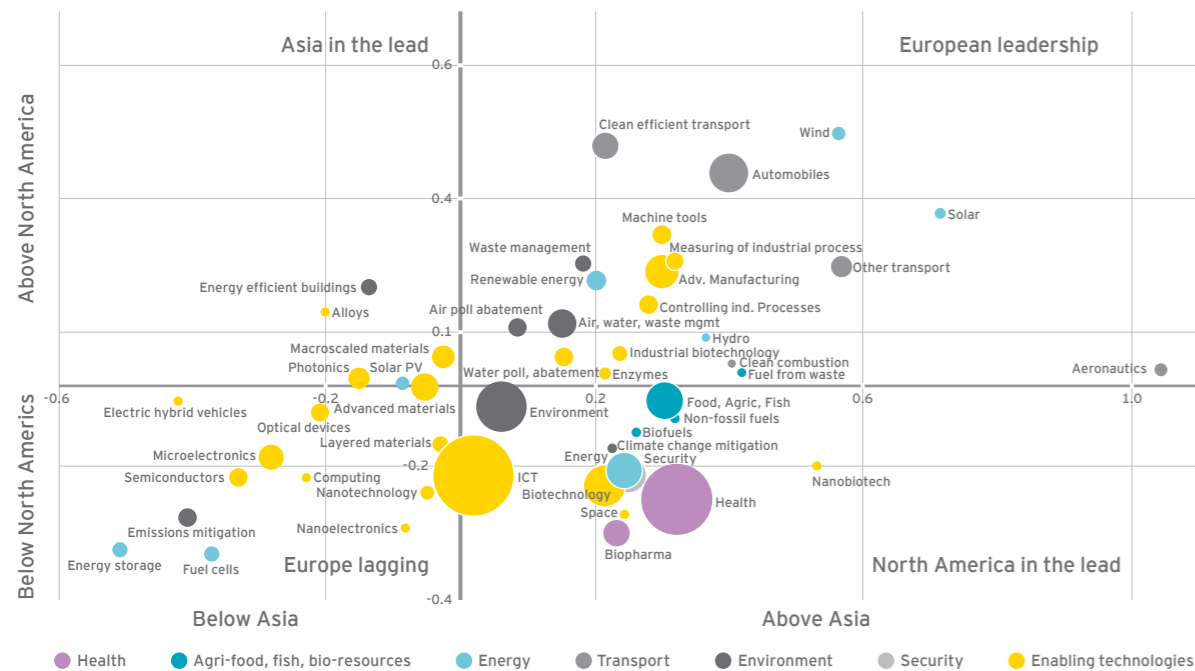


Sectoral competitiveness and the IT gap

The low-tech specialization of many EU firms has often been cited by the European Commission as one of the causes of Europe's innovation gap. Figure 6 shows the relative positioning of the EU with respect to Asia and the US in key industrial sectors. Europe still leads in areas such as automobiles, wind and solar

energy, aeronautics and advance manufacturing. And among the "key enabling" technologies (KETs) identified at the EU level, Europe seems to be performing fairly well in biotechnologies and nanotechnologies, although the US maintains a lead in these fields.

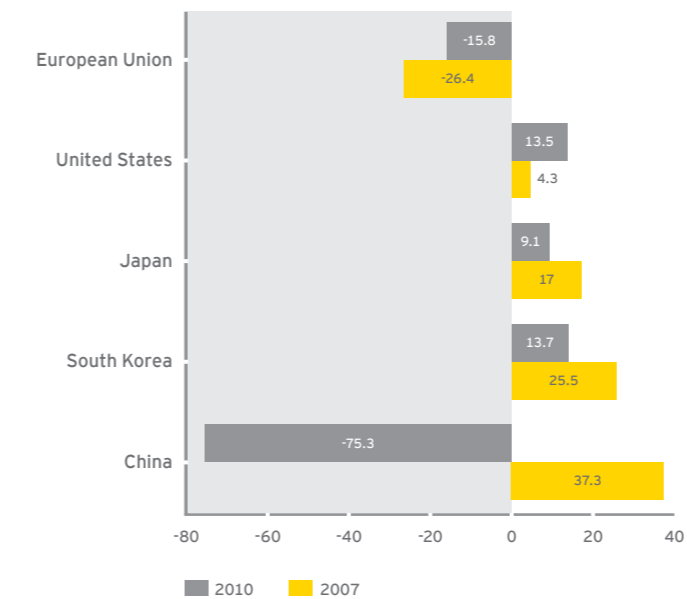
Figure 6 – Europe's competitive positioning in R&D compared with Asia and North America, by sector



Source: European Commission, DG Research.

Europe, however, seems to be faring very badly in terms of ICT. This is particularly important since the IT revolution and the internet itself are the single most important sources of growth for national economies around the world, as recently recognized by President Obama in the United States.

Figure 7 – Europe's relative positioning in ICT specialization



Source: European Commission, Innovation Union Competitiveness Report 2011.

The overall weak position of the EU27 in ICT is also mirrored by a gap in scientific specialism. The EU seems to perform better than its direct competitors – US and Japan – in sectors such as general machinery, textiles and food. On the other hand, Europe is significantly lagging behind Japan in technology-intensive sectors including electric components, audiovisual electronics, and telecommunications – and the US leads by far on medical equipment.

Engines of innovation

Young companies, together with SMEs, are widely seen as leading innovators. This is especially so in Europe, where the European Commission has found that they represent approximately 98% of all firms and two-thirds of overall employment. Such businesses – often more dynamic and flexible than their larger counterparts – are more likely to generate new ideas and take risks. Against this background, both categories are suffering heavily in Europe, due to a mix of cultural, economic, financial and legal factors.

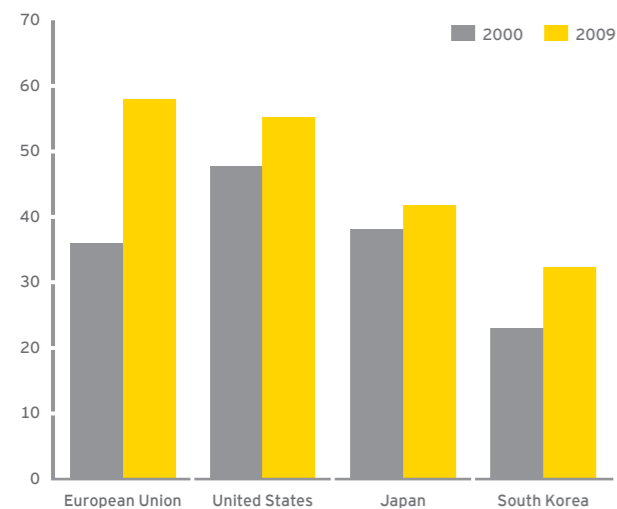
As confirmed by recent research (Cincera and Veugelers, 2010), in the EU only one out of five leading innovators was created after 1975, with young companies accounting for 7% of overall leading firms' R&D in Europe, against 35% in the US. Too many SMEs do not receive sufficient finance in the phase of development before products have been launched on the market. Access to a well-developed financial market populated by angel investors and venture capitalists is an essential precondition of a world-class investment climate and business environment.

Are universities fit for purpose?

A key aspect of a region's innovative ability is the availability of skilled researchers and a high-performing university system. In this respect, European universities are still recognized among the most advanced from a global perspective. However, European universities have in recent years been sliding down global university rankings. Although the European Research Area Board has called for a "new Renaissance" in Europe, only a few European universities seem to move at a pace similar to that of leading US institutions and rising stars in Asia.

“It’s complicated”: the EU’s innovation policy

Figure 8 – Individuals aged 25-34 having completed tertiary education



Source: European Commission, Innovation Union Competitiveness Report 2011.

Reluctance to import new talents

The innovation problem in Europe is also connected to the reluctance, in some Member States, to implement policies to attract new talents from abroad. This is particularly important when it involves non-EU countries that “produce” an enormous number of new scientists every year, such as Japan and India. Austria, by contrast, decided to act at the national level by establishing, from 1 July 2011, a special visa card for talented new scientists wishing to work in the country. In just two months, 255 new work permits had been released for qualified migrants from the US and Canada, and also from Serbia, Croatia and Russia.

A new role for large corporations in the EU?

Over the past decade, the EU’s innovation policy has been mostly related to SMEs. This is because such businesses represent the lion’s share of companies and jobs in the EU27 and are also the industry players that are most likely to play the role of entrepreneurs. But today, the rise of open innovation and distributed co-creation as new mainstream innovative concepts call for a broader approach that includes larger organizations:

- ▶ Large corporations can become the first and most efficient incubators and enablers of young and leading enterprises in Europe. Think about the emerging biotech and nanotech revolution, as well as the Application (App) economy. In all these cases, success requires the combination of the economic and financial strength of established players, and the flexibility and creativity of younger players such as university spin-offs.

- ▶ Large companies can also represent a key intermediary between governments and SMEs. EU funds are still considered too complex and “over-sized” for SMEs to make the most out of existing opportunities. With this in mind, large companies can act as intermediaries by organizing consistent R&D paths and allocating funds to SMEs participating in such projects. Given their superior market knowledge and the related production chains, large companies should be used by institutions as vehicles of targeted funding to smaller layers.
- ▶ Large corporations can also play a leading role in future European Innovation Partnerships. By representing industry and market needs and providing a significant contribution to the professional management of such partnerships, large corporations have a key role to play. More generally, the management of European Innovation Partnerships (EIPs) should not be left to scientists with limited project management skills. Managing large partnerships is a very complex task that only large-scale enterprises and consultants can undertake.

Key survey highlights

Fragmentation and administrative burdens

- ▶ 82% believe EU innovation policy is too fragmented and needs more coordination
- ▶ 82% want access to EU funds to be made easier
- ▶ 76% contend that the EU has focused too much on competition and not enough on investment incentives

The complexity of EU innovation policy is all too evident. Spread across countless programs, actions and strategies, innovation has for years been pursued via intricate decision chains, objectives and proposals. This has resulted in an enormous chunk of public money being deployed by an unprecedented number of decision-makers, agencies and ad hoc institutions.

Such a system does not deliver value for money or effective policy. Indeed, the larger the investment in innovation policy, the smaller has been the return in terms of product and service innovation. It is no surprise, then, that there is a greater awareness of the need to streamline and revisit EU innovation policy.

Such awareness has helped prompt efforts to simplify rules and procedures in key areas of R&D such as the FP7 service, which brings together the latest information on EU-funded research. However, much remains to be done. The desire to become more innovative and competitive has led to the creation of new programs that largely overlap with pre-existing ones, bringing confusion rather than clarity. A good example is the Europe2020 initiative. This “post-Lisbon” strategy defines three main objectives, seven flagship initiatives and a number of ambitious targets to be met over this decade.





Innovation Union

Of these seven flagship initiatives, Innovation Union is the most clearly related to innovation. Other initiatives are also closely connected, however. These include the Digital Agenda, the Agenda for new Skills and Jobs, the Industrial Policy for the Globalization Era and the Resource Efficient Europe for issues related to sustainability.

The strategy of Innovation Union could be made clearer. It contains at least eight different sets of initiatives, including:

- ▶ Research-oriented activities such as Strengthening the European Research Area and the European Strategy Forum for Research Infrastructures
- ▶ Education-related initiatives (more training of researchers, a brand new university ranking system, a new framework for the promotion of e-skills, the creation of new “knowledge alliances”)
- ▶ Initiatives dedicated to social innovation (a new European Social Innovation pilot and a networked “virtual hub” for social entrepreneurs and the public and third sectors)
- ▶ Innovation-related initiatives (including creating brand new EIPs – see below) and special actions on open innovation

Horizon 2020

Horizon 2020, the new Framework Program for Research and Innovation that will run between 2014 and 2020, is a response to calls for simplification of EU innovation policy. The European Commission’s Impact Assessment that backs the Horizon 2020 proposal clearly states the superiority of a less fragmented solution, compared to the past research and innovation frameworks. However, a first glance at this proposal reveals that simpler governance is far from assured.

Horizon 2020 is structured around three complementary and interlinked priorities:

1. Excellent science
2. Industrial leadership
3. Societal challenges

The links between these pillars do not seem stronger than those between the existing, separate pillars of FP7, the European Institute of Innovation and Technology (EIT) and the Competitiveness and Innovation Framework Program (CIP). The future evolution of the CIP is likely to entail as many as 11 different lines of action, from financial instruments to cluster policy, and public procurement policy to ICT-enabled innovation.

The new European Innovation Partnerships

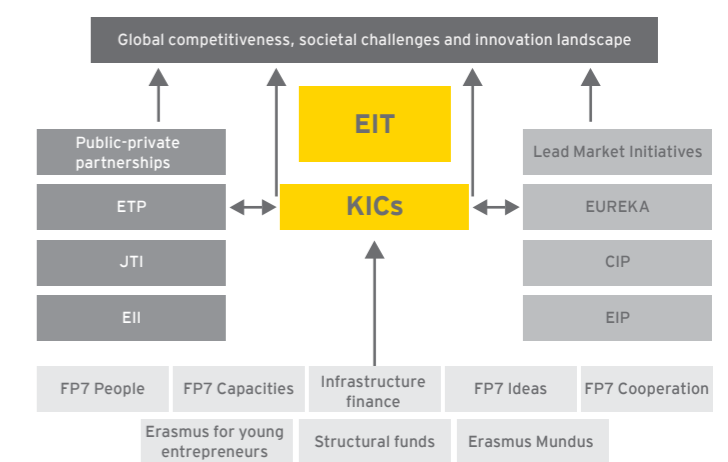
EIPs are thematic platforms in which the European Commission has sought to pool existing resources and competences from all over Europe in order to meet a specific societal challenge. The Commission announced that these partnerships will be challenge driven: for every “Grand Challenge,” there will be a dedicated EIP. Several EIPs have already been launched and more will follow in the areas of climate change, urban transport and EU competitiveness in the digital society. Although a very promising development, EIPs must be managed carefully:

- ▶ It is important to ensure that they do not overlap with existing initiatives, nor replace existing instruments such as Knowledge and Innovation Communities (KICs), which aim to be highly integrated partnerships bringing together the fields of education, technology, research, business and entrepreneurship.
- ▶ The EIT should be involved in these partnerships, as it is in charge of facilitating transitions from idea to product, from lab to market and from student to entrepreneur. However, the EIT is located in another pillar of the Innovation Union strategy, and it is difficult to imagine that such coordination will take place to a full extent.
- ▶ EIPs could be hard to manage due to their multi-stakeholder nature. Some experts from national innovation agencies have already voiced their concerns about the amount of coordination needed, highlighting the fact that EIPs require management of autonomous and independent participants, which might well have different incentives, needs and agendas. Guidance on how to manage these disparate bodies effectively will perhaps be needed.

Figure 9 shows the potential architecture of different instruments available in the EU. Programs that could potentially support the development of innovation capacity within KICs are set out in the base of the figure, whereas the vertically arranged programs are those that are tackling identified EU challenges in some way (either through a sector, technology or societal theme approach) and to which the KICs also contribute.

Although the Commission’s commitment is undisputed, it remains to be seen whether “wealth of information” will once more create a “poverty of attention.” The cumulative effect of so many budget lines, agencies and programs – all of which were created with the best intentions – have actually made the creation of an effective and accessible innovation policy more difficult.

Figure 9 - The EU’s different instruments and platforms



Source: Granieri and Renda (2012), Innovation Law and Policy in the EU. Towards Horizon2020, Springer.

Eco-Innovation

With 3.4 million jobs in eco-industries and a growing demand for environmentally-friendly products, the EU's Eco-Innovation initiative aims to give new and sustainable solutions a chance to reach an EU-wide market.

Its support actions are managed by the Commission's DG Environment but funding is managed by DG Enterprise under the Innovation Union initiative. In addition, the Executive Agency for Competitiveness and Innovation (EACI) has been operational since 2007 with a specific task to manage the Eco-Innovation initiative on behalf of the Commission. However, EACI is a temporary agency with a mandate only until 2015. Who knows whether a brand new agency will manage the expanded eco-innovation projects in the period 2014-20?

How to make it simpler: toward a layered approach



Key survey highlights

The voice of business...

- ▶ 87% believe public-private partnerships should be used to accelerate the deployment of enabling technologies such as broadband networks
- ▶ 85% say Europe requires a form of permanent consultation of industry stakeholders to identify industry needs and act accordingly
- ▶ 84% agree that fiscal incentives should be used more frequently to stimulate the demand for innovative products
- ▶ 83% would like to see a common platform of open access information for all EU researchers
- ▶ 82% say tax incentives should be used more frequently to stimulate the supply of innovation
- ▶ 73% think EU institutions should put more funds toward the development of a common broadband infrastructure

Frustration over poor innovation performance has often prompted EU institutions to attempt to lead the innovation process themselves. However, governments alone cannot provide the solution. Many commentators still consider Europe as too geared toward top-down industrial policy, rather than bottom-up reliance on market forces and entrepreneurial instinct. By contrast, in the US, where innovation and entrepreneurial risk are more widely embraced among individuals and businesses, innovation policy has long been viewed as simpler than in the EU.

In this section we propose a new, three-tier approach to EU innovation. It aims to improve its effectiveness and reduce administrative burdens for companies wishing to rely on existing funding tools and other initiatives by EU institutions.

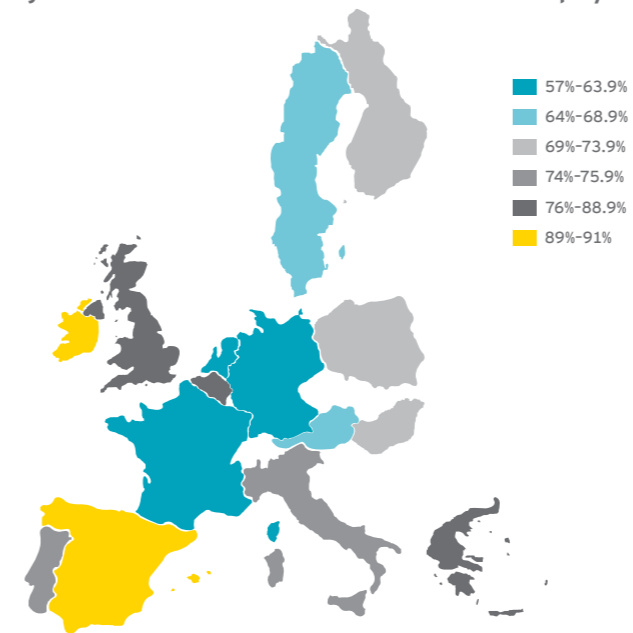
Layer 1: Governments should act as leaders and investors by creating the main building blocks of an innovative environment

These building blocks are:

- ▶ World-class infrastructure
- ▶ Education
- ▶ Research and innovation-friendly legal rules

Building resilient and world-class infrastructure in Europe has not proved easy. Although initiatives such as the Connecting Europe Facility have been launched to develop network infrastructure across the EU27, 73% of respondents to our survey want the EU to spend more money on building a common broadband infrastructure. This problem is particularly perceived in countries where broadband has not reached full penetration, or speed is still insufficient for big data transfers (see Figure 10). According to our survey, 97% of business leaders from across Europe believe that further broadband deployment would positively contribute to innovation. And 87% of them believe that broadband deployment should be achieved through public-private partnerships.

Figure 10 – Should the EU fund more broadband deployment?



Source: Ernst & Young and CEPS survey 2012.

Infrastructure, however, is obviously a far broader concept than just high-speed internet access. We believe that Europe should launch a massive investment in areas such as distributed computing infrastructure systems. This may enable round-the-clock access to data and lead to increased productivity for all European researchers and would-be entrepreneurs – as well as creating enormous new opportunities to commercialize new inventions.

The recently announced “EU partnership for cloud computing” should be linked to the work of the European Research Infrastructures (ERIs). These bodies produce vast amounts of data that need to be processed, harmonized, catalogued, stored and made accessible for users if their potential is to be fully realized. Greater sharing of information should also help to avoid duplication in R&D investments.

EU institutions should also devote efforts to help professionalize the management of publicly run universities and research institutions. This should also happen at an aggregate level for ERIs. Professional management and accountability would be facilitated by stronger coordination or, if possible, consolidation into one single institution responsible for Layer 1 policies.



Layer 2: Governments should create funding and facilitating initiatives to strengthen links between researchers, entrepreneurs and private investors, possibly with the help of public funds and tax credits

Governments should mostly act as facilitators that remove obstacles to innovation and as providers of funds, ensuring that sources of private sector investment are not crowded out. Policies to be enacted at this layer include:

- ▶ Legal rules on technology transfer that adequately boost innovative activities starting from European research.
- ▶ Awareness-raising initiatives aimed at ensuring that industry players are exposed to the results of research to enable the maximum possible absorption between research activities and the commercialization of inventions on a pan-European scale.
- ▶ Use of supply- and demand-side tax measures. Our survey has confirmed that business leaders consider that EU innovation policy should award a greater role to supply-side tax credits (82%) and demand-side fiscal incentives (84%) as tools that stimulate innovation.

Most of the respondents to our survey (71%) consider private R&D funding as key to innovation. At the same time, a much larger majority (94%) would favor the strengthening of university-industry partnerships and technology transfer arrangements. And 80% would consider a unitary patent as a useful tool in support of SMEs.

An important participant at this stage should be the European Institute of Innovation and Technology (EIT). The EIT should capitalize on the innovation capacity and capability of researchers and entrepreneurs from the EU and beyond. Unfortunately, our survey reveals that there is very limited information among business leaders on the existence and role of the EIT – and only 20% declared that they know what EIT is or does.

A second very important participant in Layer 2 policies is the European Investment Bank (EIB) group. Currently, the EIB finds it very challenging to reach SMEs due to the large size of the total loan volume it manages, compared to the relatively small number of officers in charge of their management. The EIB should consider

broadening and deepening risk-sharing operations to include innovative services and demand side measures, such as pre-commercial procurement.

Due in part to these difficulties, large companies in Europe often sit on top of significant amounts of money that could be put to use by involving SMEs in open innovation initiatives. Possible solutions include developing instruments that further allow for aggregation of local initiatives, such as clustering, to really unlock the potential of innovative SMEs and partnerships with larger companies – the “gazelle-gorilla” collaboration.

Several commentators have also advocated the strengthening of initiatives toward services innovation. Recently, Allan Mayo, Head of the Services Policy Unit at the UK’s Department for Business, Innovation and Skills, conducted a report on service innovation in the EU. The report recommended the creation of a European Service Innovation Centre (ESIC) to strengthen the links between policy-makers, business and academia. 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 Commission has recently proposed to establish.

As a combined effect of Layer 1 and 2 policies, EU institutions should be able to enable key innovation players to gain open access to new scientific knowledge from the ongoing projects to translate research into innovative products. Information could be provided in various open access formats so that public and private intermediaries, such as national research councils, private brokers and Google (with its advanced search services) could then sell value-added services for researchers. Information would therefore be processed in a way that facilitates alignment between researchers and innovators.

Such a platform could enable the emergence of all sorts of hybrid public-private and private-private collaborations, from technology platforms to US-style partnerships and communities to Intellectual Property Rights Exchanges. There is no limit to what private autonomy can conceive, but this does not necessarily mean that EU institutions should always be involved in these initiatives.

Layer 3: Government has the key task of “nudging” existing innovation efforts toward long-term policy goals.

Policy-makers should seek to stimulate demand for innovative products and services that pursue socially relevant goals. This can be achieved through tools such as social innovation, public-private distributed co-creation, crowd-sourcing, pre-commercial procurement and other strategic uses of public tendering. Such challenges are already clearly reflected in the high-level political documents that the European Commission has produced under the umbrella of the Europe 2020 strategy. Indeed, our survey confirmed the need for smarter use of procurement, something on which 77% of respondents agree. At the same time, an even larger share of respondents agreed that there should be a wider use of tax measures to stimulate both the supply (82%) and the demand (84%) of innovation.

In Layer 3, government institutions should mostly act in two ways:

- a) As buyers, through the strategic use of public procurement
- b) As “platform leaders”, by launching a limited number of partnerships that address key long-term market failures.

We believe there should be a stronger focus on the EU’s Grand Challenges and key strategic R&D sectors. As highlighted by industry, EIPs should be promoted in all cases in which strong societal needs are at stake. In those partnerships, market participants have so far been able to avoid the current fragmentation of competences at EU level. This has occurred by involving all relevant Directorate Generals of the European Commission and participants from other EU institutions in a global dialogue that has focused on industry, EU citizens and global technology challenges.

Europe should also boost public procurement of innovative solutions, in particular through pre-commercial procurement. Public authorities have substantial purchasing power that could be used to stimulate innovation. However, only a few innovations are supplied or demanded by public procurers in Europe, contrary to what happens in countries such as Japan and the US. The US public sector procurement of R&D is about 20 times larger than in the EU.

Public procurement is insufficiently used to stimulate innovation in Europe for several reasons. These include misplaced incentives (procurers tend to favor low-cost, low-risk solutions), lack of knowledge and capabilities of public procurers and the lack of a strategy that links public procurement with public policy objectives. SMEs cannot cope with public procurement at the first stage so they often act as subcontractors. This hampers the access of public authorities to the innovative potential of SMEs, which play a key role in creating innovations and innovative solutions.

Is Europe ready for the next innovation revolution?



Conceiving future innovation policy is a very difficult task. The current pace of technological progress means that actions undertaken on the basis of today's data risk becoming obsolete when they finally reach the market. This is particularly true for the EU, where any major policy involves three institutions (Commission, Parliament, Council), EU advisory bodies, and sometimes a period of consideration and implementation by Member States.

The unprecedented pace of change that has characterized global markets in the past two decades is expected to accelerate further in the years to come. A new wave of technological innovations will again change the way in which new products and services are developed and delivered. This is more an opportunity than a threat, especially if governments are able to anticipate and promote these changes with a suitable R&D policy. In this section, we consider three main developments on which EU innovation policy has not fully focused to date.

The internet and the cloud

There is no doubt that enhanced internet connectivity and cloud managed services will become, in the coming years, an even more important driver of innovation than they are today. ICT already forms half of EU productivity growth and is also the main explanatory factor for the productivity gap between the US and the EU.

The bulk of the generated value has been appropriated by (mostly US-based) App champions, with little left for European content producers and broadcasters. This trend is likely to be exacerbated since the internet is undergoing a major transformation with the development of new App stores on major platforms, and the emergence of cloud platforms offered by major (US) players such as Amazon, Google, Cisco and others.

According to recent research (TechNet, 2012), the emerging App economy has generated approximately 466,000 new jobs in the US in the past four years. Statistics for Europe are not comparable to this figure. The App economy increasingly depends on the use of GPS-enabled services for all sorts of purposes, and it is clear that Europe must seek to catch up with the US in this important sector.

At the same time, the cloud eco-system will further reduce the need for geographical proximity in the formation of clusters, and might dramatically reduce the costs of the acquisition and sharing of information between researchers and inventors. Although the importance of developing new technologies for cloud applications has been recently pinpointed by the European Commission, these overall trends suggest that there is an increasing risk that Europe will be wiped off the innovation map in the all-important internet sector in the years to come.

Big data and the wireless revolution

"Big data," which consists of datasets that have grown too large for on-hand management, is the result of increased levels of individual interaction and transactions on the internet. Such machine-to-machine interaction and data exchange is expected to increase further in the years ahead. Those companies that possess the necessary flexibility and capacity to adapt to these changes will enjoy significant competitive advantage.

The Organisation for Economic Co-operation and Development (OECD) recently estimated that there will be up to 50 billion connected devices around the world by the end of this decade. This will again change the way businesses compete, innovate and organize R&D. But there seems to be little legal certainty across the EU27 as to what legal regime should be applied to data sharing and protection. Furthermore, the amount of spectrum capacity that will be made available is also unclear.

If one looks at the development of fixed and wireless high-speed broadband connections, Europe's lag in achieving full broadband coverage becomes a problem of the utmost urgency. Europe certainly needs more spectrum to be allocated to wireless broadband, even beyond what is currently being done through the

Radio Spectrum Policy Program. By contrast, President Obama recently announced public funding of approximately US\$17 billion to help achieve full broadband coverage across the US.

And when it comes to the technologies behind the wireless revolution, Europe's innovation predicament becomes even more apparent. Just consider the patent pool that is managing the licensing of the fourth generation of mobile phones. Only a few well-known European companies play a residual role and the traces of Europe's dominance in wireless technologies have now completely disappeared. In just a few years, "augmented reality" and "artificial skin" will start changing the experience of users, researchers and entrepreneurs. If Europe does not ready itself for this revolution, its citizens and businesses will not receive such innovations until much later than those in other parts of the world, and at higher cost.

Distributed co-creation

Next-generation innovation will take an even more open form, called "distributed co-creation." This practice mostly consists of organizing R&D along a number of independent groups working on parallel and complementary streams of research, composed of both providers and customers looking for tailored solutions. Once again, this will require a cocktail of new talents, researchers and users that are always online, and clear and transparent rules on revenue-sharing and IPR management.

The potential developments that will emerge from the combination of big data, machine-to-machine communication and distributed co-creation are very hard to predict. But one thing is certain: countries that will be able to win the standards race in these emerging domains will have a chance to assure the healthy survival of many industrial sectors for the next decade or so.

Growing beyond innovation policy



Achieving a more effective innovation policy across the EU is essential for Europe's competitive resurgence. But European researchers and entrepreneurs are not only constrained by the complexity and imperfect targeting of EU research and innovation activities – they are even more heavily affected by EU rules that have not always been designed with innovation in mind.

First and foremost, a functioning internal market is the single most important reform for EU innovation. The fragmentation of innovation performance is a mirror image of the persistent absence of a genuinely integrated market for many of the most innovative sectors including, most notably, knowledge-intensive services. Financial markets are currently disjointed and the level of regulation varies across borders. While a degree of diversity is required, the lack of harmonization prevents cross-border venture capital investment and the creation of funds in areas where financing for innovation is most needed.

In a recent study, the European Commission estimated that promoting venture capital by removing regulatory and tax barriers alone would contribute up to €94billion by 2020, representing the single most beneficial policy for Europe's economic recovery. Furthermore, obstacles to individuals' mobility – in terms of taxation and mobility of pension benefits – prevent professionals and business angels from reaching new markets and establishing their business where opportunities are still unexploited.

There is also no such thing as a European single market for e-communications, a fact that further hampers the creation of a pan-European world-class e-infrastructure. In addition to the harmonization of legal rules, there are areas of EU policy that could heavily impact upon incentives to innovate. These include competition law, intellectual property law, sector-specific regulation (especially e-communications regulation) and standardization. In particular, competition policy should be handled by the European Commission in a way that is compatible with innovation. The recent announcement by the Competition Commissioner, Joaquín Almunia, that the state aid regime will be revised and made more growth-friendly therefore appears very timely and promising.

Finally, it is important to remember that innovation is an all-encompassing concept and, as such, requires an all-encompassing solution. The whole innovation cycle should be taken into account and include different participants in the innovation chain: industry, academia, public and private financing organizations, policy-makers and so on. At the same time, innovation needs to cut across all sectors of economic, social and political activity. This is why policy-makers should consider innovation at every phase of the policy cycle.

There are many ways to achieve this. For example, the appointment of a chief innovation officer in each Directorate General of the European Commission would ensure that all policies are made innovation-friendly and coherent. Alternatives include the refinement of methodologies to assess the impact of new policies on innovation during the impact assessment and the evaluation stage; and the appointment of a permanent representative of DG Research and Innovation in the Impact Assessment Board.

But there is no magic bullet. Creating a more effective innovation policy will be an ongoing process. It needs to involve a cross-EU coalition of policy-makers, business leaders, researchers and citizens. Such a combination of insights and resources offers the best hope of creating a smarter and more streamlined innovation policy, and one that will underpin a much-needed economic resurgence across the EU.



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CEPS, Centre for European Policy Studies
Place du Congrès 1
B-1000 BRUSSELS, BELGIUM
Phone +32 2 229 39 11, fax +32 2 219 41 51
www.ceps.eu