A New Approach to Innovation Policy in the European Union

A NEW APPROACH TO INNOVATION POLICY IN THE EUROPEAN UNION

INNOVATION POLICY: BOOSTING EU COMPETITIVENESS IN A GLOBAL ECONOMY

CEPS TASK FORCE REPORT

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FOREWORD

The European Union is challenged in the global arena by emerging economies as well as by the US when it comes to capturing and capitalising on knowledge and technology in the context of innovation. At the same time, the innovation chain is becoming increasingly complex, open and internationalised; it includes and involves stakeholders representing the many different sectors and parts in society, and often businesses coming from different regions. Faced with these challenges, in past years many European countries have suffered from an increasing lag vis-à-vis other regions of the world in terms of competitiveness, innovation and growth.

To be sure, Europe already features world-leading industries and a few high-ranked universities. In the past few years, the budget for R&D has been increased and several initiatives have been launched to strengthen Europe's competitiveness. So far, however, these efforts have not made the EU more competitive. On the contrary, a decline can be seen and the EU is recognised as becoming less internationalised. On top of this, the overlap between funding instruments and too many decision-makers has led the governance of EU innovation policy to become increasingly chaotic, which only adds complexity to a system that needs to be smoothly and effectively managed.

This report presents a number of recommendations for actions that are needed to ensure that the EU becomes a more attractive place for investment and education and research opportunities. It is the result of five meetings held between September 2009 and May 2010 and the participation of numerous industry stakeholders, practitioners, academics and representatives of institutions such as the European Commission, the European Investment Bank and the European Patent Office (see list at the

end of this report). All in all, we have found very fertile ground for a constructive discussion on how to 'innovate' in EU innovation policy. The overall impression is that Europe has all the necessary 'pieces', but the puzzle has to be completed by involving the stakeholders and taking account of market needs when choosing the direction of policy. This includes, but is not limited to, the funding of innovation, the Community patent, standards policy and technology transfer. On all these issues, this report provides recommendations.

I would like to thank the invited guests and for their openness to discuss concerns and challenges; the members of the Task Force for their willingness to share knowledge and experience for the duration of the Task Force; the two Rapporteurs, Andrea Renda and Massimiliano Granieri, who have provided us with excellent support during the Task Force and in finalising this report; and finally, CEPS staff for creating the conditions for a smooth and constructive sharing of experiences and expertise within the context of this very valuable initiative.

Maria Anvret, Chairwoman

INTRODUCTION AND MAIN RECOMMENDATIONS

The past decade saw a gradual European 'lag' vis-à-vis the US, Asian tigers and several emerging economies in terms of research, development and innovation (R&D&I). The 2009 European Innovation Scoreboard has shown positive signs in some regions, but overall innovative investments by businesses still appear relatively weak. Importantly, highly dynamic sectors such as ICT (information communication technology) account for almost one half of EU productivity growth, but at the same time are also the main reason for the US-EU gap. Re-launching Europe's ICT sector becomes even more crucial with the upcoming European Digital Agenda, which promises to contribute an estimated €500 billon, or 4% of GDP to the EU economy.

Various reasons account for Europe's gap, certainly including the current fragmentation of the Internal Market and the absence of well-developed venture capital; the overly complex governance of EU funding mechanisms, coupled with the extreme fragmentation of funding tools; the red tape associated with access to public funds; the limited mobility of skilled workers throughout the EU27; the absence of legal certainty as regards patent law, technology transfer and standardisation processes; the distance between market needs and public innovation policies; and many others.

Today, nothing is more important for the re-launch of the EU project than unleashing the potential for EU competitiveness through innovation. EU institutions endorsed this view in the recently adopted EU2020 strategy, which announces seven flagship initiatives, of which at least five are intimately linked with innovation (Innovation Union, Digital Agenda,

Resource Efficient Europe, A New Industrial Policy for the new globalisation era and an Agenda for new skills and jobs).

In this report, we argue that Europe must take a proactive stance towards innovation policy and must do it in a way that accounts for the systemic and changing nature of innovation.

The EU approach to innovation policy must be integrated and comprehensive, and should include, inter alia, education policy: the availability of skills should not be seen as limited to improving the attractiveness of Europe to highly qualified European students and researchers; on the contrary, Europe must compete internationally to attract the best skills available worldwide.

The EU approach should also be flexible, since the nature of innovation has changed enormously in the past decade and has also become sector-specific. Today, in some sectors (e.g. ICT) collaboration between market players for the development of complex system goods has become standard practice, and calls for the definition of clear rules related to the standardisation process. At the same time, in other sectors (e.g. chemicals) the concept of 'open innovation' is permeating new business models, blurring the boundaries between individual firms' R&D efforts and leading to a blossoming new era of collaboration.

Below, we illustrate our main recommendations, and then report some more specific findings for the EU patent system, technology transfer of climate-related technologies and standardisation policy.

I. General comments and recommendations

1. Innovation desperately needs a functioning EU internal market

A functioning Internal Market is the single most important reform for EU innovation. Currently, financial markets are fragmented and the level of regulation (e.g. taxation) varies across countries. While a degree of diversity is required, a total lack of harmonisation 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 business 'angels' from reaching new markets and establishing their business where opportunities are still unexploited. Finally, issues such as the Community Patent, clear rules on technology transfer and the standardisation process are essential for a functioning Internal Market.

2. The innovation challenge requires an integrated and comprehensive approach

The problem to be solved (demand from the market and society) should be the starting point for innovation policy; the scientific questions cannot be the only driver for innovation. This implies that the whole innovation cycle should be taken into account including all the different actors in the innovation chain: industry, academia, public and private financing organisations, NGOs, society and citizens, politicians, policy-makers, etc. The discussion should go towards accepting innovation as a transversal concept cutting across all sectors of economic, social and political activity, to cover the four different kinds of innovation. Demand-side measures, such as the lead market initiative and pre-commercial public procurement, are powerful tools that should be developed to create the market incentives for innovation.

3. There is a growing gap between public policy and the needs of private players

Innovation essentially takes place in markets, and market players know best where consumer needs and technology developments are leading. This would justify a change in perspective from a simplistic, supply-side approach (i.e. pumping innovation into the market) to a more demand-driven approach as far as new applications and societal challenges are concerned, including undertaking measures for the simplification of regulations surrounding innovation procurement. At the same time, it is very important that regulation is 'smart' – i.e. efficient, proportionate, future-proof and 'technology-neutral', and is conceived in a way that stimulates further innovation, rather than exerting a chilling effect on new market developments.

4. The current institutional governance of innovation policy at EU level is not satisfactory

Institutional competences are too fragmented across DGs, which leads to a lack of policy coherence; there are too many levels of intervention and too many instruments for funding, creating a complex environment for potential applicants. The current system lacks synchronisation and is unfit to reach small firms effectively; innovation is not considered at all stages of the policy-making process; there are no indicators that track the success of innovation-oriented policies. In summary, there is not enough leadership, insufficient ownership and limited accountability. In this respect, the role of the Secretariat General in coordinating and directing policy is very important. The President of the European Commission should take the ultimate responsibility for ensuring the development of a pervasive, coherent, coordinated, efficient and effective innovation policy for Europe.

5. Subsidiarity should guide EU innovation policy

Governance is about much more than what happens within the Commission, even than what happens at EU level. Indeed, the money the EU spends on innovation is only a fraction of what countries spend. This fact calls for two main recommendations:

- Apply the subsidiarity principle. The EU should only stimulate innovation where there is an evident EU added value, to be clearly demonstrated through an impact assessment. For instance, this could be the case where there is a strong need to link innovation policy with other EU policy priorities (climate, energy, health, etc).
- Coordinate better the different levels of governance. There should be clearer and more effective coordination between member states and EU policies and decision-making when it comes to R&D processes. As observed in other areas and debates (e.g. telecoms, competition policy, financial services, etc.), it would be possible to establish a centralised/coordinated policy at EU level, which is then implemented locally by national authorities, provided the commitment is credible, and the reverse relationship or balance is also possible or appropriate depending on the area concerned, the relevant spillover effects and the incentives. This would require, inter alia, the definition of indicators aimed at tracking progress towards common targets – a need that becomes even stronger under the EU2020 strategy and the upcoming 'Innovation Union' initiative (see Recommendation 7 below).

6. Extend co-regulatory schemes in the innovation domain

Public-private partnerships (PPPs) should be extended and promoted as the governing principle in all cases in which strong societal needs are at stake. In PPPs, market players are able to avoid the current fragmentation of competences at EU level by involving all relevant DGs of the European Commission and all competent players from other EU institutions in a global dialogue that focuses on the industry, EU citizens and global technology challenges. Also in designing and shaping the new Framework Programme (FP8), market players should be involved to make sure that the demand perspective is adequately taken into account in deciding where public money should be spent in order to add value.

7. Taking innovation seriously by improving leadership, ownership and accountability

Putting innovation at the core of the EU policy-making process cannot be only a declaration of intent. There are measures that can improve leadership, ownership, accountability, coordination and governance. These include:

a) *Opening the Impact Assessment Board (IAB) to a representative of DG Science, Technology and Innovation (STI).* This way, the IAB would be able to send back proposals that have not sufficiently considered the impact of submitted new Commission policies on innovation and research. A representative from DG STI or any other IAB member in charge of representing EU innovation could also suggest methodologies developed by EU-funded programmes, which could be used in impact assessments to evaluate ex ante the impact of the proposed new measures on innovation.

b) *Increasing and improving the participation of officers in charge of innovation policy in Impact Assessment Steering Groups*. This should guarantee that impacts on innovation are considered also at an early stage of the policy-making process.

c) *Developing indicators that track progress in the field of innovation policy and allow for an evaluation of the performance of policy measures in place*. It is paramount that the performance in innovation be measured according to standard indicators, and not be subject to arbitrary interpretations and manipulations across Europe. The experience with the European Innovation Scoreboard – based on 29 indicators – is a useful starting point in this direction, and should be complemented by other tools currently used at the international level (e.g. the OECD Oslo manual, the tools developed by FP7 projects such as INNODRIVE). The Joint Research Centre (JRC) of the Commission should ideally be in charge of this task.

d) *Adopting follow-on monitoring and evaluation strategies*. The implementation of innovation policies should be monitored ex post and evaluated according to the intended purposes to be achieved, in particular as regards the impact on the generation and successful marketing of innovations.

e) *Empowering an agency to manage the funding instruments available for innovation and research,* to exploit potential synergies between them and streamline communication with stakeholders, thus avoiding the 'spontaneous disorder', in which too many funding tools appear sub-additive rather than self-reinforcing.

f) *Coordinating innovation and research policy with other EU policy objectives already at the budget allocation stage*, e.g. by allocating funds to projects and technology platforms that promise to solve today's and tomorrow's policy challenges.

g) *Establishing a general principle at any review stage*, whereby policy-makers i) should mandatorily assess whether policy and governance are aligned; and whereby ii) if they propose a change in policy and/or the introduction of a new instrument, they should immediately consider candidate policies or instruments to drop, in order to avoid complexity.

8. Financial instruments should be used more efficiently

It is crucial that Europe invests in R&D, discriminating resources for basic research and for applied research and innovation. While the intensity of R&D is a key factor for success, quality becomes important to ensure the best, high-impact projects receive adequate funding and return innovation and growth on this investment.

The European Institute of Innovation and Technology (EIT) is to be a key driver of sustainable European growth and competitiveness through the stimulation of world-leading innovations with a positive impact on economy and society. The EIT is the first European initiative to integrate fully the three sides of the 'knowledge triangle' (higher education, research and business-innovation) and its mission is to grow and capitalise on the innovation capacity and capability of actors from the EU and beyond. In order to unleash the full potential of European innovation there is an increasing need for: i) ensuring continuity between the results of projects funded by the European Research Council and activities undertaken the EIT; and ii) a better alignment of both European and national-level initiatives, in that all contribute to the Europe 2020 vision and goals.

In addition to cross-border venture capital and technology transfer support via the European Investment Fund (EIF), the European Investment Bank (EIB) could consider widening the scope of applications, in particular by broadening and deepening risk-sharing operations, i.e. to include innovative services and demand-side measures, such as the lead market initiative or pre-commercial procurement. An important issue is the EIB's ability to reach dynamic and innovative small firms and help them grow through early-stage financing. 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. This problem should be addressed, possibly with the help of member states, by further developing instruments that allow for aggregation of local initiatives, such as clustering, to really unlock the potential of innovative SMEs.

II. Specific recommendations

A PATENT SYSTEM FOR EU 2020

9. A role for national patent offices (NPOs)

A pan-European patent system must secure a role for NPOs. Currently NPOs sit in the Administrative Council of the EPO, which may create conflicts as the EPO becomes the EU granting authority and replaces national procedures. As for other procedures (trademarks, design), NPOs can remain as receiving offices for applications. NPOs could also play a more prominent role in raising the awareness of SMEs of existing innovation policies and public support to R&D&I.

10. A simple language regime

While there is a general problem of accessibility of technical information, in many fields scientific papers and a good share of national Patent Literature (PL) are written in English. If PL is a major source of technical information, then it could be expressed in a single language or at least a reduced language regime for Europe. Having to use only one language would reduce application costs and uncertainties related to multiple translations, positively affecting EU competitiveness.

11. An acceptable and coherent cost level of patent protection

A pan-European system should keep the right incentives, be affordable and appealing in terms of protection granted. The necessity of fees must be balanced against the interest of applicants, particularly when the latter have limited resources (e.g. SMEs). EU policy-makers might introduce incentives for patent protection, for example by lowering fees for certain kinds of applicants, or making fees dependent on quality as evidenced by search reports. However, this should not lead to distortions. Alternatively, national or EU institutions may decide to subsidise patent protection for these categories of applicants, while complying with state aid rules.

12. A unified patent litigation system with an acceptable level of centralisation

Patent litigation is fragmented and national jurisdictions lack coordination. Any future litigation system must ensure that judicial application of patent laws does not lead to potentially conflicting interpretations even within a unified jurisdiction. Other issues to be solved include: i) the level of jurisdiction (and competence for each degree), ii) a uniform civil procedure, iii) an appropriate training for judges and iv) possible support for certain categories of litigants, such as SMEs.

13. A high-quality patent system

Even if European patents are considered to be of a higher quality than those of other countries, quality remains an issue. The EPO has already started work in this respect. In addition, coordination between patent authorities will be increasingly needed, also to avoid overly restrictive approaches (for national pride, one office systematically rejects what others have granted) or a 'race to the bottom' (other offices grant systematically when one of them has granted).

TECHNOLOGY TRANSFER AND CLIMATE-RELATED TECHNOLOGIES (CRTS)

14. Protecting and promoting CRTs

A lot of added value can be created along the entire value chain of CRTs. Small scale projects and low-cost technologies can be a field of interest for SMEs and local development. In addition, when investing public money for R&D, increased attention should be given to the generation of intellectual property and its transfer to the market via licensing or spin-off creation.

15. Support plans for the creation of capacity in less developed countries

The removal or weakening of intellectual property rights (IPRs), including compulsory licensing, is unlikely to lead to increased access to green technologies by less developed countries (LDCs). On the contrary, it may discourage investment by major players. Access to CRTs does not depend on the removal of IPRs and patents. Many technologies are not patented and in others, patents only cover a portion of the technology. The real problem is the ability of LDCs to understand and reproduce knowledge created elsewhere. Cooperation with multinationals and foreign firms is a way to create absorptive capacity.

16. Encourage the elimination of tariff barriers for CRTs

One serious obstacle to investment by advanced companies in LDCs and in general is represented by the tariff barriers that hit some technologies. Diffusion of such CRTs will be favoured by the elimination of possible discrimination in prices.

17. Support actions to professionalise technology and IP management in universities and public research organisations

The 'Third Mission' launched by the Lisbon Agenda for universities requires specialised human resources that universities should be able to form and retain, with prospects of a professional career.

EU institutions should devote efforts to improving the 'professionalisation' of the management of public-funded universities and research institutions. In these institutions, board members, not directly benefiting themselves from decisions made, must be in the majority, and should ensure that overall objectives and performance indicators are used to monitor the performance of those institutions in the field of R&D&I.

A NEW STANDARDISATION POLICY FOR EUROPE

18. A clearer scope for EU standardisation policy

Standards can contribute positively to growth and competition, especially when they are picked up by the market and not imposed top-down. This calls for a pro-active standards policy only at EU level in order to promote a sound standardisation process, rather than choosing the outcome.

In promoting a sound standardisation process, EU institutions should not follow a 'one-size-fits-all' approach. Rules must thus be crafted along basic principles and then refined on a sectoral basis. In addition, emphasis on open standards may be justified only where the market can accommodate a single standard and there is no competition between different standards. In all other cases, the market should be allowed to pick up the best standard.

19. A more effective governance for EU standardisation policy

The time for having three European standardisation bodies has passed. The increasingly blurred boundaries between markets and standard types calls for enhanced cooperation and even common governance, possibly leading to a single EU standards agency that replaces CEN, CENELEC and ETSI.

20. Clearer competition rules

The European Commission should provide policy documents that:

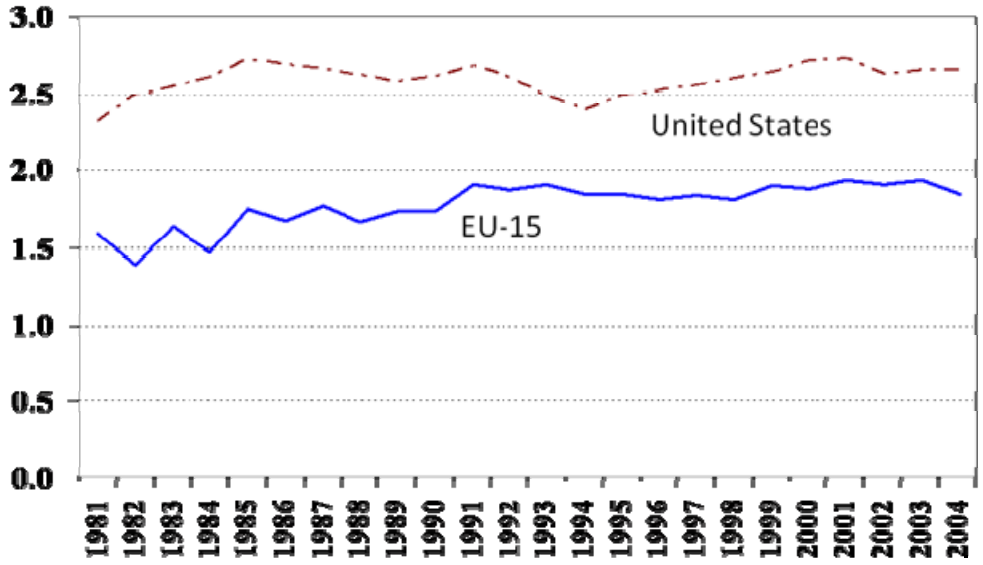
- clarify the relationship between standard-setting organisations and intellectual property rights (IPRs);
- provide general guidance on standards practices (e.g. disclosure regimes, 'FRAND' licensing, transfer of IPRs) and
- support the creation of pro-competitive, independently administrated patent pools.

CEPS TASK FORCE REPORT
INNOVATION POLICY: BOOSTING EU COMPETITIVENESS IN A GLOBAL ECONOMY
INTRODUCTION. TOWARDS EUROPE 2020

The word "innovation" lies increasingly at the core of the EU agenda. European institutions – both at EU and national level – repeatedly state that a sound innovation policy is key to recovering EU competitiveness, which lagged behind other areas of the world even before the financial crisis hit the world in 2008-09. The Lisbon strategy in 2000 already set very ambitious goals to unlock the potential for EU competitiveness, but year on year, EU institutions have gradually realised that those goals were not going to be achieved any time soon. Today, while launching the new EU strategy for a smart, sustainable and inclusive growth, the new European Commission puts even more emphasis on innovation, and one of the Commissioners has been given a specific mandate to deal with innovation.

Available data are not reassuring. As shown below, in Figure 1, the gap between the EU15 and the United States in terms of expenditure in R&D has been in place since the early 1980s.

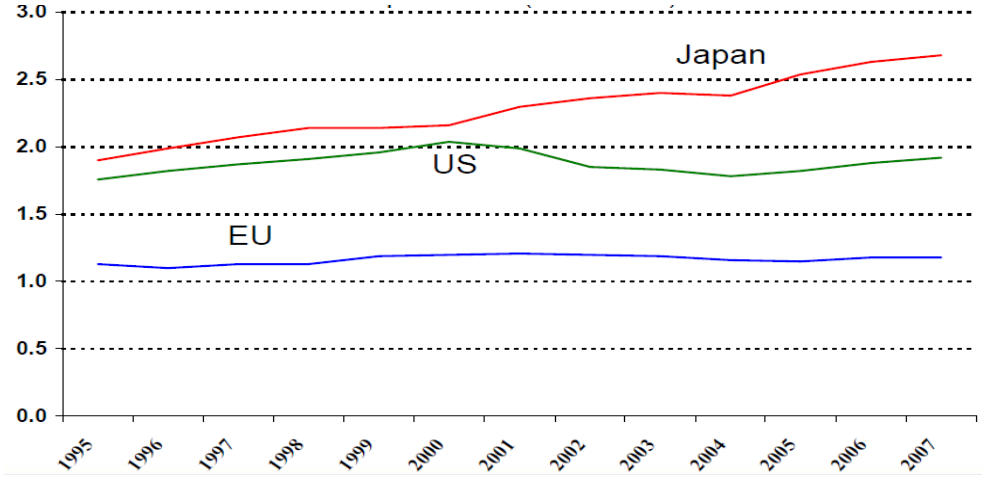
Figure 1. Gross domestic expenditure in R&D (share of GDP)



Source: Kristian Uppenberg, presentation at the first Task Force meeting, 18 September 2009.

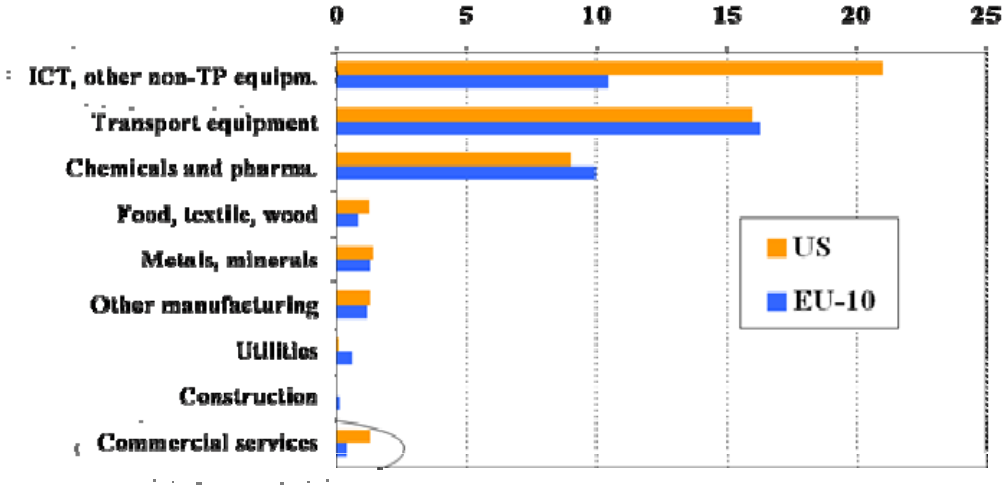
When we observe the difference between the US and the EU in terms of business sector R&D spending broken down by sector, the gap emerges in particular in the ICT and the commercial services sectors. In particular, ICT is currently the determinant of approximately one half of EU productivity increases, but is at the same time also the main determinant of the productivity gap between the US and the EU.

Figure 2. Business R&D expenditure in the US, the EU and Japan (% of GDP)



Source: Eurostat.

Figure 3. Business sector spending in R&D, by sector (% of the industry value added)

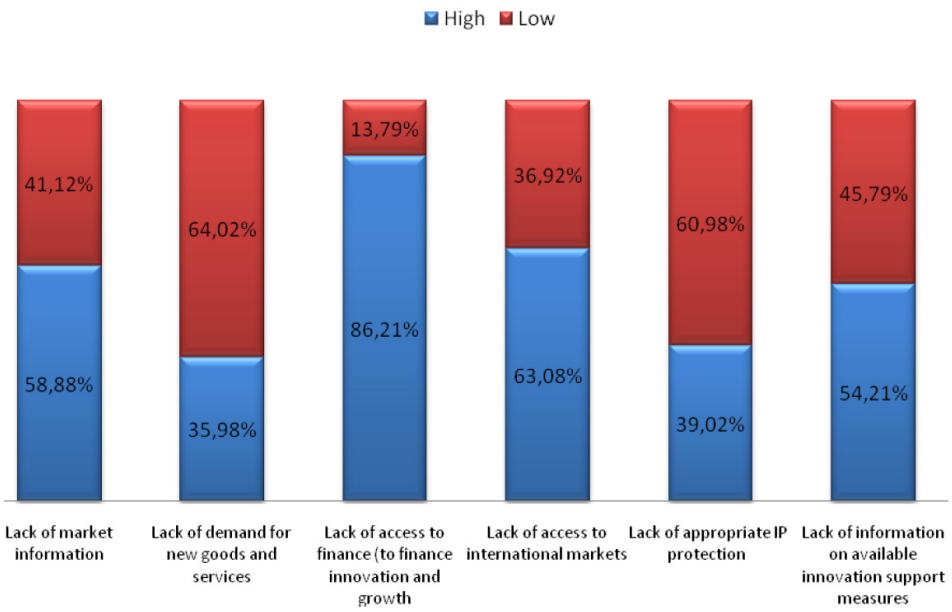


Source: Kristian Uppenberg, presentation at the first Task Force meeting, 18 September 2009, OECD data.

An important issue is the ability of the European Investment Bank (EIB) to reach dynamic and innovative small firms and help them grow through early-stage financing. 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. This problem should be addressed, possibly also with the help of member states, by further developing instruments that allow for aggregation of local initiatives, such as clustering, to unlock the potential of innovative SMEs.

This constraint reflects a more general situation, in which SMEs suffer from a chronic lack of support for innovative investments, in particular due to difficulties in accessing both public and private sources of funding. Figure 4 below shows the results of a recent survey of stakeholders, in which more than 96% of the surveyed respondents considered that lack of access to finance innovation and growth is an important barrier for SMEs.

Figure 4. Key barriers to access to finance according to stakeholders



Source: http://ec.europa.eu/enterprise/policies/innovation/files/swd_effectiveness.pdf

Box 1. Key enabling technologies

On 30 September 2009, the European Commission adopted a Communication on "Preparing for our future: developing a common strategy for key enabling technologies in the EU" (COM(2009)512 final, 30.09.2009). Key enabling technologies (KETs) are defined by the following features: i) they are knowledge-intensive (high R&D and capital expenditure); ii) they are associated with highly-skilled employment; iii) they are multi-disciplinary, cutting across many technology areas; iv) they create multiplier effects and v) they enable innovation and are of systemic relevance to economies.

KETs are important for several reasons:

- They are the driving force behind the development of goods and services.
- They are at the forefront of competitiveness, innovation and the EU knowledge-based economy.
- They modernise the industrial base and further strengthen the research base.
- They create related eco-systems of SMEs.

Against this background, the Commission highlighted the need to develop a strategic approach for KETs, especially since the EU has good R&D capacities in some KETs but is not as successful in commercialising results. Although several member states and other regions have started to identify enabling technologies that are relevant to their future competitiveness, differences exist among member states on what should be regarded as KETs, and there is no shared understanding of the importance of KETs. Thus, a more strategic approach is required to deploy these technologies in the EU. In addition, this strategy for making the EU competitive must be achieved while maintaining openness in the EU economy.

Also the conclusions of the Competitiveness Council of 28 May 2009 "welcomed the Commission's initiative to develop a proactive policy for enabling high-technologies". Specifically, the Communication tries to identify the KETs that strengthen the EU's industrial and innovation capacity to address the societal challenges ahead, and proposes a set of measures to improve the related framework conditions.

Different performance indicators have been selected for different KETs. At the initial stage, there is a screening of the common high-tech areas at member state level. Following this, there are economic criteria based on economic potential, the value-adding enabling role (innovation and productivity enabler as well as potential for positive spillovers), technology intensity and capital intensity. Based on these objective criteria the most

promising examples of KETs can be selected. The following five KETs have been identified in the 2009 Communication.

- **Nano-technology** holds the promise of leading to the development of smart nano- and micro-devices and systems and to radical breakthroughs in vital fields such as health care, energy, environment and manufacturing.
- **Micro- and nano-electronics**, including semiconductors, are essential for all goods and services that need intelligent control in sectors as diverse as automotive and transportation, aeronautics and space. Smart industrial control systems permit more efficient management of electricity generation, storage, transport and consumption through intelligent electrical grids and devices.
- **Photonics** is a multi-disciplinary domain dealing with light, encompassing its generation, detection and management. Among other things, it provides the technological basis for the economical conversion of sunlight to electricity, which is important for the production of renewable energy and a variety of electronic components and equipment, such as photodiodes, LEDs and lasers.
- **Advanced materials** offer major improvements in a wide variety of different fields, e.g. in aerospace, transport, building and health care. They facilitate recycling, lowering the carbon footprint and energy demand and limiting the need for raw materials that are scarce in Europe.
- **Biotechnology** brings cleaner and sustainable process alternatives for industrial and agro-food operations. It will, for example, allow the progressive replacement of non-renewable materials currently used in various industries with renewable resources. The scope of applications, however, is just at the beginning.

Once KETs have been identified, public intervention may follow, but this requires a comprehensive EU policy in this field. Examples of possible policy actions include focusing on innovation for KETS, improving the commercialisation of R&D, reducing fragmentation of EU policies, improving state aid for research, combining deployment policies with climate change policies, improving trade conditions, increasing venture capital, increasing the availability of skilled labour and enhancing international cooperation. In more in detail, short-term solutions include better application of existing state aid rules, a level international playing field and improved access to finance. In the long term, a high-level expert group could be established to assess the competitiveness situation of KETs, analyse R&D capacity and propose policy recommendations.

1.1 EU initiatives to boost innovation

In December 2008, the European Council called for the elaboration of a European Innovation Plan to contribute to the competitiveness of the EU's industry and to strengthen economic recovery. Since then, the European Commission has undertaken preparatory work on possible policy measures. Recent initiatives include:

- various preparatory policy documents, communications and staff working documents in particular, the Communication "Reviewing Community innovation policy in a changing world";[1]
- other policy papers covering specific areas, such as design for innovation, innovation in services, access to finance, the Lead Market Initiative and Key Enabling Technologies;[2]
- a business panel on future European innovation policy that provided a set of recommendations from a business perspective on priorities for future EU innovation policy;
- a public consultation on the European Innovation Plan, which led to 215 responses from universities and research institutions, companies, governments, non-governmental organisations and individuals;
- a consultation on the review of European standardisation, coupled with the creation of an ad hoc working group (Express), which is due to close in May 2010; and
- ongoing work on the Community patent and the common patent litigation system, which will arguably lead to future policy measures – the estimated saving for EU companies would reach €289 million per year.[3]

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[1] COM(2009)442 final, 2 September 2009.

[2] The Lead Market Initiative (LMI), launched in 2008, has identified markets for innovative products and services where innovation is both needed and possible and where the use of the above-mentioned instruments influencing the capacity to put new products on the market rapidly in a more focused way can make a real difference (bio-based products, eHealth, sustainable construction, protective textiles, recycling, and renewable energy). For KETs, see Box 1.

[3] See http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/225&format=HTML

Overall, these policy documents point to the need to i) simplify and streamline EU funding programmes; ii) enhance cooperation between different levels of governance, including regional, national and EU research and innovation programmes; iii) strengthen the knowledge triangle,[4] especially as regards education policies; (iv) focus on SMEs, which exhibit significant problems both in terms of awareness of existing support schemes and access to finance and v) focus innovation policy more towards emerging market needs and societal challenges, e.g. climate change and ageing.

The recently presented EU 2020 strategy includes seven flagship initiatives, of which one hints at the need to create an 'Innovation Union' to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs. Within this context, emerging initiatives include actions to strengthen EU instruments to support innovation (including through closer collaboration with the EIB); streamlining of administrative procedures to facilitate access to funding, particularly for SMEs; the promotion of knowledge partnerships and the strengthening of links between education, business, research and innovation, including through the EIT, and to promote entrepreneurship by supporting young innovative companies.

The new flagship initiative also deals with multi-level governance and announces the launch of joint 'European Innovation Partnerships' between the EU and national levels to speed up the development and deployment of the technologies needed to meet the challenges identified.

1.2 The governance of EU innovation policy

The plethora of initiatives launched by the European Commission in the past months on issues related to innovation policy testifies at once to the importance of the subject, and also to the challenges that this domain of EU policy is facing. As a matter of fact, the current European landscape suffers from considerable problems, mostly due to a lack of good governance. It is therefore no surprise that both public and – even most notably – private spending in R&D&I have not even come close to the very ambitious objectives set in Lisbon back in 2000. On the contrary, Europe still exhibits a

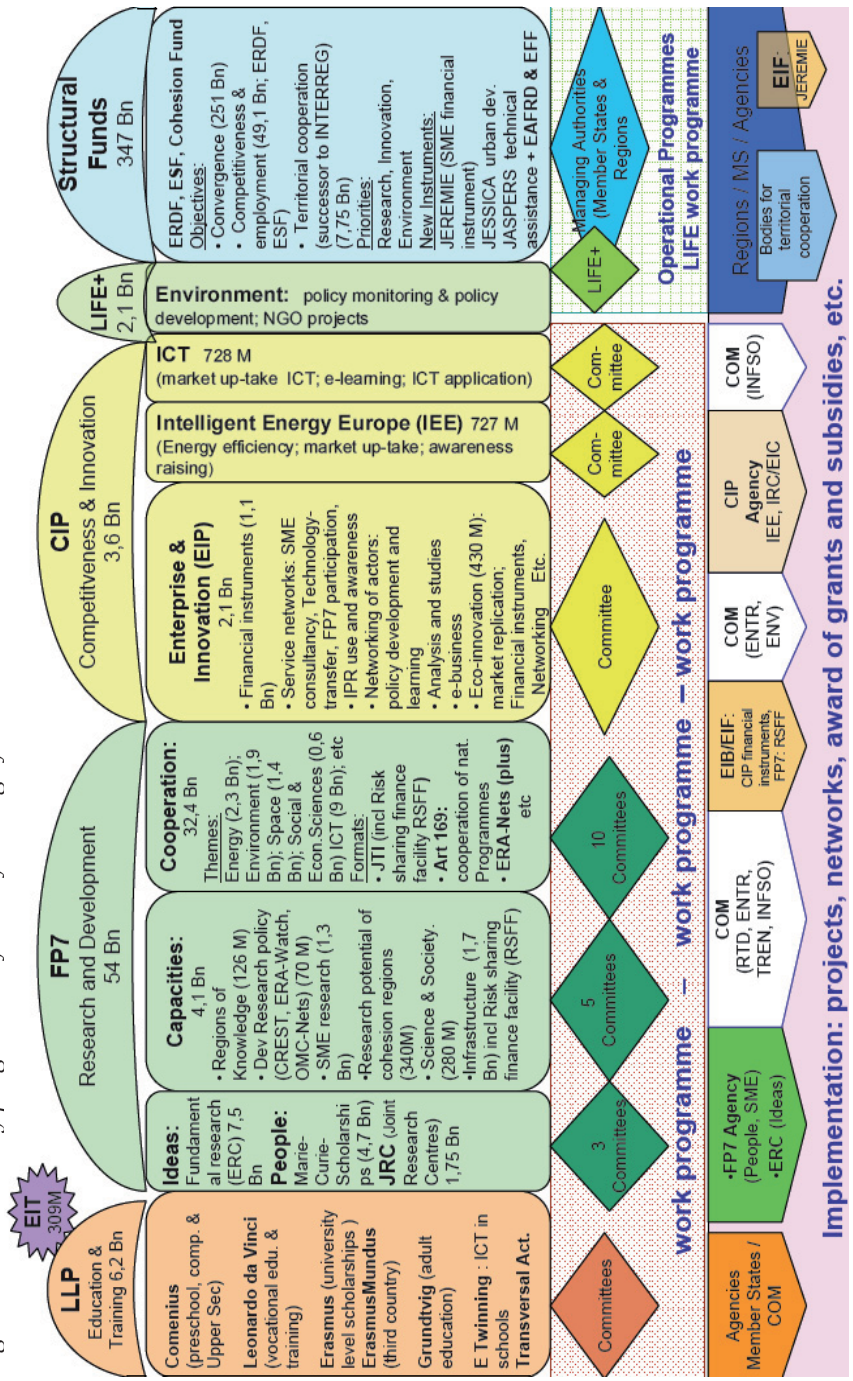
[4] The knowledge triangle refers to the interaction between research, education and innovation, which are key drivers of a knowledge-based society.

remarkable gap with, for example the US and Japan in terms of investment in R&D&I.

Public funds at EU level are available. An estimated 16.5% of the Community budget in the period 2007-13 is dedicated to innovation-related activities; however, it is spread over several programmes and under different management rules:

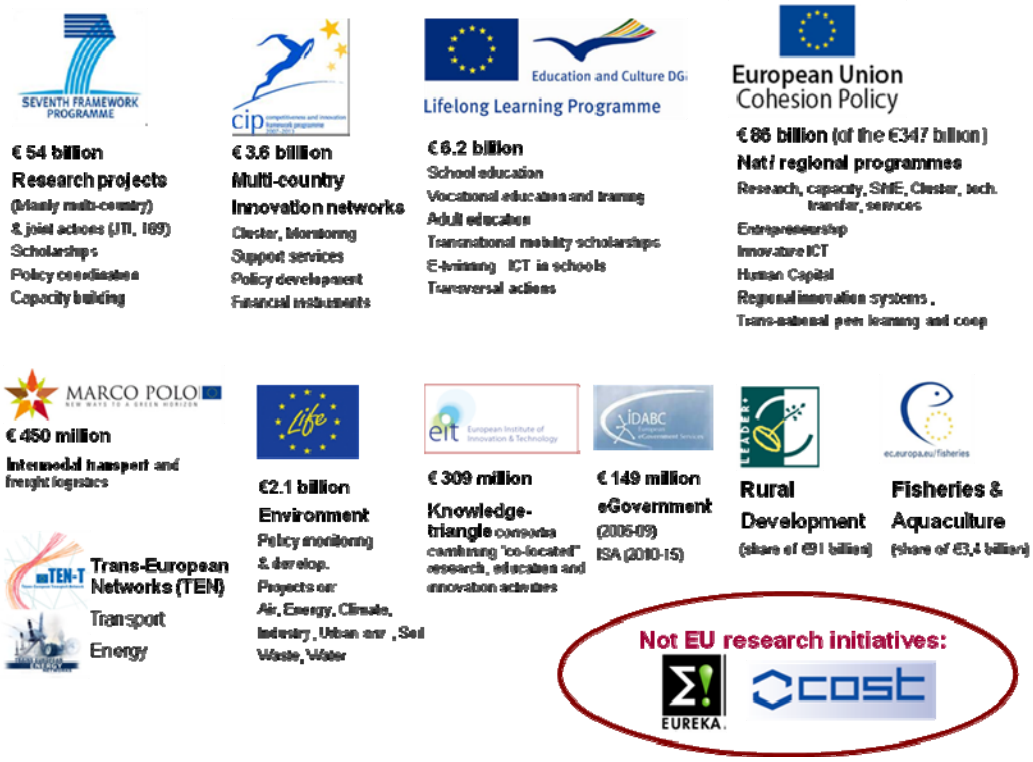
- *four centrally managed EU funding programmes* (FP7, CIP, LLP and LIFE+) and
- *four shared managed programmes* (the ERDF, ESF, EAFRD and EFF) have innovation among their targets.
- Within the CIP programme, there are three *separate sub-programmes,* each with separate work programmes.
- In addition, three *programmes indirectly support innovation* (TENs for transport and for energy, Marco Polo and IDABC/ISA for eGovernment).
- The EIB supports innovation under its 'i2i' initiative, which aims to mobilise up to €50 billion over the current decade (innovation 2010 initiative).

Figure 5. Community programmes for the funding of R&D&I



Source: European Commission.

Figure 6. Budget instruments



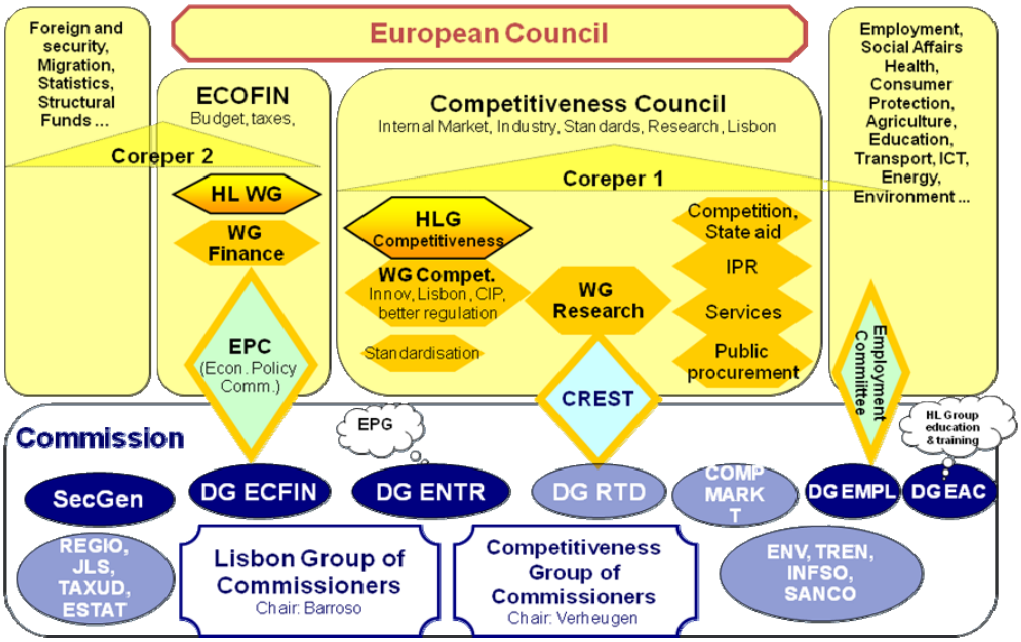
Source: European Commission.

In terms of governance, the EU landscape appears particularly complex (see also Figure 7 below):

- **Four different executive agencies** support the implementation of the centralised RTD&I programmes **+ the EIF** and its financial intermediaries for the CIP financial instruments and the FP7 RSFF.
- **24 committees** (for FP7: 19 committees/thematic configurations of committees, for CIP: 3, LLP: 1, LIFE+: 1) deal with the programming and monitoring of implementation of the centrally managed programmes directly targeting innovation.
- There are **386 operational programmes under the ERDF and ESF that contain an innovation component**. For each of them a managing authority is in charge (mostly a regional or national ministry or body; for the territorial cooperation programmes these can be joint technical secretariats, like the JTS for INTERREG IV C) and each is overseen by a monitoring committee that includes the Commission as observer.

- There are **seven DGs/Commissioners** in charge (RTD, ENTR, INFSO, TREN, ENV, ECFIN, EAC) of the centralised programmes.
- **plus another five** if the shared managed funds and indirect innovation support are taken into account (REGIO, EMPL, AGRI, FISH, DIGIT).
- **plus another six** if the indirect impact on the innovation-related programmes and policies is taken into account [COMP (state aid), MARKT (IPR, public procurement), SANCO (health & safety regulations), TAXUD (fiscal incentives), ESTAT (statistics, community innovation survey) and JLS (mobility of 3rd country researchers and immigration of high-skilled workers)].

Figure 7. The complex decision-making system of EU innovation policy



Source: European Commission.

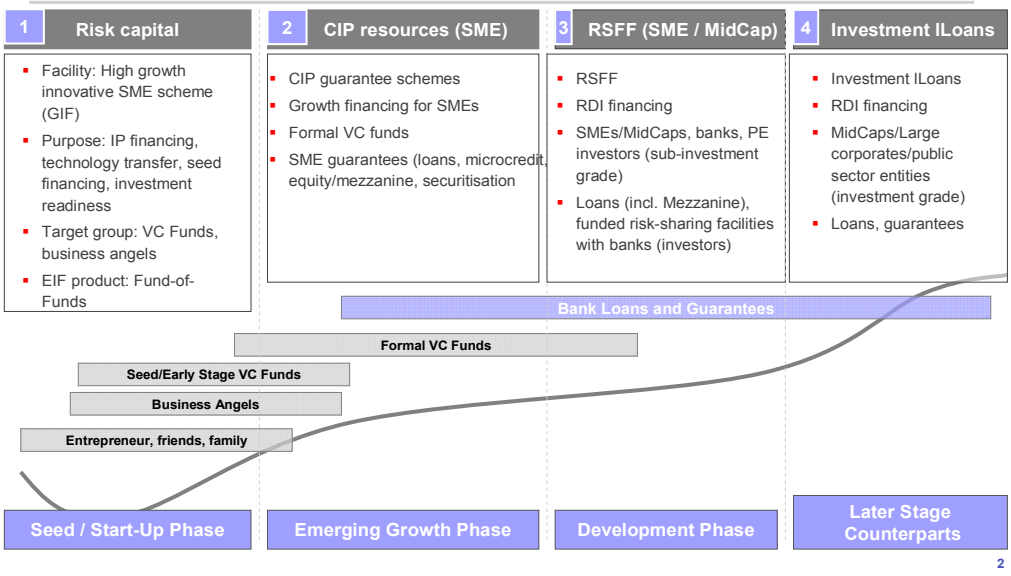
Against this background, for the potential beneficiaries there is no single information or entry point to the different EU support programmes and a panoply of different application forms and management rules at EU, national and regional level. This leads to a lack of clear political leadership and strategic orientation.

1.2.1 The European Investment Bank

The European Investment Bank Group already leverages EU budgetary funds in support of R&D&I investment. In addition to cross-border venture capital and technology transfer support via the European Investment Fund (EIF), the EIB could consider widening the scope of applications, in particular by broadening and deepening risk-sharing operations, to include for instance innovative services and demand-side measures, such as the Lead Market Initiative or 'pre-commercial procurement'.[5]

Figure 8 below summarises the different sources of EU funding available by differentiating between the different phases of growth of a firm.

Figure 8. EIB's funding instruments



Source: Presentation by Harald Gruber at the CEPS Task Force.

[5] 'Pre-commercial procurement' describes "an approach to procuring R&D services other than those where the benefits accrue exclusively to the contracting authority for its use in the conduct of its own affairs, on condition that the service provided is wholly remunerated by the contracting authority". See the Commission Communication *Pre-commercial procurement: Driving innovation to ensure sustainable high quality public services in Europe*, COM (2007) 799 final, 14.12.2007.

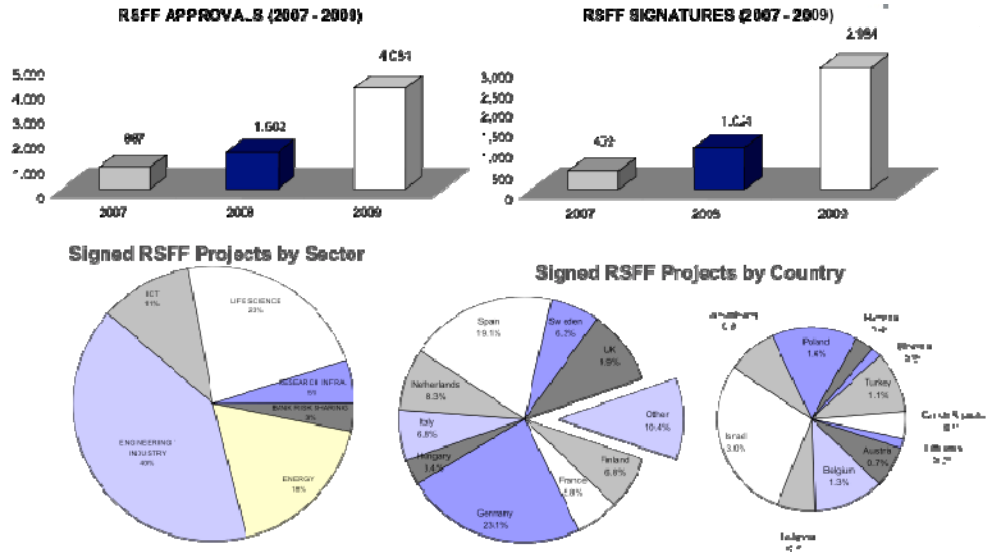
Box 2. The EIB Risk-sharing Finance Facility

An example of funding available for innovative firms during the development phase is the EIB's risk-sharing finance facility (RSFF), one component of the EIB strategy that aims at offering loans in conjunction with banks. The problem with that instrument is that the EIB is by itself constrained in reaching SMEs, because the loans that are directly managed by the bank are too big to apply to SMEs. This is to some extent mitigated by the fact that RSFF credit lines have been set up with commercial banks which have a retailing role for SME financing. However, more coordination with national banks and investors should help to bridge financing gaps. This would be very important for innovative firms in the development stage, as the RSFF may be attractive to them for many reasons, including the following:

1. Highly attractive terms and conditions (AAA rating and non-for-profit pricing)
2. Long maturities of up to 10 years or more
3. Direct EIB participation of up to €200 million per transaction (depending on rating)
4. Strong technology/industry expertise
5. EIB does not sell assets on the secondary market (buy and hold strategy)
6. No cross-selling (just long-term lender)
7. Signalling effect: EIB as a quality stamp
8. Debt and mezzanine debt product

The EIB does not generally offer the RSFF product to firms with high credit standing as they are better served with other products, such as senior investment loans. RSFF instead is used to fuel innovation by sub-investment-grade rated firms (Moody's BBB- or less), as innovative firms often fall into these rating categories. The EIB chooses firms based on projects that appear mature enough to demonstrate the capacity to repay debt on the basis of a credible business plan.

Figure 9. RSFF approvals to date



Source: Harald Gruber, EIB.

1.3 Structure of the report

Given the turbulent state of the European debate on innovation policy, with a proliferation of policy initiatives, public consultations and ad hoc working groups, the Centre for European Policy Studies decided to launch a Task Force on innovation policy in mid-2009. The Task Force met five times between September 2009 and May 2010, and brought together representatives of EU institutions (the European Commission, the EIB) and the European Patent Office, industry representatives, practitioners and scholars to discuss how to revive the EU approach to innovation policy and strengthen existing instruments to ensure that the framework conditions to unleash the potential for innovation are in place at EU level.

The main topics covered by the Task Force were the overall approach to the re-launch of EU innovation policy, as well as the governance of EU innovation policy. In addition, we have dedicated ad hoc sessions to three specific issues: the Community patent, the transfer of climate-related technologies (CRTs), and EU standardisation policy.

Accordingly, the remainder of this report is structured as follows. Section 2 discusses the need to develop a new approach to EU innovation

policy that is at once integrated and comprehensive, coordinated, demand-driven, market-based, responsive and accountable. Section 3 illustrates the Task Force recommendations as regards the Community patent. Section 4 contains the findings of the Task Force on issues related to technology transfer, particularly in the context of climate-friendly technologies. Section 5 explores potential avenues for reform of EU standardisation policy. Section 6 briefly concludes.

2. A NEW APPROACH TO INNOVATION POLICY IN THE EU

2.1 Innovation is a changing concept

The data reported in the previous section show that Europe is facing a structural problem of 'innovation stagnation'. Available data testify to a European 'lag' vis-à-vis the United States, Asia and several emerging economies in terms of research, development and innovation (R&D&I). The recent Innovation Scoreboard 2009 has shown positive signs in some regions, but overall innovative investments by businesses still appear to be relatively weak, especially if compared to the US and Japan.[6] Europe must focus on unlocking its full innovation potential in the years to come, to the benefit of EU citizens.

The CEPS Task Force discussed possible ways to overcome this problem. The first conclusion reached is that *any solution must be developed with due attention to the changing global environment of innovation*. This means that Europe must realise that innovation patterns around the world are changing and pose new challenges to the old continent's ability to compete internationally. In more detail:

- *R&D&I activities are increasingly internationalised*. There are two reasons for this. First, the sophistication of production abroad has only recently increased. Second, as stated, there is an increased desire to have R&D closer to customers in foreign markets. Available data

[6] See European Innovation Scoreboard 2009 at http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=5714&userservice_id=1&request.id=0

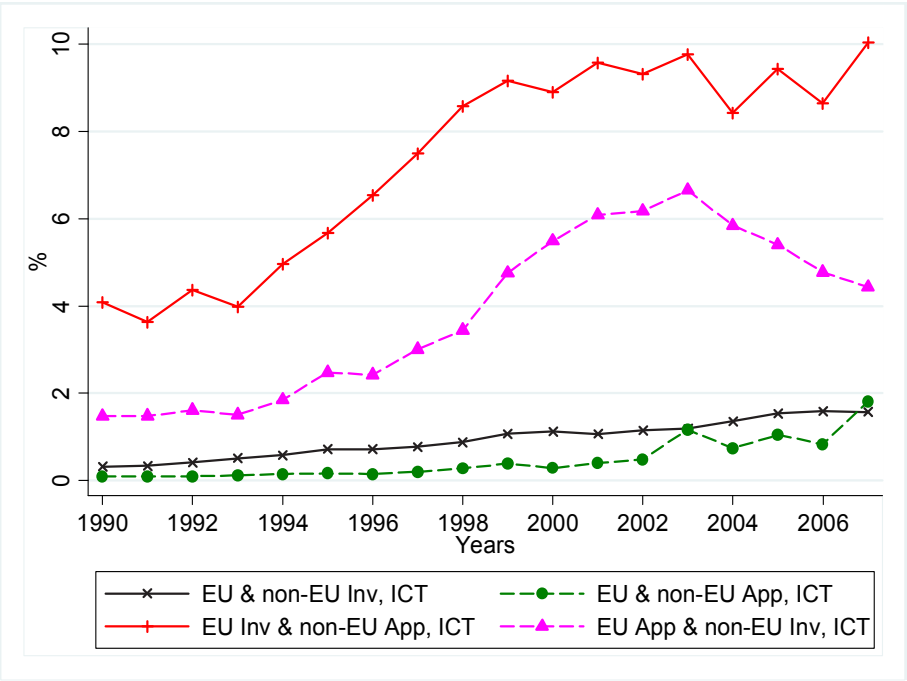
shown by Task Force participants show that companies are internationalising their research and innovation activities following two broad strategies: i) an *asset-exploiting* strategy where firms seek knowledge about new markets to customise products and extend the expertise generated at home; and ii) an *asset-seeking* strategy, whereby firms gather new knowledge and tap into the resources of a host country. Examples of R&D internationalisation include the creation of overseas R&D centres; alliances with local companies and universities; mergers and acquisitions of local firms; and increasing research intensity of foreign production facilities.

The three main players are the EU, US and Japan, but it should be noted that Asia is entering the process. With respect to the EU, US and Japan, the US appears to be a major destination and the EU a major source of R&D investments. Also, European companies perform about 30% of R&D outside the EU.

Data presented at the Task Force meetings are based on evidence of collaboration between EU and non-EU inventors and between EU and non-EU applicants and cross-border ownership of inventions in the total EU ICT-related inventions, in the period 1990-2007. The main findings are that:

- The level of internationalisation of inventive activities, while being rather low, has steadily increased over time.
- The level of internationalisation of inventive activities in ICT is and has been significantly higher compared to the average for all technologies.
- In international collaboration in ICT, US firms seem to be more active than EU firms.
- Inventive collaboration in ICT R&D with Asian economies is still relatively low, but increasing.
- The level of US-Asia collaboration is significantly higher than EU-Asia, particularly after 2000.

Figure 10. Evidence of the internationalisation of R&D

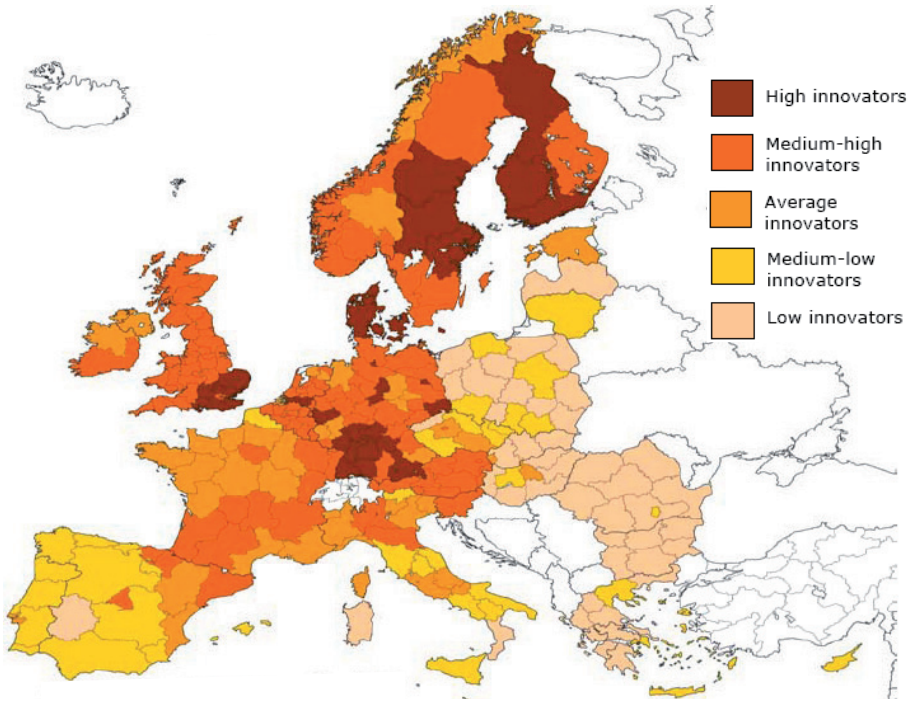


Source: Daniel Nepelski, JRC from EPO PATSTAT and own calculations.

- *The EU is still very fragmented when it comes to innovative potential and output*. The recent European Innovation Scoreboard 2009 has highlighted that EU member states can be divided into at least four different groups: i) *innovation leaders*, which include Denmark, Finland, Germany, Sweden and the UK; ii) *innovation followers*, comprising Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands and Slovenia; iii) *moderate innovators*, which includes the Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovakia and Spain; and iv) *catching-up countries*, which comprise Bulgaria, Latvia and Romania.

  At regional level, the situation is even more fragmented. The level of innovation in regions varies considerably across almost all EU countries.

Figure 11. Regional innovation performance in the EU



Source: European Innovation scoreboard 2009.

The fragmentation of innovation performance 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 (e.g. taxation) varies across countries. While a degree of diversity is required, a total lack of harmonisation 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 business angels from reaching new markets and establishing their business where opportunities are still unexploited. This calls for urgent action at the EU level to ensure that the free movement of capital and services is finally achieved.

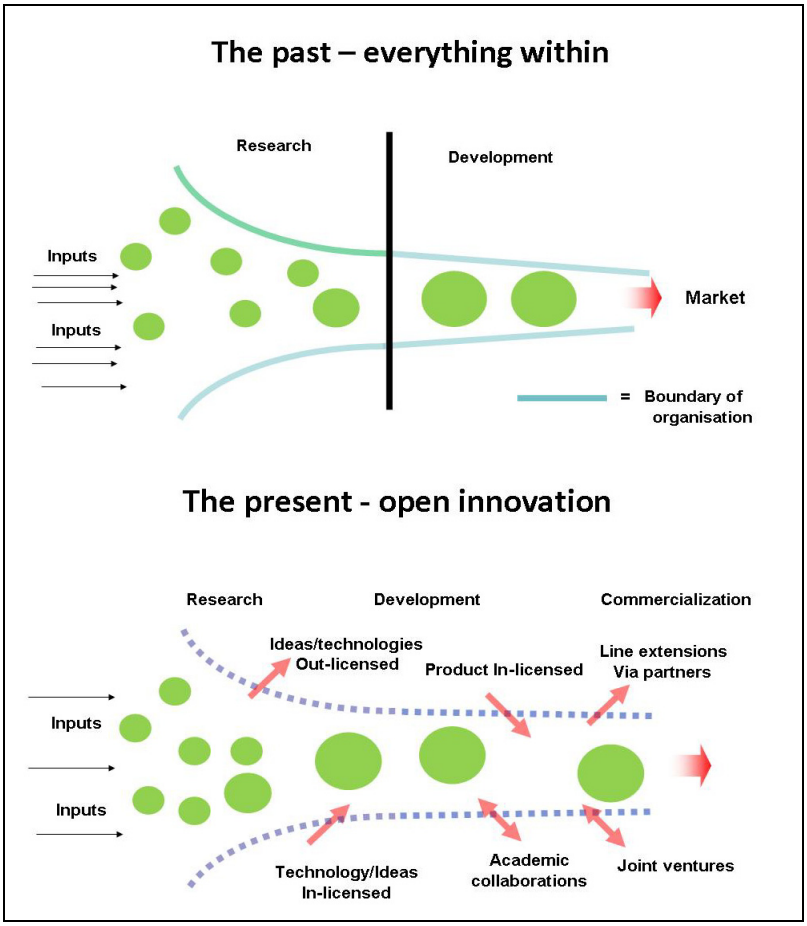
- *The concept of 'open innovation' permeates most of the recent policy discussions at international level*. As recently reported also by the OECD, "the organisation of innovative activities (technological as well as non-technological) across firm boundaries is clearly on the increase, with more balance between internal and external sources of innovation ... Industries such as chemicals, pharmaceuticals and information and communication technology (ICT) typically show high levels of open innovation".[7] Open innovation implies, inter alia, 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 a proactive IP asset management. This is leading to an increase in the number of companies collaborating in innovative activities.[8] 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 endeavours; and removing barriers to the circulation and licensing of ideas across EU member states. The role of patents, technology transfer and standardisation is key in this respect, as will be discussed below.[9]

[7] See Open innovation http://www.oecd.org/dataoecd/22/44/41446671.pdf.

[8] OECD innovation strategy http://www.oecd.org/dataoecd/1/42/43381127.pdf

[9] See below, Sections 2, 3 and 4.

Figure 12. Traditional vs. open innovation



Source: Chesbrough (2009) – quoted by Jackie Hunter, 5th meeting of the Task Force.

2.2 A new approach to EU innovation policy

The changing nature and scope of global innovation activities creates very significant consequences for EU innovation policy, requiring a substantial review of the pillars of EU innovation policy, involving both the scope and the governance of innovation at the EU and national level.

The CEPS Task Force discussed the issue in-depth. The debate led to the definition of a new EU innovation policy that is integrated and comprehensive; coordinated and multi-level; demand-driven and (where possible) co-regulated; focused and market-based; responsive and accountable. Below, we explore their attributes in more detail.

2.2.1 *Tomorrow's innovation policy: integrated, market-based, demand-driven*

The problem to be solved (demand from the market and society) should be the starting point for innovation policy; scientific questions cannot be the only drivers of innovation. This implies that the whole innovation cycle should be taken into account, including all the different actors in the innovation chain: industry, academia, public and private financing organisations, NGOs, society and citizens, politicians, policy-makers etc. At the same time, both the supply and the demand for innovation should lie at the heart of EU policy-making. The discussion should go towards accepting innovation as a transversal concept cutting across all sectors of economic, social and political activity, to cover the different kinds of innovation. Demand-side measures, such as the Lead Market Initiative and pre-commercial public procurement are powerful tools that should be developed to create the market incentives for innovation.

Innovation essentially takes place in markets, and market players know best where consumer needs and technology developments are leading. This would justify a change in perspective from a simplistic, supply-side approach (i.e. pumping innovation into the market) to a more demand-driven approach as far as new applications and societal challenges are concerned, including undertaking measures for the simplification of regulations surrounding innovation procurement.

From a demand-side perspective:

- *Public-private partnership schemes (PPPs) should be extended and promoted as the governing principle in all cases in which strong societal needs are at stake.* In PPPs, market players are able to avoid the current fragmentation of competences at EU level by involving all relevant DGs of the European Commission and all competent players from other EU institutions in a global dialogue that focuses on the industry, EU citizens, and global technology challenges.
- *In designing and shaping the new Framework Programme (FP8) market players should be involved* to make sure that the demand perspective is adequately taken into account in deciding where public money should be spent in order to add value.

From a supply-side viewpoint:

- *The supply of public support to (and risk capital for) innovation must be ensured*. There is a general need to expand private investment and public financial support, and the amount of risk capital from different

sources; to innovation for Europe to become competitive. We must expand the public EU and member state (industry will follow) support to innovation and research programmes to address both societal challenges and general competitive challenges facing the industrial base of Europe using new, revised existing (mentioned) and existing (like CIP) programmes. In addition, we must expand the public EU and member state and private capital to innovation by:

- Establishing an integrated venture capital market in Europe
- Expanding the permanent risk-sharing products of EIB
- Developing tax incentives to support investments in R&D and innovation, especially for young innovative companies.

- *The European Institute of Innovation and Technology (EIT) is to be a key driver of sustainable European growth and competitiveness through the stimulation of world-leading innovations with a positive impact on economy and society*. The EIT is the first European initiative to integrate fully the three sides of the 'knowledge triangle' (Higher Education, Research and Business-Innovation) and its mission is to grow and capitalise on the innovation capacity and capability of actors from the EU and beyond. In order to unleash the full potential of European innovation there is today an increasing need for: (i) ensuring continuity between the results of projects funded by the European Research Council and activities undertaken by the EIT; and (ii) a better alignment of both European and national level initiatives, in that all contribute towards the Europe 2020 vision and goals.
- *A key goal for the future should be to scale up the present EIT (knowledge triangle) approach which aims to join nodes of regional clusters of academia, institutes and business in pan-European knowledge and innovation communities (KICs)*. This triangle should focus on the following:
  - Addressing major challenges and opportunities;
  - Creating, capturing and transferring breakthroughs into business opportunities;
  - Forming effective governance, leadership and networks;
  - Exchanging and coordinating research and incubating efforts;
  - Exchanging the build-up of skills and educational programmes e.g. Master programmes throughout the EU27.
- *In addition to cross-border venture capital and technology transfer support via the European Investment Fund (EIF), the European Investment Bank (EIB) could consider widening the scope of applications*, in particular by

broadening and deepening risk-sharing operations, to include, for instance, innovative services and demand side measures, such as the lead market initiative or pre-commercial procurement. An important issue is the EIB's ability to reach dynamic and innovative small firms and help them grow through early-stage financing. Currently the EIB finds it very challenging to also 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. This problem should be addressed, possibly also with the help of member states, by further developing instruments that allow for aggregation of local initiatives, such as clustering, to really unlock the potential of innovative SMEs.

2.2.2 *A coordinated, multi-level innovation policy*

Governance is about much more than what happens within the Commission, even than what happens at EU level. Indeed, the money the EU spends on innovation is only a fraction of what countries spend.[10] This calls for the following main recommendations:

- *Apply the subsidiarity principle.* The EU should only stimulate innovation where there is an evident EU added value, to be clearly demonstrated through an impact assessment. For instance, this could be the case where there is a strong need to link innovation policy with other EU policy priorities (climate, energy, health etc).
- *Empower a EU agency to manage the several funding instruments available for innovation and research,* in order to exploit the potential synergies between them and streamline communication with stakeholders, thus avoiding the current 'spontaneous disorder', in which too many funding tools appear sub-additive rather than self-reinforcing.
- *Coordinate the different levels of governance better.* There should be clearer and more effective coordination between member states and EU policies and decision-making when it comes to R&D processes. As observed in other areas and debates (e.g. telecoms, competition policy, financial services, etc.) it would be possible to establish a centralized/coordinated policy at EU level (see also point above),

[10] Commission R&D funding comprises less than 5% of total public research spending in the EU, and less than 2% of total R&D spending, public and private. See; inter alia, the first ERAB report, *Preparing Europe for a New Renaissance*, 2009.

which is then implemented locally by national authorities, provided the commitment is credible, and the reverse relationship or balance is also possible or appropriate depending on the area concerned, the relevant spillover effects and the incentives.

- *Ensure that member states allocate a larger share of their resources to support super-critical programmes/instruments* coordinated at European level (*e.g.,* Framework Programmes, PPPs, Joint Technology Initiatives, ERANET+, ELSA, voluntary JP, CIP, Eureka, etc.).
- *Ensure that member states contribute to the monitoring and evaluation of the performance of research and innovation projects* by collecting information and data using common indicators.

2.2.3 *Taking innovation seriously: improving governance through accountability and coordination*

Putting innovation at the core of the EU policy-making process cannot only be a declaration of intent. At the same time, achieving a 'new Renaissance' for Europe would be impossible if the governance system that backs innovation support schemes is feudal. Against this backdrop, the CEPS Task Force welcomes the fact that the European Commission will formally establish a subgroup of at least eight EU commissioners with a stake in innovation policy (chaired by Máire Geoghegan-Quinn, the EU Commissioner for research, innovation and science), which will work on a new research and innovation strategy due to be published in the autumn.

Looking at the near future, there are additional measures that can improve leadership, ownership, accountability, coordination and governance. These include:

- *Opening the Impact Assessment Board (IAB) to a representative of DG Science, Technology and Innovation (STI)*. This way, the IAB would be able to send back proposals that have not sufficiently considered the impact of submitted new Commission policies on innovation and research. A representative from DG STI or any other IAB member in charge of representing EU innovation could also suggest methodologies developed by EU-funded programmes, which could be used in impact assessments to evaluate ex ante the impact of the proposed new measures on innovation.
- *Increasing and improving the participation of officers in charge of research and innovation policy in Impact Assessment Steering Groups*. This should

guarantee that impacts on innovation are considered also at an early stage of the policy-making process.

- *Developing indicators that track progress in the field of innovation policy and allow for an evaluation of the performance of policy measures in place.* It is paramount that the performance in innovation is measured according to standard indicators, not subject to arbitrary interpretations and manipulations across Europe. The experience with the European Innovation Scoreboard – based on 29 indicators – is a useful starting point in this direction, and should be complemented by other tools currently used at the international level (e.g. the OECD Oslo manual, the tools developed by FP7 projects such as INNODRIVE).[11] The Joint Research Centre (JRC) of the Commission should ideally be in charge of this task. Indicators should also break down different types of innovation: for example, a recent OECD report suggests that there are four different kinds of innovation: two technological 'product' and 'process' innovations (empirically the latter is far more important than the former despite what many think); and also two non-technological 'marketing' and 'organisational' types of innovation. One question in the EU context is what the financing constraints are in these areas; whether they are the same or different and whether EU policies and instruments deal with this difference.
- *Adopting follow-on monitoring and evaluation strategies*. The implementation of innovation policies should be monitored ex post and evaluated according to the intended purposes to be achieved, with the help of member states (See Section 2.2.2 above).
- *Coordinating innovation and research policy with other EU policy objectives already at the budget allocation stage*, for example by allocating funds to projects and technology platforms that promise to solve today's and tomorrow's policy challenges. For example, there has been a lively debate over Europe's huge investment in the ITER project, which accounts for the bulk of funding for energy research in the EU budget: even disregarding the riskiness of the project, its weak governance and the even weaker commitment of some of the other

[11] See the OECD Oslo manual, "Guidelines for collecting and interpreting innovation data", at http://www.oecd.org/dataoecd/35/61/2367580.pdf. And see INNODRIVE's activities at http://innodrive.org/

partners, it is impossible to ignore the mismatch between the timing of results for ITER (2040 at the earliest) and the ambitious EU goals set in terms of reducing CO2 emissions by 2020.

- *Establishing a general principle at any review stage* whereby policy-makers i) should mandatorily assess whether policy and governance are aligned; and whereby ii) if they propose a change in policy and/or the introduction of a new instrument, they should immediately consider candidate policies or instruments to drop (a so-called 'one in, one out' approach).

3. PATENT LAW AND POLICY IN EUROPE

3.1 A jagged system

The European Union does not have a unified patent system. Firms, institutions and individuals can obtain patent protection either through national patent procedures or through the European Patent Office (EPO).

National patent offices grant national patents with limited territorial protection, based on domestic (substantive and procedural) patent laws that have a sufficient degree of harmonisation (thanks to international conventions on patent protection adopted by most states in Europe and in the world).[12] Since markets are expanding, national applicants may find national patent protection inadequate and usually they also apply abroad, through international or regional filing procedures.

The EPO is an administrative office within the European Patent Organisation, created by a number of contracting states with an international convention.[13] All member states of the European Union are contracting states to this convention. Its membership exceeds the boundaries of the European Union and also includes other European countries like Switzerland, some Former Yugoslav Republics like Croatia

[12] The main international instrument is the Paris Convention for the Protection of Industrial Property, of March 20, 1883, revised several times.

[13] The Convention on the Grant of European Patents of 5 October 1973 as amended by the act revising Article 63 EPC of 17 December 1991 and by decisions of the Administrative Council of the European Patent Organisation of 21 December 1978, 13 December 1994, 20 October 1995, 5 December 1996, 10 December 1998 and 27 October 2005, further amended by the London Agreement in 2000.

and Macedonia, and even Turkey.[14] The EPO does not grant a truly single 'European' patent, but provides for a unified *application* procedure valid in all EPO member states. The office is in charge of a centralised procedure for obtaining patent protection in the contracting states by following a single route, thereby simplifying the application procedure in relation to parallel national application procedures in each member state. Eventually the applicant receives a title of property that is a bundle of national patents. This feature of the European patent system implies that certain substantive law issues are dealt with under national laws, for example claims of validity and infringement. Each national case has its own independent life and outcomes may vary.

This being the situation, neither of the two routes appears to be perfectly complete, since the national route requires multiple applications and brings national patents under distinct and parallel procedures. The EPO route, on the other hand, is simpler from a procedural standpoint in the application phase, even though the life of the issued patents eventually depends on national experiences. It is disputable whether national procedures are easier than the EPO one.

It may be seen as a paradox that the European Union lacks a unified patent system; European firms have the opportunity to compete over an internal market with no internal barriers, but when it comes to patents they experience certain fragmentation costs.[15] The remedy could be the prospect of an EU patent. Since the Lisbon strategy, the European Commission and the European Council are seeking to implement an EU patent system, but results so far are wanting.[16]

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[14] From 1 May 2010, the European patent can be granted to up to 37 contracting states.

[15] The European Parliament of Enterprises (Eurochambres) debated and voted "that the absence of a Community patent harms European business" on 14 October 2008.

[16] The goal to obtain a Community patent while improving the existing systems was declared by the Commission in its Communication *More Research and Innovation – Investing for Growth and Employment: A Common Approach*, COM(2005) 448 final, on October 12, 2005, p. 7. Considerable efforts have been made recently to approach the final result, as witnessed by the Council Conclusions of 4 December 2009, available at: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/intm/111744.pdf.

It is disputable whether patents are the best way to protect innovation and the answer is not absolute, depending rather on industries, technologies and the kind of innovation in general. But it is a fact that EU firms face higher costs and greater complexities than competitors in the US or Japan. As a consequence, they have a reduced propensity to resort to patent protection. US firms have 45% more patents than EU ones, while Japanese firms have 209% more patents than EU firms.

The current situation is partly fragmented and produces certain shortcomings that may create difficulties for applicants (especially as far as SMEs are concerned) and should be eliminated in any future, truly European, patent system. Such shortcomings are covered in the following points.

3.1.1 Costs

Patent applicants usually face three different orders of costs, such as those for i) prosecution, including professional fees, from the application to the grant; ii) translation of granted European patents, for the patent to have effect in national jurisdictions; and iii) renewal, until the patent expires, which is usually 20 years from the filing of the application.[17]

Over the years, studies conducted in Europe in comparison with other regional patent systems have highlighted the following:[18]

- Costs to patent an invention in 13 EU member states is more than 13 times higher than in the US or Japan
- Renewal fees for 10 years' protection in 13 member states are 7 times higher than in the US and Japan
- European patents are generally validated only in about 6 or fewer (larger) member states because of cost.

Such data shows that companies with a large share of their business in the US or Japan receive a substantial advantage from their own patent

[17] As a matter of fact, a small number of patents is kept alive until the very last moment. At some point in time, the cost of renewal outweighs the advantages derived from sales of patented items.

[18] A detailed account of costs and potential savings by a Community patent system can be read in Jérôme Danguy and Bruno van Pottelsberghe de la Potterie, *Cost-benefit analysis of the Community patent*, Bruegel Working Paper, 08/2009.

system, which results in a comparative advantage with respect to companies whose business is basically in the European markets.

One of the major sources of cost is related to translation. The failure to adopt one single language for patents implies the need to use translation services when applying to certain foreign jurisdictions and such costs are incurred regardless of the route (whether national or through the European Patent Organisation) chosen. This problem has been significantly reduced recently under the European Patent Convention, since the London Agreement, signed by the EPC Contracting States on October 17, 2000,[19] entered into force in 2008 (May 1st), with the purpose of reducing translation costs. Under the London Agreement, states that adopt one of the official languages of the EPC (French, German or English) are no longer required to provide a translation into the other two languages, whereas (2) any state party having no official language in common with one of the official languages of the EPO shall dispense with the translation requirements provided for in Article 65, paragraph 1, of the European Patent Convention, if the European patent has been granted in the official language of the EPO prescribed by that state, or translated into that language and supplied under the conditions provided for in Article 65, paragraph 1, of the European Patent Convention. However, the London Agreement is currently in force in only 15 of the 37 EPC Contracting States.

3.1.2 Legal uncertainty

Since there is no such thing as an EU-wide patent, patents granted in Europe are national titles only. Because certain substantive laws are those of the granting states, jurisdiction also remains national. Although there could be unified jurisdiction in the absence of a Community patent, the failure to adopt a unified patent system has indeed delayed any move towards a unified system of courts. This situation can in principle be a source of legal uncertainty, as national judges can invalidate or reform the national portion of a European patent, thus making the protection not uniform across countries. In practice this effect is reduced, because the national substantive laws are to a large extent harmonised and because judges give, whenever possible, preference to a harmonised jurisdiction.

[19] The full name is:"Agreement on the application of Article 65 of the Convention on the Grant of European Patents."

Nevertheless, studies have shown over the years that in exceptional cases national jurisdiction can arrive at inconsistent results with respect to the same European patent, thus creating uncertainties as to the actual reach of the protection. Quite paradoxically, while the EU aims at a unified internal market, European patents are still subject to a jagged protection.[20]

3.1.3 Incongruities and complexities

The same uncertainty with regard to litigation exists even before, during prosecution of the patent. Indeed, the choice between two routes is a technical one, requiring advice by experts that need to evaluate the costs and benefits of each route. Furthermore, the kind of protection afforded to subject matters can be different; one remarkable example being that of utility models that, unlike patents for invention, cannot be granted by the EPO. This fragmentation and the complexities of the system, coupled with the costs and the risk of costly litigation, leave European SMEs with the impression of having large parts of Europe in which they cannot establish a market.

On the other hand, the existence of alternative routes can provide freedom of choice for the applicants, which can adapt the requested scope of protection and the associated costs to their business requirements, which is of particular advantage for SMEs.

3.1.4 Inconsistent quality

The quality of patent protection is another important aspect.[21] Patents are often referred to as monopolies. This view might be exaggerated, since the patent owner is not a monopolist, even though the patentee enjoys exclusive rights that can resemble to those of a firm with some market power. The traditional economic literature justifies patent protection as an ex post incentive to inventive activities and to investments in research by

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[20] Two cases are often taken as an example of inconsistent results: the *Sara Lee/Phillips Electronics* case and the *Document Security Systems v. European Central Bank* case, where the rulings of judges differed across member states.

[21] Important papers and contributions have been produced on this topic. For instance, see R. Polk Wagner, *Understanding Patent Quality Mechanism*, Public Law and Legal Theory, University of Pennsylvania Law School, Research Paper No. 09-22, subsequently published as 157 *U. Penn. L. Rev.* 2135 (2009).

the innovator. In this vein, patent length and patent scope should be strictly related to the invention and to the idea of a reward for the inventor.

Because of the structure of the rights, patent protection cannot be automatic. It rather requires a granting authority in charge of assessing the existence of certain positive requirements that the invention must have to be afforded patent exclusivity. The granting authority (patent office) usually prosecutes the patent application assessing, among other things, its novelty and its inventive step in light of the existing prior art. The notion of prior art is a normative one; according to the European Patent Convention it includes everything made available to the public before the date of the application and it includes patent literature (PL), such as published patent applications and granted patents (even if expired), and not-patent literature (NPL), such as scientific papers, conference proceedings, presentations, internet postings, books.

There are several elements affecting patent quality, which is higher in Europe compared to the US.[22] Those elements can be (a) substantive, such as (i) the definition of patentable subject matter, and (b) the definition of novelty and inventiveness requirements, or (c) procedural, such as (i) the level of fees, and (ii) the characteristics of the granting procedure.

Eventually, the quality of the patents depends largely on the accuracy of the examination procedure. Patent examiners should grant patents only for those inventions that, after evaluation, correspond to patentable subject matters and are new and inventive. Low quality patents (often referred to as 'junk patents') have negative effects on the market, since the patentee can use them anyhow to exclude competitors and stifle genuine competition until someone, if any one, brings a validity action to have the patent declared invalid and removed by court. A decision to invalidate a patent is a serious and costly decision and negative incentives to initiate an action against an allegedly invalid patent can perpetuate the existence of that patent.

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[22] There is a consistent body of literature that supports this statement. See, for example, the Report by the US Federal Trade Commission, *To Promote Innovation: The Proper Balance Of Competition And Patent Law And Policy*, 2003 available at http://www.ftc.gov/os/2003/10/innovationrpt.pdf. Presentations by Bruno van Pottelsberghe and Domenico Golzio at the CEPS Task Force also confirm this statement.

If patent offices had unlimited resources, in terms of examiners, time and access to prior art information, there would be no problem with quality. Yet, the internet economy, globalisation and industrial cycles have been producing a growing number of patent applications. As a matter of fact, statistics from patent offices witness a growth in the number of applications that tend to be longer than in the past, and that are extended abroad because of globalised markets. Increased numbers and the length of patent applications can create backlogs in patent offices with potentially negative downward spiral effects: time available for the exam is reduced, so that the number of pending applications will expand. Other things being equal (that is, with given resources), quality will be inevitably affected since examiners will face workloads to be cleared in less time.

Because national systems may retain different approaches to patent law applications (for instance, as to the patentable subject matter) and to examination procedures (for instance, the number of staff examiners that each office has), or because of different propensities by firms and institutions to apply for patent protections, national offices face different workloads and the quality of patents can be different. For example, the problem of the backlog (which eventually has an influence on the quality of patents) is very well known in the US, where Congress in working to improve the patent system. The situation might be different in Europe, but a fast-changing scenario would recommend action on this issue to prevent the emergence of the problem.

To be sure, in light of the increasing importance of patents, policy-makers should undertake all possible options to organise the internal work of patent offices more efficiently and effectively. Facing the challenge of the information revolution also means striking the right balance between access to the patent system and a transparent and high-quality examination process.

3.1.5 Lack of EU-wide jurisdiction

As there is no centralised jurisdiction for patent litigation, litigation of patents remains national, unlike litigation of other intellectual property rights where the European Union has union-wide systems which complement the existing national systems (for trademarks and design, which are centralised, at least as far as the examination is concerned).

Plurality of national jurisdictions means potential variance not only in the outcome of the procedure (see above) but also in costs.[23] The European Commission highlighted such cost differences in a recent report. Four member states (the UK, France, the Netherlands and Germany) make up 90% of all patent litigation in Europe, but, as is shown in the following table, differences in costs are astonishing.[24]

Table 1. Cost of patent litigation in four member states

Member State	**First Instance Court**	**Appeal Court**
UK	€150,000 to €1.5 million	€150.000 to €1 million
France	€50,000 to €200,000	€40.000 to €150,000
Netherlands	€60,000 to €200,000	€40.000 to €150,000
Germany	€50,000	€90.000

The level of costs has an impact both on the decision to apply for a patent in a given country and on the decision to act to have a patent declared invalid.

First of all, the entrepreneurial decision to apply for a patent depends on a set of arguments, one of which is the likelihood of success in an enforcement action and its costs. There is an inner balance between the size of a company and its need for IPR protection. The smaller the business of an SME, the lower its need for IPR protection may be. However, when a business gets bigger, and IPR protection more important, costs for IPR protection become, due to the growing business, more and more affordable. In fact this is very much a self-balancing mechanism. Nevertheless, if litigation costs are too high, a company can still decide to enter the market, without patent protection, and thus save both the costs of the application and those of potential litigation. However, giving up patent protection for cost reasons can result in a loss of competitive advantage, even more in the

[23] See David Knight, *Cost of patent disputes,* in Patents in Europe. Helping business compete in the global economy, 2008, p. 25.

[24] Data are available in the Communication from the Commission to the European Parliament and the Council *Enhancing the patent system in Europe*, COM(2007) 165 def, p. 7.

case of SMEs. Studies have shown that the costs and complexities of litigation mainly hamper SMEs.[25]

Second, it must be kept in mind that during litigation there are also ways to remove potentially invalid (due to low quality) patents, since alleged infringers can try to invalidate patents on the grounds of their validity. Such invalidation can be done either by counterclaims in litigation proceedings or by separate nullity or post-grant opposition proceedings. Opposition proceedings are extremely cheap (less than 1000 euro plus attorney fees), while nullity may get more expensive, depending on the value of the patents with the same inner cost balance as mentioned above: the bigger the business at stake, the more expensive the case, and the more money there will be to finance the case. Yet, if litigation is too expensive, defendants will find it more convenient to settle a case rather than litigating it all the way; when this occurs, the ex post incentives to curb low quality patents can be altered.

A centralised jurisdiction for patents may have the benefit of being more affordable than a parallel multistate litigation and of providing an outcome that would apply uniformly.

On the other hand a Europe-wide unified jurisdiction will be in many cases (in particular those of SMEs running their business only in certain regions of the European Union) less affordable than the flexible, selective national jurisdiction as practised today where a European case usually gets litigated only in one country (e.g. Germany) and a contract with a comprehensive solution which includes all member states of the European Union is negotiated after conclusion of the selected national litigation.

The higher costs of a unified system, which is due to the fact that a European ruling has undoubtedly a greater geographical and economic impact than a national one, will mandatorily affect all existing cases, including those that are currently litigated in a selected national system only, if the unified system would become mandatory and freedom of choice be removed for applicants. This increase of costs will predominantly

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[25] Lanjouw, Jean O., Shankerman, Mark, *Protecting Intellectual Property Rights: Are Small Firms Handicapped?* 47 *Journal of Law and Economics* 45 – 74 (2004), have demonstrated that individuals and small firms in the US can be at a significant disadvantage in protecting their patent rights because of the small size of their portfolios.

affect SMEs because they lose the option to litigate a European patent only in a selected national system.

3.2 Efforts to create an EU patent system

The European Commission has been advocating for a Community patent since the Lisbon Strategy. Attempts to reach a truly unified European Patent System can be traced back to 1959. At that time, at the invitation of the Commission of the European Economic Community, the member states started working on a patent law for the Common Market that would do away with territorial limitations. The attempt failed in 1965 because of difficulties related to the failure of the UK to join the Community.

In the meanwhile, from 1969 to 1972 a conference in Luxembourg delivered the draft Convention for a European System for the Grant of patents, which was a nucleus for the Munich Diplomatic Conference, leading on 5 October 1973 to the signing of the European Patent Convention for the creation of the European Patent Organization.

Efforts to set up a community patent system restarted soon after. In 1975 the Luxembourg Convention was signed (15 December 1975), providing for a community patent and 'nullity boards' within the EPO, whose decisions would have been open to challenge before the European Court of Justice. The Luxembourg Convention has never been ratified by all signatory states and never entered into force. Diplomatic conferences in 1985 and 1989 followed and a Protocol on the Settlement of Litigation concerning the Infringement and Validity of Community Patents was added, but in vain.

In 2000, the EU Commission issued a proposal for a Council Regulation on the Community Patent under Article 308 of the EC Treaty. This same legal basis had proven successful for the Community trade mark and Community design. The fundamental idea behind the proposed regulation was to have the European Patent Office as granting authority for the Community patent. All this would have been possible by adoption of the EPC by the European Union. In this way, the EPO would have been the granting authority on behalf of one of the signing parties (that is, the European Union). At the same time, the Commission envisaged a Community Intellectual Property Court as a centralised court for issues concerning infringement and validity of the unified title.

At a later stage, relying on Articles 229a and 225a into the EC Treaty (introduced by Article 2 of the Treaty of Nice), the Commission introduced a proposal for a Council decision that should have conferred the

jurisdiction on a Community patent to a Community Patent Court, with appeals before the Court of First Instance. Basically, the main strategy was to vest in the European Court of Justice the jurisdiction for validity and infringement questions of Community patents. This ambitious attempt came to a halt when on 18 May 2004, the EU Council failed to adopt the proposal.

Parallel efforts to have a European Patent Litigation Agreement (EPLA) were conducted outside the EU system in 1999-2005 by EPC Contracting States. They aimed at creating a European Patent Court and the project was certainly a good one in terms of balance between locality and centralisation. Yet, the EPLA turned out to be unfeasible because by the time the EPC states set forth the proposal, the rule-making competence had already passed to the EU on an exclusive basis.

One of the critiques to the policy of the Commission has always been the excessive degree of centralisation in the solutions proposed. It is a fact that the fate of a pan-European patent system is strictly linked to the sentiment of a federal European Union. The future of the Lisbon Treaty will inevitably affect the power of the EU institution and, in this framework, the ability to complete the process of creating a Community patent system with a unified jurisdiction.

The latest steps by the Commission were taken in 2009 and include:

a) A Draft Agreement and Statute for new Unified Patent Litigation System (UPLS) to be created by "Mixed Agreement" with the EU and open to non-EU EPC States.

b) A Commission Recommendation to the Council to open negotiations for the adoption of the Agreement creating the UPLS (March 2009).

c) A Study on "Economic Cost-Benefit Analysis of Unified and Integrated Patent Litigation System" (March 2009).[26]

d) A Request by Council to ECJ for Opinion on compatibility of Agreement with EC Treaty (June 2009).

The main issue for this new approach of the Commission relates to the inclusion of non-EU states (like Turkey); a solution to which cannot be found by secondary EU legislation alone. This is the reason why the Commission switched to the international instrument of the convention

[26] This Study estimates that an integrated patent litigation system would generate savings of € 148 to 289 million by 2013.

and filed a request to the European Court of Justice to ascertain whether this new path is compatible with the EC Treaty.

3.3 A patent system for Europe 2020

The story of the endeavours to create an EU patent, together with studies and empirical data provide useful inputs for policy decision regarding a future patent system, which may allow Europe 2020 to provide firms, institutions and individuals with a pan-European system with high quality, affordable patent protection to compete worldwide. Such a solution requires a number of steps.

3.3.1 Choose the right level of centralisation and identify a role for national patent offices (NPOs)

The presence of the European Patent Office as a highly regarded institution will make it easier to identify the European granting authorities. Efforts by the Commission have gone in this direction and the strategy is worth pursuing as well as relatively easy compared with other possible solutions. However, the creation of a pan-European patent system requires that NPOs be brought inside the system with a role and a legitimacy that are consistent with the whole process, as long as it does not jeopardise patent quality. To this latter purpose, it is advisable that the EPO remain in control of the system in order to safeguard patent quality. Currently, there is at least one potential conflict of interests that might prevent the adoption of necessary solutions; NPOs all have a seat on the Administrative Council of the European Patent Organisation. This is consistent with the architecture of the EPO; yet, it may become a source of conflict if the EPO becomes EU granting authority and its granting procedure is supposed to replace the national ones. As for other procedures (trademarks, design), NPOs can be the receiving office for applications, thus ensuring capillarity at national level.

One way of solving this problem would be to transform NPOs into branches of the EPO, in charge of awarding the pan-European patent title. This solution would have the advantage of exploiting the competence and expertise of NPOs to ensure the competitiveness of the EU patent system, as well as reducing the problem of the backlog if all NPOs contribute to the award of the Community patent. At the same time, though, additional problems would have to be tackled, such as competition between NPOs, which may translate into a 'race to the bottom'; and divergences in the

practice of NPOs, which may remain linked to their national legal traditions when deciding upon the award of a Community patent.

3.3.2 Choose a simple language regime for patents in Europe

The European Patent Office estimated that up to 80% of technical information is contained in Patent literature (PL). Only 20% of the state of the art can be found in NPL (non-patent literature), such as papers, scientific articles, books, etc. While there is a general problem of accessibility of technical information that becomes even more urgent in light of a Fifth Freedom, it is undeniable that in certain fields many scientific papers and a good share of NPL are written in English. If PL is a major source of technical information, then the question arises: could PL be expressed by a single language or at least by a reduced language regime for Europe? If a pan-European patent system is a matter of competitiveness, having only one patent language could reduce application costs and uncertainties related to multiple translations.

On the other hand, with respect to the representation of applicants' interests before the official institutions, a single working language regime in written and oral proceedings might be a disadvantage, since it would significantly reduce applicants' freedom of choice as English is the native tongue of only 20% of the admitted representatives while the established three-language-system of the EPO covers more than 70%. One consequence of this would be an increase in costs, particularly for SMEs.

Over the years solutions have been proposed to mitigate the problem of a plurality of languages. The London Agreement is one of those. To further make the system accessible, translation machines have been proposed. This is more of a palliative then a panacea.

3.3.3 Set a cost level that is acceptable to applicants and coherent policy goals

The costs of protection are a barrier to the patent system. On the other hand, patent costs (meaning administrative costs paid to the NPOs) also play a role in focusing business activities by favouring applications only for those inventions that are really thought worthy of protection.[27] Without a

[27] Law and economics literature has explained that costs related to patent protection trigger a comparison with alternative forms of protection, including trade secrecy. See David D. Friedman, William M. Landes, Richard A. Posner, *Some*

cost associated to the protection, no patent system could survive and, more importantly, would be flooded by thousands of applications from would-be Edisons.

The necessity of the fees must be balanced against the interests of applicants, particularly when applicants are SMEs or less than large corporations with limited resources. A future pan-European system should be affordable to applicants, keeping the right incentives and making the internal market appealing in terms of the protection granted to innovative products.

European policy-makers could decide to introduce incentives for patent protection. For instance, application, maintenance and renewal fees could be lowered for certain kinds of applicants, such as universities and public research organisations.

3.3.4 Create a unified patent litigation system with an acceptable level of centralisation

Costs and uncertainties associated with the current litigation system for patents in Europe may discourage European applicants and put them at a disadvantage with respect to competitors from the US and Japan.

An issue about the creation of a European and an EU Patents Court in Europe seems to be one of the appropriate level of centralisation. To be sure, this is not a unique issue for patents; in other instances European policy-makers had to decide between centralisation and decentralisation in administering such areas of law as antitrust. At the moment, patent litigation is fragmented and national jurisdictions may lack coordination, which may in exceptional cases result in conflicts when harmonised application of law fails. Any future litigation system will require similar coordination and appropriate mechanisms to ensure that judicial application of patent laws would not re-create a situation of potentially conflicting interpretations even within a unified jurisdiction.

Besides determining the nature of the system, there are other issues to be solved, including i) the level of jurisdiction (and competence for each

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Economics of Trade Secret Law, in 5 Journal of Economic Perspectives 61- 72 (1991); see also Janusz A. Ordover, *A Patent System for Both Diffusion and Exclusion*, 5 Journal of Economic Perspectives, pp.43–60 (1991).

degree); ii) a uniform civil procedure,[28] iii) appropriate training for judges; iv) possible support for certain categories of litigants, such as SMEs.[29]

3.3.5 Improve the quality of patents

Even if there is consensus about the higher quality of European patents vis-à-vis patents from other countries (particularly the US), the quality of patents remains an issue and a goal for any future patent policy.

Actions should be taken both at substantive and procedural level to promote filing of patent applications with an enhanced quality standard that would result in strong patents while assuring timeliness and, in turn, legal certainty. The EPO has already started a comprehensive Strategic Renewal Programme that includes four concrete initiatives, namely:

i. Participation in the IP5 Programme that aims at eliminating unnecessary duplication of work among the offices, enhancing patent examination efficiency and quality, and guaranteeing the stability of patent right. This is to be achieved through a series of projects which will improve the classification system, the methods and tools to retrieve and share information on the state of the art, the patent documentation, the handling of applications, the examination practice and rules, quality management, training, and the metrics for statistical services.[30]

ii. The adoption of a 'Raising the Bar' initiative, which would lead to the granting of those innovations having sufficient merit and meeting the requirements for patentability. It includes a number of procedural restrictions and mandatory actions along the grant procedure whose aim is to increase the quality of incoming applications and subsequently filed amendments.

iii. The adoption of the Single Patent Process Programme, aimed to design a patent process that strengthens the position of the EPO as

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[28] Differences in procedure could make the outcome of litigation highly unpredictable.

[29] One form of support could be financial to cover costs of litigation or to buy insurance policies for patent litigation, a product that has low diffusion and high costs.

[30] The IP5 Group includes patent offices from Europe (EPO), US (USPTO), Japan (JPO), Korea (KIPO), and China (SIPO). It works on ten work-packages, each one led by one of the offices.

the leading patent office in the world, building state-of-the-art tools and optimising working methods to create a system that interacts dynamically with and adapts to the needs of the Office and the patent community.

iv. The implementation of measures to improve the utilisation of search and examination results existing for a single patent application in other patent offices. To do so the legal and technical base will be established to exchange information on the processing of patent applications between patent offices to allow one patent office to consult and consider the reuse of findings of another patent office. This programme, named the Utilization Implementation Program (UIP), is a follow up of the Utilization Pilot Project (UPP) launched under the EPN.

All this should be supported by a sound Patent Information system allowing the applicants and the public to access patent documentation collections and monitor the prosecution of patent applications.

Coordination among patent authorities will be increasingly necessary to ensure quality and to prevent such phenomena as path dependence. As a matter of fact, intense coordination and harmonised granting procedures can be conducive either to a restrictive approach (for national pride, one office systematically rejects what others have granted) or to a 'race to the bottom' (other offices grant systematically what one of them has granted).

4. TRANSFER OF TECHNOLOGY AND ACCESS TO CLIMATE-RELATED TECHNOLOGIES

4.1 The impact of technology transfer on innovation

The transfer of technology is a very broad label for a number of fields where the issue is about bringing innovation on the market from producers to users, through deployment stages. Among possible aspects of technology transfer there are two areas that are particularly relevant both in terms of European competitiveness and societal impact. These areas are:

- Public-private technology transfer, meaning the transfer of research results generated by universities and public research institutions.
- Transfer of 'green' (otherwise referred to as 'climate-related', CRTs) technologies, especially as far as Less Developed Countries (LCDs) are concerned.

Both areas of technology transfer also relate to the impact of public investment into research and, more closely, to those research fields supposedly aimed at producing innovative products and processes and which can complete the transformation of Europe from the old economy to the new, innovation-based economy, with value-added, intellectual capital intensive activities.

Notwithstanding these common characteristics and the strategic dimension of both kinds of transfer, each field features peculiarities and raises policy problems that need to be addressed specifically.

4.2 Public-private technology transfer

There is general agreement and available empirical data on the fact that European universities are good at sciences and technology, but there is still a poor performance in terms of innovation, particularly if compared with US and Japanese universities.[31] The situation is serious when considering the amount of funding that Europe is pouring into the R&D efforts of research and technology organisations (RTOs) and universities through framework programmes and other funds. One major goal of any policy on innovation should be to pay more attention to the return on investment for public money devoted to research.

The current situation could be summarised by saying that it is easy to convert money into knowledge, whereas it is far more complex to convert knowledge into money and, in general, into socio-economic benefits. And all leads to the recurring question: why is innovation not happening?

There has probably been much more emphasis on input for R&D than on the output and there is now a general call for more concentration on output than has been the case so far.

One way to tackle the problem is to change the nature of the research performed at European level, by pointing more ambitiously towards market-driven R&D. R&D policy can ex ante direct efforts towards research activities that are supposed to fill societal gaps and provide results in terms of innovative products and new jobs. Nevertheless, actions are also required ex post, that is to say once research programmes are being conducted or concluded, since funded institutions (universities, PROs, SMEs) must be ready to harvest results and turn them into economic development.

In 2007, the EU Council invited the Commission to develop guidance on the management of intellectual property by public research organisations. A Recommendation to Member States followed in 2008.[32] For the time being, the Commission is using soft law instruments to suggest good practices that universities should follow in technology transfer

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[31] This was also a point made by President Barroso in his speech at the European Innovation Summit, European Parliament, 13 October 2009, Brussels.

[32] Commission Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations, C(2008) 1329, 4 October 2008.

activities, including academia-industry collaborative research, licensing and creation of spin-offs. Importantly, the Recommendation invites member states to ensure that public research organisations define knowledge transfer as a strategic mission.

It is worth noting that the Commission uses a notion of knowledge transfer and not just technology transfer, to embrace all possible forms of innovation that are created out of public money and that can be moved towards the market. Transfer of technology refers more to codified knowledge and calls into question contractual forms or venture partnering, whereas transfer of knowledge also means skills, mobility of researchers, incentives for talent.

However, in the field of public-to-private technology transfer, much remains to be done at European level to ensure that R&D spending can bring innovation and competitiveness for Europe. Sure enough, fragmentation of academic systems at national level is not conducive to efficient results; however in this specific area the EU lacks power. Yet, by modulating the source of funding, incentives can be created for universities to perform better and reach that critical mass necessary for any successful strategy of technology transfer. In this regard, indicators should be used to monitor the performance at European level and reward the best institutions while providing incentives for others to improve.

4.3 Focus: the transfer of climate-related technologies

One major issue when dealing with CRTs is that of definition, that is to say to determine what technologies, technological products, processes and skills can be considered as being related to climate change. The adoption of the green economy as a new paradigm for a fresh start in environment-compliant entrepreneurial activities has recently seen a growing interest in fostering an economic development based on eco-efficient technologies, not just in terms of cost-effective, friendly solutions, but also in terms of new products that can help European firms in a strategy of differentiation. Of course, the transfer of technology in this field is about ensuring appropriate returns on investments.

At the outset, the definition of CRTs is necessary to identify those technologies and fields of research that are in need of financial support because of their expected ability to produce the kind of economic results that fit the green economy standard of environmentally-friendly innovation. In other words, the definition of CRTs is required for public

policies willing to actively promote innovation by tailoring specific interventions.

Yet, the definition can have other purposes that relate to the idea of allowing LDCs to access proprietary technologies (thus transferring those technologies) of multinational corporations (MNCs) through such provisions as those concerning compulsory licensing. In this latter meaning, the definition is crucial to avoid policy measures favouring authoritative access, such as compulsory licensing, do not cause unintended consequences by discouraging innovative efforts of firms that, as a matter of fact, do not own CRTs.

Less developed countries are concerned with climate-related technologies in several respects. First of all, LDCs are usually countries in the world where the cost of labour is a fraction of what is usually paid in western developed countries. Thus, LDCs are seen as an opportunity to delocalise manufacturing activities in the first place, but also research and development in the case of the presence of skilled and qualified workforces. The presence of highly qualified, low cost research teams is usually one reason to outsource R&D activities to those countries, thus reducing the costs of having innovative products and solutions for MNCs.

Secondly, LDCs can be also potentially huge markets for western products and technologies. Consequently, the choice to delocalise R&D and manufacturing activities is also justified by the fact that LDCs also represent the natural commercial outlet for those technologies. In this respect, CRTs can be a competitive factor as long as they can be commercialised abroad by European countries and MNCs in general. But in all cases of localising activities abroad, product development has to be considered as having the same level of quality and robustness to become an innovation as you can find in Europe.

Following the well publicised tensions between western countries and LDCs that usually emerge at WTO level, the problem with CRTs is that LDCs apply political pressure to have free or easier access to technologies, piercing the protection of intellectual property rights that MNCs usually use to retain their competitive edge. Again, this is the kind of friction usually felt at international level and concerning other technologies such as pharmaceutical leads, also potentially significant both in economic terms and for the impact they can have on people's lives, as far as important diseases are concerned.

The discourse with regard to LDCs is probably different as the value chain for the conception, research, deployment and commercialisation of

green technologies is far more complex than others and may require the interaction of many firms at different levels.

Of course, intellectual property protection (mainly patent protection) plays a crucial role also in the field of CRTs, since large investments are required along the value chain. Yet, the role of IP protection should be emphasised, since many CRTs are in the public domain and no longer require patent protection. Where intellectual property rights exist, access to technologies translate straightforwardly into overcoming those barriers or paying right-holders for access. LDCs have a great need to access CRTs for the production of energy in a way that does not compromise environment equilibrium, while allowing industrial and human activities to prosper. At the same time, those countries have limited resources, if any, with which to pay. Stuck in a situation of need and impossibility, the political leverage used by LDCs is the request of compulsory licensing, backed also by important scholarly works on this topic,[33] or the lowering of barriers by refusing intellectual property protection for some technologies.[34]

Compulsory licensing is always disfavoured by the industry, because of the negative incentive it has on the propensity to invest in R&D and business development in LDCs. Yet, the real issue with CRTs is whether compulsory licensing or elimination of intellectual property protection is the kind of measure that actually will favour the access of LDCs to CRTs. There is a serious risk that solutions advocated for other technologies (such as drugs or chemical compounds) would not work for CRTs, while creating negative incentives for innovation.

It has been noted by most players that CRTs is a broad formula that refers to technologies not necessarily protected by patents. Due to complexities in the value chain of innovation and in core technologies, CRTs are characterised by large amounts of enabling know-how not necessarily codified and not necessarily patented. Thus, climate-related technology is a wider notion than what might initially be thought, a part of which (not necessarily a big part of which) is covered by intellectual

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[33] See Tracy Lewis and Jerome H. Reichman, (2003), Using Liability Rules to Stimulate Local Innovations in Developing Countries: A Law and Economics Primer, available at http://www.earthinstitute.columbia.edu/cgsd/documents/lewisreichman.pdf (last visit April 18, 2010).

[34] There is a problem of discriminating technologies by denying protection, since under TRIPs Agreement discrimination is not allowed.

property rights. The presence of know-how and not codified knowledge implies a radical change of perspective when dealing with such topics as access to those technologies and their horizontal transfer to other countries.

If knowledge is fully codified and entirely protected by patents, access can be granted by the patent-holder through licensing. On the contrary, when knowledge is not fully codified – as it is for CRTs – licensing is not key or is not the actual enabling factor for the transfer to be complete. When know-how is at stake, cooperation is required together with, or as an alternative to, patent (or patent portfolios) licensing.

Furthermore, while access to patents is a matter of reading documents, access to technology in a broader sense – including know-how – implies both the ability to read and interpret the teaching of the patent and to acquire knowledge through collaboration, a notion that economic and organisational literature has called absorptive capacity.[35] As a consequence, the effectiveness of the transfer does not depend exclusively on the willingness of the owner to share, but also on the ability of the recipient to fully apprise and assimilate the technology.

From a policy perspective, this view has multiple implications, the most evident of which is that actions also on the demand side of technology are required and, to a more general level, the idea of access to technology must be reshaped in a more cooperative dimension. To go into more detail, some preliminary conclusions can be reached.

First, the transfer of certain kinds of technologies, such as CRTs, is more relational and requires some level of cooperation and interaction between the transferor and the transferee. Licensing is part of the process, but it is not the only means. Second, because compulsory licensing is effective only on the supply side, any imposition on the patent owner to share its technology does not automatically result in the fruitful utilisation of the technology by the recipient. At the same time, though, compulsory licensing brings about negative incentives on R&D investments and business development since returns for technology producers become shaky.

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[35] The idea was first developed by Cohen and Levinthal (1990), *Absorptive capacity: A new perspective on learning and innovation*, *Administrative Science Quarterly*, Volume 35, Issue 1, pp. 128-152, and in its original formulation refers to such organisation as research teams of firms, but it can be easily applied to states.

Third, for the reasons stated above, weakening intellectual property protection or refusing patent protection on some technology does not produce an automatic effect on the acquisition of technologies by LDCs if they lack absorptive capacity.

Fourth, any policy that disfavours intellectual property protection ex ante (by denying protection) or ex post (by granting access mandatorily) removes incentives on MNCs, and companies in general, to invest in LDCs and, particularly, to provide infrastructure.

In this respect, one could easily conclude that if the removal of intellectual property protection is not per se conducive to the transfer of CRTs towards LDCs due to a lack of absorptive capacity, technology holders could forego their intellectual property rights in those countries since locals would not be able to free ride on the technology anyhow; by eliminating proprietary rights the transfer could concededly be easier. However, this conclusion is untenable. In a globalised scenario, the choice to delocalise R&D is a common strategy for technological firms and it has been a common path for European firms. As a result, in LDCs, R&D centres are started by several companies that compete on a global market. In this context, intellectual property protection becomes necessary to prevent appropriation of newly created knowledge not by locals (populations, firms, institutions), which lack absorptive capacity unless trained specifically *in situ*, but by local personnel of competitors (usually well-trained and skilled), an outcome that would turn into a loss of competitive advantage. The risk of opportunistic behaviours by competitors speaks in favour of ensuring intellectual property protection for firms willing to delocalise R&D and invest abroad.

In this respect, intellectual property rights are still one of the determinants of foreign direct investments (FDI) and European firms need to be assisted by this kind of protection even when abroad, following internationalisation strategies. Notably, a failure to protect R&D investments abroad due to opportunistic behaviours of competing MNCs or other foreign institutions would result in harm to LDCs, since in the long run FDIs will be redirected towards those countries that ensure higher standards of protection for R&D investments.

The aforementioned points are consistent with some of the final findings of a study commissioned by DG Trade "*Are IPR a barrier to the*

transfer of climate change technology?" (2009).[36] The study finds no argument in favour of extending the use of TRIPS (trade-related aspects of intellectual property rights) provisions on compulsory licensing to climate change technologies. Furthermore:

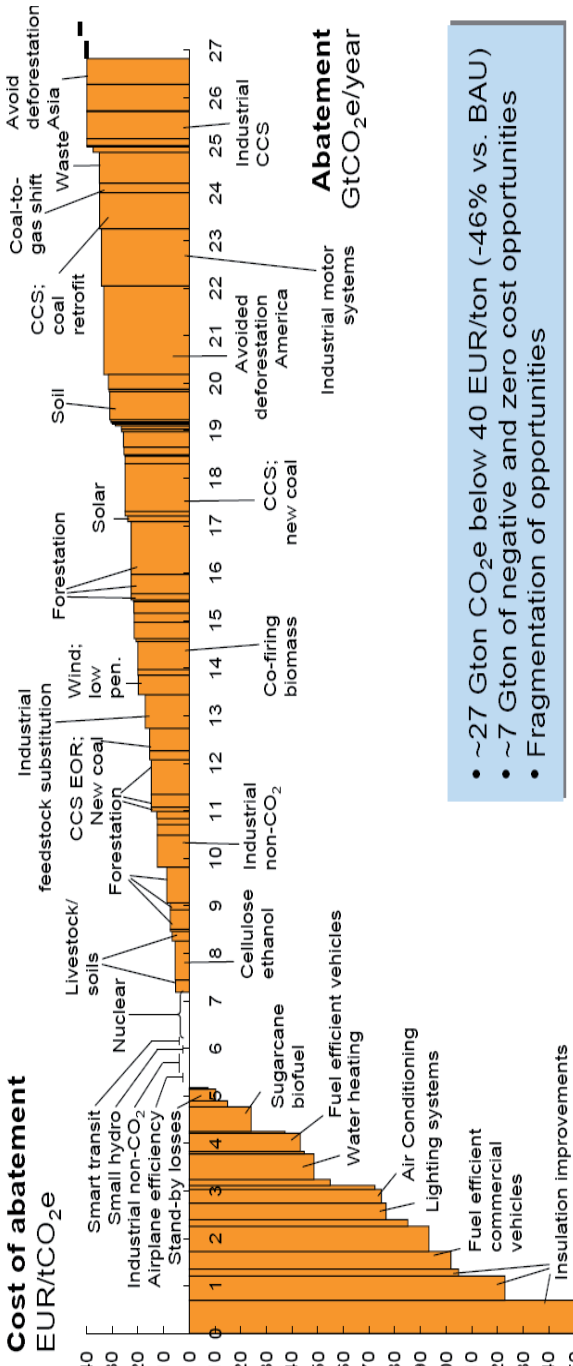
> Dismantling or weakening the intellectual property rights system would not only hinder the access of developing countries to costly technology, it would also hinder the access to low cost technology as IPR protected technology is also to be found among the low abatement cost technologies.

Indeed, a study of the Vattenfall Institute and McKinsey highlights the fact that many low-cost technologies are available to reduce CO2 emissions that could be eventually used also by LDCs.[37]

[36] Copenhagen Economics and The IPR Company, *Are IPR a Barrier to the Transfer of Climate Change Technology?*, Copenhagen, 2009.

[37] See Vattenfall Institute and McKinsey, Global cost curve of GHG abatement opportunities beyond business as usual *by 2030*, (2007).

Figure 13. Abatement costs per technology



Source: Vattenfall Institute-McKinsey (2007).

All this seems to suggest that the technology transfer of climate-related technologies requires a step beyond mere licensing schemes. Policy measures should be worked out accordingly. LDCs tend to associate the horizontal transfer of technologies from rich countries with local development and autochthon entrepreneurship that should be fostered by cooperation with technology owners. Coupled with the need for an increased absorptive capacity, local development is only possible through cooperation between transferor and transferee. And cooperation inevitably involves the whole value chain of CRTs.

In the frame of cooperation, there are a number of issues that can be addressed and that equally affect the diffusion of CRTs in LDCs besides building absorptive capacity, such as:

- A qualified assessments of market needs
- Creation of transparent markets
- Elimination of tariff barriers (if any) for green technologies
- Identifying adequate forms of financing
- Building a reliable framework for procurement

It seems like an efficient transfer of CRTs is more about building ecosystems of innovation than just granting access to proprietary technology by licensing intellectual property rights. To this purpose, innovative mechanisms have been proposed to facilitate the diffusion and transfer of CRTs.[38]

[38] A structured proposal is offered by the Alliance for Clean Technology Innovation (ACTI), a group of leading companies, including 3M, Air Liquide, Alstom, ExxonMobil, General Electric, Microsoft, Philips, Siemens and Vestas. The proposal for the creation of technology centers is provided in a concept paper titled *Climate Change Technology Centers*, 2 October 2009.

5. STANDARDS AND STANDARDISATION POLICY IN EUROPE

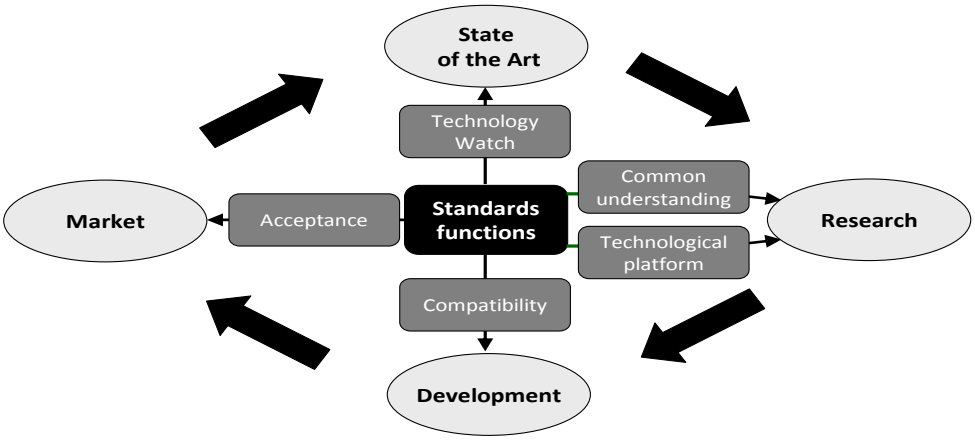
Standardisation policy has been a key element of EU innovation and competitiveness policies since the launch of the Single Market Initiative in 1985.[39] After 1998, the European Commission successfully launched the "New Approach" to standardisation as a co-regulatory scheme that today governs the formation of industry standards in the EU (Directive 98/34). However, the debate on the role that standards can play for the future of the Internal Market is still open, and some commentators have questioned the usefulness of standards as drivers of EU competitiveness and growth. In more detail, the added value of standards in the EU also depends on how standards are formed, who can participate in the development and definition of standards, where and how standards apply, and how often they are updated and refined.

Studies at the macroeconomic and microeconomic levels in various European countries and around the world have, in certain areas, demonstrated the clear benefits of standards and standardisation to the wider economy. Standards may play a role in facilitating the sharing of common technological solutions, removing trade barriers, enabling technology transfer, facilitating certainty in the marketplace and boosting the creation of complementary upstream and downstream markets. However, in some cases an early, top-down standardisation can lead to

[39] A standard is a document that provides, inter alia, requirements, rules and guidelines for a process, product or service. These requirements are sometimes complemented by a description of the process, products or services. The process of formulating, issuing and implementing standards is called standardisation.

undesirable results, such as locking industries into inferior standards. At the same time, standards can have both positive and negative effects on competition, and this inevitably warrants a case-by-case approach.

Figure 14. The role of standards in the innovation process



Source: European Commission.

The key problems identified by the European Commission in promoting an active use of standards to foster innovation and growth in Europe are the following:

- **Lack of awareness by innovation actors**. In particular, SME access to the development and implementation of standards must improve. Education and information dissemination about the decisive role standards can play for the Single Market is largely missing in Europe.
- **Prejudices about standards**: for example, there are still people that think that standards can hamper innovation per se, since they reduce product variety. In reality, the only thing that should be kept in mind is that standards, despite being potentially useful in reducing market uncertainty, transaction costs and barriers to trade, are no panacea. They are a tool, and must be used properly.
- **Complexities at the interface between IPR and standards**. To some extent, it may seem that standards and intellectual property rights are almost incompatible, since the former foster openness, whereas the latter imply exclusivity rights. Again, reality is much more complex than this: one the one hand, in some markets individual IP-protected products become *de facto* industry standards; in other markets

consortia of businesses pool their IPRs to build the standard of the future, and compete with similarly developed standards; in other sectors, standards are formally defined with the help of standardisation bodies and often require licensing at FRAND (Fair, Reasonable and Non Discriminatory) terms. What's more, some markets imply the co-existence of these situations, with some complementary products being proprietary, and others being dominated by international standards. Often, the different regimes also depend on the stage of development of the different complementary products, where brand new products are more seldom subject to international standards than more established ones.

- **Access to standardisation by SMEs.** SMEs seem to be absent in many of the stages of standardisation, and most notably in the standard development phase. The participation of SMEs in private standard-setting bodies is hampered by collective action problems, although recently there have been examples of SMEs pooling their efforts and sharing costs by hiring a specialist to represent their interests during the standardisation process (e.g. in the case of ECAP, the European Consortium of Anchors Producers, which represents SMEs in EOTA and CEN committees[40]). A recent study for the European Commission identified several barriers for SMEs to benefit from standards: i) awareness of standards; ii) awareness of the importance of standards for the SME's own company; iii) tracing standards; iv) obtaining standards; v) understanding standards; (vi) implementing standards; (vii) evaluating the implementation of standards. In addition, SMEs face a sequence of barriers to benefit from involvement in standardisation, ranging from awareness of the process and importance of involvement in standardisation for the SME's own company; to the tracing of standardisation projects, the ways in which SMEs can become involved effectively, and the evaluation of standards.[41] Finally, and perhaps even more

[40] For a detailed description, see: De Vries, H. et al. (2009), SME access to European Standardisation. Enabling small and medium-sized enterprises to achieve greater benefit from standards and from involvement in standardisation, Rotterdam School of Management, Erasmus University, at http://www.ecap-sme.org/documenti/primapagina/stampa/SME%20Access%20Report%202009-08-21.pdf.

[41] Ibid., at 12. The same study quotes earlier surveys such as the one conducted by the German Occupational Safety and Health committee, which found that 35% of

importantly, the involvement of SMEs as users in the standardisation process appears essential to guaranteeing that developed standards are easy to use for SMEs afterwards.

- **Global market access and international standards.** Difficulties in accessing European and international standards also implies that European firms end up facing difficulties in promoting their products in wider markets. In this respect, the alignment of European standards with international standards is crucial for the competitiveness of European firms, in particular SMEs, and in particular in sectors dominated by formal standardisation.

Recently, the EXPRESS working group published a report focusing on the future of standardisation in the European Union, recommending, inter alia, an enhanced cooperation between European Standardisation Organisations (ESOs); enhanced cooperation between European Commission DGs to ensure that standards are consistently used as a basis for achieving policy goals; stronger interaction of European Standardisation Bodies with fora and consortia, researchers and industry stakeholders; and more coordination between the European Standardisation System and global standards.[42]

In addition to the recommendations of the EXPRESS group (and those that will come from an upcoming study on IPR and standardisation), other initiatives are likely to promote standardisation and its impact on innovation in the near future. These include the EU Standardisation Policy

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SMEs had no idea of sources from which to find information about standards. Also NORMAPME (European Office of Crafts, Trades and Small and Medium sized Enterprises for Standardisation) reported that finding information about standards – including whether a given standard is still in place – is among the most difficult issues for SMEs. In addition, SMEs also find difficulties in understanding the context of the standard, such as the references to other standards, etc.

[42] See *Standardisation for a competitive and innovative Europe: A vision for 2020*, Report of the Expert Panel for the Review of the European Standardisation System, exp384, February 2010, available online at: http://ec.europa.eu/enterprise/policies/european-standards/files/express/exp_384_express_report_final_distrib_en.pdf. The Expert Panel for the Review of the European Standardisation System (EXPRESS) comprised 30 individual experts from European, national and international standards organisations, industry, SMEs, NGOs, trade unions, academia, fora and consortia and public authorities from EU member states and EFTA countries.

Package, a Workshop organised by DG RTD on the use of standards for innovation; the stronger inclusion of standardisation issues and the use of standards in the upcoming 8th Framework Programme for Research (FP8); and measures to provide support standardisation in specific areas (Smart Grids, Hydrogen, etc.).

Below, we explore the findings of the CEPS Task Force as regards different aspects of standardisation policy. Section 5.1 below explores the issue of industry standards, IPRs and competition. Section 5.2 deals with European Standardisation bodies. Section 5.3 summarises the main findings of the CEPS Task Force as regards standardisation.

5.1 Standards, IPRs, and competition

In certain sectors, one of the issues that affects the development of certain types of standards and their impact on competition and competitiveness is the interface between IPRs and standards. The European Commission has recalled on several occasions that misuse of IPRs in the standardisation process can significantly affect access by industry players to relevant markets. For example, former Commissioner for Competition (and current Commissioner for the Digital Agenda) Neelie Kroes stated recently that:

> Abuse practices in standard setting can harm innovation and lead to higher prices for companies and consumers. For its part, the Commission will continue to vigorously enforce the EU's antitrust rules in this area, for the benefit of technical progress and European consumers.

This approach was echoed to a certain extent on the other side of the Atlantic, where concerns about the potential impact of strategic behaviour in the standardisation process led FTC Chairman Stan Leibowitz to state (within the *Rambus* case discussions) that "[The FTC will] continue to make standard setting and monopolization cases a priority."

Analysing the role of (private) standards with respect to the use of intellectual property, competition and innovation is a very complex exercise.

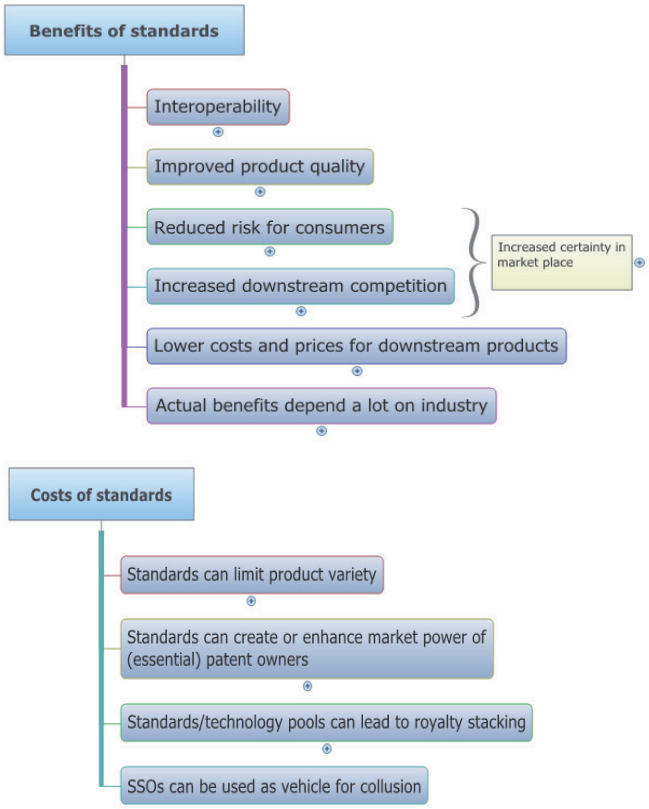
- On the one hand, as shown in Figure 15 below, standards can provide substantial benefits in a number of sectors, and especially in sectors with significant network effects. The enhanced interoperability triggered by standardisation helps improve product quality because a large number of undertakings work for the improvement of the standard. At the same time, risk for consumers is reduced due to acceptance of a commonly recognised standard. The overall impact

on competition is positive whenever the standard fosters aggressive downstream competition, where the standard provides a level playing field for all companies that want to compete in a given relevant market. Overall, the positive impact of standards in terms of certainty in the marketplace can lead to better quality products, at lower costs.

- However, when it comes to private standard-setting, not all that glitters is gold.
    - First, when chosen too early, standards can limit product variety by stimulating 'intra-standard' competition in markets where 'inter-standard' competition could have led to better competitive outcomes and faster innovation to the benefit of end consumers.
    - Second, when they include IP-protected components, standards may lead to excessive market power for those that possess IP rights over essential elements of the standard: recent antitrust cases such as *Dell* and *Rambus* confirm that strategic behaviour may occur in standard-setting organisations (*see below*). Even more generally, whenever a de facto industry standard is generated by a 'winner-takes-all' game, where those standards that reach the tipping point wipe all rival standards away from the relevant market, the market power that accrues to the holders of essential patents may be significant, especially if the pace of innovation in the sector at hand does not lead to overlapping generations of products and – consequently – to a genuine 'competition for the market'.
    - Third, the inclusion of IP-protected components in standards adopted by an industry can give rise to potentially strategic behaviour of all sorts. Patent ambushes, patent trolls, royalty staking, hold-out and hold-up behaviour could occur in certain markets, and this could exert a chilling effect on incentives to engage in virtuous 'co-opetition' between firms. In some cases private standard-setting – when rules are not defined clearly in advance and pools are badly run – may border on situations of anti-commons and 'patent thickets' – a situation that may warrant clarification in years to come (see below).
    - Fourth, private standard-setting organisations may lead to instances of collusion and collective boycott. Collusive outcomes are possible when the standard-setting process

facilitates horizontal coordination between competing firms and increases the transparency of markets. At the same time, standard-setting organisations may try to foreclose market access for players that wish to enter the market.[43]

Figure 15. Benefits and costs of standards



Source: Presentation by Gunnar Wolf, 4th meeting of the Task Force, 14 January 2010.

The ultimate impact of the standard-setting process on competition and innovation depends on the relative weight of those costs and benefits. Negative effects generated by the standardisation process should be limited when reasonably possible, to avoid the innovation process becoming distorted over time.

[43] See, for example, *Allied Tube* in the US.

To be sure, the basic tenets of standard-setting in many sectors are that:

- In terms of development, standards should ideally be developed by all affected stakeholders.
- They also need to be based on a solid consensus:
- Standards should be broadly accepted.
- Examination of the selected technologies for which patent protection is requested demands very sophisticated standard setting processes and complex interfaces between standards-developing organisations (SDOs) and patent offices.

5.1.1 Focus: Practices in patent pools

A 'patent pool' can be defined as a portfolio of patents essential to the same standard but owned by different parties. The purpose of any patent pool is to facilitate licensing of essential patents by creating a 'one-stop shop' to reduce transaction and administrative costs. This provides increased certainty and predictability to the market on the level of royalty rates and may establish a market reference. This also ensures uniform and non-discriminatory licensing of essential patents.

Patent pools are common, especially in sectors where products take the form of complex systems, requiring a large number of complementary products and technologies. When this happens, the success of a given technological innovation may require interoperability: in turn, interoperability may need standardisation: and the implementation of complex standardised technologies may be faciliated by patent pools.

Patent pools can have pro-competitive effects for the following reasons:

- They can help in establishing a single reasonable royalty rate (that, according to economic theory, may be expected to be lower than the cost of separately negotiated licenses);
- They can clear blocking patents that would otherwise prevent competitive entry into a given field;
- They can reduce litigation costs and the costs of administering multiple patent licensing programmes;
- They can reduce royalty stacking problems;
- They can lower transaction costs and increase the efficiency of the system, and

- They can provide funding for research and innovation, since widely accepted licensing programmes allow members to generate revenues from patents, which can be re-invested in research and innovation.

Building a successful patent pool is, however, far from easy. The key challenge is building consensus and achieving wide acceptance as regards the proposed initiative. In particular, a successful pool has to attract both large and small licensors and offer all licensees an attractive licensing solution. To achieve broad acceptance among licensees, a pool should:

- Offer a value-based license;
- Include administrative tools that enhance efficiency and make the reporting and payment process easy;
- Include enforcement and compliance mechanisms to give licensees confidence that all market participants are treated equally.

Important challenges are faced by patent pools already at the early stage of the formation of the pool. Without proper information exchange, there is a risk of multiple patent calls and the formation of several smaller (and thus less efficient) licensing programmes. In addition, multiple efforts to persuade patent owners to support the selection of one administrator can also create confusion and waste resources. Thus, for the success of the pool, it is important that the selection of the administrator is quick, transparent, and has the broadest possible support. Typically, a 'beauty contest' is the best way to select the best candidate in a transparent way.

The time needed to establish a patent pool depends on:

- Frequency of facilitation meetings;
- Authority of representatives of each patent owner and pace to approve decisions of the facilitation group;
- Willingness of patent owners to compromise on key issues, such as royalty rates and sharing mechanisms;
- Number of parties (large number increases complexity).

Connections between SSOs and Patent Pools may be held necessary since today there are multiple competing standards for almost each technology, especially in the ICT field. Therefore it may be in the interests of the SSO that patent licensing issues are quickly addressed. Shortly after finalisation of a standard, SSOs could for example encourage patent owners to meet under the supervision of a patent facilitator to agree on common licensing terms and conditions, make them public, and quickly start a patent pool.

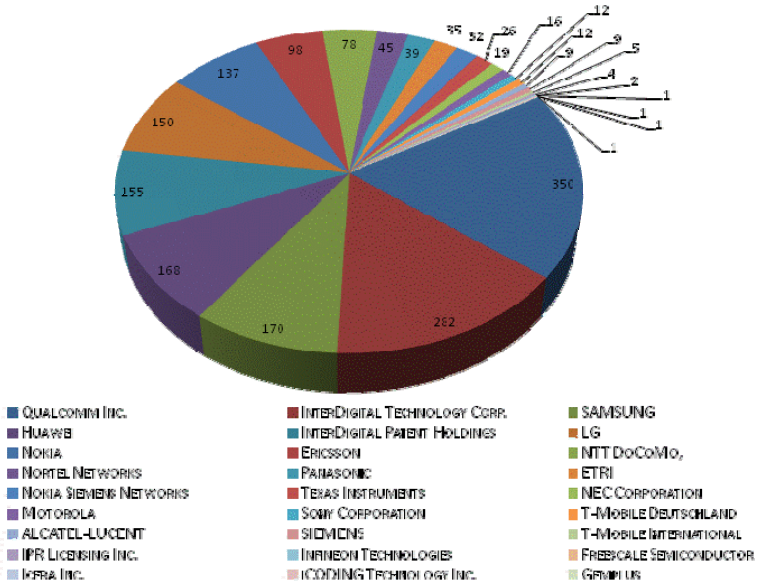
An important feature of patent pools is the independence and professionalism of its administrator. In this respect, guidance could be provided to pool participants to avoid the appointment of biased administrators, who may end up stifling competition within the pool. In addition, the success of technology innovation may be linked to the capability to interoperate, hence to the success of the standards, while the success of standardisation may be linked to the success of the patent pool. When potential problems are solved effectively in terms of governance and competition, patent pools can have a pro-competitive effect, lowering prices, increasing efficiency and thereby promoting innovation.

Box 3. The LTE patent pool

A good example of a complex patent pool is the LTE (Long-Term Evolution) pool, which is on the way to becoming Next Generation Standard for mobile broadband communications – 45 mobile operators worldwide have already announced that they will adopt it. LTE has been standardised by 3GPP, and more than 350 companies have participated in the working groups. LTE IPR declarations on the ETSI database are 1,860 as of January 11th, 2010.

The following graph exemplifies the number of IPR declarations on the LTE project.

Figure 16. Number of IPR declarations in the LTE consortium, as of January 2010



Source: Sisvel, presentation at the 4th meeting of the CEPS Task Force, 14 January 2010.

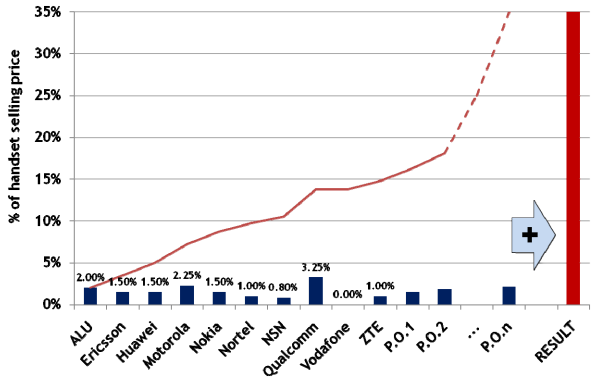
One important issue for the LTE patent pooling is setting the appropriate Royalty Rate. Different methods for doing this are the following:

- Some players* stated that the maximum royalty acceptable from the market is a single digit % (e.g. ≤ 10%).
- Pool royalty rate could adjust in response to increases in the number of patents in pool portfolio.
- Whenever a large licensor joins, the royalty rate could increase – preventing dilution of other licensors' allocations.
- Small patent owners could also be protected by allocating a significant portion of royalties equally among licensors.

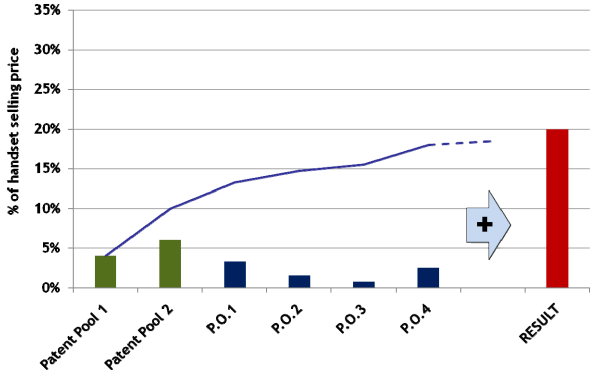
The possible results of different approaches are summarised in the following tables, using the LTE case as an example.

Figure 17. LTE royalty level – different scenarios

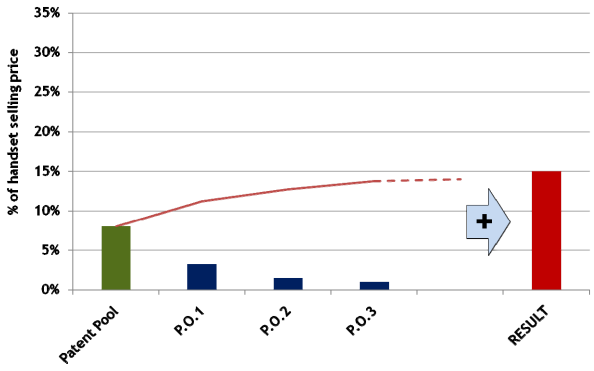
No patent pool



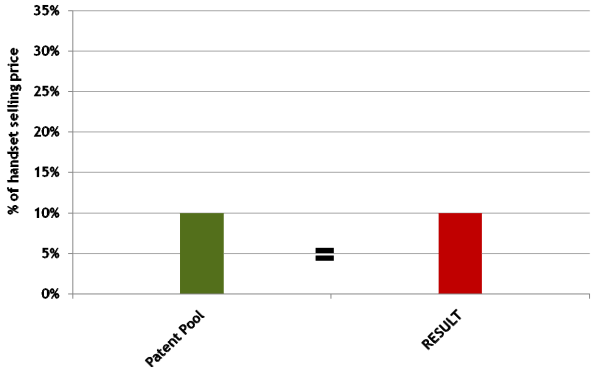
2 patent pools and outside patent owners



1 patent pool and outside patent owners



Ideal Scenario



Source: Sisvel, presentation at the 4th meeting of the CEPS Task Force, 14 January 2010.

5.2 European standardisation

In terms of standardisation policy, the CEPS Task Force welcomed the initiatives that will be launched by the European Commission in the months to come. These include:

- The **Standardisation Policy Package** (mid-2010), which is likely to include a Communication, a legislation proposal for the reform of the European Standardisation System;
- The stronger **inclusion of standardisation in the FP8**: Standardisation as evaluation criteria. Separate programme for measurement and testing (pre-normative standards);

In addition, the European Commission is expected to issue new guidelines on horizontal agreements, which will cover horizontal R&D cooperation. This will be a key opportunity to provide guidance on the practices that are likely to minimize the anti-competitive impacts of standard-setting activities. The CEPS Task Force led to the identification of a number of practices that can be considered relevant from this standpoint:

- ***The relationship between standard-setting organisations and IPRs should be clear:*** The rules for disclosure of IPRs and licensing provisions that will apply to the standard developed by the SSO should be clear. This helps avoid 'patent thickets', which in many industries force SSOs to undertake a sort of 'messy private ordering' and to 'bargain in the shadow of patent law' – in particular to avoid problems of hold-out ('last in line' bargaining) and hold-up (opportunistic exploitation of third party commitments; difficult to avoid in component/network technologies with 'probabilistic' patents). The new Horizontal Guidelines should:
  - Keep options for SSOs open (e.g., no mandate on ex ante solutions but only guidance on how this might be done);
  - Emphasise the general benefits of standards (for companies, national competition authorities and judges);
  - Provide guidance on the relationship between standards and IPRs (also other than patents).
- ***There is a strong need for developing standards practices, especially as regards the ex ante disclosure regimes.*** The CEPS Task Force hosted a discussion on possible regimes for the disclosure of IPRs during the standard-setting process. In particular:
  - *Ex-Ante Disclosure of IPRs* is an important feature for the avoidance of Patent Ambush, and an important feature for building up IPR databases at SSOs
  - *Ex-Ante Disclosure of FRAND licensing* Promise is important for necessary privilege under Art. 101(3) EC Treaty as every standard by its very nature limits technical competition
  - *Ex-Ante Disclosure of Maximum Royalty Rates* is far more controversial, since the required knowledge for determination is often unavailable; the collective rate is theoretical and usually far above real rates; high theoretical collective rates can represent a significant competitive disadvantage for the standard at hand; and they create a competitive advantage for

'early' contributors over 'late' contributors since early contributors declare their IPRs at a time where there is less competition.

- *The ex ante disclosure of most restrictive licensing terms* is also not recommended, since the required knowledge for determination is seldom available; the missing knowledge will result in vague terms with many disclaimers; the terms are usually hardly comparable; it creates a high risk of severe delay of time-to-market of standard as licensing terms must be created and reviewed by legal and commercial experts; it also brings a high anti-trust risk, even if group discussions are formally not allowed; and it does not help to foster mutual trust, which is the basis for compromises and broad acceptance.

- ***General guidance on standard practices,*** *e.g. FRAND* licensing in terms of its goals and problems of enforcement. FRAND goals are essentially to constrain the ex post price resulting from 'undue' ex post market power. In general, this is negotiated on a bilateral basis between the patentee and each licensee outside the SSO. Problems with this system sometimes emerge in the enforcement phase. Agencies and courts generally have little proficiency in assessing the reasonableness of royalties, and possible fines and penalties can tip bargaining incentives in favour of the licensee or the licensor, depending on the direction they take.
- ***Standard-setting organisations should continue to improve rules*** (e.g., rules on transferability) and consider and try other solutions/mechanisms where appropriate.

Table 2 below shows some example of practices in standard-setting organisations and comments on their likely impact in terms of competition and innovation.

Table 2. IPR Disclosure rules and potential impact

Rule	Licensor member promises	Comment
Disclosure	"I have some patents here that may relate to the technology. I may or may not license them once we've agreed on a standard."	Enables 'inventing around', which also reduces incentives to disclose. Does not remove the 'nuclear option' (injunction) if patents are included in the standard. Avoids Patent Ambush.
Royalty free license	"For the uses covered by the standard, you may use my patented technology for free."	Highly effective for users of standard. However, some IP holders will avoid the SSO like the plague, which may be counterproductive (they can still sue later on). Common in open source IP environments. No financial compensation for technology providers.
(F)RAND	"Once the standard is set, I will license my essential patents on fair, reasonable and non-discriminatory terms and conditions."	Takes the threat of an injunction off the table. However, what's reasonable? 25% of running royalties? 5%? Are grantbacks or admissions of validity and infringement part of (F)RAND?
Unilateral, ex-ante (F)RAND	"I will license my essential patents at (F)RAND terms, no worse than $10/unit plus exclusive grantback for 5 years."	For users of standard better than (F)RAND alone. May allow choosing alternative technologies while there are still options. May impose significant delay on standard setting.
Penalty defaults	"For any undisclosed essential patent, the maximum royalty is $10,000."	Creates a strong incentive to search for and disclose essential patents. For users of standards very effective but for technology providers a heavy burden.
Joint *ex ante* negotiations	Actual negotiation of licensing terms at the outset of the process.	Front-loads and delays the technical process. Engineers hate it. SSOs are afraid of liability from potential (buyer or seller) price fixing.

Source: Gunnar Wolf, presentation at the 4th meeting of the CEPS Task Force, 14 January 2010.

Finally, when it comes to the licensing phase of standard-setting, two options are normally available:

- *Frame conditions can be set within SDOs* that have well established and accepted IPR policies, a broad range of participants, and FRAND licensing promise.
- *On the contrary, licenses can be negotiated outside SDOs* through bilateral licensing agreements (very flexible) or via patent pools (if common license agreements can be found).

5.3 Conclusions

The CEPS Task Force on innovation policy reached widespread agreement on the following issues:

- ***A sound standardisation policy is key for European competitiveness.*** Standards contribute positively to growth and competition, especially when they are picked up by the market and not imposed top-down. The increasingly blurred boundaries between types of standards (for example, see e-health standards) today calls for enhanced cooperation and common governance of the three European Standardisation Bodies, and possibly for a single EU standards agency that replaces the three organisations CEN, CENELEC and ETSI.
- ***There is no possible 'one-size-fits-all' approach to standards***: this means that rules must be crafted along basic principles and then refined on a sectoral basis. For example, there is no possibility to adopt a harmonised approach to standardisation in ICT markets, as they are too heterogeneous. Emphasis on open standards may be justified in cases where the market can only accommodate one standard and there is no competition between different standards. In all other cases, the market should be allowed to pick the best standard, be that open or proprietary.
- ***Competition rules should provide general guidance.*** In particular, the upcoming new guidelines on horizontal agreements, which will focus in particular on R&D agreements, should provide the right basis for engaging in consortia, SSOs and patent pools by minimizing the risk of strategic behaviour. In this respect, the European Commission should work on future policy documents (such as the horizontal guidelines) that:

- Clarify the relationship between Standard-Setting Organisations and IPRs
- Provide general guidance on standards practices (e.g. disclosure regimes, FRAND licensing, transfer of IPR)
- Support the creations of pro-competitive, independently administrated patent pools.

GLOSSARY OF ACRONYMS

CEN	Comité Européen de Normalisation (European Committee for Standardisation)
CENELEC	Comité Européen de Normalisation Electrotechniques (European Committee for Electro-technical Standardisation)
CRT	Climate-Related Technology
DG	Directorate General (of the European Commission)
DG ENTR	Directorate General for Enterprise and Industry
DG RTD	Directorate General for Research
EIB	European Investment Bank
EIT	European Institute of Innovation and Technology
EOTA	European Organisation for Technical Approvals
EPLA	European Patent Litigation Agreement
EPO	European Patent Office
ERA	European Research Area
ETSI	European Telecommunications Standards Institute
ICT	Information and Communication Technologies
IP5	The five major intellectual property offices: the European Patent Office, the US Patent and Trademark Office, the Japan Patent Office, the State Intellectual Property Office of China, and the Korean Intellectual Property Office.
KET	Key Enabling Technology
KIC	Knowledge and Innovation Community
LDC	Less Developed Country
LTE	Long-Term Evolution standard
MNC	Multinational Corporation
NPL	Non-Patent Literature
PL	Patent Literature
R&D	Research and Development
R&D&I	Research, Development and Innovation
RSFF	Risk Sharing Finance Facility
UPLS	Uniform Patent Litigation System

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