

National and regional policies for Globalisation and Open Innovation

Thematic Report N° 6

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National and regional policies for Globalisation and Open Innovation: Thematic Report

Executive Summary

The phenomena of globalisation and the adoption of a more open approach to innovation (so-called open innovation) are challenging established policies and instruments for stimulating research and innovation, from clusters and industry-science relations, to IPR protection. Both issues transcend firm and national boundaries and pose particular problems for the design of policies in the context of geographically bound knowledge-based activities or of vertically integrated value-chains of firms.

This report provides a brief snapshot of how S&T&I policies and the governance of research and innovation policy have been adapted in the face of increasing globalisation and in the context of open innovation. Information was collected by means of a questionnaire-based survey, conducted in 2008, using the network of Country Correspondents of the INNO-Policy Trend Chart initiative of DG Enterprise and Industry.

Specifically, the questionnaire sought information on the following issues:

- The extent of debate concerning the innovation policy response to these phenomena and the concerns / issues identified in such policy debate.
- Whether there has been an explicit policy response to the issue of “open innovation”, the nature of this response and evidence concerning the success or failure of these policies/initiatives, or of the shift in the policy context.
- Where there have been distinct policy responses to open innovation, the types of actors mainly addressed and the level at which the policy response was articulated and coordinated.
- What could be done at a European level to address these concerns/issues and what would be the rationale and added-value of such policy intervention.

The first finding is that it is clear that both terms are open to a degree of interpretation: globalisation is often used interchangeably with internationalisation; and open innovation attracts more intense discussion, with some questioning the novelty of the notion itself, while it is also commonly closely associated with collaboration and networking.

In terms of **policy debate**, the overall impression is that while such debate on globalisation and its associated issues is widespread, there is generally less policy attention on the issue of open innovation. Moreover, discussions on the two issues are not frequently linked. Globalisation is highlighted as being of particular importance to small countries and open economies, with concerns focusing on issues of FDI, outsourcing of R&D, Human Resources in S&T, up-skilling and research prioritisation. Innovation is frequently seen as a solution to many of the problems posed by globalisation. Policy responses to globalisation have taken the form of the establishment of ‘globalisation councils’ or the release of policy documents which address the issue explicitly.

Overall, although open innovation is a phrase which is rapidly gaining currency, it is not frequently explicitly used in policy documents and is more often referred to in the academic and business literature, although there are some notable exceptions where extensive policy debate is reported (e.g. Finland, Ireland, Netherlands, UK and India). Policy debate on open innovation issues is also influenced by the national economic and industrial structure and the prevailing innovation policy mix.

More specific **policy responses** to open innovation are generally associated with the stimulation of collaboration and networking, although it is pointed out that many countries have long-standing policies in support of these aspects of open innovation, which predate its conceptualisation, although they may not cover some of its other key features as elaborated by Chesbrough and others. The key policy concerns with an open innovation focus include: holistic views of innovation policy; user-driven

innovation; collaboration and the development of clusters; IP, patent reform and competition concerns; and the development of appropriate indicators for open innovation. Generally, however, the notion of open innovation is treated as an integral part of innovation policy and not as a special area for specific support or the development of measures, although some countries have introduced measures which explicitly refer to open innovation, including Austria, Belgium (Flanders and Wallonia), Sweden, Ireland and the UK and Norway, while there are some regional schemes in Italy (Piedmont and Veneto) and Spain (Basque country and the Autonomous Community of Madrid). So-called 'Living Lab' activities are also closely associated with elements of the open innovation idea and there has been varied experience with these in Finland, Portugal, Spain, Sweden and Hungary.

In terms of the **indications of success or failure** of these measures (which also include more general collaboration schemes rather than explicit support for open innovation), evidence is relatively limited. Examples are provided for Austria, Flanders, Estonia, Finland, Norway and Brazil.

As noted, the vast majority of innovation support schemes mentioned in the (explicit or implicit) context of open innovation tend to be highly oriented towards the stimulation and support of cooperation and interaction between actors in the innovation 'ecology'. Thus, as would be expected, such **measures principally target** firms (from SMEs to large firms), public sector bodies (universities, PROs, PSREs, etc.), together with science or technology parks, users, intermediaries, public administrations, and hospitals. There was also a spread from schemes with a sectoral or thematic focus, to broad-based schemes. A range of operational levels was also evident, with the level of operation being dependent on what is appropriate for their delivery.

Concerning **the rationales and opportunities for support at the European level**, several considerations are important regarding the notion of open innovation and its relation to public policy, i.e. it is largely a company management concept, it originally derives from a US perspective, the importance the environmental context within which policies operate and the need for a balance between cooperation and competition. Several rationales for European level support were expressed, with a small number of arguments against.

With regard to the **appropriate level for policies in support of open innovation**, strong and valid arguments were put forward for action at the local, regional, national and supranational (European) levels. However, it was also noted that there are already many initiatives in place that support elements of the open innovation concept, particularly that of collaboration. Here, it was felt that existing European policy initiatives (such as Eureka and the Framework Programmes, for example) were already greatly contributing to an environment conducive to collaboration. Other specific areas for possible action included: the promotion of framework conditions, policy learning and awareness initiatives, further stimulation of cross-border cooperation, the development of 'open innovation indicators' and support for SME networks.

Lastly, it was noted that, due to the ongoing debate over the degree of novelty of the idea of open innovation, it is difficult to make specific **recommendations for policy action** by the European Commission. However, a number of (complementary) opportunities for immediate action were put forward:

- Production of an EC position paper on the various ideas underpinning the notion of open innovation, to shift the notion from the arena of academic debate to the level of practice and policy.
- Surveys and studies to identify and disseminate good practice in the application of open innovation concepts at both the firm strategy level and at the policy level.
- An extensive and comprehensive mapping of EU Member States' policy measures for innovation support against a framework based on the principles of open innovation.
- Organise a series of debates and workshops on the implications of open innovation for policymakers.

Regardless of the outcome of the debate over the novelty of open innovation, it is nevertheless apparent that it has served, and continues to act, as a useful focus for further policy attention to a number of important aspects of innovation.

Policy debate on the issue of globalisation is already widespread, often at the highest levels and recommendations for policy action at the European level are less obvious. Suggestions included support to existing collaboration programmes to further strengthen the EU's position as a global competitor and, in contrast, the opening up of such programmes in order to tap into the knowledge and other opportunities existing outside Europe.

National and regional policies for Globalisation and Open Innovation

1 Introduction

1.1 Background

Investments in R&D are increasing, not only in developed countries, but also in developing countries, and especially in emerging countries; knowledge has spread more widely with more and better educated scientists and engineers in developing countries; more people, including users and suppliers, are able to innovate for themselves; ICT infrastructures, applications and services, especially Internet-based applications and services, are increasingly available world-wide¹; the use of ICT in other scientific areas has created new research fields with high innovation potential, which need to be tackled by involving knowledge and expertise from a variety of areas; global challenges (such as climate change, energy shortage, health, and social problems) need innovative solutions with huge financial and human investments; product life cycles are shortening due to increased competition which calls for the capacity to leverage resources and integrate solutions.

To adapt to these changes, firms are turning to a more open model of innovation²; one that makes more extensive use of ideas and research results that originate from outside their boundaries at the global scale³. R&D and innovation are increasingly linked to business strategy, to the development of new products, processes and services, and firms actively seek to demonstrate financial returns from their R&D investments.

While developed countries, such as the EU member states, still predominate in R&D investment and performance, the emergence of global players like China and India, both as new markets and as platforms for research and talent, have raised concerns about the off-shoring of R&D and related high-skilled jobs and/or the erosion of EU competitiveness. In particular, for catching-up EU countries, the emergence of global players increases the level of competition for R&D and innovation-related FDI and for research talents, making the catching-up process more difficult.

As open innovation is about “Open” business models for innovation, involving innovating outside firm and national boundaries, it becomes increasingly difficult to design policies in the context of geographically bound knowledge-based activities or of vertically integrated value-chains of firms. In fact, Globalisation and Open innovation together are challenging established policies and instruments for stimulating research and innovation, from clusters and industry-science relations, to IPR protection.

The question then arises; where and how have S&T&I policies and the governance of research and innovation policy been adapted in the face of increasing globalisation and in the context of open innovation?

This questionnaire seeks to identify those countries in which policy debates and policy adaptations have been taking place, what have been the results of the debates, what are the policy adaptations,

¹ (and as a result, access to information and knowledge has been made quicker, easier and more affordable)

² According to Chesbrough (2003), the central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (i.e. patents) from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g., through licensing, Joint Ventures, Spin-offs). In contrast, closed innovation refers to processes that limit the use of internal knowledge within a company and make little or no use of external knowledge.

³ At the same time, ideas and knowledge that cannot be utilised within the company may also be commercialised through alternative paths, external to the company, leading to the creation of spin-offs, etc., with the policy implications this entails.

what consequences/impacts can be expected from such policy measures and what can be learned for policy formulation at Community level.

1.2 Methodology

The information contained in this report is based on supporting information provided by the INNO-Policy Trend Chart Network of National Correspondents and was collected by means of a brief questionnaire.

Specifically, the questionnaire sought information on the following issues:

- The level of debate regarding the innovation policy response to the phenomena of economic globalisation and open innovation and the concerns / issues identified in such policy debate.
- Whether there has been a clear policy response to the issue of “open innovation” (as explicitly phrased), the nature of this response (i.e. through the adaptation of existing policy instruments or through a new policy approach) and evidence (from evaluations or elsewhere) concerning the success or failure of these policies/initiatives, or the shift in the policy context.
- Where there have been distinct policy responses to open innovation, the types of actors that were mainly addressed (e.g. universities, research centres, intermediaries, large companies or SMEs) and whether the policy response was articulated and coordinated at regional, national or European level.
- What could be done at a European level to address these concerns/issues and what would be the rationale and added-value of a policy intervention at European level?

The author gratefully acknowledges the inputs from the Network of National Correspondents, and from Aikaterini Karakisidou, in connection with this study.

At the time of analysis, responses had been received for the countries noted below:

Austria	Czech Republic	Iceland	Lithuania	Slovakia
Belgium	Denmark	India	Luxembourg	Slovenia
Brazil	Estonia	Ireland	Malta	Spain
Bulgaria	Finland	Israel	Netherlands	Sweden
Canada	France	Italy	Norway	Switzerland
China	Germany	Japan	Poland	Turkey
Croatia	Greece	Latvia	Portugal	UK
Cyprus	Hungary	Liechtenstein	Romania	USA

Notes: Orange highlight indicates no response.

The results are synthesised in the following sections.

2 Debate on globalisation in the innovation context and open innovation

The specific question posed by the questionnaire was:

In your country, is there a debate regarding the innovation policy response to the phenomena of economic globalisation and open innovation? What are the concerns / issues identified in this policy debate?

The responses are presented according to those from EU Member States, other 'European' countries and non-European countries.

2.1 Activities in the EU member States

In **Austria**, innovation is typically seen as a means to escape competition from catching up countries; this is particular importance to Austria due to its geographical proximity to many NMS. The Wifo white-paper (2006) labels this the 'centrality – edge' issue, which is widely recognised as part of the current environment for industrial and innovation policy. Austria is a small open economy and, thus, crucially depends on international (technological) developments. The importance of knowledge inflows and absorptive capacities are generally recognised. Internationalisation of R&D also forms a topic of the ongoing discussion and, *inter alia*, was an issue discussed within the TIP project⁴, a consulting project of three ministries in charge of innovation policies.

The discussion comprised analytical aspects internationalisation of R&D (patents, external R&D for foreign firms; R&D conducted by foreign firms, etc.), knowledge and innovation intensity of trade flows, brain drain and brain gain, internationalisation and innovation, Austria as a location for (R&D) headquarters etc. Another platform providing insights is the "Research Centre International Economics"⁵. The "research dialogue"⁶ also discussed internationalisation as one relevant aspect of Austria's future research policy. The frequently mentioned concerns about decreasing innovation performance due to decreasing shares in global R&D (of both Austria and Europe) have been rejected. Yet, there is evidence that Austrian businesses are suffering from IPR abuse in emerging Asian economies (especially China), which also feeds into the policy debate.

Many Austrian policies already foster open innovation, however, the term 'open innovation' itself seems to be rather new in policy documents, although its use is becoming increasingly popular.

In **Belgium**, Chapter 4 of the Brussels Regional Innovation Strategy 2007-13 concerns the internationalisation of innovation. The measures proposed, however, are rather classic concerning boosting SME participation in the EU research FP and increasing research mobility. In the region of Flanders there is no real debate on innovation policy response with respect to economic globalisation; not because this issue is not considered important, but because there is consensus that globalisation is very much affecting the open Flemish economy and that innovation is necessary to keep up Flemish performance in an international perspective. This has been laid down in a number of 'Pacts' (consensus documents between stakeholders and government) as part of the Flemish activities to reach the Lisbon Goals. These include the pact of Vilvoorde on the Lisbon process as a whole (where stakeholders include employers' federations and unions), and the Innovation Pact in the specific innovation goals (stakeholders include employers, unions and also universities and research institutes). The concept of open innovation is not mentioned explicitly in these 'Pacts'.

⁴ www.tip.ac.at

⁵ <http://www.fiw.ac.at>

⁶ www.forschungsdialog.at

In the 2008 policy note from the Flemish minister Ceysens, open innovation is mentioned once explicitly: as the concept behind the so called competence poles (see Section 3). Flanders is also involved in the VISION ERA-NET project which includes a study on open-innovation co-authored by Chesbrough. A specific chapter of this report (available in English) concerns Flanders⁷. In Wallonia, the issue of globalisation and internationalisation of innovation is certainly part of a broader debate on the position of the Walloon economy (extremely open economy, with high share of foreign ownership notably of R&D performing enterprises). Open innovation as such is not mentioned in policy documents (such as the so-called Marshall Plan up to 2010), but as noted in Section 3 below a specific programme has been launched funding projects on this topic since 2007. This makes Wallonia relatively unique in the EU as far as we are aware.

There is some debate concerning the innovation policy response to economic globalisation and open innovation in **Bulgaria**. The authors of the fourth Annual innovation performance report of the Bulgarian innovation system (Innovation.BG), published early 2008, introduced the concept of open innovation. The report provides a summary of recommendations for new policy actions related to various issues, including:

- Developing open and focused national innovation and research programmes towards attracting European and international talent and reintegrating Bulgarian talent in the Bulgarian innovation system. Bulgaria should pay particular attention to stimulating the free movement of researchers from the Western Balkans and the Black Sea Region, including through actions under FP 7;
- Developing public-private partnerships for increasing investment in R&D and innovation, including direct public support and guarantees for Bulgarian organisations, which have successfully bid for projects under the EU framework programmes;
- Developing trans-regional cooperation between Bulgarian partners and organisations and companies from Romania, Macedonia and Greece in environmental protection and common innovation and technology development.

There is no explicit debate on globalisation and open innovation in **Cyprus**, where no aspect of innovation policy has ever been very important to form the nucleus of a broader debate. Globalisation and the positioning of the country in the broader European and Eastern Mediterranean context is crucial and is one of the main concerns in the context of competitiveness policies, but innovation and innovation policies are only implicitly mentioned in this debate.

Innovation policy in the **Czech Republic** addresses the issue of economic globalisation indirectly. The main aim of the country's innovation policy is to strengthen the competitiveness of the Czech economy, which, through its openness is greatly influenced by economic globalisation (e.g. the impact of multinational enterprises in terms of FDI). However, the issue of ongoing economic globalization as such is taken into account only as a general contextual factor of the Czech innovation policy.

As for the idea of open innovation, the Czech innovation policy takes some aspects of this concept partly into account although it does not mention it explicitly. Cooperation among all actors of the innovation process (entrepreneurs, universities, research organisations, municipalities, etc.) as one aspect of the open innovation approach is emphasized in the Czech innovation policy. In addition, the importance of cooperation in innovation is an issue within the present policy debate on a new R&D and innovation policy for the next planning period (2009 – 2015).

Policy makers in **Denmark** generally recognise that, for small open economies, it is necessary to engage in internationalisation and collaboration. A recent debate in policy making therefore concerns the national and international character of the subsidy system. Innovation policy in Denmark is characterised by a very high emphasis on collaboration and directly impacting knowledge diffusion, and a correspondingly low explicit emphasis on building innovative capabilities. In addition, the majority of funding measures in Denmark also require collaboration with public research institutions.

⁷ See: http://www.visioneranet.org/?84_m=251&s=10

This is particularly the case in relation to the policies designed by RTI (the Council for Technology and Innovation), a unit within the Ministry of Science, Technology and Innovation. RTI's innovation policies are the most closely related to open innovation and take place within four target areas: interaction between businesses and knowledge institutions, high education workers in businesses, technological service, and commercialisation of research.

A major question is whether a lack of emphasis on strengthening internal R&D capabilities necessarily implies that policies are not affecting it. On the one hand, clearly collaborative R&D projects will also strengthen internal R&D (in each of the participants) whether this was the primary goal or not. On the other hand, excessive focus on collaboration, in particular in large projects with several participants, alters the nature of R&D work and may dissuade many firms who do not have the resources to shift much of their R&D capacity to such large-scale collaborative work. Similar trade-offs exist in promoting cooperation between companies and public research. On the one hand, it is important for business to tap into the wealth of knowledge and expertise in public research, making this an important policy goal. However, it is also equally important to recognise that this may have impacts on building the internal capacity of firms. For example, this may be the case if industry-science collaborations essentially result in research being undertaken by public research and not the firms.

The debate regarding the specific notion of 'open innovation' is rather limited on the policy level in Denmark. The Danish Ministry of Economic and Business Affairs is one of two main ministries addressing innovation policy issues. Within the ministry, the main agency responsible for innovation policy is the Danish Enterprise and Construction Authority (EBST). The Ministry is active in a number of policy areas dealing with innovation, in particular improving framework conditions and promoting 'softer' or non-technological forms of innovation. Among the focus areas are: entrepreneurship, user-driven innovation, design, culture and the experience economy, and open innovation. EBST is directly interested in open innovation as a concept and has actively participated in the OECD project on open innovation and globalisation, and maintains ongoing dialogue with key national and international actors. EBST is currently investigating a number of aspects of open innovation, where a key focus is on understanding open innovation and its role in Danish business, and in identifying potential market or systems 'failures' that would motivate policy measures.

The VISION Era-Net⁸ project opened the discussion around open innovation in a more visible way in **Estonia** in 2005. VISION Era-Net is a collaborative network of nationally and regionally leading innovation policy agencies including the Ministry of Economic Affairs and Communications from Estonia. The network includes 12 partners from 10 countries, and develops shared knowledge bases for innovation policy. The project is part of the 6th Framework Programme of EU that supports the building of ERA, and runs between 2005 and 2009. Different stakeholders from the innovation system in Estonia took part in the VISION events (locally and internationally). 'Research strategies of open innovation in Europe' formed one of the topics presented during the conference. Estonia was chosen as one of the case studies towards developing an open innovation policy assessment framework. Some of the critical aspects raised were:

- What is the optimal policy level to make decisions (only EU, only national or interplay between these two)?
- Shifting dynamics because of R&D globalisation: more Europe, less national policies? How to coordinate across countries?
- NIS or RIS: has a unique 'DNA', hence policymaking should be adapted to it. No one size fits all policy.

Open innovation and globalisation has been identified as a topic by the Estonian Development Fund⁹, which has developed it in a series of innovation labs.

⁸ See: <http://www.visioneranet.org/>

⁹ See: <http://www.arengufond.ee>

Globalisation and its impacts have raised much attention in **Finland** during recent years. There is widespread awareness about the dynamic challenges Finland faces due to the ongoing transformation of company strategies and emerging innovation models. Globalisation is one of the key drivers of change which were taken into account in preparation of the first national innovation strategy in late 2007-early 2008. According to the strategy proposal, published in June 2008, industrial manufacturing is today "very flexibly placed in locations offering the most favourable operating conditions. Knowledge and competence are undergoing similar development. Operators in developing countries are striving to challenge those who are presently enjoying success throughout the world". The proposal also explicitly refers to open innovation when dealing with ongoing changes in innovation activity; "various forms of open and public innovation activity are gaining ground alongside traditional closed innovation activity" and "policies must create the preconditions for the emergence of open innovation environments".

Further, the innovation strategy proposal brings to the fore the need to renew policies to reflect changes in innovation. It is noted that "the future attractiveness of the innovation environment will largely depend on the success of strategic centres of top expertise, which must pay special attention to the development of cooperation administration and infrastructure, user-oriented innovation activity, networking with international top players, interaction between various research sectors and industries, the exploitation and development of new forms of innovation activity and interaction environments (open innovation, lablet, living lab, lead market, etc.), and a thoroughgoing renewal of Finnish trade and industry, and society".

Economic globalisation is a baseline debate in **France**. Two recent reports consider this phenomenon. The national think tank *Conseil d'analyse strategique* (CAS) has produced (2007) a report on the internationalisation of the enterprise R&D and French attractiveness¹⁰. The CAS also works on globalisation on its foresight exercises. The CAS report compares different types of business R&D internationalisation and analyse the phenomenon of global innovation centres. A report from the Parliament published in 2008¹¹ reviewed and underlined the weaknesses of the French public support system and the difficulty for France to easily link the creation of knowledge, innovation and economic growth. As a result, France is in the process of writing a new national strategy for research and innovation¹². This exercise, led by the Ministry for Research should answer four types of challenges: challenges of the society (ageing, etc.), knowledge challenges, challenges of key technologies and organisational challenges (regional, national and European articulation of policies etc.). The challenge of globalisation is not addressed as such. Economic globalisation is set as a context but not explicitly identified as a challenge so far.

Open innovation is not explicitly referred to in the current French debates, but the principles behind it are at the basis of the major innovation policies developed these last years.

There is a lively debate on the consequences of globalisation on innovation among innovation policy makers and stakeholders in **Germany**. The debate is dominated by a sceptical view, i.e. there is a fear of a loss in innovative capacity due to dislocation of R&D and innovation activities to other countries. While large industrial corporations have established an extensive global network of R&D, innovation and production since the late 19th century, in recent years a large number of SMEs have also engaged in R&D and innovation activities abroad. While much of the debate focuses on emerging economies such as China or India, most internationalisation activities of German firms in the area of R&D and innovation take place in neighbouring Western European countries and increasingly in the New Member States. Despite the policy concern of a potential loss in innovative capacity and

¹⁰ CAS, 2007, Internationalisation de la R&D des entreprises et attractivité de la France, http://www.strategie.gouv.fr/article.php?id_article=603

¹¹ Sénat, 2008, Rapport d'information sur la stratégie de recherche et d'innovation en France.

¹² See:

http://media.education.gouv.fr/file/2008/51/9/Strategie_nationale_de_recherche_et_d_innovation_pourquoi_comment_34519.pdf

competitiveness, data show that most German firms engaging in R&D/innovation abroad can profit from these activities in their home market¹³.

Open innovation has not been adopted as a policy-guiding concept by innovation policymakers in Germany so far. Stimulating co-operation in innovation is a long-standing policy approach, however, and is closely related to the notion of open innovation. In this regard, German innovation policy has a very long tradition of acknowledging the role of open innovation processes and encouraging both firms and universities to share their knowledge, enter into innovation-related co-operation and form innovation networks. The oldest programme in this respect is the IGF (joint industrial research programme), dating back to 1954. Nowadays, most Federal and Länder programmes in the field of R&D and innovation that target companies focus on collaborative research.

Although innovation policy has been discussed in **Greece** since 1980, only since 2000 have measures in favour of innovativeness become more visible. Nevertheless, the debate is limited to a few “competent” organisations and does not effectively permeate the discussion on national competitiveness. The issue of globalisation is still seen by some influential actors in the public life as a threat and not as a challenge.

The new National Strategic Reference Framework 2007-2013, which expresses the government’s official policies, adopted innovation as one of the basic components of the developmental policy at national and regional levels, in the framework of the Lisbon Strategy. Entrepreneurship, extroversion (export performance) and business RTD are at stake, as well as the reduction of red tape and the improvement of the business environment. But the lack of large productive firms, addressing international markets, is placing the issue of “open innovation” on a different ground than in many other EU countries. Most firms acquire embodied technology through purchasing and innovate in “production processes” and “new to firm” products”. A few cooperate freely with researchers in universities and public research centres to transfer or to create new knowledge. The regulations on external collaboration in these organisations are quite permissive and leave the academics with much freedom of movement. The firms themselves are occasional users of the PRO’s services. Public incentives for clustering among firms in the traditional sectors have had very limited uptake in the last ten years. More successful is clustering in advanced economic sectors, such as microelectronics.

Economic globalisation is a major concern of **Hungarian** innovation policy. The government’s mid-term STI policy strategy states that its general goal is “that in the mid-term Hungary shall become a country where knowledge and innovation are the driving engines of the economy and companies appear on the global market with competitive products and services.” The major issues in this respect are how to foster the international competitiveness of Hungarian businesses, as well as to develop a research infrastructure that enables Hungarian researchers to participate in international networks.

The “open innovation” concept has not been a central issue in either policy debates, or policy-making, and the term rarely appears in policy documents or as a specific objective of support measures. However, a few isolated events took place in recent years where open innovation was on the agenda. In 2005, a British journalist gave a presentation, as part of the so-called “Innovation Spring” series, organised by the National Office for Research and Technology. The main theme of the presentation was the various models of open innovation. The central question was how companies can cope with the changing, complex and uncertain environment, which characterises the new phase of globalisation. More flexible structures and approaches are required, and firms interact more intensely with the world around them. These new models might also have implications for innovation policy. Open innovation has also been associated with the Living Lab concept, also promoted by various EU initiatives (FPs, etc.), and has in this respect received some attention in recent years. The main idea here is also to create a more open environment for innovation, e.g. involving customers in the innovation process, creating more flexible and common working platforms, more efficient collaboration

¹³ See <ftp://ftp.zew.de/pub/zew-docs/dp/dp08035.pdf>

of teams in different locations, etc. In Hungary, the most important application of the Living Lab initiatives aims to provide new solutions for the population living in rural areas, e.g. the agrarian trade co-operatives. A number of events have been organised to disseminate the concept in other sectors, too, e.g. for automobile manufacturers and their sub-supplier network in Gyor.

In **Ireland**, the threat of globalisation and the need to move up the added-value chain in both services and manufacturing has underlined the debate on the need to invest more in Science, Technology and Innovation since 2000. The Lisbon/Barcelona target and the National Reform Programme reviews of 2005-07 have ensured a Government focus on innovation. Consequently, the Government recognised the value that investment in R&D and innovation represents, both to maintain economic competitiveness and to improve living standards. This is clearly reflected in the Social Partnership Agreement, *Towards 2016*, and in the current Programme for Government, the *National Development Plan 2007-2013* and the *Strategy for Science, Technology and Innovation 2006-2013* which set out the Government's targets in relation to STI and the mechanisms for achieving them. The current Government is committed to Ireland's ambition to become a leader in innovation (it is a government initiative). In June 2008, the Department of Enterprise, Trade and Employment published a policy statement, *Innovation in Ireland*, thus the debate is over and there is a social partner agreement on the plans. The key issues addressed were: the level of investment needed in HE R&D, the stimulation of industry, the attraction of FDI high added value in Ireland and upskilling workers under threat.

However, increasing innovation is a key part of the investment and the current debate is on open innovation. In 2007 and 2008, Enterprise Ireland organised Open Innovation Forums for industry, the HE sector and the regional and local development bodies. Key speakers were leading open innovation academics and practitioners from Europe mainly. The events included:

- Venture Capital for Open Innovation (2006) – a conference sponsored by the Irish R&D Group, a private sector industry representative body.
- Innovating the Business Model - Using Open Innovation to grow your business (2007). Key speaker: Prof Henry Chesbrough. Organised by Enterprise Ireland.
- Making Innovation Deliver Results (2008) – focused on open innovation, with nearly 300 participants, overbooked. Organised by Enterprise Ireland.

Issues discussed include frameworks for stimulating open innovation in services and manufacturing companies, appropriate innovation business models, measures to support open innovation, networking with other innovators, tools and techniques, and SMEs and open innovation, including working with very large companies such as Procter & Gamble. Overall, there is a lot of interest in open innovation. However, in policy terms generally, open innovation is treated as part of innovation, not a special area for specific support or measures.

The issue of globalisation is often mentioned in **Italian** public debates and in policy documents. The need to adapt to the new changing world and re-gain competitiveness (especially through innovation) of Italian firms is often mentioned. However, this is not the case for the issue of open innovation. The term "open innovation" as such is rarely heard in public debates/events¹⁴ or seen in policy documents. What is often found or heard instead is the expression "*fare sistema*" which can be translated as "creating a system". It refers to the need to increase the networking and the interactions among the main players of the innovation system. A clear example is to increase the interaction between the world of research and the industry (to bridge the gap). Since bridging this gap implies increasing collaboration between enterprises and research institutions, technology transfer, and the like, in a way this could recall to the concept of open innovation.

¹⁴ "open innovation" was mentioned in a session of this year's Innovation Forum held in Milano, but it was all about "Web 2.0"

Industry 2015, the latest policy document (launched in September 2006) designed by the Ministry of Economic Development to allow interventions in the field of industrial innovation calls for the need to adapt policies to the new challenges brought about by globalisation. In particular, the document identified three strategic areas, namely industrial innovation, innovative finance and enterprise networks that need to be further developed and strengthened if the Italian economy is to compete successfully in the global market. However, the document does not make explicit references to the open innovation phenomenon.

The phenomenon of economic globalisation has also had an important place in the national policy debate on the future strategic development of **Latvia** given the gradual loss of its former advantage of cheap labour and natural resources, which are no longer seen as the primary asset of the national economy in the light of international market developments. As in many countries, the advancement of knowledge-based and innovative activities have been brought to the front of the strategic policy orientation of Latvia. Currently, the framing of the challenges posed by economic globalisation for Latvian companies is mainly done in terms of stressing the need for boosting their own internal capacities in delivering higher value added (and exportable) products and services (e.g. by means of up-skilling their staff, increasing labour productivity) on the one hand, and pursuing more active strategies in tapping into the external resources offered by research institutions as well as other companies of different profiles on the other. These two aspects accordingly also represent the main directions identified in the national innovation policy with specific measures being developed and launched as a policy response to these challenges in order to enhance the competitiveness of the enterprise sector and the national economy as a whole.

There is no general debate on the globalisation as **Liechtenstein** profits significantly from technological exports. Globalisation is driving industry growth for most established corporations specialising in global niche markets. Internationalisation of R&D is an issue, but to date, the Government judges the liberal general economic policy in combination with low taxation as the most efficient strategy to keep R&D in Liechtenstein and to attract new innovative business.

Open innovation forms part of the larger debate on future innovation policy. Emphasis is laid on discussing the role of users and consumers, both on idea generation and entrepreneurship. Empirical studies since the 1980s have shown that users are a very important external source of innovation. However, innovation and technology policy has hardly responded to these findings, although interest is rising rapidly. Thus, the following questions have been identified as being important for future public policy:

- What are the influences of traditional innovation and technology policy on the interaction of users and other types of external sources of innovation and firms?
- How can policy makers analyse the intensity, scope and effects of user innovation at the national and regional level? How can findings at the firm level be elevated to learn about effects of user-firm interaction at the industry level?
- Which type of government intervention will have a positive impact on this specific type of interaction of firms with users and other forms of external sources of innovation?

To find answers to these questions, the government is co-sponsoring a research project at the University of Liechtenstein with the following goals (2008 – 2010):

- the appraisal of traditional innovation and technology policy effects on the interaction of firms and users as a special type of external source of innovation;
- the elaboration of indicators capturing information on the prevalence and importance of user-firm interaction for new product/service development in the context of a nation state or specific region and;
- the identification and definition of deliberate innovation policy instruments fostering user innovation (as one aspect of open innovation)

Policymakers and practitioners should expect the following results from this research:

- Better understanding of how users and firms interact and what are the effects of this kind of collaboration on innovation performance, regional growth and employment;

- Qualitative and quantitative indicators capturing the nature, scope and impact of user-firm interactions on the innovative performance of firms, industries and nations;
- Public policies and programmes to foster the innovative interaction between users and firms for the promotion of commercially attractive new products and technologies.

Lithuanian innovation policy efforts are little concerned with globalisation and open innovation issues, despite the presence of successful innovation activity and although the country's innovating enterprises are mainly internationally oriented. However, at the current stage of innovation and business policy development, primary tasks include the development of internationally competitive products and services via technology transfer and the implementation of quality standards and quality management techniques. Great attention is paid to the internationalisation of enterprises. However, the measures cannot be considered as targeting globalisation issues but rather internationalisation. Open innovation as a concept and practical model of innovation is still at the "development" stage in the Lithuanian innovation policy framework, although the idea of collaboration for innovation is explicitly supported in most of the innovation policy measures. Collaboration for innovation is also predominant in innovative enterprises (according to CIS VI), however the supplier-oriented innovation type dominates and suppliers are identified as the most frequent and most valuable innovation partner. The open innovation model would be applicable to the few R&D intensive enterprises acting at the technology frontiers, such as lasers, biotechnologies, etc., however, the number of such enterprises in Lithuania is limited to higher education sector spin-offs.

Currently, there is no debate about the integration of open innovation in the innovation policy implemented in **Luxembourg**.

The National Strategic R&I Plan and the Operational Programme I implementing **Malta's** Cohesion Policy 2007-2013 address concerns regarding the effects and impacts of globalisation on traditional sectors/activities; increased competition faced by local enterprises (SMEs) in the face of a globalized economy and the need for these to respond to such challenges by investing more in innovation and research. However, there is no specific debate on how innovation policy can tackle these challenges (Malta lacks a stand-alone innovation policy and relies on a broad framework for research and innovation defined in the National Strategic R&I Plan). There is no reference to the term "open innovation" in relevant policy documents and thus there is no clear debate on this concept. Nevertheless, policy responses to the concepts underlying open innovation include the promotion of collaboration; internationalization of markets; clustering and networking as drivers of innovation and learning (aggregating economies of scale to better compete in local and international markets).

Open innovation has attracted a high level of policy debate in the **Netherlands**. In 2004, the Innovation Platform (IP) published its advisory report 'Vitalising the knowledge economy' in which open innovation is recognised as one of the key trends in the innovation system. Collaboration between different parties in the system is increasingly important. Regarding open innovation, the IP recommended to continue and extend instruments that stimulate linkages in the innovation system. In 2004, the policy mix already included several instruments that stimulate (public-private) collaboration. The IP recommended the establishment of new "technological top institutes", "societal top institutes", open innovation centres and co-ordinative bodies (*regieorganen*) with sufficient critical mass. Experiments should be started with new forms of public-private collaborations. The Cabinet welcomed the recommendations. In the streamlined policy mix (2005), the instruments for stimulating collaborations played a prominent role. (e.g Innovation vouchers, innovation programmes for the key areas).

In 2006, the Ministry of Economic Affairs asked the Advisory Council of Science and Technology Policy (AWT) to give advice on open innovation. There were two central questions: (1) what are trends in the innovation practices of companies in the Netherlands; is there an increase in open innovation? (2) which adaptations in (innovation) policy are required to address the developments in innovation practices of companies? The AWT made the following recommendations:

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- A. Broadening of innovation policy (i.e. use an integral approach to innovation; give more attention to users and give them more room in innovation policy; and promote and facilitate independent entrepreneurship)
 - B. Collaboration and alliance formation between organisations (i.e. strengthen policy aimed at “hot spots” and strengthen competences for collaboration)
 - C. Policy for Intellectual Property and Competition (i.e. increase the quality of the practice of patent issuing; protect the space for user innovation in IPR policy; and clarify the relation between IP and Competition by starting a broad debate).

In a reaction to the AWT advice, the Cabinet explicitly acknowledged the importance of open innovation for companies to achieve renewal. Because of increasing internationalisation of the world economy, innovativeness is more than ever the most important factor to stimulate sustainable economic growth. Innovation becomes increasingly important for companies to remain competitive. In addition, the Cabinet saw innovation as the key to solve societal challenges. Regarding collaboration and alliance formation, the Cabinet argued that its standing policy already addressed this issue with its “programmatic package” in the innovation policy (which enables development of “packaged” innovation programmes based on public-private collaboration in “key areas”) and its “Peaks in the Delta” approach to the regions (in which regions develop innovation programmes in regional “hot spots” based on public-private collaboration). Regarding the broadening of innovation policy, the Cabinet argued that it had already embraced innovative procurement. An example is the Small Business Innovation Research (SBIR) scheme with which the government can procure socially relevant R&D to SMEs.

In addition to several policy measures in the 2006 policy mix that address the issues raised by the AWT, the Cabinet listed several new initiatives. (e.g. the Ministry of Economic Affairs took the initiative to start an international OECD project on policy implications of globalisation and open innovation, and the Ministry of Economic Affairs and the Netherlands Competition Authority (NMa) would collaborate to clarify the relation between IP and Competition).

In general, the concerns/issues in the policy debate on economic globalisation and open innovation are mainly translated in terms of a need for more public-private collaboration and development of clusters and hot spots. Because the ‘innovation paradox’ used to be an important driver of innovation policy, stimulation of public-private collaboration has been an element in Dutch innovation policy for a long time. It is noteworthy that collaboration is mainly stimulated at a national level. The idea is that the Netherlands needs to have specific focus areas with excellent R&D to remain internationally competitive and to be an attractive location for R&D in a globalising economy, i.e., globalisation and open innovation are drivers for focus and mass. In the most current policy documents, the term ‘open innovation’ is not mentioned explicitly (e.g. not in the Policy Programme of the Cabinet Balkende IV (2007-2011) nor in the Working Programme Netherlands Entrepreneurial Innovation Country).

Note: The multinational company Philips plays an important role in the Dutch economy. Philips has embraced the concept of ‘open innovation. It has started the High Tech Campus Eindhoven to facilitate open innovation¹⁵. The “open innovation campus” has become an important element in the innovation landscape in the Southeast region. Another example of an important multinational company that has adopted the open innovation philosophy is DSM. DSM has developed the open innovation campus Chemelot¹⁶. Both Philips and DSM are active partners in (developing and running) the innovation programmes of the ministry of Economic Affairs.

Overall, there is no evidence from **Poland** suggesting that there is a debate regarding the issues of economic globalisation and open innovation. There are at least two reasons for that. First, Poland is starting to launch the EU Structural Fund interventions (2007-2013), the funding of which is considerable. For example, the financial allocation of the Operational Programme Innovative

¹⁵ See: <http://www.hightechcampus.nl>

¹⁶ See <http://www.chemelot.nl/>

Economy alone is estimated at €9.7 billion, not taking into account additional funding from the Operational Programme Human Capital and 16 Regional Operational Programmes. Thus discussions are focused on practical aspects regarding the implementation, such as the interpretation of the EU rules on State aid. Secondly, Poland is undergoing significant reform of the science and higher education system, the first results of which should be noticeable once the five Acts are implemented sometime in the second quarter of 2009.

The response from **Portugal** takes a more analytical view of the question posed: If the question concerns a debate regarding the combination of economic globalisation AND open innovation (defined as “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology”, involving a combination of internal and external ideas into architectures and systems whose requirements are defined by a business model” [Christensen, 2006:xxiv]), the answer is no. There has not been a debate on the innovation policy response to the conjoined effect of those two subjects. There is, in some instances, an implicit recognition of the links among them (as it happened, for instance, in the introductory texts of the Globalisation Council), but one of the issues is always in the background, and is not made explicit. However, if the question concerns the innovation policy response to each issue taken in isolation, then some debate has taken place.

Globalisation has long been a concern in Portugal. The dominant tone in the debate on globalisation and innovation policy has been the need to stimulate innovation in order to escape the increasing competition from emergent countries. In this vein, innovation policy was envisaged in a broad perspective, including organisational innovation, namely in the building up and management of an international supply chain. There has been a debate regarding the effects of globalisation and the policy response to it. Three main perspectives have emerged: (1) voices towards a protectionist stance, defending so-called national interests, coming mainly from the right wing of the political spectrum; (2) criticisms to multinational firms as the main drivers of globalisation, leading to (often unrealistic) policies to curb their power, voiced mainly by leftist parties and NGOs; and (3) the need for an innovation based policy that might enhance competitiveness in a globalised World, which is very much in line with the reasoning behind the Technological Plan.

An important initiative in this regard has been the convening of the Globalisation Council, under the aegis of the President of the Republic. There were two sessions of this Council, in 2007 and 2008, and a third will take place in November 2009. The first Council dealt with meta-national advantage and the globally integrated company; gateways and barriers to globalization, and expanding the benefits of connectivity. The key topics for the second Council were: (1) Entry Strategies for the XXI Century, (2) Innovation in a Global World; and (3) Private Equity: friend or foe? The introductory text on Innovation in a Global World, (see Annex 1) raises some issues that might be related to an open innovation perspective, but no explicit link has been drawn on that regard.

According to an article of the President of the Republic, published in one of the main Portuguese newspapers, the purpose of the Council is to provide a forum where “foreign and Portuguese entrepreneurial leaders will debate the actual challenges, think over the global economy risks and opportunities, and share their experiences“. In that article, the President of the Republic argued that:

“In a world that is now facing a bigger economic integration, competitiveness depends on its capacity to take advantage of enterprises and economies interdependence and complementarity. Nowadays, to explore new growth opportunities in the international markets is an avoidable option and sometimes a question of survival for a growing number of business sectors and Portuguese enterprises. However, the global challenge is linked to three keywords: innovation, competence and flexibility.

Permanent innovation must be compulsory for all companies. Scientific progress and technological innovation, applied in new business models, are moving fast, with no interruptions. New companies, especially those from the emerging economies, are shaking the productive structures and competition standards belonging to the past.

Companies that will stay close to the same old production techniques, organisation and management methods, as well as ancient commercial practices are, inexorably, compromising their competitive levels. Innovation must be a compulsory word for all companies aiming to succeed in global markets.”

With regard to open innovation and innovation policy, the debate has been more restricted. The main, though limited, debate on open innovation has concerned company policy, and not national or regional policy. Even in the preparation of the recent National Strategic Reference Framework, the theme has not been explicitly raised. Since there is no Portuguese partner in initiatives like the ‘Vision ERA_NET’, thinking on this specific theme has been rather limited. It has been restricted to the role of Living Labs for innovation policy. The Portuguese Living Labs meeting on “From Innovation to the imagination Society”, held last June, addressed the concept of open innovation and its relationships with the activities of the Living Labs.

Some companies have shown interest in open innovation, and there are cases of initiatives towards the creation of open innovation platforms. In the academic world, the company perspective has prevailed over the national policy perspective. Open innovation is now a topic in several Innovation Management curricula, and the relationships between the ideas of Chesbrough, Eric von Hippel (democratising innovation), and C.K. Prahalad and V. Ramaswami (Experiential Innovation) are being explored. Some papers were published on the topic, and a research project, involving the Universities of Porto and Laaperanta (Finland) has been recently launched on Open Innovation policies in large firms.

Debate on the innovation policy response to economic globalisation is very lively in **Romania**. The most recent example is the conference ‘The role of diaspora in Romanian scientific research’ (Bucharest, 19 September 2008), which addressed not only the potential contributions of the diaspora to strengthening Romanian research, but more broadly, the links that Romanian research and business communities need to build internationally for better integration. The concerns/issues identified in this policy debate revolve around the major need to strengthen the competitiveness and visibility of Romanian research institutions and business firms nationally and internationally, especially within the European Union/the European Research Area, through such measures as: improving the participation of Romanian researchers in EU and international projects, consortia, partnerships and strengthening the links between the R&D and business communities, nationally and internationally.

In this respect, the most recent initiative of the National Authority for Scientific Research is the launch, at the end of August 2008, of the ‘Innovation Roadshow’, organised as a series of conferences, seminars, meetings between representatives of R&D institutions and firms (especially SMEs) in all the development regions of the country. At these events, the most advanced products, services and technologies (ready for implementation/acquisition) of the national and private R&D institutes, universities, other R&D actors, are presented to the business sector, adapted to the economic specificities of the region/county. The roadshow also presents government and EU funding opportunities for joint projects of R&D institutions and business firms, and organises visits to the firms that are interested in taking over/developing new innovative products, services or technologies, or entering partnerships with R&D units.

At present, R&D and innovation are broadly considered to be the remit of national and private R&D institutes, and only a small share of domestic business firms are actively undertaking R&D activities or implementing innovation policies (only about 19% of Romanian firms are considered to be innovative, according to a 2004 survey of the National Institute for Statistics). This is also the key reason for the poor linkages between the R&D and business communities discussed above. Therefore, the concept of ‘open innovation’ or business models for innovation involving innovating outside firm and national boundaries is relevant only to a small share of Romanian business firms, as most of the others rely primarily on technology acquisitions for improving their business processes.

To date, no policy debates and policy adaptations on open model of innovation have been taking place in **Slovakia**. None of the basic innovation policy documents (the 2007 Innovation Strategy and

the 2008 Innovation Policy) and the S&T policy documents (Long-Term Objective of the State S&T Policy up to 2015) tackle these issues.

In **Slovenia**, debate regarding innovation policy response is scarce and limited to academic circles. One of the relatively often mentioned concerns is that, due to its small size and therefore limited human resources in S&T, Slovenia cannot play an important role in attracting FDI in the R&D area. In fact, the few attempts to become a regional R&D centre in a specific area have not been very successful, partly because of the changed strategy of the foreign partner (decision to move to the BRIC countries) and partly due to insufficient human resources.

The analysis of the 2007 European Innovation Scoreboard shows that **Spain** is currently facing two difficulties in the field of innovation. On one hand, Spain is less innovative than other European countries with similar or even less economic prosperity. On the other, a result of the previous difficulty, Spain needs to import technology (and especially medium-high and high-technology products) from other countries. The overall consequence of these two factors is the existence of a negative balance of payments and the loss of competitiveness. Furthermore, economic globalisation and open innovation, which ease the introduction of foreign technological products in the Spanish market, are believed to threaten current competitiveness as Spanish products and services will have to compete with foreign ones. In this context, it is not surprising that the effects of economic globalisation and open innovation are high on the agenda of innovation fora. Thus, for instance, Spain has organized several international conferences on the topic and a number of fora have taken place. However, this interest in economic globalisation and open innovation is not coupled with policy responses. As explained below (see Section 3), measures to confront the effects of economic globalisation and open innovation are scarce and only a few policy responses have been identified in two autonomous communities.

The analysis of innovation literature shows that both research agents and entrepreneurs perceive economic globalisation and open innovation as an opportunity to create a more innovative culture within the Spanish society. Research agents and entrepreneurs therefore call for a policy context that encourages innovation in enterprises, universities and technology centres. The results presented in the Deloitte report¹⁷ have also raised a number of discussions on the changes that need to be implemented if Spain wants to take advantage of economic globalisation and open innovation. Based upon the results of this report, only 50% of Spanish enterprises have an innovation strategy and only 40% of these companies have been involved in open innovation.

Over the last year there has been an active debate in the **Swedish** media concerning the innovation policy response to economic globalisation and open innovation. This relatively active debate can mainly be explained by a forthcoming new governmental bill on research and innovation. The attention to these questions has also been driven by the work of the newly established Globalisation Council. One of the major concerns in the ongoing debate is the increased outsourcing and off-shoring of Swedish manufacturing industries as a result of increased global competition. This has meant that several of the big companies in Sweden have downsized manufacturing employment in Sweden in favour of expansion on new markets abroad. This trend not only concerns the manufacturing sector but also includes outsourcing and off-shoring in knowledge intensive industries and R&D. This is seen as a worrisome development (job destruction), but also because there is an obvious risk that, in the long run, it may undermine the Swedish global innovation competitiveness.

A second issue of concern in the debate is the necessity for Sweden to prioritise among R&D-fields. Innovation and research are expensive activities. To achieve global competitiveness, it is important to be able to mobilize sufficient resources. There is agreement among most actors in the Swedish innovation system that Sweden, as a small country, has to prioritise a few strategic research areas to become globally competitive. This approach is also visible in the above-mentioned forthcoming bill on

¹⁷ <http://www.deloitte.com/dtt/cda/doc/content/Estudio%20innovacion.pdf>

research and innovation. In the bill, the Swedish government has identified three strategic areas to be prioritised – life sciences, engineering and climate.

How to attract competent persons and knowledge investments to Sweden has been another subject of concern in the debate on economic globalisation. Human knowledge and competence are among the most important resources for innovative companies. As a consequence of globalisation, competition over human resources has increased. This development is also noticeable in Sweden. There is a fear that Swedish researchers (as well as other higher skilled persons) will leave the country for more attractive employment abroad. There is national concern about how to attract competent persons to the country, and to give them incentive to stay in Sweden in the long term in order to guarantee continued economic growth and national prosperity. Swedish value creation is dependent on export and import. Today, Sweden's main trading partners are located in Europe. New markets, especially in Asia, have been available via the globalisation process, but so far Swedish companies do not seem to have made use of this opportunity to the full extent. According to Statistics Sweden, only 1.9% of Swedish exports during 2007 went to China. Equivalent numbers for Japan and India the same year were 1.3% and 0.9%.

There is a general agreement among the actors in the innovations system that there is a need to take certain measures to meet these challenges and to safeguard Sweden's position as leading research nation and to guarantee the country's innovation competitiveness.

In the **United Kingdom**, there is an ongoing lively debate on open innovation and internationalisation/globalisation issues. The main policy makers involved in the debate are: the Office of the Prime Minister, HM Treasury, the Department for Innovation, Universities and Skills (DIUS), the Department for Business, Enterprise & Regulatory Reform (BERR) and the National Endowment for Science, Technology and the Arts (NESTA). The Regional Development Agencies (RDA) are also involved. In 2007 and 2008 several Government's documents, white papers and policy strategies have been published and implemented in order to face the challenges and capitalise on the opportunities offered by globalisation and open innovation.

In the *Race to the Top: a Review of Government's Innovation Policy*, by the former Science Minister Lord Sainsbury, published in October 2007, the author highlights that a winning strategy for the UK would be that of moving "into high value goods, services and industries". The report foresees the leading role of the Technology Strategy Board in coordinating the actions of the Research Councils, the RDAs and other Government Departments. The traditional role of the Government in improving the supply-side factors of innovation should be maintained and improved but also the demand-side should be taken into consideration by promoting innovation through procurement and regulations. The Review also recommends improving the UK's global standing by implementing extensive campaigns to improve science, technology, engineering and mathematics teaching in schools. Furthermore, it suggests improving and capitalising on the success of knowledge transfer initiatives in graduate placement in companies including SMEs, improved commercialisation of university research and increasing in collaboration of universities and companies in R&D and innovation activities. Another critical factor is the IP regime and the use of metrology and standards to improve knowledge transfer between research centres, companies and public policy makers.

The Review suggests seeking out and investing in early stage high-technology companies due to their great potential for rapid growth and innovation. Venture capital should therefore be available to sustain high technology start-ups and proof of concepts activities. Following increasing recognition of the potential of RDA science and innovation policies to drive regional economic growth, Lord Sainsbury suggests increasing regional focus and resources on science and innovation. Within a national policy framework for innovation, importance should be shifted towards the regional level where employees, companies, universities, research institutions and government interface more directly. Finally, the Review recommends making international collaboration a core part of strategy, and to improve co-ordination of the UK bodies involved because "international collaboration is important if the UK is to stay at the leading edge of world science and innovation and benefit from the 90% of the world's scientific output that is produced elsewhere".

Following the Sainsbury review, several Government papers have taken Globalisation (or the new globalisation) into account, albeit from different perspectives. For example, *Globalisation and the changing UK economy*, published by BERR in February 2008 features a description of the process of globalisation that involves Great Britain, its drivers and how the British economy and society is changing in response to globalisation. It also highlights the policy response of the country. In fact, in order to achieve the Government's central economic objective of high and stable rates of economic growth and employment, the "openness" of the Country to globalisation is a priority. Openness to trade and to foreign competition strengthens the drivers of productivity, foster innovative ventures and increase incentives for investments. The paper offers a comprehensive analysis of the effects and the policy framework in response to globalisation by highlighting potential benefits and also policy challenges.

The NESTA working paper *UK Global Opportunities, Local Challenges*, published May, 2008, analyses and puts into perspective the new wave of globalisation and its implications (or the role) of innovation. The new wave of globalisation is mostly characterised by the high content of knowledge intensive activities and how globalisation takes place in consideration of knowledge-rich localities. For example, a local economy has to achieve a certain level of internal capability before it can take advantage of economic globalization; at the same time, external factors help shape the way globalisation manifests (i.e. the capabilities of other local economies). As these factors are influencing the new wave of globalization, significant policy interest should be placed on those internal capabilities that will help "domesticate" globalization flows. Internal capabilities in such a context are identified as "connectivity" – the ability to reach out and influence the globalization flows – and "absorptive capacity" – or the ability to understand, manage, maintain and create international relations.

For the innovation policy perspective, these are observations that have had a profound impact on the policy possibilities. For example, while the UK generally appears as a highly globalised country, globalization seems to be largely contained within two or three regions of the country. Also, the shift of this new wave of globalisation towards smaller players, shared-interest communities and distributed global supply chains (for example through outsourcing/off-shoring) requires new ways of thinking about globalisation. The policy challenges then are summarised by the following questions: Is 'Central Government' (outside the Devolved Administrations) the right level of policy response to the impact of globalisation on the sub-central level? What would be a possible division of labour between the central and sub-central level of government? Is it foreseeable, for example, that English regions get a greater say on selecting skilled immigrants to the UK? Can they set up their own foreign 'business' representations? (NESTA, 2008, pg. 32)

Open innovation also has a high visibility in the UK innovation policy debate. The DIUS White Paper *Innovation Nation* and the BERR document *Enterprise: unlocking UK's talent*, both published in March 2008, take into account the importance of open innovation within the competitiveness framework and innovation policy debate. In this context the phrase "open innovation" is mainly intended for business innovation at a corporate level for large firms and multinationals and in a broader sense – involving other business support activities – with regard to SMEs.

In more detail, *Innovation Nation* recognises the value of open innovation practices in the business sector and broadens its applicability to the public sector. The principle behind the arguments is that "businesses are internationalising their R&D, supply chains and customer bases and adopting "open innovation" models. Like the ideas that they create and use, the people who drive innovation are also increasingly mobile, as is the finance that support innovators". In assessing the Government's role in innovation, the White Paper envisages public sector innovation as a main driver of innovation in the wider economy. The rationale behind this is that the delivery of public sector services embodies a powerful driver for innovation when the principle of open innovation is embraced in order to adopt and diffuse innovative solution from the private and the third sector.

Innovation Nation also points out the science and technology play an important part in open innovation, because it happens “across the private, public and third sectors. Businesses are increasingly engaging in “open innovation”, reaching outside their walls for ideas. Users are innovating independently and in partnership with organisations, creating the demand for new products and services” (DIUS, 2008, pg. 12/13). *Enterprise: Unlocking UK’s Talent* places the emphasis on the beneficial mechanisms behind open innovation business strategy against the shortcomings of a “closed innovation strategy”. For example, in traditional business innovation strategy “good ideas that did not apply to the firm’s core business model were often discarded and their benefit lost to other businesses. In some firms, the volume of unexploited patents has been found to be as high as 75-90%”; while adopting an open innovation business strategy, “large firms reaching out for ideas and offerings introduces great opportunities for innovative SMEs seeking growth”.

Recently, NESTA launched several initiatives aiming at fostering innovation in the British economy. Regarding open innovation, NESTA’s focused on openness in the corporate world. The rationale was that “Since Henry Chesbrough popularised the term ‘Corporate Open Innovation’ in 2003, many large companies have been attracted by the idea of sourcing new products externally from small businesses and individual inventors. In theory, this enables firms to reduce costs, gives them access to a greater knowledge pool and increases potential revenue from new markets”. NESTA’s work began with a wide enquiry into barriers and accelerators to open innovation comparing the open innovation concept with the traditional closed innovation strategy. The resulting taxonomy highlights the factors underpinning both concepts. Based on this theoretical approach, NESTA is sponsoring four major initiatives based on the corporate open innovation idea.

These are: Corporate Connections with the aim of “bringing together a diverse group of companies to encourage innovative thinking and develop shared opportunities, through a series of collaborative workshops”; Open Alchemy , with the aim of “encouraging firms to seek opportunities outside their traditional internal innovation streams”; The Procter & Gamble Open Innovation Challenge which “seeks to harness the potential of design companies to develop the next generation of products and services for P&G”; and Open Ventures aiming at applying “the concepts behind open-source software to business development”. All the above initiatives are business-oriented.

The same concept of open innovation, although not named as such, is applied by NESTA in a wider range of initiatives, the most important of which is the Interdisciplinary collaboration initiative. This involves universities, scientists, and higher education and research institutions and engages in innovation within the universities sector; develops new collaborations across disciplines, innovative solutions to tackle the big issues in energy research and sustainable solutions to the problems that people face in developing countries.

2.2 Other ‘European’ countries

There is currently no debate on these topics in **Croatia**. Innovation policy is not discussed in the context of globalisation. Given the underdevelopment of innovation policy, it is understandable that the debate focuses on less complex (national-level) issues. Some aspects of open innovation have been discussed by social theorists of the younger generation, especially those gathered around the Multimedia Institute (mi2) in Zagreb. In such cases, the issue is not approached from a business or policy perspective; the emphasis tends to be on the dynamics of collaborative innovation (e.g. through online communities) and limits to it posed by the current IPR regime.

In a recent declaration made by the **Icelandic** Science and Technology Policy Council (2007), globalisation was identified as a key factor for the future. Increasing globalisation provides opportunities for Iceland, but at the same time raises several issues (many of which were identified during a large foresight exercise carried out early in 2007), which need to be addressed. Issues of concern in this respect are:

- Attraction of knowledge/brains (high potentials) / keeping knowledge in Iceland
- Image creation of Iceland – marketing/branding
- Increased cooperation between business and the education system

- Modernisation of government
- Dealing with/anticipating the changing demographic structure/social changes (e.g. the fact that Iceland already has a large share of foreigners)
- Sustainable development (safe and healthy food)
- Renewable energy and greenhouse gas emissions
- Importance of creative industries
- Innovation in the services sector
- Mobilizing the financial sector to invest in R&D (providing a better understanding of why investment in R&D/funding is of interest)

The threat and opportunity inherent in the rise of Chinese and Indian engineering skills was outlined as challenge in the 2006 Trendchart report on **Israel**, reflecting a concern that was common among both business leaders and government officials in charge of innovation policy. The concern was based on first hand knowledge: Israel has long enjoyed the benefits of many Israeli technologists, entrepreneurs and investors who have spent a few years in Silicon Valley, often working with Chinese and Indian colleagues. When these colleagues started to return to their respective countries to set up companies or join existing firms it was clear that Israeli innovation-based industry faced a new threat because people who go home after a few years in the valley become innovation leaders, with knowledge of how to get things done, knowledge of the markets and customers and better access to capital.

Today, in many ways there is no longer a debate about the issue but a consensus that the strong Israeli tendency, both in business and in policy, towards open innovation (see Section 3) has to be strengthened. Israel itself has long enjoyed the fruits of open innovation both through a large network of R&D agreements with other countries and because of the structure of its start-up industry which is heavily predicated towards M&A exits. Large firms have been buying Israeli start-ups because of their open innovation business strategies, and many of the Israeli start-ups bought during the last decade or so have become the nucleus of Israeli R&D operations for the purchasing company. People who work in these purchased firms gain knowledge of the market and market opportunities and then often leave to set up new start-up companies.

Israeli firms also have a great deal of experience in joint R&D ventures with foreign firms, a tendency that historically has always been encouraged by the government. In many ways the debate during the past few years has been not about the merits of an open innovation model but about how Israel might have too much of a good thing. It is claimed by many that the tendency towards open innovation prevents the growth of large Israeli innovative firms. This debate shows signs of petering out because of the realities of the marketplace.

The importance of internationalisation is increasingly being recognised by policy makers in **Norway**. In a small open economy like Norway, the need for international interfaces combined with knowledge accumulated domestically is necessary. This is reflected in already existing tools stimulating international linkages and supporting international cooperation. An example is the importance attributed to the participation in EU framework programmes. Studies indicate that the open innovation performance by SMEs is rather weak and that the science system seems not to have the ability to provide support for such enterprises. Policy tools have been set up in this context, such as the Norwegian Industrial Development Contracts (IFU) scheme and the Norwegian tax deduction scheme, known as SkatteFUNN.

More recently, the need to develop new indicators for measuring global open innovation has emerged and is being debated. It is recognised that not all aspects of firm level innovation activities are equally well covered by innovation survey data. A recent study (see Herstad et al. 2008) points to the importance of requiring data, especially on the geography of innovation search and data on external technology commercialisation.

There has been no theoretical or conceptual discussion about the relationship between the phenomena of economic globalisation and open innovation and the appropriate innovation policy in

Switzerland. The main reason for the absence of such a debate is that the Swiss innovation policy approach is dominated by a bottom-up approach. However, while no explicit debate has been held, the relevance of globalisation and open innovation are acknowledged indirectly, e.g. in the ERI message 2008-2011, where the importance of knowledge transfer and international cooperation are emphasised. A further example is the weight the KTI/CTI places on the promotion of knowledge transfer.

In **Turkey**, no debates are reported regarding the innovation policy response on the issues of globalisation and open innovation.

2.3 Developments outside Europe

In **Brazil**, there have been some debates about the innovation policy response to the phenomena of economic globalisation and open innovation. These include:

- The *Open Innovation* Seminar 2008
- Open Innovation and Opportunities of Technological Entrepreneurship (FGV-EASP)
- VIII ANPEI conference – workshop Open Innovation
- Annual Congress of the Brazilian Society of Knowledge Management – KM Brazil 2008

One of the issues in these debates concerns how the model of Open Innovation can contribute to the creation of programmes and public policies to stimulate innovation. Brazil's innovation policy has continued to evolve in an enterprise-centred way. Nevertheless, it now needs to move to a next level by focusing on innovative start-up growth, innovation policy refinement and measures integration and consolidation of its geographic decentralization and governance structures.

The fiscal incentives system (Positive Law of 2005) has been streamlined, awareness roadshows about intellectual property have been conducted, innovation and technology transfer centres (NITs) have been established in universities and research organizations, funding for corporate innovation has increased dramatically and policy efforts for internationalizing technology SMES are about to be launched. The geographic decentralization of innovation policy continues and regional governments have begun to design their own innovation policies while a commission to monitor and coordinate the sector funds has been established and the latest national STI policy seeks to integrate all state (agencies and enterprises) expenditures on RDI.

Chinese scholars and political elites share consensus on globalisation: a double-edged sword, which brings both vulnerabilities and opportunities to **China's** economic development. Considering globalisation to be inevitable, the Chinese government has been actively integrating itself into the global economic system¹⁸. Domestically, various policy tools have been implemented to develop human capital, facilitate banking reform and legal system reconstruction, and stimulate the growth of key industries. Internationally, the increasing involvement in Middle East and African affairs also demonstrates China's dedication to secure raw materials, energy and market access in the world economy.

Views on open innovation are somewhat different. Since it was introduced into China, the concept of open innovation has aroused increasing interests in both academia and industry. A burgeoning Chinese literature focuses on why and how domestic enterprises need to remain competitive via open innovation under this increasingly complex and uncertain context. Compared with academic enthusiasm favouring open innovation, policy makers are more cautious in embracing this term. In contrast to regarding economic globalisation as an irreversible reality, open innovation is merely taken as one suitable innovation approach for China. The main concerns are summarized as follows. First, the term "open innovation" seems contradictory, at least literally, to China's national strategy of independent innovation, or indigenous innovation. Second, despite that the term is new, open

¹⁸ Aninat, Eduardo, China, Globalization, and the IMF, Speech on the Foundation for Globalization Cooperation's Second Globalization Forum, Sanya City, China, January 2001.

innovation has been practised to some extent at both domestic and international levels. In the process of catching up, the Chinese government has initiated and implemented various policy tools to stimulate industry-university collaboration, attracting FDI, and expanding S&T international cooperation. Unsurprisingly, there are no new policy measures particularly targeting open innovation at its current stage. The third related issue is that Chinese leaders tend to believe that the past practice of “Chinese market in exchange of imported advanced technology” did not succeed. Some core technologies did not come along with foreign equipment purchasing and foreign investment flow. Thus strengthening innovation capacity through indigenous innovation is deemed as the key to survival in the global economy¹⁹.

In **India**, the impact of economic globalisation is not restricted to specifically economic issues such as trade, liberal economic reforms, conforming with WTO regulations and on IPR issues. The impact of globalisation is widely felt and is manifested in the areas, sectors and institutions concerned with science and technology (S&T) and R&D, particularly during the last 6 to 7 years. For instance, over 250 global TNC firms have set up either stand-alone R&D laboratories or centres as part of joint global development and marketing ventures in collaboration with local firms and institutions. These developments, together with other national innovation policy trends have generated considerable debate amongst government S&T ministries and departments, industry associations such as the Confederation of Indian Industry (CII) and the Federation of Indian Chambers of Commerce (FICCI) and S&T policy professionals. The policy discourse prompted the government to commission a report on Foreign R&D Centres in India through the Technology Assessment and Forecasting Council (TIFAC) of the Department of Science and Technology (DST) in 2006. The main concerns and issues flowing out of this policy discourse were: a) does this new trend indicate the development of an ‘open innovation’? b) What is the nature and character of linkages of foreign R&D firms with local firms and institutions?; and c) does this trend indicate India’s emerging knowledge and innovation capacity or a means for taking advantage of India’s highly skilled human resources available at cheaper salaries compared to Europe and North America?

With regard to open innovation, it should be noted that most R&D in **Japan** is performed on an intramural basis: of total self-financed R&D expenditure by firms, around 13.4% is extramural²⁰. At a policy level, although there is no direct reference to “open innovation” in any of the major policy documents, for instance the Science and Technology Basic Plans (covering the period 1996-present) or the Innovation 25 document (2007) (this document has largely slipped from view due to changes in Prime Minister), “open innovation” has only been explicitly referred to by a small number of documents. In particular, these include an outline paper on intellectual property by a specialist review panel in the Cabinet Office, and another document on economic growth strategies with Asia²¹. Here the emphasis is on how Japan can position itself to be an innovation centre within Asia, against the context of the human resource challenges faced by Japan. At another level, open innovation is a topic that is being encouraged but without direct reference to the term – this is chiefly through measures to promote university-industry links.

Regarding economic globalisation, this is a regular feature of Japanese policy debate and centres on a country facing population decline and ageing within an economically emerging region. The concerns relate to economic growth in Asia and the role Japan will play in this, with debate focusing on Japan becoming an Asian hub of innovation and the steps that are necessary to achieve this. On the other hand, there is a fear of “Japan-passing”²² whereby Japan’s presence becomes less important and increasingly overlooked as other Asian countries become increasingly important.

¹⁹ http://202.123.110.5/wszb/zhibo156/content_762868.htm

²⁰ <http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001009098&cycode=0>

²¹ <http://www.meti.go.jp/report/tsuhaku2008/2008honbun/html/i2450000.html>

²² This is an adaptation of the “Japan-bashing” phrase that was a regular appearance during the 1980s when Japanese economic dominance was feared.

Open innovation is a term widely embraced by an increasing number of businesses in the **United States** since the publication of Chesbrough's book. There is a rising interest in university-industry relationships, encouraged, in part, by the concept of open innovation. Indeed, industry support for academic research increased in 2004, 2005, and 2006 to \$2.4 billion by 2006, following a 3-year drop between 2001 and 2004.²³ With increasing attention has come greater consideration of patent reform. The National Academies issued a report in 2004 calling for widespread patent reform to keep pace with technological advances.²⁴ Companies have lined up on both sides of this policy area. With respect to the open innovation concept, some opponents have raised issues about the conflict between the patent system, university management of intellectual property, and the "open collaboration model."²⁵

The globalisation issue typically raises questions about shortages of workers and the issuance of H-1B visas for temporary foreign employees in technological and specialised occupations. There are those who are concerned that the visas enable the substitution of lower wage foreign workers for higher cost US employees, and those who believe that the system places too many restrictions on the guest workers without sufficient workforce protections.²⁶ The issue has also been linked to contentious debates about illegal immigrants and whether or not special citizenship processes should be developed for them.

²³ National Science Foundation, Science and Engineering Indicators, 2008, Chapter 5.

²⁴ National Academy of Sciences, 2004, A Patent System for the 21st Century.

²⁵ Congressional Economic Leadership Institute, Is the US Patent System Endangering American Innovation?, June 8, 2005, p.5; The National Academies'. Board on Science, Technology, and Economic Policy (STEP), University Management of Intellectual Property: Lessons from a Generation of Experience, Research, and Dialogue, July 1, 2008.

²⁶ See for example US General Accounting Office, H-1B Foreign Workers: Better Controls Needed to Help Employers and Protect Workers, GAO/HEHS-00-157.

3 Specific policy responses to globalisation and open innovation

This section deals with responses to the questions:

If there has been a clear policy response to the issue of “open innovation” (as explicitly phrased), did this consist of an adaptation of existing policy instruments or did it require a new policy approach? For example, existing collaboration schemes would address an aspect of open innovation but may have existed before the term ‘open innovation’ was actually coined. We are interested in any changes specifically prompted by the concept of open innovation. Please identify any adaptations of S&T&I policies proposed/adopted to address the above-mentioned concerns/issues. What do evaluations and other evidence say about the success or failure of these policies/initiatives, or the shift in the policy context?

3.1 Activities in the EU Member States

Policy response to the conceptual ideas espoused by open innovation is widespread in the **Austrian** innovation policy landscape, since collaboration has long been an element of Austrian innovation policy. Networking initiatives (e.g. clusters, Kind/Knet) and R&D-collaboration schemes (e.g. Kplus, COMET) typically mention the catch phrase ‘open innovation’. Innovation cooperation is increasingly gaining significance in programme design.

As to open innovation in publicly funded R&D, the competence centres (pre-competitive collaborative research co-operations of industry and science) have already been open to international collaboration of a maximum of 20%. COMET, the successor programme of the competence centres, is more open to international participation because it dropped this threshold in its programme specification. In addition, strong international ties to both industrial innovators and the scientific community are implemented by funding agencies (e.g. e.g. promotion of international collaboration in industrial R&D of the FFG, or scientific exchange programmes of the FWF). In the area of training, in 2003, the platform “innovate! austria” was founded. This concentrates on the diffusion of innovation management skills, and addresses large firms (including MNEs) and SMEs of all industries²⁷. *Inter alia*, the platform is promoted by the Austrian Ministry of Economics and Labour. Similarly, the Austrian Economic Chamber (WKO) offers training modules of how to optimise “open innovation” at firm level.

In terms of any evidence of success or failure, the Kplus centres (Kompetenzzentren) as well as the major clusters (e.g. clusterland.at) have been positively evaluated. A once prevalent lack of innovation collaboration between academia and industry seems to have vanished (due to the competence centres).

Again, policy responses in **Belgium** are dealt with by the regions. In Flanders, in the 2008 Policy note, Minister Ceysens defines Open Innovation as ‘innovation that is realised by effective cooperation and interaction between the most relevant actors from industry and research.’ Competence poles ‘focus in this respect on knowledge creation and /or knowledge diffusion for as large a group of companies as possible. Competence poles are bottom-up initiatives, proposed by the private sector with a focus on demand driven issues with an open and collective nature’.

In the framework of the “Mobilising Marshall Programme 2007”, the Walloon authorities have decided to fund research on how to implement the concept of “open innovation”. An annual budget of €5 million is allocated to each of the programme’s call for projects. The programme involves four other

²⁷ See: <http://www.innovate-austria.at/>

topics apart from “open innovation” (information systems security, nuclear fusion, power electronics, hydrogen and fuel cells). Applications should involve at least one company as a coordinator and one university laboratory. Duration of the research projects is limited to three years. Proposals are evaluated on the basis of the technological innovativeness, the scientific quality of the team and the exploitation of results. The motivation for this new approach is that most companies, including Walloon firms, are still functioning using the paradigm of “closed innovation”: i.e. conducting research and transferring the results of eventual discoveries into production, distribution, support, etc., in-house. The open innovation principle is that one should not ignore the good ideas of people outside the firm’s boundaries. Even the most creative companies that have a full research unit at their disposal have to take account of external knowledge and ideas related to innovation; good ideas flourish inside and outside the company. Projects in this area will focus on the study of new innovation practices in enterprises, with a particular emphasis on smaller firms as well as on research characterised by the use of external competences or of new ground-breaking co-operation. Obstacles to innovation and the ways to overcome them could therefore be subject to further study and identification of potential policy support.

The competence poles, although inspired by ‘open innovation’, are only open to a limited extent. They are intended for Flemish industry, and only Flanders-based companies and knowledge institutions participate. While a number of competence poles have been established, evaluations are not (yet) available, although several are performing a self-evaluation at the moment as an input for later external evaluations. The general feeling is that some have more added-value than others. Client satisfaction for most of the competence poles seems good (although it has not been measured by all poles as yet) however the added-value in terms of international competitiveness is hard to measure, even at the scale of individual companies participating in a competence pole. As the Walloon programme on open innovation was only launched in 2007, it is too early to appraise its success.

In **Bulgaria**, the recommendations formulated in different analysis and documents focus on updating the Bulgarian National Innovation Strategy of 2004 and include new policy measures reflecting the changes in the global situation and the EC’s guidelines. Bulgaria’s regional innovation strategies address innovation in a regional and global sense - the elaboration of the RIS is part of the EU accession process and draws on international knowledge but relies substantially on local capacity and cooperation for setting up the local innovation infrastructure. These efforts aim at proposing knowledge based regional innovation strategies, which strike the right balance between international and local experience, skills and knowledge in shaping local economic development.

Other new documents on collaboration also address some aspects of open innovation. For example, in September 2008, a new agreement for cooperation was signed between the Bulgarian Ministry of Economy and Energy and the Hungarian Ministry of National Development and Economy in the field of SMEs. The aim is to promote the integration of markets, gaining familiarity on the opportunities and requirements of the EU to promote entrepreneurship, the development and implementation of bilateral innovation projects, joint exit of regional and international markets, and joint participation in the development and implementation of EU projects. The two sides will promote cooperation in joint programmes aimed at developing business infrastructure and related services, assisting the overall work of SMEs in innovation, including open innovation and technology transfer, transmission of the integration experience and others.

In **Cyprus**, the notion of “open innovation” is not used in any policy document or debate. However, policies are very open to international collaboration due to the realisation that the country is too small to be able to be competitive without such collaboration. Similarly the idea of promoting collaboration among the few actors undertaking (or being able to undertake) innovation is supported by most policy support mechanisms.

Although there has been no explicit response to the idea of open innovation in the **Czech Republic**, cooperation among various innovation players in the form of clusters has been promoted since 2004–2006 from EU Structural Funds (Operational Programme Industry and Enterprise). The new Operational Programme Enterprise and Innovation 2007–2013 focused its effort more at the

innovation dimension of this cooperation by broadening the supported cooperation activities (clusters, technology platforms, poles of excellence). The support provided in the period 2004–2006 is currently undergoing deeper evaluation. However, it is possible to say that the support increased the general awareness of the significance of cooperation in innovation.

As mentioned in Section 2, a number of areas related to open innovation have been on the innovation policy agenda of **Denmark** for the past couple of years but there have been no policy measures initiated specifically phrased as dealing with or driven by the notion of open innovation.

Specific policy responses to open innovation *per se*, is missing in **Estonia**. However, there are a number of collaboration schemes which address this aspect of open innovation although these were launched before the term was more widely introduced in policy design. Here, the Programme of Competence Centres (Trendchart measure EE_20) may be considered as the best example. The programme encourages groups of research and industry partners in specified technology fields to develop jointly strategic R&D programmes and to implement these using resources from both sectors. However, one may question the ‘openness’ of knowledge created in competence centres as the internal agreements of the partners usually limit access to this new knowledge. The mid-term programme evaluation by Technopolis Group took place in 2008 (the final report should be available in September) and raised the question of the openness of competence centres to new partners and how to ensure a more extensive impact on the Estonian economy through their establishment. Adaptations to the programme may follow in 2008-2009.

The Estonian Development Fund has launched the first field-specific foresight on ICT, EST_IT@2018, which appears to consider open innovation and globalisation in the process of defining the future development areas in the ICT field. Again, one has to emphasise the openness of the process itself for field-specific experts in Estonia and elsewhere²⁸. Generally, it is still too early to provide any evidence of success within the open innovation context.

In **Finland**, some existing measures, such as the Tekes programmes (previously known as technology programmes) have long involved elements and goals that have linkages to "open innovation". From early on their role as a networking tool has been a significant dimension of the programmes – i.e. the promotion of collaboration and knowledge flows between firms and between firms and universities/research institutions is an important aim of the programme instrument. According to Tekes, "besides financing, the programmes increase the exchange of information and know-how by providing professionals with both networking opportunities and with the very latest information on new innovations in their fields". In recent years, Tekes has tuned the scope of the programmes to reflect its redefined strategy and the challenges of the national innovation system while Tekes' mission has been broadened to cover not only the promotion of technology but also innovation.

FinNode and FiDiPro represent recent policy initiatives, which apparently have links to open innovation, even if the term is not explicitly used. FinNode, the Finnish innovation centres, have been established in global hotspots of economic development and R&D to promote the internationalisation of Finnish companies and to attract foreign companies and investors to Finland and strengthen knowledge flows to and from abroad. The Finland Distinguished Professor Programme (FiDiPro) is a funding programme jointly launched by the Academy of Finland and Tekes to recruit foreign professorial-level researchers to Finland for a fixed period of time. Among others, the programme aims at creating a new kind of international co-operation between basic and applied research and the R&D efforts of business companies.

²⁸ See: <http://arengufond.wikidot.com/iktarenguseire>

Recently, 'living lab' type arrangements have become more common in different parts of the country. For instance, Forum Virium Helsinki is an independent cooperation cluster founded to promote the development of digital services in six main areas: traffic, learning, healthcare, retail trade, digital home and multi-channel event media. The aim is to foster an environment of open innovation where a variety of organisations can bring together their expertise to develop new services that consumers or businesses need. Members of Forum Virium Helsinki include large Finnish companies (among them Nokia, TeliaSonera, YIT-Group), public sector actors (e.g. Sitra, Tekes and VTT) and a number of SMEs.

The development of a policy response to globalisation and open innovation requires a wide-ranging rethinking of current policies and policy rationales. The national innovation strategy proposal includes an action plan with guidelines on how to adapt policies to changing innovation practises. The action plan urges development of the principles of public research, development and innovation financing so as to meet the demands of a borderless operating environment. Key ministries (the Ministry of Education, the Ministry of Employment and Economy) and funding agencies (the Academy of Finland, Tekes) are tasked with developing new incentives and operating models for "the procurement of international expertise and participation in open innovation activities". At the same time, national research financing should be selectively "made available for foreign participants on a reciprocal basis in connection with international joint programmes and application processes". Overall, there is a need to reconsider rules concerning national financing of research, development and innovation - "the costs of research, development and innovation activity implemented abroad will be approved as eligible for national financing more extensively if there is a strategic justification for this". Foreseen changes also require the development of "more comprehensive assessment procedures for national interests... to support financial decisions".

In addition, the action plan lists actions through which "Finnish enterprises and research units' opportunities to develop and exploit competence and cooperation networks worldwide in their research, development and innovation activities" could be strengthened. Strategic cooperation and partnerships should also "be reinforced in the areas of emerging economies and innovation most interesting to Finland" — government conventions on scientific and technological cooperation and the FinNode network are given as examples.

Most policy responses to open innovation are still in the design or early implementation stage and therefore only some preliminary notions on their success or failure can be made. The performance of FinChi, the first Finnish Innovation Centre established in Shanghai in China, was evaluated in 2007. It was concluded that "from the perspective of export promotion and internationalisation of Finnish companies FinChi have proved to be as an advanced concept". At the same time, though, "impacts on innovation activities of the Finnish companies have been more modest than pursued" and the centre's role in the promotion of knowledge flows, investments, etc., from China to Finland has remained insignificant. As the main recommendation, the report suggests that a more explicitly articulated model should be established for promoting innovation activities and that this model should be closely integrated with the instruments of the Finnish system of innovation. Furthermore, the evaluators propose that attracting Chinese investments to Finland be organized into a systematic model of practice.

Without referring to open innovation as such, **France** has tried to develop 'ecosystems of innovation' and has supported many policies in favour of grouping partners and other networking or collaboration activities (e.g. competitiveness clusters, Carnot institutes etc.)

Although the policies are too recent to measure the impact on the economy, one can say that actors associated with clusters and other networking schemes have been enthusiastic. The evaluation of the competitiveness cluster policy recommended its continuation.

The term "open innovation" is very rarely actively used by innovation policy makers in **Germany**. The English edition of the Federal Report on Research 2006 by the Federal Ministry of Education and Research does not contain this term. One reason might simply be language, since there is no

straightforward translation of “open innovation” into German. It may also be quite unclear to policy makers what the notion of “open innovation” actually brings in addition to the notion of collaborative research or user-producer interaction in innovation (both are a substantial conceptual base for designing innovation programmes in Germany). While “open innovation” is not used as such in German innovation policy, a number of policy developments may be linked to the underlying concept. For example, a newly introduced programme, the Research Bonus, aims at improving framework conditions at public science to more effectively and more intensively interact with innovative SMEs, considering the specific knowledge demands and interaction modes of small firms. The new Top Cluster Programme is also linked to open innovation since it attempts to bring together all types of actors within a certain field of technology (or a certain product market) that are relevant to successful innovation and stimulate knowledge flows among actors. With regard to the two above-mentioned schemes, the Research Bonus programme is currently subject to an evaluation while the Top Cluster Programme has just started and it is too early to make any appraisal.

Government policy in **Greece** aims to promote the concept of innovation in new to market and exportable products throughout an economy dominated by the service sector, principally tourism, retail trade, banking, transportation (mainly sea-) and housing/construction. There are no particular regulatory restrictions as to the access of firms to the services of public RTD laboratories, most depending on the strategies and the initiatives of the entrepreneurs and the personal orientation of the researchers themselves. Informal restrictions are imposed by the general ethical rules, the state aid rules and the “political” pressure of a part of the academic community that consider cooperation with industry as alienating to private short-term interests. Some firms in knowledge intensive sectors are emerging, with strong linkages to research organisations and export orientation. The scheme for support to academic spin offs [GR_39] has brought to existence 35 such firms. The scheme that supported five regional innovation poles has also generated joint activities of external cooperation between firms and laboratories.

“Open innovation” has not been used as an explicit rationale or policy objective in the current **Hungarian** policy mix. This does not mean, however, that various aspects of open innovation are not addressed by the large number of existing support measures. Cooperative research and innovation has been one of the central concerns of Hungarian STI policy and is supported as a primary or secondary objective by a number of schemes. These include large schemes, such as the Cooperative Research Centres, the Regional Knowledge Centres at Universities, the Regional Corporate Research Centres, Regional Innovation Agencies or the Innotett programmes. Thus, it is not relevant to analyse the success or failure of a non-existent shift in the approach towards open innovation. However, in general, it can be concluded that there is no (or very scattered) evidence that the existing policy mix has exerted a notable positive impact on the prevailing weak cooperation between the various producers and users of knowledge (sectors, customers, etc.), and the overall RTDI performance of the Hungarian NIS.

More in-depth analysis as to the reasons of this observed paradox (a large number of schemes aiming at apparently appropriate objectives are in place – yet, these measures are not effective) is prevented by the fact that Hungarian STI policy measures are not monitored and evaluated systematically.

Enterprise **Ireland** operates a number of initiatives that existed before open innovation was widely recognised, but could be now called open innovation initiatives, e.g., company research networks, HE-industry collaboration grants, partner searches for licensing out and licensing in technology, incubation centres in HE institutions, HE-industry centres and innovation vouchers for SMEs. In addition, the Centre for Software Engineering (particularly open source projects/networks and partnership projects) and the Innovation Relay Centre have both been involved in formal open innovation activities for several years. Moreover, the innovation fora and introductions to large companies (for technology partnerships /networks /collaborations) are direct initiatives for open innovation. A further initiative by Enterprise Ireland is called ‘Open Innovation - Why Technology Acquisition is the new R&D’. The service available is TechSearch through which companies can

locate and acquire technologies external to the company that are not readily available from commercial sources.

The earlier non-open innovation measures have all proved to be effective in stimulating positive results. It is too early to assess the innovation fora and the large company introductions. Tech Search is a successful measure that has been in use for a number of years.

There is no clear policy response to the issue of open innovation in **Italy**. Although the term “open innovation” as such is hardly ever used, either in the policy debate or in policy documents, the new policy measures to sustain innovation consider open innovation. For example, in the Industrial Innovation Projects (big industrial projects in strategic technology areas) foreseen in Industria 2015, the composition of the Consortium must include (apart from enterprises) Universities and/or research centres. Their participation is thus compulsory, unlike in previous instruments (e.g. FIT - Fund for Technological Innovation or FAR - Fund for Applied Research) where the participation of universities/research centres was allowed but not obligatory. The Industrial Innovation Projects also allow for the participation of a foreign partner in the consortium, even without operational branches in the national territory (a real novelty).

The measure of the Tax credit for R&D expenses foresees a bonus of 10% of eligible expenditures to favour the use of knowledge external to the firm and to promote closer networking between the business and science communities: a bonus of 40% is available to research contracts assigned to universities and public research centres.

In all cases, it is too early to evaluate the measures as they have been recently launched.

It should be noted, however, that although the phrase “open innovation” is rarely found in national policy documents, at the regional level the term can be found in recent initiatives. For example, in Piedmont, a project has been launched (*Open Innovation: l'open source come leva tecnologica per l'innovazione*) to favour the development of synergies and to create a network of competence centres of Turin University and the Politechnic and local SMEs to promote the open source²⁹. In Veneto, a survey titled *Open Innovation in Veneto* has been produced. The report is about a mapping of centres for innovation and technology transfer in the region. However, even if the word “open innovation” is part of the title, these still resemble standard technology transfer initiatives.

Though the very term “open innovation” has not yet been taken up in the political and economic discourse in **Latvia**, the underlying idea of the importance of promoting various collaboration schemes both between companies themselves and between the private and public sector institutions in order to develop innovative solutions has been increasingly discussed over the last decade resulting in a growing number of policy measures and initiatives geared towards facilitating such partnerships (e.g., via clustering, competence centres, collaborative market-oriented research projects, international R&D cooperation, technology transfer offices). Since the majority of these innovation support measures have been developed only recently the respective policy approach was also taken as a basis thereof from the outset. As for the success or failure of these initiatives, it is still too early to draw any conclusions at this point, yet it is clear that these measures have stimulated the awareness of the potentialities of such partnerships for innovation among the stakeholders.

In **Lithuania**, there is no explicit use of the concept of “open innovation” in innovation policy formulation. Although the collaboration schemes encompass the development of partnerships for innovative product development, cluster initiatives and networking, they remain limited within the existing concepts and do not cover such important open innovation issues as a knowledge governance within networks, support to open innovation via the development of appropriate IPR regimes, etc. The measure for R&D support in business (which was closed in 2007, and replaced with the new measures “Intellect” and “Intellect+”) supported the development of innovation within

²⁹ <http://www.opi-piemonte.it/it>

networks of private and public research establishments in the area of lasers, and biotechnologies. In the ICT sector, innovation development in collaboration is a common feature, however the open innovation concept has not been analysed more deeply, neither is it explicit in the policy measures and their impact assessment.

Since the open innovation concept was not explicitly stated in the innovation policy formulation, nor specifically supported, the evaluation of success is impossible. The above-mentioned policy measures have varied in their success and popularity rates during the period of 2004-2007. As an example, just a few cluster development initiatives came from the business sector – most were dominated by the NGOs (industrial associations, and the like), while the measure aimed at technology upgrades, the development of innovations in house and similar goals, faced high competition rates among projects coming from the business sector.

There has been no direct policy response to the issue of open innovation in **Malta** and thus no adaptation in policy to report on. There are efforts (instruments/measures) to support aspects of open innovation namely promoting enhanced collaboration and networking among local enterprise though there are no data on whether these instruments are resulting in the sharing of research results and diffusion of knowledge and ideas (taken in a context where Malta's business expenditure on R&D is low and well below the EU average). Again, such instruments and measures are not responding directly to open innovation.

Existing and new policy measures are addressing certain aspects of open innovation. Thus the new Malta Enterprise Act and its implementing measures addresses the need for further collaboration among enterprise, stimulating research and innovation outside firm and national boundaries through Eureka; internationalisation of local markets and products; and promoting technology transfer (such as through the IRC network). There is perhaps more "open innovation" in terms of collaboration and knowledge flow among local (Maltese) enterprises and their foreign (international) partners than within the local enterprise community (international linkages are emerging more strongly compared to domestic linkages). Programmes such as Eureka are stimulating such international collaboration.

The innovation programmes of the **Netherlands'** "programmatic package" are explicitly designed to create focus and mass (clusters) in the key areas and to stimulate (public-private) collaboration. Although open innovation is not explicitly mentioned, the programmes do show many signs of the open innovation philosophy. The ministry of Economic Affairs works with the entire innovation chain to develop innovation programmes in sectors where the Netherlands can excel. Programmes are wide-ranging and tackle all the relevant problems in a particular sector (for instance by investing in R&D, marketing knowledge, boosting SME participation, stimulating exports and investing in human capital). Overall, the policy response largely builds on pre-existing collaboration schemes. Collaborative schemes have a long tradition in Dutch innovation policy (before the term open innovation was coined). The schemes have been elaborated and adapted (and tailored to the specific needs of a sector). Another policy response was to make RTOs (TNO and the Large Technological Institutes) more responsive to user demands. Base funding was reduced (abolished) and programme-based funding was introduced instead.

In 2008 several innovation programmes were set up (Food & Nutrition Delta, High-tech Automotive Systems, High-tech Systems & Materials, Chemicals, Life Science & Health, Maritime, Point-One and Water Technology). However, it is too early to tell whether the programmes are a success, but the first signs are promising.

Despite the lack of general policy debate in **Poland**, there are some measures addressing the aspects of open innovation and the challenge of globalisation. One range of instruments can be considered as science-industry collaboration schemes. A relevant recent measure is the Technological Initiative launched in 2007, the objective of which was to support joint research projects between Polish research institutions and industry. Most recently, the Innovation Voucher has been launched to help companies to engage in collaboration with knowledge-base institutions. Despite new initiatives being launched in recent years, support for collaboration schemes has existed prior to the

launch of the EU Structural Fund interventions (2004-06), however, the underlying difference between the national and EU measures is the level of funding. Besides that, there has recently been an attempt to launch the scheme known as the Status of R&D Centre. The main idea was to encourage foreign R&D Centres to start their operations in Poland and support the newly commercialised branch research institutions through fiscal incentives.

Evidence from the Technological Initiative shows that its major drawback was the delay in concluding the contracts with the tenderers whose projects were positively evaluated a year previously. So far, it is estimated that about 50 out of 150 contracts have been signed. In the case of the Status of R&D Centre, foreign companies have considered that the amount that they would receive to be insufficient for their efforts, especially because they view the Special Economic Zones as an effective instrument.

The influence of the idea of Open Innovation in policy terms has been extremely limited in **Portugal**. This concept has not been explicitly considered in the last round of innovation policy design, in the context of the QREN and its influence is not visible in the Technological Plan. The only exception is the country's involvement in the 'Living Labs' initiative, since these may be envisaged as open innovation instruments.

The Portuguese Presidency has promoted the strengthening and expansion of the European Living Labs Network, created during the Finnish Presidency. A Living Lab may be defined as "a sustainable open co-creation environment to improve citizens and workers in research and innovation of new services, products and systems" and "a more efficient innovative system as an open co-creation in natural daily life/work environment together with engaged citizens/users, closing the gap between needs/ideas and business/user valid solutions"³⁰. The key idea is to provide 'experience' environments where scientific and technological developments might be translated into prototypes, applied and validated in real time by users. To some extent, the Living Lab concept is related to the ideas of "democratising innovation" (Von Hippel, 2005) and "experience innovation" (Pralhad and Ramaswamy, 2003). Portugal had one of the 'first wave' Living Labs, located in Madeira island. It has been argued "that the current dynamic ICT and organisational testing environment in Madeira can provide the ideal conditions for an European Living Lab targeted to new collaborative and mobile work processes, services and business models as being currently pursued by Madeira Tecnopolo" (Oliveira, 2006). In the second call for applications, five new projects from Portugal were selected, out of 10 applications. The approved initiatives are the S. João da Madeira Industrial LL (mainly addressed to shoe and automotive components industries), the Creative Media Lab (regarding digital media, particularly digital journalism and participatory media), Renex (renewable energies friendly community), LL Minho (focussed on information systems and located at Minho University, in the North of Portugal), and the Eco LL @Chamusca (based on the concept of industrial symbiosis networks, in which a waste resource of one company is taken as a raw resource by other companies)."

A link has been established between the Living Labs initiative and Open Innovation. As noted on the Technological Plan website, Living Labs are "a new innovation promotion tool, which has the advantage of envisaging innovation as a systemic and collaborative process demanding an increased interaction among creativity, scientific research, and market research", therefore stimulating the interaction among the players concerned. As a consequence of the Living Labs meeting (see Section 2.1), the intention is to evaluate the possibility of financing the Living Labs under the National Strategic Reference Framework 2007/2013 and the 7th Framework Programme. It is argued that the importance of the Living Labs is due to the "recent changes in the innovation process and the development of new, co-creative innovation and research methodologies, new alternatives for a collaborative, participated innovation [and the emergence of] new forms of promoting a user-centred innovation system". This makes a clear link between Living Labs and Open Innovation. This may entail innovation policy implications in the near future but, so far, no policy instruments have been launched on this regard.

³⁰ <http://www.ami-communities.eu/drupal/node/28>

This is not to say, however, that open innovation concerns, even without being formally mentioned, have not been present in a few initiatives. A good example is the Innovation Scoring instrument, recently developed by COTEC with the support of the IAPMEI (the Institute for Small and Medium-sized Enterprises and Innovation). This tool, intended to help companies in undertaking self-diagnosis on innovation capabilities and performance, includes some items very much in line with Open Innovation perspectives, namely on innovation cooperation and networking, the support to internal initiatives and entrepreneurship, the support to spin-offs, and a more open intellectual property policy³¹.

In **Romania**, there has been no clear policy response to the issue of ‘open innovation’, which is not explicitly formulated as such, particularly at firm level. Innovation policies designed and implemented by the National Authority for Scientific Research primarily target the national and private R&D institutes, universities and business firms with R&D activities, and encourage their collaboration or partnerships with the business sector through a series of funding instruments (e.g. the 2007-2013 National RDI Plan, the ‘Research of Excellence’ programme, the INFRATECH Programme, the Structural Funds, the Innovation Roadshow initiative, etc.). None of these instruments has been changed or adapted to specifically encourage open innovation. As most of the programmes mentioned above as stimulating research-business collaboration are relatively new, little evidence is available on their success or failure.

Open innovation has not been introduced in any **Slovenian** innovation policy measures, in fact some openly require intellectual property agreements among the main collaborators in the research project or even the transfer of intellectual property rights to the funding body (as in the case of R&D subsidies coming from the Ministry of Defence). Since the concept of open innovation has not yet entered the policy debate, it is too soon to expect that it will have any impact on policy measures.

The recently approved National Plan of Scientific Research, Development and Technological Innovations in **Spain**, makes some reference to issues pertaining to technological innovation (e.g. promotion of knowledge exchange between national and international research agents, mobility of researchers). Some of these measures offer an opportunity to face the effects of economic globalisation on the Spanish innovation system. In contrast, there is no evidence of policy responses to ‘open innovation’ at the national level. In this regard, ‘open innovation’ issues do not seem to have achieved prominence within the Spanish innovation policy mix.

In this context, the only response to ‘open innovation’ found in the literature is a network initiative – the Corelabs Project. The purpose of the Corelabs Project is the establishment of a European Network of living labs. Living labs constitute an important component of ‘open innovation’ initiatives, having been defined as “public-private entities oriented to encouraging the participation of enterprises, public bodies, research centres, or general public in innovation activities, including the creation of services/products/platforms, validation of technologies, and the development of business models”. To date, five living labs have been integrated in the European Network. The labs are located in the regions of Catalonia (where the first living lab was set up), Castille and León, Aragón, Asturias and Andalusia.

At the regional level only two examples of policy responses to ‘open innovation’ have been found:

- In the Basque Country, ‘open innovation’ has been one of the main areas of interest of innovation policies in the last few years. The regional government established a Decalogue of principles of innovation policies – the “Manifiesto por la innovación en Euskadi” (Manifesto for innovation in the Basque Country). Within the framework of the new regional plan for scientific research, technology and innovation, the Basque Government launched three programmes aimed to support ‘open innovation’:

³¹ <http://www.innovationscoring.pt/>

- *Gaitek Programme*, to support 'open innovation' in the development of new products, with a budget of €15.5 million.
- *Innotek Programme*, to support 'open innovation' in the development of new processes or the improvement of current products (budget €15.5 million).
- *Aldatu Programme* designed to support 'open innovation' in the field of marketing, organisations' innovation capacity-building, and organisational strategies. The maximum amount of money granted by this programme is €90,000 per beneficiary and year, covering up to 50% of the costs of the project. Funds are non-recoverable and they cover expenses derived from the performance of a project, employment of personnel and external consultancy.
- In the Autonomous Community of Madrid, similar to the regional plans for scientific research, three-year programmes are elaborated for the promotion of innovation in enterprises. Within this plan 'open innovation' is a core issue, along with the following funding-lines: a) Creation of technology-based enterprises, b) Technological R&D oriented to the creation of products, services and processes, c) Investment in assets for technological innovation. The plan foresees a maximum financial aid of 50% for 'open innovation' projects, thereby becoming the line in which more financial support is provided.

Since the approval of the three programmes designed by the Basque Government (Gaitek, Innotek and Aldatu) more than 500 enterprises have benefited and more than 700 enterprises have shown their interest in these programmes since September 2007. These figures indicate that 'open innovation' is expected to achieve a major role in shaping innovation policies in the Basque Country. There is no data on the number of enterprises that have received funding from the 'open innovation' programme of the Autonomous Community of Madrid, which makes it difficult to evaluate the success or failure of the programme.

The case of Electrolux is symptomatic of innovation policy in **Sweden**. As the country is an export oriented nation with limited resources, public private partnerships have played an important role for innovation. The (large) companies (Ericsson, ABB, Volvo, AstraZeneca, TeliaSonera) have realised they might not have all the competences (in house) needed for successful R&D and innovation activities. Innovation policy (formerly known as technology policy) has addressed this challenge by promoting technology based user – producer "development blocks". (See Annex 2). From the public perspective, the partnerships have focused on satisfying public needs, represented by public procuring organisations. From the business perspective, they have provided a long term basis for substantial R&D investments as a basis for international competitiveness in the export market. The essence of the development blocks have been mutual benefits and the complementing of resources by relying on partners outside traditional company borders (i.e. open innovation). As a result of market liberalisation and changes in the business community, this model has lost efficiency and is nowadays more or less abandoned.

However, the idea of 'open innovation' has received new attention as way to seize the benefits of globalization. As a way to revitalise the old model of competence block and enable companies to better exploit the global pole of competence, technology and ideas - as well as promoting the concept of user driven innovation – open innovation has been addressed in policy terms. VINNOVA, the Swedish innovation agency, has among other things established the following measures:

- A programme ("Innovative companies: management of innovation processes") addressing open innovation. Some SEK 45 million (€4.8 million) will be allocated to about 10 projects during 2008-2012. (Within the programme, a report has been published that gives an overview of the emerging research field of open innovation.)³²
- Several pilot initiatives to accelerate the adoption rate of ICT through user involvement - so called Living labs. Some SEK 11 million (€1.2 million) will be invested during 2007-2008. In addition VINNOVA is funding a national network to coordinate and document progress among the different Living labs in Sweden. The network is managed by Open Living Labs Sweden situated at Umeå

³² The report is available at: <http://www.vinnova.se/upload/EPiStorePDF/vr-08-02.pdf>

University. Other initiatives to stimulate user driven innovation will also be launched in the areas of ehealth, egovernment and “everyday IT” (IT in common life).

- An initiative to stimulate globalisation strategies within strong research and innovation milieux – making actors from the triple helix (business, policy and institutes/academia) form a joint vision of international work (global linkages). Some SEK 10 million (€1.06 million) has been reserved for the initiative. About 10 milieux will most likely get funding in 2008³³.

Aspects of globalisation are to be addressed in all forthcoming measures from VINNOVA. This means that all innovation programmes in explicit terms must take globalisation into consideration before they obtain permission to be launched. Moreover, VINNOVA is also working on an internationalisation strategy as a foundation for the agency’s policy on open innovation in a global setting.

As the above initiatives have just been launched, it is too early to tell if they will prove successful or become a failure. *Ex ante* impact assessments have been made and data for the initiatives mentioned above will be collected (as a way to enable evaluations).

Policy responses to some of the issues underpinning open innovation have been implemented in the **United Kingdom** well before the phrase “open innovation” became a buzzword. For this reason, a great deal of initiatives, for example Business Link launched in 1992, the SBRI launched in 2001 and the KTP launched in 2003, although based on principles of open innovation, do not mention the phrase verbatim. However, more recent policy documents and White Papers, such as DIUS’ *Innovation Nation* and BERR’s *Unlocking UK’s talents* have placed some importance on the following aspects of open innovation.

The NESTA initiative on open innovation “aims to discover, and then address, the main barriers and accelerators to corporate open innovation, and explore whether these stem from systems of management or more universal human interactions“. The initiative unfolded into four streams of activities:

- Corporate Connections with the aim of “bringing together a diverse group of companies to encourage innovative thinking and develop shared opportunities, through a series of collaborative workshops”;
- Open Alchemy, with the aim of “encouraging firms to seek opportunities outside their traditional internal innovation streams”;
- The Procter & Gamble Open Innovation Challenge which “seeks to harness the potential of design companies to develop the next generation of products and services for P&G”; and
- Open Ventures aiming at applying “the concepts behind open-source software to business development”

Corporate Connections involves one large company collaborating with several SMEs. It is not bounded by sectoral definitions but links various large and multinational companies across a wide range of sectors. The aim is to foster cross-fertilisation hence achieving and discovering unexpected innovation routes. “Open Alchemy is a collaborative innovation project between diverse, non-competing UK clients of Oracle”. Led by Innovaro, a consultancy firm, it involves Oracle’s suppliers’ customer base to collaborate in order to create new technologies. The P&G Open Innovation Challenge is designed to help P&G in identifying and developing innovative ideas originated in SMEs and help bringing them to the market. The fourth initiative is led by Mo.Jo, a business development company, with the aim of harnessing the interests, skills and resources of crowds and uses these to create viable new ventures. The final goal of the initiative is to generate a new and open revenue-generating business models, worth £10 million (€12.8 million) per year, for Cancer Research UK.

³³ The call for proposal is available in English:

http://www.vinnova.se/upload/dokument/Verksamhet/Starka_Fol-miljoer/globala_lankar/Utveckling%20av%20strategier%20globala%20lankar%20utlysn080515_en.pdf

A formal review/evaluation of NESTA's open innovation schemes is not foreseen. However, several of the abovementioned linkage schemes have been successfully evaluated but, as noted, not within a specific framework of open innovation conceptualisation.

To date, there has been no policy response to open innovation in **Liechtenstein, Luxembourg** or **Slovakia**.

3.2 Developments in other 'European' countries

In **Iceland**, open innovation is not widely discussed although it is indirectly referred to in the context of globalisation. Iceland has a rather open innovation system, particularly at the policy level where there is strong cooperation with other Nordic and EU countries. Nevertheless, policy makers are aware of the fact that increasing openness (i.e. through cooperation on the research team level) needs to be further strengthened. At the moment, and in the past, funding schemes are open to foreign participation. There are no indications that new specific measures or changes are anticipated to further stimulate, promote or take into account the idea of open innovation.

The main players dictating open innovation in **Israel** are in the business sector although the government has always encouraged joint R&D ventures with a broad network of foundations and agreements with other countries. The oldest of these initiatives is the BIRD-F Foundation, which celebrated its 30th anniversary this year. BIRD-F supports R&D joint ventures from pairs of Israeli and American firms. The endowment is replenished from royalties paid by those firms whose joint ventures succeed. There is now talk of increasing the endowment. The latest trend in policy is to both expand the network of national cooperation agreements and to encourage similar agreements with major international technology companies.

The Israeli government does not usually use evaluation tools (as these are understood in Europe). However BIRD-F reports that it has supported 770 joint ventures over the years, investing \$250 million in support which led to \$8 billion in direct and indirect sales.

Norwegian policy makers have for a long time recognized the importance of networks and clusters (examples are schemes such as ARENA Innovation in Networks and the NCE Norwegian Centres of Excellence). However, these programmes focus on *national* level networks. There are some exceptions, however, of policy tools that include and foresee international collaboration, such as the IFU-programme (Industrial Research and Development contracts) and the SkatteFUNN tax deduction scheme which also support collaboration with foreign companies and research institutes respectively. The IFU scheme, in place since 1996, aims to: stimulate R&D co-operation between a customer and a supplier on the development of competitive products with a potential for export; stimulate the establishment of new business relations and networks between customer and suppliers, in order to develop partnerships or alliances between Norwegian firms or between Norwegian and foreign companies; and to strengthen the competitive ability of Norwegian industry locally and abroad by leading to co-operation between a company and a public institution/customer.

The new industry PhD scheme, launched in 2008, is based on collaboration between a company and a University or University College. Both partners are committed to fund the PhD position. The aim is to increase research activities in companies and strengthen knowledge exchange between industry and academia. The government announced its ambitions to establish the scheme in the White Paper on Research in 2005.

A trend in policy making is the shift from a focus on technological innovation towards a wider form of innovation. An example is the introduction of the BIA programme (User initiated innovation), which includes non technical R&D innovation projects.

In terms of the evidence of success or otherwise, the SkatteFUNN scheme was evaluated in 2007. The results show that the scheme is most effective for small businesses, in companies where

education levels among the workforce are relatively low, and in companies with low R&D intensity. The IFU scheme has been evaluated in recent years. The results indicate successful outcomes for firms, particularly for creating fruitful connections between Norwegian firms and lead users abroad.

There have been no policy responses reported in **Croatia, Switzerland and Turkey.**

3.3 Developments outside Europe

Results from the 2005 **Brazil** Innovation Survey (IBGE/PINTEC) had already shown that so-called innovative firms in Brazil, when they undertake R&D, have an inward-looking innovation strategy. Results from a recent analysis of PINTEC data for the software and related services industry-SSI (Projeto SIBSS), the most innovative sector in Brazil, show that just a little over half of the SSI firms had done internal R&D (52%) and the SMEs (50-99 employees) and the large firms (>250) had the largest percentage of high interest in internal R&D (62-63%). The vast majority of innovative firms in this industry segment did not develop external R&D (96%) and they also have very low expenditure on external R&D (6% of internal R&D expenditures).

New policy mechanisms and actions are now addressing previously identified gaps and bottlenecks: technology transfer centres are being implemented in public universities and research centres; the intellectual property granting institution is being reformed, revamped and staffed; seed capital financing programmes are being implemented and, more importantly, the volume of direct RD&I corporate grants has increased substantially over the past two years. However, these policy measures predate the open innovation debate. Moreover, recent evaluations of the programme show that the selection criteria have been narrowly defined to reject proposals which seek a more open innovation model. The justification offered is that the programme aims to increase the number of firms doing internal R&D and increase the volume of R&D done in corporate R&D labs.

The growth in the number and scope of innovation policy mechanisms and instruments was made partially possible by recent fundamental changes in the legal framework, with the introduction of new areas of allowable intervention and the qualification of new recipients of resources disbursed by old and new research policy instruments. However, none of these policy responses referred to open innovation.

Policy mechanisms to address the issue of success and failure have been put in place over the past year or so. The direct corporate grants launched in late 2006 generated an enormous demand, but also exposed the lack of understanding and preparedness, particularly of SMEs, to design and develop innovation projects. Firm cooperation with universities and research centres is still limited. The reformed and new fiscal incentives introduced in mid-2006 have had a limited impact as yet.

As already noted, before the concept was expanded by Henry Chesbrough, the practice of “open innovation” existed in **Chinese** firms and was also facilitated by the government. In 2006, the Mid-long Term Plan of National Scientific and Technological Development set indigenous innovation as a national strategy to improve China’s self innovation capacity. Open innovation is accepted as a key element or feature of China’s indigenous innovation efforts. In the 2007 Sino-US Economic Dialogue, the Minister of MOST (Ministry of Science and Technology) emphasised that indigenous innovation is not closed innovation. Rather, it encompasses open innovation, original innovation, and re-innovation with imported technology³⁴. The NRDC (National Reform and Development Commission) further elaborated that to achieve the goal of an innovative society, China needs to “walk on two legs”: i.e. combine indigenous innovation and promote international cooperation particularly in some key industries such as the IT sector. Except for the visible efforts in IP protection, financial and tax incentives and human resource development, no new policy measures can be found that adopt open innovation.

³⁴ http://www.most.gov.cn/sytt/200706/t20070613_50391.htm

The issue of the evaluation of open innovation policy is not applicable to China since the PRC leaders have incorporated the concept of open innovation into indigenous innovation strategy. At the industry level, however, successful cases are reported and promoted by the Chinese government. For example, the Shenyang Machine Tool Group, China's largest machine tool manufacturer, is considered a successful model for combining open innovation together with indigenous innovation³⁵.

The term 'open innovation' is not explicitly used in formal policy documentation in **India**. However the meaning of 'open innovation' - understood as globally dispersed or distributed innovation processes emerging beyond the boundaries of MNCs' home countries in other industrially developed countries - is well understood in the formal policy discourse. Policy discourse prompted the government to commission a report on Foreign R&D Centres in India through the Technology Assessment and Forecasting Council (TIFAC) of the Department of Science and Technology (DST) in 2006. Secondly, the government set up a National Knowledge Commission with a high powered Committee led by Dr Sam Pitroda under the Prime Minister's office. Both these policy responses in large measure are examining the potential prospects and benefits for India from the trends in 'open innovation'. The Knowledge Commission is particularly concerned with the development of human resources and increasing the higher education enrolments and its expansion in terms of new universities in the coming five years.

As mentioned above, in **Japan**, the explicit use of the term "open innovation" in relation to policy has been limited. Such documents have only recently been published and have been of restricted policy scope. There are a number of policy areas that fall under the "open innovation" definition, but these pre-exist the recent debate. A number of policy measures designed to stimulate greater links between different actors in the innovation system, in particular university-industry links, have been introduced since 1998. The indicators on collaborative research between universities and industry suggest that there is a broadening of collaboration between the two sectors. The number of collaborative projects, contracted projects and invention disclosures entered into have all increased³⁶. Firms have used universities for research in fields that they find particularly difficult, and to obtain information³⁷.

In the broad context of open innovation, efforts to change the **United States** patent system in 2005 were renewed with the introduction of the Patent Reform Act of 2007 (H.R. 1908, S. 1145). This legislation was introduced to change US patent law to switch from 'first to file' to 'first to invent', provide for post-grant review, and institute other changes. However, the intense debate around this issue, plus attention to the forthcoming presidential elections, has halted the adoption of patent reform legislation to date.

In the case of globalisation and visa reform, the US Senate introduced the Comprehensive Immigration Reform Act of 2007 (S. 1348) to extend workforce and citizenship privileges. However, this legislation was very controversial and has not been adopted.

No policies addressing these issues were reported for **Canada**.

³⁵ http://vweb.youth.cn/cms/2006/2006news/xdjs/yw/200805/t20080507_701671.htm

³⁶ http://www.mext.go.jp/a_menu/shinkou/sangaku/sangakub/07083106.htm

³⁷ http://www.mext.go.jp/b_menu/houdou/19/10/07102312.htm

4 Actors and level of operation

This section addresses the question:

“If there have been distinct policy responses to open innovation, which types of actors did these mainly address (e.g. universities, research centres, intermediaries, large companies or SMEs)? Was this policy response articulated and coordinated at regional, national or European level?”

4.1 Evidence from Member States

The results for **Austria** suggest that, depending on the type of support, different players have been addressed. An overall picture of the Austrian support system suggests that all actors have been approached and eventually involved. For instance, both clusters (e.g. www.clusterland.at) and competence centres as well as COMET (the successor programme), address several kinds of actors, such as (applied) universities, research centres, large firms and SMEs.

Both national and regional policy action has been evolving over time, and often in parallel developments. For instance, despite being implemented and co-funded at the regional level, Kplus was initially a federal initiative. On the other hand, certain clusters evolved at regional level due to the industry structure (e.g., clusterland in Upper Austria or the automobile cluster in Styria). Notably, there seems to be increasing collaboration between regional and national policy makers (e.g. COMET and clusters; and the beginning of a national cluster monitoring), as well as more coordination between regions (e.g. collaboration of clusters; mutual cluster policies in border regions).

Obviously, in the case of **Belgium**, all relevant programmes tend to operate at the regional level. Thus, in Flanders, competence poles are an initiative at regional level, driven by large companies and SMEs, and using (to various degrees, depending on the needs and options) universities and knowledge institutes. For the Walloon programme, the conditions stipulate that applications should involve at least one company as a coordinator and one university laboratory.

Activities in **Bulgaria**, especially the measures in the RIS, are oriented to companies (SMEs), research institutions and intermediaries.

While there are no distinct policy responses to open innovation in **Cyprus**, the need to open up in the face of globalisation pressures has been discussed in the framework of RTDI policy design. There is an old provision foreseeing the possibility of foreign partners to participate with 30% of the budget in any publicly supported R&D or innovation project. In addition, increasing funds are being given to bilateral agreements for research support. This type of agreement started with EU member states but there is an effort to extend them to the MEDA countries. A first agreement has been signed with Egypt. Although policy makers would like to see companies responding to these incentives, it is mainly universities that take advantage of them. Besides, the number of established cooperations is limited.

Relevant policy measures in the **Czech Republic**, mentioned in Section 2.1, address all innovation players, although stronger emphasis is being put on SMEs. These policy measures are coordinated at the national level, but regional entities play key role in the implementation and project initiation.

The **Estonian** competence centres may be considered as one example of a measure addressing elements of open innovation, although with some limitations. These address joint initiatives by companies (large firms and SMEs), universities or other research organisations and other public institutions (for instance, hospitals). Around 30 companies, different research institutes from three

main universities, and one hospital form the core partners involved in the five competence centres in Estonia³⁸.

As noted, although awareness concerning open innovation has been increasing in **Finland**, to date, policy responses explicitly tailored to this issue are limited. In any case, the major ministries and funding agencies in the field of innovation policy are seriously considering options to develop policies or adapt existing ones in a way which would address the challenges and opportunities that globalisation, open innovation and other changes may open up for a small country like Finland. Living labs are an example of arrangements which usually are result of local and/or regional efforts to promote new ways of innovation. In case of Forum Virium Helsinki, focus is on the capital region.

The two **German** programmes mentioned above address universities and PSREs (Research Bonus) and all types of actors, i.e. large companies, SMEs, universities/PSREs, users, intermediaries and the public administration (Top Cluster Programme).

There are no distinctive policy measures for open innovation in **Greece**. The national strategy to promote innovation aims to mobilise all available sources and forces to create new products and improve the competitiveness of firms, hence both universities and SMEs are targeted by the various policy approaches. Some effort is also made in the education policy area to raise the image of “entrepreneurship”.

Similarly, in **Hungary**, open innovation, *per se*, has not been addressed and no shift in the policy approach can be observed. No scheme has been launched, where the open innovation concept is used as a main rationale or as a main source influence. However, as in other countries, some of the existing schemes aimed at fostering academia-industry co-operation address universities and other publicly financed R&D units as the main target group, while others address companies (again, separately large firms and SMEs). Yet another set of schemes assist intermediaries.

In general, most of the schemes promoting co-operative activities are devised and operated at the national level. In recent years, however, several steps have been taken to involve various regional bodies, such as the Regional Development Agencies in the policy preparatory phase, as well as in administering centrally devised and funded STI policy measures.

The innovation forums in **Ireland** are primarily aimed at the private sector (services and manufacturing), followed by the HE sector and development bodies. The introductions are aimed at the private sector (services and manufacturing).

In terms of the policy measures aimed at promoting collaborative activities in **Latvia**, the main target groups include SMEs, universities and public research institutions. This policy response, as in most cases in Latvia (given the size and the centralised profile of the country), has been articulated and coordinated at the national level, with many elements taken up from the European level discourse.

The most active actors in the development of the **Lithuanian** networks for innovation and clusters are industrial and business associations, higher education establishments and technology parks. However, since the measures were limited to networking and cluster initiatives, their impact on open innovation remains unclear.

Again, in **Malta**, there are no distinct policy responses to the concept of open innovation: the main group of actors benefiting from “collaboration/networking” schemes are SMEs and large companies (the enterprise sector). These initiatives are being coordinated at national level (through specific incentives of the Malta Enterprise Act); at European level through involvement in programmes and networks such as Eureka and Innovation Relay Centre; and at the international level, e.g. the

³⁸ See more at <http://www.eas.ee/?id=1225>

smartycity@malta project in collaboration with Dubai Internet and Media City (attracting FDI to Malta) and Euro-Mediterranean Institute for Technology Initiative (EuroMediti).

Because the ‘innovation paradox’ was an important driver of innovation policy in the **Netherlands**, both public and private parties are addressed. A series of ‘virtual institutes’ were set up to coordinate R&D and to make research more responsive to economic and societal needs. SME involvement is a major theme in most of the schemes, but large firms tend to take the lead in innovation programmes. The national level is, thus, the most important level. The regional innovation programmes in the ‘Peaks in the Delta’ approach also originate from the national level (but are filled in bottom-up by regional actors). Increasingly, alignment with the European level is a concern in designing Dutch innovation programmes and synergies are sought with the European level.

In **Romania**, there has been no distinct policy response to open innovation. Existing programmes are equally open to research units, universities and R&D performing firms, and are designed exclusively at the national level. Some regional R&D and innovation policies are only now starting to be developed within the Regional Innovation Strategies of each development region of the country, and are coordinated by the regional development agencies (RDAs). However, the relationship between the local RDAs and the National Authority for Scientific Research, in charge of the national RDI policies, is not clear.

Since the early 2000s, **Slovak** governments have opted for framework support RTDI policies. A favourable business environment and tax policies (including flat tax) have been considered the best way for attracting FDI, including high-tech investments. Specific RTDI policy initiatives were limited in number and volume of support. This, however, does not mean that “Open” business models for innovation, involving innovating outside of the firm and national boundaries, were not supported. Several Slovak cities became popular with foreign investors in innovative technologies. For example, the high-tech Israeli firm Ness Technologies expanded its development centre in Košice (eastern Slovakia) in 2008. The firm has branches in 18 countries and employs about 8,000 people. The Košice development centre was established in 2005 and currently employs some 250 software engineers. Further expansion is planned for 2009. The arrival of high-tech investors was not, however, driven by specific S&T policies, but due to the attraction of a favourable business environment and a supply of skilled labour.

All three programmes implemented by the Basque Country in **Spain** are targeted to support ‘open innovation’ in enterprises (SMEs and large-sized enterprises), funds of enterprises and company associations. On the other hand, the programme of the Autonomous Community of Madrid only addresses SMEs. The Autonomous Community of Madrid defines a SME as an enterprise that meets the following requirements: fewer than 250 people, annual business volume is below €40 million and less than 25% of its capital is shared by other enterprises. Given the lack of policy responses to ‘open innovation’ at the national level, no coordination has been so far required.

The **Swedish** policy responses (defined as the introduction of policy measures) have mainly addressed strong research and innovation milieux (Centres of Excellence). This entails a somewhat loose articulation of a specific group of actors. Actors from academia, business as well as the policy side are addressed by these measures through the formation of consortia, with agreements on how to handle the challenges of internationalisation). Innovation policy in Sweden has, in other words, addressed the whole innovation system, stressing that all actors must get view themselves from the perspective of globalisation. The same holds true for the pilot initiative on Living labs. Here companies and universities cooperate to include users in innovation processes. Actors vary according to sector and, again, all actors must find an approach to globalisation.

With particular regards to open innovation the main recipient of policy support in the **United Kingdom** is the business community. In the spirit of open innovation, albeit using a different terminology, policy makers have highlighted industry-university partnerships and inter-university collaborations and other collaborations between science and technology institutions. With particular reference to “open innovation”, NESTA is at the forefront of promoting initiatives in the business sector involving both

large companies and SMEs, universities and other higher education and research institutions. NESTA equally promotes initiatives in the wider innovation “arena” although the phrase “open Innovation” is used only in its “corporate” meaning.

4.2 Other ‘European’ countries

As noted, there are, as yet, no specific policy responses to ‘open innovation’ in **Iceland**. The work of the Science and Technology Policy Council is currently moving in that direction. The policy responses are thus older, predating the term as such, and are mainly directed towards universities and research organisations.

In **Israel**, universities have been one of the main beneficiaries of the various European framework agreements. As far as industry is concerned open innovation support is directed towards all firms. But the reality of the Israeli innovation scene is that many of these firms are small.

The **Norwegian** IFU scheme targets all types of companies, large and SMEs, start ups and research institutes, the Arena programme addresses SMEs, company networks and R&D institutions in all sectors and the NCE programme targets large companies and company networks. All the programmes are coordinated at the national level only.

4.3 Evidence from outside Europe

In **Brazil**, the industrial policy (PITCE) and the STI policy (PNCTI) are increasingly converging and there is an emerging recognition by both industry and academia of the importance of innovation policy, which bears some of the hallmarks of open innovation. There have been some major changes in the innovation policy mix, particularly in regard to the beneficiaries (from universities to firms, including SMEs); the nature of aid to firms (from finance to direct RDI subsidies and grants) and enlargement of scope of fiscal incentives (from two economic sectors to all sectors).

At the end of 2007, the federal government introduced the Brazilian Support System for Industry Technological Development (Sibratec), in the framework of the National Plan for Science, Technology and Innovation for National Development. Sibratec is a national technology development support system which aims to support the technological development of the business sector through the promotion of R&D, processes or products geared to innovation, metrology services, agricultural extension activity, assistance and technology transfer. These activities are organised in the form of networks, which may be thematic.

India’s policy response mainly addressed challenge of globalization rather than open innovation and focused on the expansion of universities and enhancing the quality and training of human resources. A second concern was addressed to firms to understand the nature and character of linkages and spill-over effects arising from foreign R&D centres in India. Much of this policy concern was articulated at the national level in the Indian context.

Similarly, policy responses towards open innovation in **Japan** have chiefly related to the universities and public research institutions. For the universities, these include changes in the ownership of intellectual property rights, the development of intermediary organisations (technology licensing organisations), and the development of funds that seek to strengthen the ties with firms (particularly SMEs), particularly in the regions. Larger companies have played only a small part in regional cluster initiatives in Japan according to recent research. Since gaining greater independence from government, many of the public research institutions have also developed systems for collaborating with industry. In particular, the National Institute of Advanced Industrial Science and Technology and the Institute of Physical and Chemical Research (RIKEN) are particularly active. NEDO, a research funding agency, is a major funder of projects that seek to stimulate cooperation between universities and industry as well as between different firms. The policy response has largely been directed at the national level, with the development of funding programmes that are then implemented through selective bids submitted by regional actors.

The only relevant policy response in the **United States**, the Patent Reform Act of 2007, explicitly mentions inventors, the US Patent and Trade Office, and the judiciary system (federal circuit judges). However, based on participants in hearings on the legislation before the US Senate Judiciary Committee, legislative activity also involved representatives from universities, IT companies, pharmaceutical and medical device companies, and investment and brokerage firms.³⁹ The Comprehensive Immigration Reform Act of 2007 explicitly mentions various government enforcement bodies: Attorney General, US Customs and Border Protection, Secretary of Defense, Secretary of State, Secretary of Homeland Security. However, civil liberties organisations, university representatives, and high tech company executives, health care personnel, and other industry representatives have taken part in hearings on US visa policy and immigration reform.⁴⁰

Perhaps the most significant responses in the US to the open innovation movement have occurred outside the formal US policy system. The open innovation movement has encouraged greater attention within universities, to organise to facilitate industry's use of academic R&D. Technology transfer offices continue to operate to link university inventions with commercial opportunities. One indication of the increasing role of universities is the growth in invention disclosures from universities which rose by 12% from 2003 to 2005.⁴¹ An example of US universities' distinctive organisational approach for working with industry, is Georgia Tech's "The Strategic Partners Office," which was formed in 2006 to help smooth industry efforts to use Georgia Tech resources.⁴² In addition, companies have set up on-line communities to source solutions to R&D challenges from a wider audience.

³⁹ <http://judiciary.senate.gov>

⁴⁰ <http://judiciary.senate.gov>

⁴¹ <http://www.autm.net>

⁴² <http://www.innovate.gatech.edu>

5 Rationale and opportunities for European-level support

The final question was:

“What could be done at a European level to address these concerns /issues? What would be the rationale and added-value of a policy intervention at European level?”

The results have not been aggregated into country-specific sets, as this adds little value to the synthesis, most of the non-EU Member States reporting that this issue was not relevant.

Overview response:⁴³

This answer is a little impressionistic and not founded on a thorough analysis of the underlying issues. The question challenging, but this response is based on a re-reading of Chesbrough’s ideas on Open Innovation and Public Policy (namely Chesbrough [2006: 190-195]), on a browsing of the elements found in VISION ERA-NET website and on earlier thinking on innovation policy developments.

The concept of Open Innovation is still chiefly a company management concept. It deals with how firms can capture value from innovation in the present economic and social context. Open Innovation may be envisaged as a framework for designing innovative business models that may simultaneously enable the firm to foster innovation, its source notwithstanding, and to profit from it. Open Innovation requires the firm to look outside its ‘borders’, and to explore collaborative opportunities, since knowledge is increasingly dispersed worldwide. But for the concept of Open Innovation to thrive, an appropriate environment is needed. The four Erosion Factors identified by Chesbrough (2006) are environmental factors. The stimulus to these factors should be an important concern of Public Policy, both at the national and supra-national levels. Attention should be paid, however, to the specific conditions of a given country to launch appropriate measures, as it happens with the promotion of venture capital in small economies, with a tradition of a credit-based system.

The same may be said about Chesbrough’s policy suggestions. Of course, these are very much influenced by US concerns. Nevertheless, most of his ideas may be applied to the European context. The development of a closer dialogue and cooperation between academic researchers and Industry has long been in the European Commission’s agenda. The observations with regard to intellectual property are more subtle, and provide an alert against the importation of “Academic Capitalism” (Slaughter and Leslie, 1997) models. A shrewd regulation of IP is essential to keep innovation open, as Nelson (2005) has persuasively argued.

The concept of Open Innovation may also be extended as a set of guidelines for public policy. Interestingly, its main tenets seem to fit the EU Open Method of Coordination in the context of the Lisbon agenda. The envisaged extension means that widespread information, collaboration, knowledge combination, creativity and experimentation should be central concerns of innovation policy. However, care has to be taken to balance cooperation and competition. The recent Vision ERA-NET Report on the main challenges for the governance of research and innovation policies in small European countries provides interesting ideas in this regard (Hjelt *et al.*, 2008). The Living Labs initiative goes in the right direction. The same may be said about the increasing importance assigned to creativity: the concepts of Open Innovation and the Three Ts (Florida, 2008) fit very well.

The European Commission might also stimulate international innovation networking, at both the academic research and firm business levels. Support might also be provided to the development of new innovation sharing and innovation market initiatives similar to Innocentive or Yet2com. Open innovation policy means encouraging more flowers to blossom, that is, encouraging diversity. It also means opening to the World. Given that the World is ‘expanding’ elsewhere, this implies that Europe (and the West) will no longer be the ‘centre’ of the World.

⁴³ This section is derived from the response of V. Corado Simoes (Portugal) and provides a good reflective overview of the issues identified in Chesbrough’s conceptualisation of open innovation.

Level of action:

Given significant differences in the importance of innovation across the EU (frontier versus catching up economies), innovation policy has to differ as well at national / regional level, addressing the idiosyncratic needs of the member states. Hence, most policies should be rather conducted nationally or regionally. This is especially true for open innovation which depends on industry structure and technology intensity, where typically large firms cooperate with all different kinds of partners (research, universities, specialised SMEs, MNEs etc.).

Many regions in the Member States still do not consider innovation as the main key of regional development, partly also due to their regional socio-economic predispositions. At the European level, novel measures thus should be found, which would efficiently address these regional shortcomings. Many studies revealed that different regions need different kinds of support; support to innovation being only one of the possible ways to improve regional development.

Globalisation and open innovation, by definition, call for policies which transcend national borders: if the production factors critical for the creation of new knowledge and innovation are indeed flowing freely around the globe, then the nation state may be too small an entity to address the accompanying challenges, or to take full advantage of the opportunities. However, as noted by Borrás and Jacobsson (2004), research and development have arguably been one of those policy areas in which the search for a common European policy and a balance between the European and national dimension has turned out to be a challenge. Evidently, policy-makers and politicians alike face a delicate question on how to balance national interests and enable the coordination of policies in the field of R&D and innovation at a European level. Changes in innovation practices, no matter how they are labelled, require the reconsideration of roles in innovation policy making and 'coopetition' at local/regional, national and supranational level.

Intervention at an EU level would mainly mean a scale enlargement. There are challenges faced in relation to open innovation on the EU level, which can only be adequately tackled at that level (e.g. EIT, ETP, etc.). Within the EU, further openness should be achieved at the Member State level, where innovation systems could and/or should be opened further. There are already activities and initiatives on the EU level, like the ETP (EU technology platforms) which are open platforms for EU and extra-EU coordination of industry/academia. The EU should maintain the provision of this kind of 'platform', in concertation with local levels. A key aspect in the discussion on open innovation is IPR protection. In this context, a European patent, clear rules and procedures, etc., would be instrumental to further opening up. Also, on the regulatory level there are steps to be taken.

Rationale:

As a conceptual remark, one response pointed out that innovation has always been "open": different types (and pieces) of knowledge – possessed by different (types of) players have always been required for successful innovation processes. Thus these players have always cooperated in various forms, to a different degree, though, in different national innovation systems. In particular, the needs of the users have always been a key concern. Companies have long been aware of the importance of scientific research conducted by other organisations. As a simple example, Tungstam, a major electric and lighting company established and funded the first nuclear physics university department in Hungary in the early decades of the 20th century. In brief, the concept of "open innovation" can be regarded as a "hype". It cannot give any useful guidance when analysing innovation processes (its specific features in different NISs or at different levels of technological and socio-economic development), and thus in devising policies. For this reason, no resources (financial, intellectual, time and energy of policy-makers, researchers, etc.) should be devoted to any exercise based on this hype, either at EU, national or regional levels. Resources are advised to be used when relevant issues have to be tackled – and these are abundant, while resources are not.

Following this point, another correspondent did not see any rationale and added-value of a policy intervention at the European level. The EU currently consists of 27 countries with diverse levels of economic and social development, population and economic size, location, business models, etc. Consequently, each country has to find its own model for RTDI development.

There are reasons to believe that the level of complexity in research will continue to increase and that the tendency among business to focus on core competences will continue. This means that the concept of open innovation will maintain its importance, that more specialised knowledge will be needed and that the need to collaborate (in order to achieve progress) will maintain its importance. If this forecast is correct and if Europe aims to become the most competitive region in the world, embracing the concept of open innovation could be both useful and necessary. Today, actors in different European countries are specialised in different areas and some regions are already complementing each other (while others are competitors). By favouring partnership in Europe, specialised knowledge could be enhanced among European actors and a critical mass (within Europe) established or sustained. For this to happen, actors must probably:

1. feel that they are Europeans and therefore choose European collaboration first. This calls for communication efforts and the creation of an image about Europe as a haven for radical innovation and economic progress. This “propaganda approach” is primarily based on public relations and cultural factors. Overall, it is hard to motivate from a business perspective, in particular when companies feel no obligations to nation states (and must make decisions based on economic terms);
2. be offered conditions that make it economically defensible to choose Europe first - despite presence of actors and offers for collaboration from other parts of the world. This approach depends on favourable institutional settings and an environment that enhances creativity. An actor must profit from choosing Europe first. This approach calls for increasing investments in all kind of R&D&I projects favouring collaboration and networks among European actors (This can embed actors in pan-European innovation systems). Collaboration is a common feature within the European framework programmes (as well as in collaborations such as Eureka) so the principal concept is already in place, but could probably be further improved by including open innovation as a theoretical baseline / conceptual framework within ERA (the European Research Area).

Public intervention should be based on market failure. It is hard to argue that large companies which initiate the open innovation process face substantial difficulties. Yet, other agents may benefit from participating, and may face difficulties entering the innovation platform. Perhaps smaller firms may want to initiate innovation process as well, but require platforms to do so (for example, the ITU provides standardisation platforms in which medium sized firms – perhaps smaller MNEs – partake in standardisation processes). Market failures in open innovation could be justified by suboptimal matching of actors due to transaction costs.

The added value of an EU intervention depends on the topic/sector/technology. In real international business with mainly large companies the EU level can provide the (research and market) scale necessary to compete. This is happening with the technology platforms, and in the more traditional FP projects. For sectors with more SMEs, which are not dependent on university research as a mechanism of innovation, the added value is more limited. The EU level may provide overviews of new technologies that can be implemented by local agents in local industries (which may compete on international markets by the way). EEN activities and international (SME) projects are support measures.

National programmes often face difficulties to target beneficiaries from other countries, partly because of a reluctance to spend national taxpayers’ money to foreigners, partly because of lack of information at the side of potential beneficiaries from abroad, partly because of language or institutional barriers. Where companies operate in international markets, open innovation processes will require interaction with actors from abroad. For these interactions, the usual market failure arguments apply (high transaction costs, information asymmetries, lack in efficient legal instruments to avoid free-rider behaviour and moral hazard). While these barriers may be tackled by national programmes in the

case of collaboration with actors within the country, there might be little support actions for international collaborations, which could make a point for European level (or better: global level) intervention. However, this issue has been identified as a need for policy intervention many years ago and resulted in the EU Framework Programmes. It is difficult to see why one would need another EU instrument to tackle the very same issue.

The importance attached to 'open innovation' by two of the wealthiest regions in Spain (the Basque Country and Madrid) will probably encourage other regions to take similar action. However, the push and incentives offered by European policies are often essential to facilitate the spread of such practices at the regional level.

Opportunities:

While most initiatives should be national, at European level policy intervention could promote framework conditions (i.e. a single market), and policy learning initiatives (e.g. policy improvement from cross country learning initiatives, or the provision of best/good practice examples, perhaps accompanied by in-depth case studies for various socio-economic environments). Public debates at European level would help to increase awareness and present good practices and new ideas. Many small countries have been strongly influenced by EU initiatives and many of the innovation measures adopted were designed in compliance with the European experiences. Along the same lines starting the debate on Open Innovation might attract attention and influence national policies. In addition, awareness could be raised on the various innovation models among entrepreneurs and regional policy makers, while debate could be promoted among policy makers at the highest level (Competitiveness Council and ECOFIN).

At European level efforts could be focused on: stimulating cross-border research projects (through ICT); stimulating links between researchers to achieve synergy and complementarity for new knowledge and competencies; stimulating international co-authorship in scientific publications; creating multinational research laboratories; popularising EUREKA; greater legal harmonisation of IP.

At company level, most managers are by now familiar with open innovation: the idea that companies, by looking outside their own boundaries, can gain better access to ideas, knowledge, and technology than they would have if they relied solely on their own resources. European companies should develop more open IP strategies and increase R&D collaboration. Managers can use the principles and mechanisms of "creation nets" to profit from open innovation and to create more value than would be possible with the closed model of innovation.

Issues that could be addressed include incentives, interoperability and IPR regime. Here, policy developments at the European level could provide additional benefits to open innovation. The current support schemes do not sufficiently tackle open innovation. The recombination of resources and collaboration arrangements cannot be fully captured by the project logic (in which partners, resources and timeframes are predefined) that dominates current innovation policy. Perhaps future support schemes should allow more flexibility, but that should also entail new governance mechanisms. Another important issue is interoperability. Collaboration is facilitated when there is interoperability of different technologies and systems. However, interoperability can rarely be imposed from above; it is more likely to be negotiated when it is in the best interest of key players, or it can be enabled through a meta-standard / platform that facilitates interoperability. Europe has some positive experience from the past (e.g. GSM), which may be (partially) transferred into the age of open innovation. Finally, open innovation should be facilitated by the IPR regime – both in terms of efficient protection of IP rights related to new technologies (which can then be subjected to diverse collaboration arrangements), as well as to ensuring that current IP rights do not hinder further innovation.

At European level it is important to encourage activities outside national boundaries. As seen in the VISION project, national decision-makers may meet dilemmas, whether to choose a national or a more ambitious international approach for supporting "open" innovation models. Usually national resources are also limited to extend the activities to abroad. This particularly concerns smaller and less-developed EU countries. The VISION project results can be used as an input to develop cross-

border policy measures but the funding should come from EU sources to give equal opportunities for all EU countries. There are some good examples already present at EU level, such as the Enterprise Europe network or the Eurostars programme.

Support training by selected experts throughout the EU and create accessible training material, support dissemination of know-how through short and medium term secondments of policy makers and explore the possibilities of transnational open innovation in EU through appropriate schemes..

A programme designed to stimulate transnational partnerships and networks between SMEs to exploit open innovation activities, particularly in the services sector. This initiative should increase the level of transnational exploitation of open innovation among SMEs who might otherwise be reluctant, or find it too high a financial risk, to participate in such partnerships and networks.

Possibly the best response would be a policy that recognises the opportunities inherent in the rapidly growing markets of India and China. Such markets are hungry for innovation in many areas in which Europeans excel. Rather than policies that encourage the sale of goods it would be interesting to examine policies that encourage R&D cooperation for the internal markets of India, China, Brazil and other countries. Several Israeli VCs are already conducting interesting experiments in these areas. It is too early to examine results, but the proponents of this trend are enthusiastic and optimistic.

New and improved forms of research-industry cooperation could be sought by governments and the promotion of Public-Private-Partnerships between universities and companies. Also public incentives for cooperative projects with user communities might be interesting. Schemes such as innovation vouchers, that allow companies to commission research in universities, can also be a potential drive for open innovation. The vouchers could be even expanded not only to universities or research labs/centres but also for ordering research from other firms or even individuals. If this is expanded it might well go over national boundaries, at EU level, so that firms can order research from any institution or individual in the EU.

There are also reasons to believe that subsidy or allowance schemes could be introduced as a way to stimulate European test beds and lead markets for new technology. The Swedish approach of including users in the innovation process could be a useful feature in an open innovation policy. User driven innovation has great potential to accelerate the adoption of technology and to gear products towards successful development. Another benefit of user driven innovation is that the inclusion of users (citizens) appeals to democratic values (democratising of the innovation process). This is probably an important feature in gaining acceptance among high level policy makers (and policy entrepreneurs).

Researchers worldwide have been highlighting the importance of user innovation versus manufacture/producer innovation. In addition, in almost every standardized innovation survey, most corporations state that customers are one of their most important sources of innovation. However, standard innovation indicators do not allow for any specification of how firms actually interact with customers/users, the extent to which customers are integrated in the different phases of the innovation process or what are the outcomes of this type of innovation. Researchers are working on elaborating new indicators and methods to capture the impact of user innovation at the industry and national level. Thus, it would be very important to have a special focus on the topic of user innovation or even broader open innovation, covering also dimensions such as trading patents and forms of corporate venturing, in one of the Community Innovation Surveys (CIS), for example like the "Environmental innovation" (CIS 2008). Another concrete step would be the integration of distinctive open and user innovation programmes into the European Framework Program.

Develop specific innovation indicators to measure "open innovation" (as an aggregate at EU/regional level rather than at country level) and better adapt the EIS indicators and EU level innovation surveys to the issues of global open innovation, in particular taking into consideration: the geography on

innovation search, external technology commercialisation of firms⁴⁴. Whilst encouraging open innovation, provide for adequate policy support measures for SMEs for these to fully benefit from international linkages and knowledge exchange; Platforms for open innovation.

There are several bottlenecks that hinder cross-border collaboration (in innovation programmes). Their removal would require the harmonisation of framework conditions, IPR, regulations, etc., all important issues that could be addressed at the European level. In addition, Increasing the international mobility of research would help (i.e. create a single labour market for researchers), as would stimulating (world-class) shared research infrastructure. The European level could also help research institutions to develop stronger and sharper research profiles, and to increase their capacities to collaborate in networks. Open innovation benefits from a vital ecosystem with strong and complementary research performers.

R&D and innovation policy-making in several New Member States (e.g. Romania) has very closely followed developments at the EU level and many of the changes recently implemented nationally often broadly replicate EU measures and have been prompted by a need to align with EU standards. Therefore, any policy intervention at the European level aimed at strengthening open innovation is likely to have significant impact in the NMS and speed up the process of international/EU integration. However, the success of such measures needs to be accompanied by structural changes of the national RDI system and policies, which, in some NMS, currently target and rely heavily on the national and private R&D institutes and have relatively little effect on firms, either those with or without R&D activities. This view was shared in Slovenia where much of the policy response is shaped by policy interventions at European level, with a certain time lag. Once a concept emerges in EU policies, Slovenian policy makers generally pick it up and start to reference it, at least rhetorically, if not in practice. For a small economy and small national R&D sector, the concept of open innovation could offer more opportunities for collaboration.

Support and stimulate international networks of SMEs in all fields.

⁴⁴ The reflections are based on some of the conclusions in Herstad et al. 2008 “Open innovation and globalisation: theory, evidence and implications”

6 Conclusions and recommendations

6.1 Overall conclusions

6.1.1 Policy debate

In terms of policy debate, the overall impression is that while debate on globalisation and its associated issues is widespread, there is generally less policy attention on the issue of open innovation. Moreover, the discussions on the two issues are not frequently linked.

Looking at the two issues separately and in more detail, we find that the phenomenon of **globalisation** is highlighted as being particularly important to small countries and open economies, largely for reasons of their dependence on international technology developments. Specific examples were noted for Austria, Cyprus the Czech Republic and Denmark. Policy debates on globalisation tend to focus on the issues of the encouragement and maintenance of FDI and the outsourcing of R&D. This latter aspect attracts discussion on concerns around Human Resources in Science and Technology (with the accompanying problem of brain drain) and the question of up-skilling. It also tends to be linked to the recognition of a need to specialise or focus on particular research and industrial competences, as it is now impossible for countries, particularly small countries, to aspire to be globally competitive everywhere. (The Netherlands and Sweden particularly emphasised this need for concentration).

A number of countries (such as Austria, Belgium, Portugal, and other, larger member States) view innovation as a key element of any strategy aimed at staying ahead of economies that are 'catching up', while others view it as an opportunity to catch up, provided they remain more competitive than other rival catch up economies. China, in particular, together with India, sees globalisation as a double-edged sword – offering opportunities for a broader market for their products and services, while simultaneously opening the field to other competitor economies – to which innovation offers a policy solution. Other countries (for example, Latvia) see innovation as a means to recoup the loss of their former advantages, cheap labour and natural resources, for example, in the face of global competition.

A number of countries have produced broad policy responses. These include the formation of so-called Globalisation Councils (e.g. in Portugal and Sweden) or a dedicated Globalisation Strategy (as in Denmark), while several countries have produced one or more policy documents which wholly or partly deal with the issue explicitly.

It is worth noting that, in some countries, globalisation is not an issue, and more emphasis is placed on internationalisation – i.e. how to improve the country's international standing in order to become part of the phenomenon of globalisation.

Moving to open innovation, a number of responses commence with a more conceptual analysis of the phenomenon (for example, the Portuguese and Hungarian responses). One area of debate is whether open innovation is a concept that applies just at the firm level (as originally described by Chesbrough) or whether it can feature at a wider policy level. In this debate there is some overlap with the ideas of open innovation systems and economies and their relevance to globalisation.

Overall, it seems that **open innovation** is a phrase which is rapidly gaining currency, but which is not frequently explicitly used in policy documents⁴⁵ and which is more often referred to in the academic and business literature. Some notable exceptions to this exist, however, and extensive policy debate on open innovation has been reported in Finland (in the innovation strategy proposal, 2008), Ireland (with the Open Innovation Fora), the Netherlands (with the AWT report produced at the request of the Ministry of Economic Affairs), the United Kingdom (where the issue receives attention in several

⁴⁵ An interesting point made by the German response is that there is no direct translation of the term into German.

government policy documents and in the activities of NESTA), and in India (in the context of the Department of Science and Technology's TIFAC report on foreign R&D centres in the country). In addition, Denmark has participated in an OECD project on open innovation and globalisation, the Liechtenstein government has commissioned a study into open innovation and several countries are involved in the VISION Era-Net project on open innovation.

In many policy discussions, the idea of open innovation is very often translated into issues connected with collaboration and broader networking. Typically, this involves policies concerned with the stimulation of firm-to-firm and public/private interactions, especially the latter, where there is greater opportunity for policy leverage). In several instances (such as in Germany) it is pointed out that many countries have long-standing policies in support of these aspects of open innovation.

It is also clear that policy debate on open innovation issues is also influenced by the national economic and industrial structure, which determines the available innovation policy mix. Thus, countries with a preponderance of SMEs (which tend to focus on the purchasing of technology and by innovating through production processes or new-to-firm products) have a different set of policy concerns from those whose industrial ecology comprises several large national or multi-national firms. In a similar way, clustering activities (which offer opportunities for open innovation behaviours) tend to focus around advanced technological sectors. As an illustration, in the UK, open innovation is mainly seen as a strategy for business innovation at a corporate level for large firms and multinationals, while, in a broader sense, it can involve other business support activities, such as those concerning SMEs. However, in the UK the discussion also covers the potential applicability of open innovation ideas into the public sector.

A brief list of the key policy concerns with an open innovation focus includes the following:

- Holistic views of innovation policy
- User-driven innovation
- Collaboration and the development of clusters
- IP, patent reform and competition concerns
- Development of appropriate indicators for open innovation.

In general policy terms, however, it seems that open innovation is treated as an integral part of innovation policy and not as a special area for specific support or the development of measures.

A number of responses also indicate that 'Living Lab' activities are closely associated with elements of the open innovation idea. Living Labs aim at the creation of a more open environment for innovation, for example, by involving customers and users in the innovation process, creating more flexible and common working platforms, developing more efficient collaboration between teams in different locations, etc. There has been varied experience of these activities in Portugal and Hungary.

Lastly, a limited set of countries indicate that globalisation and open innovation discussions have been linked together. These include: Brazil, Finland, India, the Netherlands, Norway, Spain, Sweden and the UK.

6.1.2 Specific policy responses to open innovation

The responses to this set of questions were dependent on the precise interpretation of open innovation issues and concepts. The general view tended to follow that put forward in the example of Flanders where, in a 2008 Policy note, Minister Ceysens defined 'Open Innovation' as "innovation that is realised by effective cooperation and interaction between the most relevant actors from industry and research".

Operating under this broad definition, it is clear that most (if not all) countries have in place schemes designed to stimulate interactions between actors in the innovation system. These include networking initiatives, cluster schemes, collaboration schemes, the French 'ecosystems of innovation', competence poles, etc. While the introduction of some of these schemes may have been prompted by the view (as in Wallonia) that many companies are operating 'closed innovation', many pre-date the

notion of open innovation and often have very long histories. Examples of such long-lived measures can be found in Denmark, the Netherlands and the UK, to name but three.

A word of warning arises from Lithuania, where although existing collaboration schemes encompass the development of partnerships for innovative product development, cluster initiatives and networking, nevertheless they are relatively restricted and do not cover important open innovation issues such as knowledge governance within networks, support to open innovation via the development of appropriate IPR regimes, etc. Again this raises the issue of the precise definition of open innovation that is being applied in the national policy context and also depends on whether such schemes are expected to cover all aspects of the open innovation concept as elaborated by Chesbrough and others, or just some of them.

In the great majority of the cooperation and other interaction schemes in operation, open innovation is not referred to explicitly. There are some exceptions to this, however:

- in Austria and Belgium (Flanders and Wallonia), the example schemes contain mention of open innovation;
- in Sweden, VINNOVA has launched three schemes explicitly referring to the ideas of open innovation and globalisation;
- Enterprise Ireland has a scheme called 'Open Innovation - Why Technology Acquisition is the new R&D', which helps companies locate and acquire external technologies that are not readily available from commercial sources;
- Several of the initiatives run by NESTA in the UK are explicitly concerned with open innovation ideas;
- In Norway, policy making is exhibiting a shift from a focus on technological innovation towards a wider form of innovation. An example is the introduction of the BIA programme (user-initiated innovation), which includes non technical R&D innovation projects.

The notion of open innovation is also made explicit in some regional level schemes. For example, in the Italian regions of Piedmont and Veneto, some recent schemes claim to address open innovation ideas, although they are reported to resemble standard technology transfer schemes. In Spain, programmes in support of open innovation have been introduced in both the Basque country and for the Autonomous Community of Madrid

A number of responses also indicate that 'Living Lab' activities are closely associated with elements of the open innovation idea. Living Labs aim at the creation of a more open environment for innovation, for example, by involving customers and users in the innovation process, creating more flexible and common working platforms, developing more efficient collaboration between teams in different locations, etc. There has been varied experience of these activities in Finland, Portugal, Spain, Sweden and Hungary.

Lastly, with regard to the support of public sector R&D, international collaboration is also a major aim in a number of programmes (both outward and inward, through the opening up of national programmes to foreign participants). Examples were noted for Austria and Cyprus.

6.1.3 *Indications of success or failure*

In terms of the indications of success or failure, evidence is relatively limited:

- The Austrian competence centre scheme has been positively evaluated;
- The Flemish competence poles are reported as being well regarded by participants;
- The Estonian competence centres have been evaluated, with questions raised over their level of openness to new partners;
- FinChi, the Finnish Innovation Centre, established in Shanghai in China, was evaluated in 2007, and found to have been successful in terms of export promotion and the internationalisation of Finnish companies, although its impacts on the innovation activities of Finnish companies have been modest and its role in the promotion of knowledge flows, investments, etc., from China to Finland has remained insignificant;

- The Hungarian paradox (wherein a large number of schemes aiming at apparently appropriate objectives are in place yet do not seem to be effective) appears to be due to the fact that Hungarian STI policy measures are not monitored and evaluated systematically;
- The Norwegian SkatteFUNN scheme, evaluated in 2007, appears to be most effective for small businesses, in companies where education levels among the workforce are relatively low, and in companies with low R&D intensity. The IFU scheme appears to have delivered successful outcomes for firms, particularly for creating fruitful connections between Norwegian firms and lead users abroad;
- Evaluations of some Brazilian Schemes indicate they tend to be biased against proposals offering a more open innovation model.

6.1.4 *Targets and level of operation*

As noted above, many countries operate cooperation schemes of various descriptions that meet at least some of the major criteria of the notion of open innovation. In addition, the limited number of innovation support schemes that explicitly address open innovation ideals also tend to be highly oriented towards the stimulation and support of cooperation and interaction between actors in the innovation 'ecology'.

Generally, as would be expected from their nature, both types of measures principally target firms (some schemes focus mainly, but not exclusively, on SMEs – large firms are also targeted), while others include public sector bodies (notably universities and PROs, PSREs, etc.). Lesser mentioned, but still prevalent targets are technology parks, etc., users, intermediaries, public administrations, and hospitals.

While some degree of sectoral or thematic focus is also evident, there is also substantial variability with some broad-based schemes. As open innovation tends to be characterised by a shift towards interdisciplinarity and the inter-sectoral mobility of knowledge and ideas, the presence of schemes with a thematic or sectoral focus appears counter-intuitive.

Finally, a range of operational levels was also evident, with some schemes applied at the national level, with examples at the regional level. The level of operation depends largely on what is appropriate for their delivery and also on the governance level responsible for their formulation and implementation.

6.1.5 *Rationales and opportunities for EU-level action*

Before embarking on a synopsis of the main responses to issue of rationales and opportunities for support at the European level, a number of salient points, raised by one of the respondents, needs to be reviewed. Essentially, the notion of open innovation and its relation to public policy, as framed by Chesbrough (2006) has a number of features:

- It is largely a company management concept, dealing with how firms may capture value from innovation within an appropriate environment.
- Public policy should address itself to the environmental conditions within which firms operate (Chesbrough's 'erosion factors').
- Chesbrough's notion is derived from a US perspective although it may be applicable to the European context, provided sufficient attention is paid to the specific models (such as IP regulation) in operation.
- The main tenets of open innovation tend to fit the EU's Open Method of Coordination provided a balance is maintained between cooperation and competition.

Concerning the appropriate level for policies in support of open innovation, strong and valid arguments were put forward for action at the local, regional, national and supranational (European) levels. Clearly, the level of policy action depends on the policy objectives and the prevailing conditions at any of these scales: given the focus of open innovation, it seems logical that a principal determinant for action should be the harmonisation of the environment within which collaboration occurs. Thus, a

clear EU role would be in the field of regulation or IP (the question of a European patent emerging as one suggested area for action), or similar efforts that might lead to the creation of an environment conducive to collaboration.

The rationale for action provoked a more contentious line of debate. Some respondents considered that no policy action was necessary as open innovation is nothing new and merely a matter of 'hype': existing policies address the same concerns and efforts should be made to ensure their success. Others felt that the national level was the appropriate arena for policy action, given the variety of contexts that firms currently operate within.

The emphasis on cooperation espoused by open innovation prompted the suggestion that European policy action to stimulate greater pan-European cooperation was already bearing fruit (through Eureka and the Framework Programmes for example) and should be reinforced. Market failure arguments were evoked in favour of this policy stance.

Finally, a number of more specific opportunities for EU policy activity were put forward. These covered the following broad issues and ideas:

- Promotion of framework conditions, especially in the area of IPR, but also in standards and platforms
- Policy learning initiatives, awareness campaigns, public debates and show-casing (involving the private, public and policy sectors)
- Further efforts to promote both intra-border and cross-border collaboration and cooperation, such as new arrangements for Public-Private partnerships and EU level 'innovation vouchers'; the removal of barriers to cross-border cooperation
- More work on the development of 'open innovation indicators', which could inform on the extent of user-driven innovation and engagement, for example.
- Specific support for the formation and maintenance of networks of SMEs.

6.2 Recommendations

From the above, it is clear that the novelty of the notion of open innovation has yet to gain full acceptance. Some view it as merely a re-badging of longstanding innovation behaviours, or as a form of hype, while others espouse it as a new way to take innovation (and innovation policy) forward. Hence, whether one views open innovation as merely "collaboration plus" or as something with greater potential, it is difficult to provide concrete recommendations for future policy action by the European Commission. The previous section set out a number of areas in which suggestions for Commission activity were put forward. Drawing on these, the following recommendations for immediate action are proposed:

- Production of an EC position paper on the various ideas underpinning the notion of open innovation. The primary purpose would be to move the notion from the arena of academic debate to the level of practice and policy. Several useful initiatives along these lines are already underway in the countries covered by this (very limited) review.
- Surveys and studies to identify and disseminate good practice in the application of open innovation concepts at both the firm strategy level and at the policy level.
- Undertake a more extensive and comprehensive mapping of EU Member States' policy measures for innovation support against a framework based on the principles of open innovation.
- Organise a series of debates and workshops on the implications of open innovation for policy makers.

The above suggestions are all feasible as isolated activities but are clearly complementary to building up a better understanding of open innovation concerns and implications.

Clearly, the notion of open innovation is still an issue of debate. However, the outcome of that debate is, in some ways, irrelevant: if open innovation serves as a banner to the benefits and possible pathways to improved innovation performance, and as a focus of further attention to discussions on the role of innovation, then its novelty is a secondary consideration. Nevertheless, such debate and policy action must not be allowed to deflect existing resources from the implementation of sound evidence based innovation policy support.

Returning to the issue of globalisation, it is evident that, in some contrast to open innovation, this has received considerable acceptance as a rapidly developing phenomenon, which raises serious policy concerns. Policy debate on the issue is already widespread, often at the highest levels. Thus, recommendations for policy action at the European level are less obvious. Amongst the responses obtained in this limited survey, there was a slight trend favouring action that further strengthened the EU's position (i.e. through pan-European collaboration networks such as Eureka and the Framework programmes and through the continued development of ERA). In a sense, this seemed to promote a European centred protectionist view. In contrast, other opinions (adhering to the precepts of open innovation) favoured the opening up of such programmes in order to tap into the knowledge and other opportunities existing outside Europe.

ANNEX 1

Introductory Text from 2nd meeting of the Portuguese Globalisation Council: “Innovation in a Global World”

“More and more companies are finding that the old formula of developing products, processes, business models, and other innovations in their home countries and then projecting them into the world is proving to be much harder than it used to be. For a set of different reasons, external and internal. For example, some companies are finding highly qualified scientists and technologists where they went looking for a less skilled lower paid labour force. For other companies, the tacit knowledge of manufacturing is now gone from their original countries, as manufacturing moved overseas a couple of decades ago and their home-based engineers and managers with factory experience have now retired. Others are finding lead customers on the other side of the world. Others see their original clusters fade way from the limelight, as other, more specialised clusters emerge in other parts of the world.

The internal challenges may even prove harder. For example, many companies see highly qualified scientists and engineers leaving their foreign subsidiaries simply because they find no excitement in working in a unit that has the pompous name of “R&D lab” but that remains focused on the local adaptation of products sent from the headquarter. Despite all the recent ‘hoopla’ about involving the periphery of multinational organisations in global projects, many companies still see their managers overseas as faithful implementers – not as a source of new ideas and valuable contributions. Institutionalising “centres of excellence” in certain locations often de-motivates the organisation elsewhere.

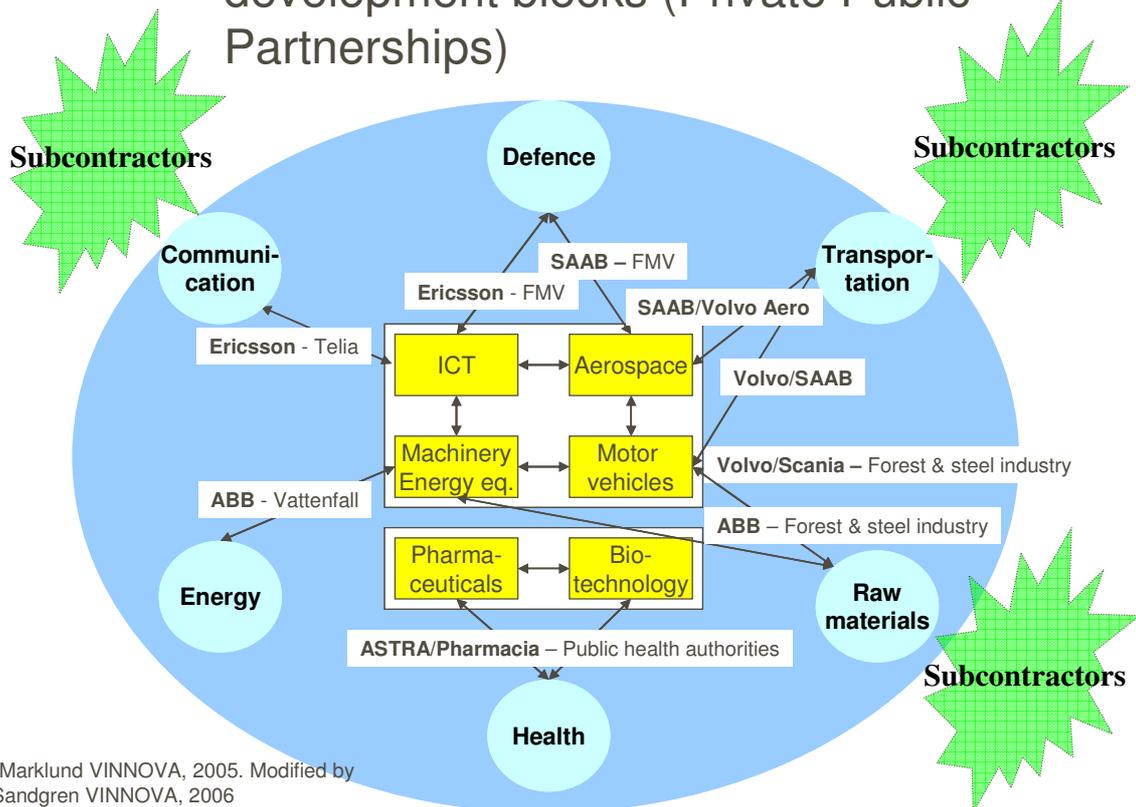
The matter of managing innovation globally calls for a deep partaking of the leaders of multinational companies, namely those that have already embarked in the imperative of global integration. Many questions remain: How can a company effectively involve distant units in its innovation processes? How to grow the awareness and realise the benefits from the vast knowledge that exists in the company worldwide network? How to engage its people in non-traditional knowledge flows, such as those from a small unit in an emergent market to the powerful headquarters in a developed economy? How to combine such knowledge systematically? How to involve universities and partners abroad in innovation? And what about innovation in the global world of services?

In particular, are there new roles for governments to play in the development of global innovations? Should a government in an “emergent economy” be more inclined to develop local R&D labs or rather praise local companies that take the risk of setting a R&D lab in a “developed economy”? Should governments in “developed economies” be more worried with high tech jobs leaving their countries or with creating the conditions for their companies to benefit from such high tech skills wherever they are in the world? Should governments influence where companies locate lead markets (or test markets) as they have influenced where companies locate factories?”

ANNEX 2

The Swedish innovation system in terms of development blocks (Private Public Partnerships)

The Swedish innovation system in terms of development blocks (Private Public Partnerships)



G. Marklund VINNOVA, 2005. Modified by P.Sandgren VINNOVA, 2006