Report on the

2013 ERAC Mutual Learning Seminar on Research and Innovation Policies

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**Lena Tsipouri**, National and Kapodistrian University of Athens

***Luke Georghiou*** *- University of Manchester and*

*Manchester Business School*

***Stefan Lilischkis,*** *empirica*

*Gesellschaft für Kommunikations- und Technologieforschung, Bonn*

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# 1. Introduction

The 2013 European Semester started with the adoption of the Annual Growth Survey in November 2012. The 2013 AGS offers overall guidance for the European Semester and ensures continuity with the previous edition in terms of priorities concentrated on delivering growth and jobs. This is especially valid in the field of Research and Innovation, where the focus is on the monitoring and implementation of the twelve Country Specific Recommendations related to R&I adopted by the Council in July 2012. In this context a Mutual Learning Seminar (MLS) was held in March 2013 supporting the implementation of the Country Specific Recommendations (CSR).

The aim of the Seminar was to stimulate discussion amongst Member States about some specific subjects closely linked to the implementation of the CSRs and about main policy orientations in the field of R&I in the context of Europe 2020. The exercise was structured similarly to the 2012 MLS and concentrates on three ways in which research and innovation policies can contribute to the enhancement of economic growth and competitiveness.

Three themes were selected reflecting the need for in-depth discussions and policy measure inspiration in the Member States:

1. Effectiveness of national research systems (linked to the Commission's communication 'A Reinforced European Research Area Partnership for Excellence and Growth' from July 2012)
2. Innovation strategies articulating supply side and demand side aspects and
3. Policies for high growth innovative enterprises.

In the Opening Session Pierre Vigier, Head of Unit, Economic Analysis and Indicators, DG Research and Innovation, European Commission, welcomed the participants and stressed the importance of the effective implementation of innovation policy in the Member States. He also referred to progress for the completion of the ERA and expressed the view that the Seminar can play an important role for exchange of information and aspiration for Research and Innovation policies in the Member States[[1]](#footnote-1). Then the three themes were presented by their respective moderators based on Background Papers[[2]](#footnote-2), followed by comments from country experts and technical experts. A generalised discussion followed each session giving the opportunity to all participants to ask questions and present their own experiences. This report provides a shorter overview of the divided into three sections covering each of the topics covered in the seminar. The ultimate objective is to be used as background and prove useful to Member States for their strategic priorities and the implementation of research and innovation policies.

# 2. Effectiveness of National Research Systems

## Background and main topics

 A background paper presented by Luke Georghiou outlined the main issues on the improvement of effectiveness of national research systems in the context of the Commission's July 2012 communication 'A Reinforced European Research Area Partnership for Excellence and Growth'. The main topics outlined in the paper included:

## Understanding the benefits and limitations of competitive funding

Work by the OECD and the European Commission has indicated that the share of competitive funding as a total of public R&D funding (GBAORD) varies from 20 to 80% among Member States with an average of around 40% being allocated through open calls for proposals. The remainder is institutional funding, allocated in a block. In some cases this is allocated through an evaluation of performance but the bulk of this funding is allocated without reference to competition. Several studies have shown is that while increased competition is associated with higher performance levels, the underlying situation is complex and includes other incentives and environmental factors.

In understanding these effects it is useful to characterise research support systems in terms of three dimensions which between them condition the terms and framework for competition for resources:

**Selectivity**

This refers to the degree to which there is prioritisation between fields. In the context of current initiatives such as Smart Specialisation and Key Technologies it normally results in targeted competition for resources against a set of predefined priorities. This highlights the processes by which those priorities are determined. Normally they combine scientific promise with socioeconomic potential. Policy decisions may concern the proportion of resources to be made available for ‘blue-skies’ or investigator-driven research compared with those which are targeted strategically.

**Concentration**

The principal question here is which institutions or research teams to support and the degree to which funding should be concentrated on the best performers. Hence, concentration is a natural outcome of competitive funding.

**Sustainability**

This asks whether the funding model allows for the replenishment of human and physical capital within the research system, and hence maintains and grows institutions in the long‐term. Unlike the previous two dimensions this feature can only be measured over time. The unit of measurement can be either the research institution or the system as a whole. The outcomes of selectivity and concentration decisions impact upon sustainability, while in the longer term sustainability determines which actors are available to take part in those choices.

All forms of research support can be allocated on a more or less competitive basis. Normally funding project proposals via grants is regarded as pure competitive funding but within that broader frame, as we saw in the discussion of elite funding above, it is possible on the one hand to design the terms of competition to create a fairly flat distribution with a high success rate moderated mainly by a quality threshold, and on the other hand to award major grants which attract large numbers of applications but where only very few are awarded. Similarly, at one end of the scale, institutional block funding can be allocated non-competitively on the basis of factors such as historical precedent or formulae based on the scale of activity (for example numbers of researchers by field but increasingly performance based criteria are being applied to drive the distribution of these funds. Institutional assessments are discussed in a following section but here it is worth considering the respective roles of competitive and institutional funding.

### Benefits and Limitations of Competition

It is clear that competition incentivises researchers and to a large extent prevents those in senior hierarchical positions from using their influence to dominate receipt of resources. Ageing academies in pre-reform transition economies provided the archetype of institutional sclerosis in the absence of open competition. The shorter timescales and higher granularity involved in project funding allow resources to be flexibly applied as science develops and create a relatively simple line of accountability to ensure that the resources are used for the purpose.

On the other hand it is also possible to have too much competition. There are three main reasons why all resources should not be allocated through granting mechanisms:

• Application processes for grants involve a high level of transaction costs in preparation and review. These costs are relatively insensitive to the size of grant awarded and may consume an increasing proportion of senior researchers’ time.

• Institutional funding provides space for researchers to develop ideas which may not be ready for exposure to external competition and allows the institutions themselves to behave in a strategic fashion rather than running the risk of converging on ‘hot areas’ and leading to a loss of diversity in the wider research system.

• There are items of equipment and support services of generic benefit which are not easily attributable to individual grants. Since few funding agencies pay the true full costs of research, the long term absence of institutional funding leads to a ‘hollowing out’ of research institutions.

### Peer review

In most cases resources for research are allocated by means of peer review, either in its pure scientific form or modified by the addition of extra criteria, normally relating to expected socio-economic benefits. Increasingly an international frame of reference is used for peer review and many countries, particularly smaller ones, use foreign peers to seek greater independence or to raise domestic standards.

Peer review is also recognised to have inherent limitations. It may promote conservatism by militating towards safe choices reflecting a consensus view and screening out work that may pose a radical challenge. Interdisciplinary research can be particularly at risk as it may stray from the norms of each of the disciplines whose panels take part in its judgement. A different discipline-related issue that can arise in peer review comes when panels are operating in parallel across fields. There is a risk that members may feel that low scores could damage the reputation of their own field. As a result, peer review may be characterised by ‘grade-inflation’ – a steady upward trend in the mean scores awarded - even though the level of discrimination and hence the proportion of projects awarded remains similar.

The necessary attention given to the track record of applicants can itself be a major barrier for new entrants, especially early career researchers. Funding bodies generally recognise these issues and seek to mitigate them by offering specific competitions for new entrants and by stressing the need for interdisciplinary approaches.

### Institutional assessments

In addition to competitive grant funding, which assesses prospective proposals and individual researchers or teams, there is an increasing tendency to assess the work of whole institutions or of major areas of research within them. This may be with a view to allocating block funding for research in a more concentrated (and hence competitive) manner. While the general aim is the promotion of excellence, the specific approach varies between Member States.

## Experiences and perspectives presented in the Workshop

Workshop participants heard presentations on national experiences and cross cutting perspectives:

### Improving excellence in research – Swedish R&D funding

In Sweden the national Research & Innovation bill is up-dated every 4 years. In the new R&I bill from 2012 Sweden addresses the Council Country Specific Recommendation (in the context of the European semester governance cycle 2012) with the objective of improving excellence in research. While the overall level of the research system is good, it is considered that Sweden does not have a sufficient presence in the very top echelon.

Specific measures in the bill include increased direct funding to universities. This is both to allow increased risk-taking in research and to increase the permanent employment of researchers. External funding for universities accounts for 43% of total funding. From 2014 and onwards 20% of the block funding, instead of 10% which is the present level, will be redistributed according to quality indicators to provide more incentives for universities to specialise. Internal evaluation should be used more often and more widespread to influence the distribution of direct funding locally.

Several measures address the need to develop and attract excellent researchers.

* International recruitment of researchers: more money is devoted to attracting international top researchers since the level of international recruitment of high quality researchers in Sweden is still low. Measures include:
* Young researchers: new programme in Swedish Research Council to allow getting permanent employment in universities.
* Excellent senior researchers: new programme in Swedish Research Council to stimulate taking higher risk and great potential.

A future allocation system, including peer-review is due to start in 2018. This will also take into account relations with society and industry. The current system of allocation, based on a formula using publications/citations and external funding is thought to not capture all aspects of research quality, lead to less risk taking and is vulnerable to different traditions of publications across disciplines.

### Closer science-business links and steering higher education; Top Sectors in the Netherlands

The 2012 Council Country Specific Recommendation to the Netherlands indicated that the Netherlands should promote innovation, private R&D investment and closer science-business links, as well as foster industrial renewal by providing suitable incentives in the context of the enterprise policy, while safeguarding accessibility beyond the strict definition of top sectors and preserving fundamental research.

An important recent policy initiative is known as “Top Sectors”. This focuses on 9 priority areas which form the basis for public-private partnerships. Together with generic policies (financing, fiscal rules, smart regulation, education, etc.), the objective is to reach the top 5 position among knowledge economies and to increase Dutch R&D efforts. The areas were selected according to their knowledge intensity, the links between business and academia and potential contribution to societal challenges.

The aim is to establish Top Consortia for Knowledge and Innovation by 2015, which have Innovation Contracts, a Human Capital Agenda and focus on Internationalisation. They will also address regulatory barriers. They have also a regional dimension, as some of the top sectors are clearly concentrated in a number of regions spread all over the Netherlands. The Top Consortia will be supported by funding from the Dutch government, including research funding via the research council N.W.O. and budgets of various ministries. However, 40% of the funding is expected to come from industry. The Top Sectors correspond to 97% of current R&D funding and so are not a means of prioritisation but rather a means of mobilising action.

The workshop also heard about the introduction of performance steering of higher education and research in The Netherlands, which was in fact also aligned with the Top Sectors. It was based on a Commission (Veerman) in 2010 which indicated that the Dutch HE system was not sustainable. It needed better quality, stronger education and research profiles, more excellence and more collaboration and strategic alliances. The Top Sector policy asked for better support of the R&D needs of the top consortia and addressing the Human Capital needs as well. The 2011 Strategic Agenda for Higher Education and Research was the resulting policy proposal by the government, including more focus in research and more valorisation (knowledge transfer). The next steps in 2012 were strategic performance agreements concluded with the institutions. Moreover, 7% of total HE funding was made performance based: 5% by funding conditional to reaching the agreed targets in 2016 and 2% selective funding for very good plans. New agreements are expected in 2017. There is a high acceptance for this principle among the institutions concerned, and the new scheme has already led to slight shifts in research and education profiles.

### National Research Systems: a perspective from recent OECD work

OECD has carried out a number of studies of public research funding in the context if understanding national research and innovation systems. One such study has addressed performance-based funding for public research in tertiary education institutions. The main rationale is to increase the quality of research but there are also other goals such as increasing links with industry and ensuring better alignment to societal goals. There are similarities across countries in the indicators used such as 3rd party income, publications, degree completions. However, some differences also exist whereby some countries may rely solely on peer review or publications. While there have been few formal evaluations, positive effects are seen on research output and research management, while negative effects are seen in the narrowing of research to focus for example on a few elite journals.

New forms of incentive funding for public research (Centres of Excellence and Research excellence initiatives) include combination of features of both institutional and project-based funding. These provide funding, but also prestige. They are part of strategies to fund fewer institutions, selected on the basis of excellent performance. Normally there are international selection panels. Evaluation evidence remains weak –the long-term effects remain unverified and evaluation efforts have yet to focus on effects on research landscape as a whole.

Public research institutions have also been affected by these issues. An OECD study showed diversity but with a trend towards competitive funding. However, concerns around short-term results, convergence (similar institutions bidding for the same projects which may lead to overlap between different research organisations) and instability in terms of career, infrastructures has led some countries (New Zealand and Korea) to reinstate core funding.

### Evolving public research systems: locating the roles and limits of evaluation

The balance between core and competitive funding is not a new issue, it has been a matter for debate since 1964 and there is still no clear means to compare Member States. There are two layers of issues: issues of balance between core & competitive funding and issues of allocation within each component. The case of France illustrates that the understanding of what is considered to competitive funding may vary – normally only funding flows are counted but human resources may also be allocated, for example new joint units with CNRS in universities. The selection and life cycle of such units is done in competition on the basis of an evaluation process that corresponds to all criteria of ‘project based funding’. If allocations of this type are counted the share of competitive funding changes considerably – France rises from 21% to 31%, equivalent to the levels found in Switzerland or Austria.

In considering evaluation systems, there are three classical situations in which evaluation is applied: allocation of core funding to performing organisations; selection of projects; and the recruitment and careers of researchers. A fourth applies to the selection and life-cycle of “mixed” or joint collective research institutes. Evaluation may be characterized across several dimensions: delegation, subsidiarity or autonomy; systematisation and periodicity; the balance between ranking (publications and citations) and role (position in research field and direction); and focus – whether the main criteria concern academic excellence or wider issues such as industry-university relations.

In the case of France the evaluation of researchers is delegated to their employing institutions while the evaluation of ‘research collectives’, teaching curricula and that of organizations, PROs (Public Research Organisations) & universities, is delegated to one independent agency, AERES. The AERES process is similar for each type, a self-evaluation report, an expert panel and site visit, a report finalised by AERES, a response from the evaluated body and publication of both on the website of the agency.

## Key lessons from the presentations and the discussion

The background paper had launched three key questions. To summarise what emerged on these points:

**What is the optimum balance between competitive and block funding in a research system?**

There was a clear message that this was a matter of balance. While competition does in general incentivize researchers and research organizations in the direction of excellence there are also drawbacks including the loss of strategic space and a tendency to converge on a limited range of output types or research priorities. It is worth noting that some countries which had previously moved very strongly in the direction of competitive funding have restored a degree of block funding associated with institutional autonomy. On the other hand some other countries still are seeking to promote excellence through increased competition both for grants and for institutional funding. This is also consistent with a trend among funding agencies towards elite funding where larger and longer grants are concentrated on the top echelon of researchers. Here the challenge has become ensuring the development of the next generation. A distinction should be made between share of competitive funding for the budget of an institution and competitive funding as share of national budget dedicated to research. Competitive funding is normally associated with project based systems but increasingly it is also being used for the selective allocation of block funding for institutions.

There appear to be significant measurement issues in calculating the share of competitive funding in a system, especially when flows of resources other than cash are included. Furthermore statistics do not take account of the degree of competition in each circumstance. The term competitive funding can encompass a relatively flat distribution at one of the spectrum and the extreme levels of competition found in some elite competitions.

**What measures can be taken to improve national approaches to peer review?**

In general international peer review is seen as a positive element though it is by no means a panacea in terms of assuring independence of peers and parity of standards. A common concern is an insufficient degree of risk-taking in research but worries about conservatism emerge both in peer review and in indicator-driven systems of allocation that use publications or grant income as proxies for quality. Among indicators it remains controversial what to choose, for example publications in journals at certain level (normally by impact factor or other ranking systems) versus direct measures of scientific use (such as h Index, citation counts or more recently downloads. Both indicators and peer review are backward facing to a degree and hence favour incumbents over new entrants. Funding agencies regularly take measures to mitigate these effects, normally by restricting competitions to early career researchers and occasionally by seeking to weight the criteria.

Peer review has increasingly been required to take into account wider socio-economic considerations, raising questions about fitness for purpose in making such judgements and what information might be needed as a basis for assessment.

**What is the most effective way to incentivise institutions to improve their research performance?**

In the third set of issues perhaps the most important trend emerging during the workshop is the increased tendency to assess institutions as a whole rather than focusing only on their component parts. Most typically these assessments have focused on higher education institutions but they also address public research organizations. Some such assessments are motivated principally by accountability but normally they are set in the context of a drive towards excellence. Indeed the starting point for analysis often is the system as whole Concerns about the sustainability of the Dutch higher education were supporting a drive towards better quality and more diversification, involving stronger educational and research profiles, more excellence, and collaboration and strategic alliances. The approach to the Swedish system also began with systemic concerns. In other examples mentioned, for example the German and French Excellence Initiatives the desire again was to increase systemic performance but though using a competitive allocation of resources to bring the strongest players up to a level where they were considered to be able to compete with the world’s best. This latter point is significant, if some systems concentrate excellence and hence support internationally leading institutions, this creates considerable pressure on other governments to create what are in effect national champions able to play in this elevated field.

For the ERA there remains a dual challenge of moving up the levels of both the top end of the distribution and also the average – to support Europe’s ambitions neither can be neglected. As observed at the conclusion of the workshop, there is clearly no one size fits all approach regarding the complex issue of funding but the direction and benefits are clear. Competitive funding with respect of principles of international peer review are at the heart of the ERA Communication adopted last July and endorsed by the Council in December. Member States to remove barriers and to adopt national reforms to increase efficiency and support the completion of ERA.

# 3. Innovation strategies articulating supply side and demand side aspects

## Background and main topics

 A background paper presented by Lena Tsipouri outlined the main issues on the need for and progress of supply policies in the EU. The main topics outlined in the paper included:

### The role of strategy and the overall situation in the EU

Innovation Strategy is increasingly important to face international competitive pressures, whereby it is clear that developed regions can only compete with the low-wage developing world by successfully developing new, innovative products and production processes, improving quality and achieving productivity gains. This requires maximising economies of scale and scope at the company level and economies of agglomeration at the spatial level. As market forces alone are insufficient to generate such economies and individual success stories remain rare, successful strategies have incorporated policies supporting clusters and networks to generate linkages and to maximise spill-overs.

In all 27 Member States there are now important innovation strategy documents, which include the National Reform Programmes for the implementation of the Europe 2020 strategy for smart, sustainable and inclusive growth. In these programmes, the Member States spell out how they translate the targets and policy priorities established at European level into their own national policies. In addition the 27 National Strategic Reference Frameworks agreed between Member States and the Commission, set out the investment priorities for the new generation of regional and sectoral programmes to be supported by the European Union over the seven-year period 2007-13. They draw their inspiration from the priorities of the “Community Strategic Guidelines for Cohesion”, where innovation plays a prominent role. New strategic documents (in the form of Partnership Agreements) are expected within 2013 suggesting strategies for the next programming period. In the Member States with significant Structural Fund support there are Operational Programmes for Competitiveness, which include RTDI strategies and pave the way for the creation of a better performing national innovation system. It is increasingly argued that there is a need for some kind of coordination between these documents (and some more specialised ones in individual countries).

In order to maximise the practical relevance of strategy design policy makers are increasingly involving entrepreneurs in innovation strategies as manifested in the smart specialisation exercises relying on entrepreneurs’ knowledge for the selection of sectors, niches or themes for individual regions to specialise. This specialisation would then lead to generate in­vestments not only in the area selected but also in related variety and even in deriving completely new areas where technologies are appropriate. At the same time the role of entrepreneurs is recognised in policies prioritising incentives for demand as leverage for increasing investments and productivity by creating or stimulating product markets that act as incentives for business investments. In addition to directly supporting entrepreneurs, opening market opportunities and giving them the possibility to compete for such new markets seems to be an important way to complement supply-side policies.

In all European strategy documents the role of demand side is increasingly mentioned and recognised as a means to leverage private funding in times of austerity and play an important role for creating lead markets.

### The relevance of demand-side policies

Demand-side policies are those that can induce investment in technologies by enlarging markets for them. Rising expectations about future demand for new technologies increase the incentives for investments in innovation by enlarging payoffs to successful innovations. Typically demand-side policies are those addressing social and societal concerns, where the state is an important user (public procurement) or needs to regulate markets (standards, environment, radio-waves). In the case of social challenges, which address public goods (like climate change), there is a rationale for state intervention, which is not in contradiction with market and competition rationales. Adopting demand-side innovation policies has several implications for the public sector. The combination of policy measures (sectoral, supply- or demand-oriented) to support demand for innovation makes good governance and policy co-ordination within the public sector essential.

A policy typology used for demand-side instruments includes:

Public procurement

* Public procurement of innovation
* Pre-commercial public procurement (although there are doubts expressed to the extent to which this type is really a demand-side instrument)

Regulation

* Use of regulations
* Standardisation

Supporting private demand

* Tax incentives
* Catalytic procurement
* Awareness raising campaigns

Systemic policies

* Lead market initiatives
* Support to open innovation and user-centred innovation

While in strategy document the relevance of the demand side is acknowledged, policy makers are cautious when it comes to implementation. Reticence to make sectoral and thematic choices is observed because of the generic fear of substituting market failures with government failures; there are indeed numerous instances in the past where picking-winners policies have failed. In addition public procurement policies risk to be accused for hidden protectionism. For this reason policy experiments are rare and the policy discourse if followed by few examples only.

## Important experiences presented in the Workshop

A number of success stories were presented in the workshop:

### Creating a lead market -Electromobility programme Estonia

A presentation of a Lead-Market project in Estonia was presented by Mart Laatsit. The project is of particular interest because it constitutes a demand side policy in a country who is not the producer of the main product. Estonia decided to create the first nationwide charging network in the world for electric cars without having a national electric car production. It expected both direct benefits as a demonstration case that could attract producers for pilot demonstrations and indirect benefits from linkages to electric vehicle operations.

The decision was taken at the ministerial level and coordination between ministries as well as negotiations with municipalities constituted crucial ingredients of rapid adoption, implementation and success. Impact and risk assessments were undertaken, but the final decision had to be taken with political responsibility since there were still important factors of uncertainty at that stage, e.g. demand for electric cars (prizes and models), other countries deciding to pursue a similar electromobility programme etc. On this regards *policy makers need to accept a certain degree of risk* and the risk is higher the further from the market and the more complex the project is.

Estonia had *already other experiences* with public procurement for innovation and efforts to create lead markets and this type of policy thinking has started establishing in the minds of the administration. The project was implemented smoothly and Estonia has now the most dense network, with not only higher density but even the highest number of recharging stations in absolute numbers in Europe. For the project to success

* Advanced charging infrastructure
* Competence centres
* Car sharing schemes
* Demo and awareness raising campaigns and
* EV grants

were mobilised/ created.

The result was spectacular with a demonstration fleet with 507 cars for social workers around Estonia, a car sharing scheme (cooperation with Mitsubishi and Nissan). There are already 100 cars bought by private customers. Government subsidies enable car dealers to offer cars for an equivalent to petrol-powered car price. *The selection of quick charging technology* (20-30 minutes for full charging) was a crucial factor of success and so was the density of the network (at 50 km maximum distance). Beside the benefits for the environment a major indirect benefit was the development of software industry skills for operating and billing the quick charging network as well as car sharing schemes. The latter has already created new business for Estonian software developers, as the solutions have been installed in Washington DC and Maryland. BMW has also made a strategic investment in the software company for their billing software.

The main lessons learned from this project are:

* Experience (even with failures) is important for embedding demand-side policies into the overall national strategy
* Uncertainty is built in, into PPI and hence some political risk-taking is necessary
* The selection of appropriate technologies and timing are crucial elements of success
* PPI is not only successful in countries where the main element of the procurement process is locally produced.

### Pre-commercial grants and prizes in the UK

The UK has very early adopted the idea of demand-side policies and has in particular debated the issue of public procurement in several policy documents, national agencies and even the House of Lords. The Innovation and Research Strategy for Growth (November 2011) and the Industrial Strategy for the UK include a large government grant support component but they are complemented with demand-side instruments. They are considered as being effective alongside other mechanisms because they are supporting commercialisation and incentivise product development. However it is important to have committed budgets and competent procuring organisations able to make intelligent selections. The experience of the UK has confirmed the barriers identified in the literature, including timing (leaving it too late), practical knowledge gaps, problems with Solution led specifications, disconnection between key players, risk aversion and last but not least misunderstanding of legal framework and supplier engagement.

Based on past experience the UK has adopted two main instruments in demand-side form, which were discussed in the workshop:

1. **The SBRI Programme**

The SBRI programme, a variation from the long-established US SBIR programme, uses the power of government procurement to drive innovation. It provides opportunities for innovative companies to engage with the public sector to solve specific problems. Competitions for new technologies and ideas are run on specific topics and aim to engage a broad range of organisations. Thus the public sector engages with industry during the early stages of development, supporting projects through the stages of feasibility and prototyping. It is organised in stages, notably

* Open competition supported by the Technology Strategy Board
* Selection of most promising proposals – final submission and grant
* Demonstration of feasibility (50-100000 £)
* Assessment for Phase 2 funding
* Prototype development (250000-1m £)
* Applicant free to further develop and exploit IPRs

In theory there are benefits for the department (access to new solutions), companies (becoming lead customers) and the economy as a whole (supporting high-tech SMEs, innovation and new market development). There have been 230 competitions since 2009, 1200 companies have benefitted and 40 public sector bodies were involved for a total sum of 100 million £. Success stories were reported in energy efficiency (energy efficient soldier competition now in discussion for selling to the US Department of Defence) and detection of drug drivers.

SBRI can be a very good tool to develop a culture of innovation, it can be very effective at local/regional level and useful for private entities (hospital) in order to achieve IPP.

1. **Inducement/challenge prizes**

Inducement/Challenge prizes are not the usual reward for past merit but a offer a reward for a solution to a specific problem or issue. This triggers stimulation of innovation and constitutes an incentive to innovate where the market might struggle. It can even increase effort directed into solving a problem and encourage radical solutions.

The benefits of inducement prizes include the raise of the value society places on solving the problem, seizing public imagination and focusing effort; encouraging investment in neglected research domains; creating novel collaborations, opportunities for cross-disciplinary working, complementary innovations, new customers and sources of finance; developing new markets, or introducing more customer focus; offering a new information source when disseminated. Last but not least they have good value for money - the value of the work input far outweighs the value of the prize itself. They also assist commercialisation, matching innovators and investors, identifying the most promising inventions in areas most likely to deliver added value.

Inducement prizes are best suited to spur innovation when a goal can be defined in concrete terms but the means of achieving it are unknown, no specific organisation or individual is a clear candidate for developing the innovation and one can expect that resources can be devoted to winning the prize.

Innovation and Research Strategy announced a strategic role for inducement prizes in the UK innovation eco-system and BIS supports the UK Centre for Challenge Prizes. As yet BIS co-sponsors two unique challenge prizes on topical subjects, both fitting the green agenda: Hands off my bike / Workplace cycle challenge and Carbon data measurement prize. Similarly the Cabinet Office has run two prizes: Ageing well – reducing isolation among the elderly and Reducing waste in communities.

### The German experiences

The High-tech Strategy 2020 in Germany stresses the potential of PP for innovation embedded in mission-oriented policies to solve grand challenges, e.g. “public procurement is to focus more strongly on innovations in security technology”.

In Germany there is a relatively long history of PPI activities allowing academic research. Such projects include:

2006: High-tech Strategy: stress potential of PP for innovation

2007: joint initiative of six federal ministries: “Intensified innovation-oriented PP”

2009: modification of the German law against restraint of competition (GWB): award criteria have been extended by innovative aspects

2010: High-tech Strategy 2020: stress potential of PP for innovation further, embedded in mission-oriented policies to solve grand challenges, e.g. “public procurement is to focus more strongly on innovations in security technology” (BMBF, 2010: p.17).

2011: brochures to raise awareness of PP by Federal Ministry of Economics and Technology (BMWI) and encouragement of public procurers to participate in the European calls for proposals for cross-border PCP and PPI projects

2012: Innovation concept of BMWI: They will provide incentives for PPI.

2013: opening of competence centre for innovation-oriented PP

Since 2006: annual prize “innovation creates a lead”

An expert presentation from Germany stressed the overall picture rather than concrete examples. It stressed that a special survey dedicated to the sources of innovation has found customers and demand to be among the major sources (20%) of process innovation and 16% for product innovation. In several sectors public customers had a leading role. From different sources of academic research in Germany has found that

* PPI contributes to higher sales with new products
* no such effect found for defence demand, however
* SMEs, services and firms from eastern Germany profit most from PPI
* PPI tend to limit export activities of firms, particularly for service firms that use PPI from the health sector.

The academic experience from Germany calls for of collecting complete data (after creation of measures) and providing access to these data and identified the Need for evaluations of PPI: on firm level, industry level and regarding main objective: improving public services / mitigating grand challenges AND comparison of effects with other policy instruments.
The ultimate goal is to understand which instrument works best for what?

### The Italian Experience

Unlike the experienced countries above Italy has started late with PPI. The main interest is that in Italy the policy developed as a bottom-up experience from regional level to central government. There was an element of policy learning from northern regions to southern regions, which could eventually integrate Structural Founds and Smart Specialisation to regional PPI. A good coordination between Ministers (national level), regions (regional level) and European level helped.

Italy has been a typical case where the public administration was not aware of the potential of PPI and due to inertia factors (risk aversion, budget constraints and fragmentation of public administration, inappropriate legal framework and lack of technical skills) it was unwilling to experiment with new instruments.

An experiment of Policy learning at the DPS (Department for Cohesion and Development Policies) in 2010-2012 triggered change: A project for policy learning in the fields of Research and Innovation policies under Structural Funds started with the involvement of more than 200 senior and middle-level officials at Regional governments (appr. 60 on demand-driven innovation policies). Groups were involved into knowledge sharing and communities of practice with a final goal to produce administrative and legal documents ready to be implemented for demand-driven innovation policies. It ended up with an Italian model of Innovative Procurement broken down into a PCP stage and a commercialisation stage. An important element in the model is the use of technological foresight to reduce technological uncertainty in the process.

Based on this experience and the interest of a number of regions in 2013 a large national programme on demand-driven innovation was launched. It is now a joint scheme of the Ministry of Research and Ministry of Economic Development in Southern Regions with a budget of 150 mln €. The programme will use the phases developed during the regional pilot derived from six regions.

## Key lessons from the presentations and the discussion

The background paper had launched three key questions which were partially dealt with during the discussions:

1. When designing innovation strategies are demand and supply side aspects equally taken into consideration? From the experience of the Member States and the discussion it was clear that demand-side policies are now an integral part of the discussion and there are experiences in nearly all Member States. The rationale is well understood and incorporated and the long history of discussions has contributed to better awareness and higher willingness to experiment.
2. How are demand side aspects implemented (in connection with strategic priorities)? It seems that even in countries where demand-side instruments are more frequent than in others, they take the form of specific programmes rather than en explicit strategic element. It seems that the time has come for a more systematic approach to demand-side becoming a better integrated policy but also for more systematic data collection and evaluations.
3. What are the experiences with demand side instruments? The number and experiences with demand-side instruments are rapidly increasing. Public procurement is the most important instrument adopted by the Member States. However, it takes various forms ranking from complex high risk projects envisaging lead markets to prizes leveraging private resources to resolve specific problems of public relevance. Coordination between different ministries as well as between the regional and the national level are crucial elements in that respect. Instruments that are proven successful in other countries, starting in the US and transferred to the UK, are Small Business pre-commercial support for public needs (in the SBRI form) and different prizes that address societal challenges.

In addition to the three key questions discussed five transversal points appear of relevance:

*Technological selection issues*: The selection of technologies is a major barrier for decision makers as they fear picking the wrong technology and locking in. Impact and risk assessments (as in Estonia) and the utilisation of technological foresights (as in the Italian model) are helpful elements to face this difficulty. Nevertheless, ultimately an element of political risk needs to be taken, in particular when dealing with early stage technologies or complex projects.

*Experience helps*: Pilots and awareness raising projects are crucial, not only because they help develop the necessary skills but equally importantly because they create an environment, which is more conducive to Public Procurement of Innovation. Risk aversion is diminished as more cases are developed and the public administration becomes aware of the elements and value of such pilots. Dissemination and proliferation are this way facilitates, either between different layers of the administration (as the national and regional level in Italy) or through national coordination (as the different ministries both in Italy and Estonia).

*Skills* are identified as a major barrier in the literature. But the experiences described during the workshop do not seem to consider skills as an inhibiting factor. Overall experience and political determination are seen as ways to either develop skills (as in the Italian case of the regional pilot) or to create the necessary environment, where skills develop.

*The role of industry* is important but not always visible from the beginning: Direct gains for national lobbies constitute an important driver. However, indirect benefit, for industries linked backwards or forwards with the specific procurement or lead market (as the software development in Estonia) can prove ultimately important beneficiaries in lead markets.

Finally, in countries where there is limited experience a driver for change can play an active role in developing pilots and accumulating experience. This can be individual organisations (such as the Centre for Challenge Prizes in the UK), individual projects and regional authorities (as in Italy) or even political personalities taking responsibilities are in Estonia.

# 4. Policies for high-growth innovative enterprises

## Session introduction

Stefan Lilischkis from empirica Communication and Technology Research (Bonn, Germany) moderated the session. He stated that there has been **increased interest** in high-growth firms by both political decision makers and academics in recent years.

We know about **high-growth enterprises** that their number and share in all enterprises is small, but that the number and share of jobs they create is disproportionally large. We also know from research that, in the USA, high-growth of enterprises coincides with a similar level of high failure. So if Europe seeks more high-growth enterprises, it may also have to accept a larger amount of spectacularly failing enterprises. Furthermore, we know that the determinants of enterprise growth are manifold. Among the main determinants of high growth is that entrepreneurs actually seek high growth, particularly in internal markets as the domestic market may be too small. Such entrepreneurial seeking needs to be accompanied by skills, access to finance, and favourable framework conditions.

There are indications that **policies for HGIEs** need to be different from policies for small and medium-sized enterprises (SMEs) in order to succeed. There are suggestions that direct government support for HGIEs needs to be selective (i.e. they need to select promising firms), proactive (i.e. they need to search for promising firms), sustainable (i.e. the initiatives must not end after one or a few years), professional, and they need to collaborate with the private sector. However, there are no solid research results yet that would allow identifying particularly effective and efficient policies for HGIEs.

A **survey** among members of the European Research Area Committee for this seminar session found that most European Union Member States that responded to the survey have a low priority for HGIE policies. From 21 countries for which data are available, a relative majority of nine appear to have a low priority, meaning that they acknowledge the importance of HGIEs for the economy but they have no specific policy measures to foster HGIEs. Further six countries have some priority, i.e. they have an articulated objective to foster HGIEs and one specific measure. Four countries have a rather high priority, meaning that they pursue the objective to foster HGIEs and have several specific measures. Finally, in two countries there is a very high priority, meaning that they have a strategic focus on HGIEs and comprehensive policy measures.

The lead questions for the session were the following:

(1) What measures are particularly (un)helpful to facilitate access to finance for HGIEs? In particular: What barriers do Member States face on the road to a Single Market for VC in Europe? What experiences were made when trying to promote business angels?

(2) What characteristics should targeted schemes for supporting HGIEs have? In particular: is a focus on coaching entrepreneurs worthwhile?

(3) What framework conditions need to be modified to support HGIEs? In particular: Should the focus be on general business regulations, investment regulation, labour law, bankruptcy law, SME policies rewarding to stay small, or other conditions?

## Support for HGIEs: policy measures in Poland

Anna Brussa stated that Poland has high shares of enterprises with growth ambitions. The Global Entrepreneurship Monitor (GEM) 2012 found that the share of high employment growth expectation companies in total early-stage entrepreneurship activity (TEA) in Poland was 30%. Poland reported the fourth-highest share behind Romania, Latvia and Hungary. The same ranking applied to the share of high employment growth expectation companies in established companies. In both cases, “high growth expectation” was defined as more than 50% growth within five years, and only companies with more than ten employees were considered. The GEM also found that the share of companies with high growth expectations in the USA and in European countries that are no members of the European Union was higher than in EU Member States.

However, a survey of the Central Statistical Office of Poland breaking down enterprises by growth showed that the number of HGEs and also the number of growing companies decreased from 2007 to 2010. Nevertheless, the Innovation Barometer[[3]](#footnote-3) (2011-2012) found that there is a clear growth in innovative potential and competitiveness of enterprises in Poland benefiting from the Innovative Economy Programme support.

Poland has started to take measures to foster the development of HGIEs in an “SME investment readiness system”. The Polish government is strongly seeking to initiate innovative activity in enterprises. Incubators play an important role in this respect. The Polish government supports 43 incubators with 580 million PLN, seeking more than 1,800 pre-incubation units and more than 600 start-ups. Currently, 340 million PLN have already been paid to incubators, supporting 350 start-ups and mobilising additional private capital of 280 million PLN. About 30 disinvestments have taken place so far.

The Polish government also supports business angel investment. With a budget of more than 28 million euro, more than 1,100 conferences, seminars and workshops were conducted, and more than 60 investments in companies were achieved. The Polish government furthermore seeks a co-investment scheme in an “Innovation Finance Support Fund” of 50 million PLN. The scheme will target micro and small entrepreneurs with growth ambitions having a contract with investors such as business angels and venture capital funds. The relation of the loan to the investors’ input will be 2:1. The scheme is planned to begin in June 2013.

The support schemes for 2014-2020 for enterprises, the next Structural Funds programming period, are being elaborated at the moment. As a basis for the structuring of these new schemes, four types of enterprises have been identified: high-growth leaders, which are close to the global technology frontier, comprise approximately 5%, and high-growth catching-up enterprises 10%. Then there is a group of “stable enterprises”, of which 35% perform moderate growth through regional and local level innovation, and 60% are “lifestyle” enterprises which are technologically backwards.

Finally, Anna Brussa confirmed that high growth is the result of a mix of factors and it is normally not to be ascribed only to one reason. Her recommendations are the following: Focus on improving the overall business environment; encourage entrepreneurial attitude to stimulate more growth ambitions in new and existing businesses, to support the provision of training in young and small enterprises (management skills); improve access to debt and equity finance for new and small firms in particular to fund investment in R&D and the acquisition of non-tangible assets. The valuation of intellectual property and intangibles and their use as collateral for loans should be promoted; and promote innovation and internationalisation activities of new and small firms for their potential role as factors of enterprise growth.

#### Discussion

In the discussion, Anna Brussa elaborated that while there are initiatives to promote enterprise growth in Poland, the term “high-growth innovative enterprises” does not yet appear in Polish policy papers. The investment situation is improving: Not long ago there was virtually no venture capital available in Poland. The government’s promotion of business angel networks was successful: after initial governmental support the networks are now self-sustained. The co-investment scheme was designed with experiences from the Scottish enterprise promotion agency. No analysis of HGEs by sectors has been conducted yet in Poland.

## Support for HGIEs: policy measures in France

In France there are no specific measures for HGIEs but there are comprehensive measures for enterprise development. In France there is a special monitoring of 2,000 growing SMEs by the network of the Ministry of Productive Recovery. Within the framework of the Public Investment Bank (BPI), customised international support is provided to 1,000 SMEs. The French government focuses on **four key measures** to support enterprise development: 1. emergence of HGIEs, 2. access to finance, 3. fiscal incentives, and 4. framework conditions.

The Government’s “**Pact for Growth**” is a key step towards economic recovery and the reinforcement of French competitiveness. The Pact aims at providing a strong strategy to face globalization and maintain France’s social model through economic performance. The Pact distinguishes eight drivers of competitiveness with 35 specific decisions.

As regards **encouraging the emergence of innovative SMEs**, public incubators are a key measure in France. The support function of incubation projects is crucial because it determines the project's success and sustainability of the company. It is placed upstream of a particular financing chain which is vital for incubated companies: opportunities to access these funds depend in part on the quality of support that must take into account the "market“. There are 30 regional incubators across the country, created as a result of the Innovation Act of 1999. At the end of 2009, 84% of incubated SMEs were still active. In 2010, 194 projects incubated led to a creation of a company.

A focus is on measures to favour **clusters** development providing a support mechanism for SMEs. Competitiveness clusters bring together large companies and SMEs, research centres and educational institutions in a confined geographic area. The goals of competitiveness clusters are to strengthen the links between research and industry, focus public aid, and set up an ecosystem including education, private funding (business angels, VCs, and others), IP management, entrepreneurship, and international development. SMEs receive financial support for R&D collaborative projects between big companies, SMEs and laboratories by the FUI (inter-ministerial fund) and creation of new products. The third phase of the policy is focused on the creation of new products and services.

As regards **access to finance**, a Public Investment Bank was created which will invest €42 billion over the next five years: €32 billion in loans and guarantees and €10 billion in capital funding. A new public guarantee scheme will be set up to make over €500 million available to SMEs. Business financing will be supported through tax reform for savings. The banking law will be reformed so that banks can play their full part in supporting the growth of the real economy. SMEs’ access to capital markets shall be facilitated.

The presenters focused on national funds for **seed funding** (fonds national d'amorçage). A fund of funds was created in 2010 with a budget of 400 million euro plus additional 200 million euro in 2012. The targets are national research strategy priorities, including health, food and biotech, ICT, nanotech, climate change and clean tech. In March 2013, commitments will be given for 17 seed funds of national or multiregional scope, with a level of commitments of 333 million euro. Ten seed funds are actually active – a closing was achieved – with 29 firms in the portfolio. There are general difficulties to raise private funds on this market segment. 10 % private investors in closings are a rule, and there are EIF commitments in some funds.

As regards **fiscal incentives** for innovation, the government perpetuated the research tax credit. Over 5 billion euro was refunded for the year 2010 for 13,000 beneficiaries. A new innovation tax credit is being created to allow SMEs to benefit from an additional tax rebate on innovation expenditures. A system for “young innovative companies” entails a temporary exemption from employers’ contributions and taxes on profits.

Focussing on support of **young innovative enterprises**, during the 2004-2010 period, 4,400 enterprises benefited from a related scheme. The exemption from employers’ contributions and taxes was of 798 million euro over the same period. Results of the 2012 impact assessment from the Ministry of Productive Recovery showed that the YIC in the scheme has strongly increased employment and turnover, but less than half of them make profit. The scheme was found to improve the survival rate of the YICs. The R&D investment increasing by the firm benefiting from the scheme has been higher than the budget cost of the scheme.[[4]](#footnote-4)

As regards **framework conditions**, the French Government identified three main guidelines for reducing the administrative burden for businesses: strengthening the management of simplification policies under the authority of the Prime Minister; achieving stability of five key tax mechanisms for investment and business survival over five years; and launching administrative burden reduction initiatives on seven key areas. The “SME test” will be a procedure to assess the impacts of all new regulatory proposals on SMEs.

A new measure, planned for 2013, will **support HGIEs by mobilising public procurement**, as a measure of the “Pact for Growth”. The goal is to make public procurers more aware of innovative products and services, including R&D. A target is set: 2% of the total procurement of the state, public bodies and hospitals shall be allocated to HGIEs. A related action plan includes a conference to mobilise public procurers, each ministry and body will write an innovation procurement plan, a guideline and good practices are described in a new guide, and a monitoring system is to be developed.

**Lessons** of French innovation policies include the following. First, there is an issue of centralised policies: SMEs need close relations which strengthens the role of regions and which requires a consistency of strategies. Second, it is important to adapt the development of new technology to market needs and demand. Third, innovators sometimes focus on technology perfection and lose sight of product marketing. Fourth, SMEs can stagnate because they do not succeed in generating a threshold turnover.

**Future avenues of innovation policy** should create better synergies and links between regional and national targeted R&I policy measures for SMEs. Entrepreneurship may be improved by training from school to high education. Industrial collaboration between SMEs, start-ups and large firms needs to be fostered. Collaboration between suppliers and start-ups needs to be facilitated. Access to public procurement for innovative SMEs needs to be enhanced, and innovation needs to be better integrated in public procurement.

#### Discussion

The discussion revolved around the issue whether governmental measures can establish a self-sustained ecosystem of innovative companies. While survival rates are high, it could not be clarified to what extent survival and growth of innovative enterprises in France is due to public support. In the Netherlands there are companies which are heavily dependent on fiscal measures and would not survive without it. As regards public procurement, no direct target is possible. The French government helps public agencies to take a more proactive and consultative attitude towards HGIEs and their products. The level of venture capital available in France was stated to be much lower than in the US and the UK.

## Finance for HGIEs: what policy makers can do

At the beginning of his presentation, Jean-Marc Soustre pointed out that the following would be relevant for disruptive innovation in technology such as life sciences, ICT, and CleanTech. He described the **different sources of finance** along the development stages of an enterprise: First, concept and pre-seed funding, typically in the range of around 0.5 million euro, as well as seed and start-up funding of about 0.5 to 1.5 million euro, from public funds, the “three Fs” (family, friends and fools), and business angels. Second, and overlapping with the start-up phase, first real venture capital of about one to 1.5 million euro from local venture capital. Third, international venture capital in the mezzanine and follow-on stage (5-20 million euros); fourth, private equity or initial public offerings market for IPO as well as mergers and acquisition (more than 30 million euro).

In the EU there are basically three entities developing and financing innovation: First, **start-ups** and spin offs. Large corporations have largely retreated from R&D and focus on incremental innovation. They frequently fail to exploit breakthrough innovations (e.g. Xerox PARC, Bell Labs) and prefer to preserve current lines of business. Second, there is **public innovation support**. Direct financing is not yet the rule, instead governments try to foster innovation through regulations because they are cash-strapped and suffer from a past record of failures. A framework for indirect financing is still in process (e.g. a “European Small Business Administration”), and there are patchy national regulations. Tax breaks for supporting innovation are expensive and unproven. Third, **venture capital** appeared as the solution, with an expected focus on start-ups and disruptive innovations, as it was on top and attracting better players and because VC-backed companies perform better.

Jean-Marc Soustre stressed that in Europe, venture capital does not follow the **Silicon Valley VC model** which is based on highly talented individuals from universities, VC money to finance creation and supply competencies and a strong incentive for success (stock options). He said that trying to copy the Silicon Valley VC model in Europe generally led to disappointing results, with cyclical constraints in funding. European VC barely finances company creation and spin-offs, which is a European specificity. The assumed template of venture capital as practiced in the Silicon Valley is in crisis since Europe started to adopt the US model in 2001 at the wrong time and without assessment of the applicability of the model to the European background. The Silicon Valley venture model has two biases: one towards disruptive innovation, with a high risk and return profile and a limited holding period, and against fundamental research, with unusual risk and return profiles as well as uncertain holding periods. The other one with a mono-focus on individuals in the three-dimensional play of the individual, support mechanisms (soft money, …) and research commitments. Corporate VC plays a new active role in Europe, providing non-cyclical VC.

There are, however, a couple of **good news stories** for VC industry that represents the market arbitrage. VC-backed pre-and post-IPO performance now matches or exceeds that of US counterparts – the best European VC funds demonstrate top US quartile performance. Europe has seen some 15 billion dollars in venture-backed liquidity events during the past two years. This is 50% of the US value, yet occurring with only one fifth of the venture funding. Europe has also seen capital efficiency improvements: Proportionally, European VC is now producing higher exit multiples than US VC as well as higher capital efficiency. Europe is also characterised by lower entry valuations, high-quality deal flow, and a buyers’ market. In 2011 there were 8.2 billion euro of VC invested which is close to 2001 level, and plus 55% in one year.

**VC trends** in Europe include the following: First, there is less demand for independent venture capital. Technologies have made it cheaper to build a product and attract customers, and alternative sources of financing are available, e.g. corporate VC, angels, and crowd funding. Second, venture return rates become lower, related to overwhelming peaks in valuation and inefficient capital allocation. Third, there are trends which may not be sustainable in the long-term. Therefore new adaptive behaviours appear: growing use of technology in how the investments are made; emergence of ‘branded guilds’ as leading communities attract deals and talents; independent VC firms are bigger or smaller, adaptive and tend to hire operational personnel; corporate VCs are growing (there were more than 90 new corporate VC funds in 2011); and there is a search for new opportunities that do not fit into the traditional VC investment criteria. All in all, VC is part of the solution, not the only one.

Jean-Marc Soustre saw the following **potential ways forward for a European VC model**. Above all, a structural change for the VC market is necessary, with impact on exits and fund duration, to stimulate investors. This implies a need to facilitate longer term investments for funds (difficult to negotiate with investors), to facilitate VC market consolidation and syndication by industry, a Pan-European VC passport as currently prepared by the EC, to create a VC second-market (which is yet to emerge for non ICT investments) since growth is also critical, disintermediation (information gap), and an extension of tax-breaks because costs for VCTs are high – while the cost and impact of such breaks are unclear. Besides, there is a need for reinforced ‘oriented’ research in universities to reach the international competitive edge, there need to be better conditions to achieve tech transfer from universities to market, technology parks and incubators need to be close to labs, and there needs to be support to entrepreneurship and investment readiness (through training, coaching, seed funding, competition, and soft money). In order to attract the best entrepreneurs, he recommends to increase the critical mass of innovation support structures and to consolidate their role, given that the best entrepreneurs are the real scarce resource in knowledge-based economies.

Jean-Marc Soustre recommended a **simple process** model to develop VC in each European country: Governments need to qualify the current situation (i.e. to select a push or pull model and check Gross Expenditure in R&D, triadic patents, Scientific Talents and Financing Entrepreneurship), plus identifying and qualifying potential policy measures linked to strategic options, which may result in the creation of a national platform for VC. There are five dimensions for strategic options: taxation, economy, policies, society, and jurisdiction. Most options are closely interlinked – they are not to be used as separate means but rather as an impact intensive combination depending on the chosen strategy. Governments need to qualify typical financial measures in terms of benefits, weaknesses, start-up type, risk, vehicle, combination, impact, implementation timeframe, effect, cost and other characteristics.

Whatever the model is, Jean-Marc Soustre gave the following tips: Incentivise VC syndication and collaboration including corporations (market consolidation); accelerate international exposure to VC and organise high-growth coaching; encourage local funding vehicles (crowd funding, business angels) and help structure first round lead investors; privilege continuity to attract finance; control exit markets via brokerage; and incentivize external cross-pollination across EU. On the other hand, do not limit corporate venturing to Tier Ones only; do not invest before you have qualified your own model, and remember that output tax incentive is easier but it does not favour ‘local’ R&D.

#### Discussion

In the discussion, Jean-Marc Soustre stressed the importance of collaborative approaches and syndication for further developing venture capital in Europe.

## Innovation revisited: policy implications for fostering HGIEs

Allan Martel operates a consulting firm based in Canada where the March 2013 Federal Budget continued the dramatic shift in Canadian innovation policy away from tax credits and more towards direct support for firms through the nation-wide coaching network operated through the National Research Council. In the 2012 Budget the role and mandates of the R&D laboratories was altered fundamentally with the aim to convert basic science R&D centres into the equivalent of the German Fraunhofer Institutes across Canada. These changes are the first set of responses by the Federal Government to the Jenkins Report, a study commissioned in 2011 to look at innovation policy in Canada.

The first part of his presentation was about **critical innovation elements in the life cycle** of knowledge-intensive SMEs. It described the results of an extensive survey of knowledge-based SMEs in western Switzerland undertaken in late 2011 by platinn, an agency charged with operating an SME coaching network in the region (http://www.platinn.ch). The results show how various innovation elements wax or wane in importance depending on the life cycle stage. It also characterises those elements where the SMEs believed themselves to be the most competent and those where help is required. The purpose of this part was to illustrate the workings of a very effective SME HGIE coaching network.

The main conclusions from the platinn survey were the following: The life cycle stage of the SME is a critical determinant of what innovation and growth elements are important and missing. SMEs believe themselves to be more competent in some of the innovation and growth determinants than with others. Only two of the four innovation vectors have any potential for R&D to be of value. Universities are at times important but never the number one priority. Coaching networks should be prepared to offer support across all critical elements to varying degrees at various life cycle stages.

In the second part of his presentation, Allan Martel described the drivers of innovation based upon key results from a book by Marcel Coté and Roger Miller about “**innovation reinvented**” from 2012. The authors found that innovation pursuit in emerging markets is inescapable, but this is not so in mature markets. In mature markets a strategic commitment to innovation is the most important factor followed by corporate culture. The detailed study comprised of over 1,000 firm surveys and 60 case studies conducted over nine years describes the contribution of emerging sectors versus mature sectors to economic development, arguing for a focus on mature industries and emulators as by far the greatest contributors to economic growth as opposed to breakthrough technologies. **R&D is not on the list of principal drivers of innovation** – it is often associated but rarely critical. 95% of innovations involve improvements to what exists in the market or in the production process. The exception is in system breakthrough and “pushing the envelope” type where R&D is at the core of customer-driven change. However, breakthrough innovators rarely survive – they are mostly pushed aside by more competitive emulators. The major contribution by universities is not their research but their creation of a skilled labour pool of graduates.

In the real world, innovation takes place within a continuous stream of improvements in products and processes with an occasional breakthrough that gives rise to a new market or that disrupts an existing one. An effective set of public policies aimed at stimulating innovation should target the continuous stream of improvements. This means (among other things) setting up HGIEs to be able to enter open innovation networks of multi-national enterprises.

Many of Canada’s (and possibly also Europe’s) current public policies do not fare well when viewed through the lens of the games-of-innovation framework. There is an inappropriate bias towards R&D intensive innovation. There is at best a tenuous link between research at universities or dedicated research institutions and innovation. The findings from Coté and Miller are in line with the findings from the platinn survey. “Pushing the envelope” project support is worthwhile as there is a clear requirement for focused R&D. Encouraging local employment of university graduates and restructuring the National Research Councils to become innovation partners with industry (matching funds required for all activities) are likely to be effective. Venture capital targeting firms that survive in the ecosystems of innovators and non-technological businesses has higher impact as odds of survival are higher and their economic footprint larger.

In the third part of his presentation, Allan Martel turned to what can go wrong even if innovation policy is successful. Even if “a plethora of knowledge-based SMEs that grew quickly” were created, seeking international markets and relocating business elsewhere can potentially endanger employment creation and growth in the region where the company was founded. **Hostile take-overs** are another danger. Canada has much smaller pools of risk capital than the US. Canada therefore tends to fund companies at lower levels than the competition. They are therefore weaker than the competition and often cannot realise their full potential. Canada’s companies are cheap, and not rarely they are acquired. The Branham group has listed 164 significant ICT companies that have been lost to acquisition in the last decade. According to Allan Martel, Canada’s security regulators compounded this problem by making hostile acquisitions easier in Canada than in the US.

#### Discussion

In the discussion, Allan Martel explained guidelines when seeking to create **high-growth coaching networks**. The first thing is to analyse the local situation. One needs to understand that establishing a high-growth coaching network is not an overnight task. The culture of SMEs may need to be changed, making them “proud entities”. Often there are huge gaps in SMEs’ competencies that need to be filled. However, coaching networks must not foster dependency on consultants. Innovation policymakers have a role in furnishing business intelligence through coaching networks. A robust network of knowledge-based SMEs is well-positioned to take advantage of the open innovation policies of several Multi-National Enterprises (MNEs). Providing a look into the MNE innovation priorities and furnishing competencies information from the network itself are vital roles under the aegis of business intelligence. Finally, a high-growth coaching network needs to target clear operations. The platinn network is a good example; it has very clear measures. The expectations of high-growth coaching networks need however to be managed. Such networks may bring SMEs up to new markets, but the enterprises do not necessarily grow beyond 100 employees.

The question was raised whether the limited role of university R&D in business innovation, as found by the platinn survey as well as the Miller and Coté study, may call for enhancing just this role. It was also mentioned that **take-overs** are not necessarily bad. Enterprises may be acquired but still operate in the same location and flourish. And even if the enterprises go, the entrepreneurs will often stay – and start another firm.

## Conclusions

The main conclusions from the session can be summarised as follows:

There is increasing awareness in Europe about the importance of HGIEs and policies for HGIEs. The examples from Poland and France show that countries are developing related policies; they may however also show that in many countries the development of such policies is in a fairly early stage.

Venture capital from funds is an important source of finance for HGIEs, but not the only one. Corporate VC, business angels and crowdfunding also provide solutions. Venture capital needs to be further developed in Europe in order to unleash its full potential to foster HGIEs. National governments are recommended to base policies for developing VC in their country on a careful analysis of the situation in their country.

Coaching networks can support the development of HGIEs. However, experience from a Swiss coaching network as well as recent research suggests that the current importance of university R&D for innovation and growth of enterprises may be smaller than previously assumed. Furthermore, policy makers should take appropriate measures to prevent hostile take-overs of HGIEs which could threaten the employment and wealth created by these enterprises.

# Appendix 1: Agenda

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| ***Opening session*** |

08:00-08:45  *Registration & coffee*

08:45-09:00 Welcome and introduction by **Pierre Vigier,** Head of Unit, Economic Analysis and Indicators, DG Research and Innovation, European Commission

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| ***Session I*****Effectiveness of national research systems** (linked to the Commission's communication '*A Reinforced European Research Area Partnership for Excellence and Growth*' from July 2012)**1. What is the optimum balance between competitive and block funding in a research system?** Is that balance different according to national circumstances?   What are the limits of competition? What level of concentration of funding of grant awards should a research system aim to achieve to maximise effectiveness? How can competitions for funding be designed to raise the level of effectiveness of national research systems? Which instruments are best to implement competitive funding? How can competitive funding be designed to encourage new entrants to challenge the incumbents?2. **What measures can be taken to improve national approaches to peer review?** How can the highest quality of experts be motivated to engage in peer review outside their own national contexts? How significant are the limitations of peer review and what can be done to mitigate these? 3. **What is the most effective way to incentivise institutions to improve their research performance?** What degree of institutional autonomy is necessary for them to be able to respond to incentives that reward quality? What is best practice in institutional assessment? What level of institutional concentration on excellence is best for a research system? What are the effects on those not selected? |

09.00-12.00

* Introduction by the moderator of Session I **Luke Georghiou -** University of Manchester and Manchester Business School
* Discussion panel:

***Arie van der Zwan****, Ministry of Economic Affairs, Agriculture and Innovation and* ***Jacky Bax,*** *Ministry of Education, Culture and Science,* ***Netherlands***

***Pier –Eric Yngwe****, Ministry of education and Research,* ***Sweden***

***Michael Keenan****, senior analyst, Directorate for Science, Technology and Industry, OECD*

***Philippe Laredo****, Université Paris-Est and University of Manchester*

* General discussion

12:00 -13:00 *Networking Lunch*

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| ***Session II*****Innovation strategies articulating supply side and demand side aspects*****1*. When designing innovation strategies, are demand and supply side aspects equally taken into consideration**? All Member States have innovation strategy papers, some countries even more than one. When preparing strategy papers what is the process? Repeating past rationales and interventions or organising new evidence creation and experiment with new measures? How are demand side policies perceived during the strategy design phase? Are there specific demand side measures favoured over others? If yes, why?**2. How are demand side aspects implemented (in connection with strategic priorities)**? There is more experience with supply side measures than demand side in innovation policies. This often leads policy makers to disregard demand side aspects mentioned in strategy papers and by inertia favour supply side. Does the actual policy reflect the role granted to demand side in strategy documents? Is the mix as planned? Are adaptations to the strategy decided explicitly and ex ante or does policy develops partly independently of strategy?**3. What are the experiences with demand side instruments**? What are the main demand-side measures implemented in your country? What are the reasons for selecting these instruments and not others? What are the experiences with them? What are the main obstacles to implement demand-side measures? How can these obstacles be eliminated? |

13:00-15:10

* Introduction by the moderator of Session II
**Lena Tsipouri -** Professor at the University of Athens
* Discussion panel:

***Mart Laatsit****, Ministry of Economic Affairs and Communications****,*** *Estonia*

***Nick Rousseau****, Innovation Directorate, Department for Business, Innovation & Skills, UK.*

***Birgit Aschhoff****, Senior Researcher, Centre for European Economic Research (ZEW), Germany*

***Andrea Bonaccorsi****, University of Pisa and ANVUR, Italy*

* General discussion

15.10-15.30  *Coffee break*

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| ***Session III*****Policies for high growth innovative enterprises**1. What measures are particularly helpful or unhelpful to facilitate **access to finance** for high-growth innovative enterprises? What barriers do Member States face on the road to a Single Market for venture capital in Europe? What experiences were made when trying to promote business angels?2. What characteristics should **targeted schemes** for supporting high-growth innovative enterprises have? Is a focus on coaching and mentoring entrepreneurs worthwhile?3. What **framework conditions** would most urgently need to be modified in order to support high growth of enterprises? Should the focus be on general business regulations, investment regulation, labour law, bankruptcy law, SME policies rewarding to stay small, or on other conditions? Or should the whole set of framework conditions be targeted?  |

15.30-17.40

* Introduction by the moderator of Session III
**Stefan Lilischkis**, Empirica, Bonn
* Discussion panel:

***Anna Brussa****, Polish Agency for Economic Development,* ***Poland***

***Pierre-Louis Autin****, Ministry of Higher education and Research and* ***Rémy Arquevaux,*** *Ministry of Public Recovery,* ***France***

***Jean-Marc Soustre, founding partner, HumanEye****, France*

***Allan Martel, president*** *Allan Martel Consulting, Canada*

* General discussion

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| ***Concluding session*** |

17:40-17:50 Main messages to emerge from the discussions - Summary by the moderators

17:50-18:00 Conclusions by **Clara de la Torre**, Director, Research and Innovation, DG Research and Innovation, European Commission

# Appendix 2: Background Papers

# Effectiveness of National Research Systems

Luke Georghiou, University of Manchester

**Introduction**

This background paper supports a session in the 2013 ERAC Mutual Learning Seminar on the theme of the effectiveness of national research systems. Within the wider context of Europe 2020 the aim of the Seminar is to support the monitoring of the implementation of the twelve Country Specific Recommendations related to research and innovation. The specific objective of the session is grounded in the priority for the European Research Area (ERA):

*“More effective national research systems – including increased competition within national borders and sustained or greater investment in research.”[[5]](#footnote-5)*

The ERA Communication argues that open national-level competition is necessary to improve the effectiveness of the national research systems and thus contribute to deriving maximum value from public money invested in research and innovation. Best practice in this respect is stated to involve:

“*Allocating funding through open calls for proposals, evaluated by panels of leading independent domestic and non-domestic experts (peer review) - this incites researchers to reach internationally-competitive levels of performance; and*

*Assessing the quality of research-performing organisations and teams and their outputs as a basis for institutional funding decisions - peer review can form a part of such assessment and, in the long-term, lead to organisational change*.”[[6]](#footnote-6)

The expectation is that Member States should introduce, or enhance competitive funding through calls for proposals or institutional assessments, introducing legislative reforms if necessary. Public bodies responsible for allocating research funds are expected to apply ‘the core principles of international peer review’.

The annual cycle of economic policy coordination, the European Semester, results in Country-Specific Recommendations (CSRs). In the final versions approved by the Council in 2012 several Member States (Czech Republic, Estonia, Latvia and Sweden) had recommendations in relation to increasing the effectiveness of their research systems,

Following the adoption of the 2012 ERA Communication and Council Conclusions thereafter , this session of the Mutual Learning Workshop will focus on these issues. The aim is to explore how different approaches lead to different results across the EU; and to identify best practices and consequences in terms of modernisation/upgrading of national research systems, and possible drawbacks throughout the implementation process. This background paper seeks to highlight some of the issues involved in competitive funding, peer review and institutional assessment.

**Setting the Scene**

Work by the OECD and the European Commission has indicated that the share of competitive funding as a total of public R&D funding (GBAORD) varies from 20 to 80% among Member States with an average of around 40% (see Figure) being allocated through open calls for proposals. The remainder is institutional funding, allocated in a block. In some cases this is allocated through an evaluation of performance but the bulk of this funding is allocated without reference to competition.

**Share of GBAORD allocated through calls for proposals**

Source: OECD, based on preliminary data from the microdata project on public R&D funding of the Working Party of National Experts in Science and Technology (NESTI), 2009-2010 and Commission estimations for missing observations – extracted from Commission Staff Working Document Impact Assessment of ERA Communication, Brussels, 17.7.2012 SWD(2012) 212 final

The conclusion that is drawn in the Impact Assessment is that researchers, universities and research institutions face very different levels of competition for accessing public funding. This is seen as problematic because of evidence in the academic literature that excellence in science is linked to the degree of competition between researchers. For example Aghion et al find that each percentage of a university's budget from competitive grants is associated with an increase of 6.5 rank points in its Shanghai index calculated for the Academic Ranking of World Universities.[[7]](#footnote-7) Hicks reviewed fourteen performance-based research funding systems and concluded that it was likely that the governmental goal of enhancing research excellence would be met.[[8]](#footnote-8) She found that their most significant effect was to create powerful incentives within university systems driven more by the competition for prestige rather than the actual level of resources allocated. Some caution is expressed about the risk of compromising other values such as equality or diversity. Auranen and Nieminen examine the relation between university funding approaches and publication performance in terms of national efficiency in producing scientific publications.[[9]](#footnote-9) Their work shows a clear differentiation between two groups of countries. The first, more efficient, group includes the UK, Australia and Finland well-known for highly competitive funding but also Denmark which during the period had a system that was not strongly competitive. The second group encompasses only countries with less competitive systems and demonstrates a substantial improvement in the efficiency for Sweden, which increased the proportion of competitive funding in the period, though the authors still describe its funding system as ‘input-oriented’. The broad conclusion from these studies is that while increased competition is associated with higher performance levels, the underlying situation is complex and includes other incentives and environmental factors.

A different line of argument in support of competition is made by Mitsos et al (the High Level Panel on the Socio-economic Benefits of the ERA) who set out the fundamental arguments for an unequal distribution of funding.[[10]](#footnote-10) They begin with the highly skewed distribution of scientific productivity across scientists, a finding that has held good since the 1920s when Lotka’s Law[[11]](#footnote-11) was proposed. In view of this, funding schemes should be based on the presumption that the most productive scientists will make better use of public resources. Put another way, more and better science will be produced for the same input. The argument is that it would be a wasteful, or even immoral, use of public funds were these to be spread equally. The Panel’s report also suggests that competition is beneficial not only at the upper end of the distribution (for example those who apply to the European Research Council) but also has benefits at all layers and hence on the average of the distribution.

**Characterising research systems and defining the limits of competition**

The fundamentals of a research support system can be characterised in terms of three dimensions which between them condition the terms and framework for competition for resources:

1. *Selectivity*

This refers to the degree to which there is prioritisation between fields. In the context of current initiatives such as Smart Specialisation and Key Technologies it normally results in targeted competition for resources against a set of predefined priorities. This highlights the processes by which those priorities are determined. Normally they combine scientific promise with socioeconomic potential. Policy decisions may concern the proportion of resources to be made available for ‘blue-skies’ or investigator-driven research compared with those which are targeted strategically.

1. *Concentration*

The principal question here is which institutions or research teams to support and the degree to which funding should be concentrated on the best performers. Hence, concentration is a natural outcome of competitive funding.

1. *Sustainability*

This asks whether the funding model allows for the replenishment of human and physical capital within the research system, and hence maintains and grows institutions in the long‐term. Unlike the previous two dimensions this feature can only be measured over time. The unit of measurement can be either the research institution or the system as a whole. The outcomes of selectivity and concentration decisions impact upon sustainability, while in the longer term sustainability determines which actors are available to take part in those choices.

*Dynamics of Competitive Funding*

By considering the interplay of these choices it is possible to understand some of the dynamics of competitive funding. For example the choice of a particular field for support predetermines which institutions or teams will be able to compete for those resources. As noted above it is concentration which is the most likely outcome of competitive funding. This takes place because weaker institutions or research teams are less likely to be able to invest in maintaining infrastructure and in developing the careers of researchers. Over time positive and negative cycles of development are evident.

As noted above, selectivity normally brings socio-economic criteria into consideration as a means of setting priorities. An example of a national drive to focus resources on priorities is the Polish National Research Programme, which defines the R&D directions and channels R&D funding into seven strategic research areas and disciplines which are considered to be crucial for the country’s social and economic development.[[12]](#footnote-12)

Prioritisation to achieve selectivity changes the terms of competition more broadly as successful candidates may be asked to demonstrate their potential for impact or their ability to attract co-funding from business or other sources. There are inherent challenges for prioritisation processes including:

* establishing a meaningful level of granularity to avoid generic categories (e.g. ‘environment’) that cover large proportions of research;
* interdependence of priorities, whereby one area may depend upon another that does not itself feature as a priority (e.g. mathematics); and
* a reluctance among researchers, when called to sit on panels or decision-making bodies, to identify negative priorities (items to be cut to allow resources to be focussed on selected areas.[[13]](#footnote-13)

Barriers to entry may be high for those wishing to develop the capability to compete. This suggests that to maintain the benefits of competition in the medium to long term it is necessary to have channels that allow new entrants to the system to emerge and perhaps some incumbents who are past their best to exit (bit see comments below on peer review).

*Scale and Critical Mass*

Scale is an important element for sustainability. While studies suggest that the critical mass of a research group is normally not very large (10 or fewer members), the issue of critical mass does become important at the level of the institution where the ability to combine different disciplines is key to addressing socio-economic problems. In this case the advantage is derived from economies of scope rather than economies of scale per se.[[14]](#footnote-14),[[15]](#footnote-15) Scale of course remains important when indivisible facilities are involved such as large scale research equipment or provision of doctoral training. Even here, the disadvantages of smaller scale activity can be mitigated by effective networking and shared activity, a key function of the ERA.

*Elite Funding*

In practical terms it is possible to modulate the effects of accumulation through success in competition. A recent trend among funding bodies has been to accelerate concentration by awarding larger and longer-lasting tranches of funding to elite researchers or teams. Pressures on international competition along with the earlier observation that the return on investment is higher from leading researchers have motivated the European Research Council organisations as well as national organisations such as the Wellcome Trust to place increased emphasis upon identifying and supporting this elite.

This strategy may contain inherent limitations. One concern is that that the elite either individually or collectively may not have the long term absorptive capacity to support sustained concentration. If leading researchers end up devoting very small amounts of time to each of a large portfolio of grants the policy is in effect funding their assistants by proxy while excluding the next level of highly excellent people. The challenge for the sustainability of competition is to improve the competitive abilities of that next level (a different task from that of bringing up the level of new entrants).

**Modes of funding and the Balance between Competitive and Non-Competitive Project and Block Funding**

All forms of research support can be allocated on a more or less competitive basis. Normally funding project proposals via grants is regarded as pure competitive funding but within that broader frame, as we saw in the discussion of elite funding above, it is possible on the one hand to design the terms of competition to create a fairly flat distribution with a high success rate moderated mainly by a quality threshold, and on the other hand to award major grants which attract large numbers of applications but where only very few are awarded. Similarly, at one end of the scale, institutional block funding can be allocated non-competitively on the basis of factors such as historical precedent or formulae based on the scale of activity (for example numbers of researchers by field but increasingly performance based criteria are being applied to drive the distribution of these funds. Institutional assessments are discussed in a following section but here it is worth considering the respective roles of competitive and institutional funding.

*Benefits and Limitations of Competition*

It is clear that competition incentivises researchers and to a large extent prevents those in senior hierarchical positions from using their influence to dominate receipt of resources. Ageing academies in pre-reform transition economies provided the archetype of institutional sclerosis in the absence of open competition. The shorter timescales and higher granularity involved in project funding allow resources to be flexibly applied as science develops and create a relatively simple line of accountability to ensure that the resources are used for the purpose.

On the other hand it is also possible to have too much competition. There are three main reasons why all resources should not be allocated through granting mechanisms:

* Application processes for grants involve a high level of transaction costs in preparation and review. These costs are relatively insensitive to the size of grant awarded and may consume an increasing proportion of senior researchers’ time.
* Institutional funding provides space for researchers to develop ideas which may not be ready for exposure to external competition and allows the institutions themselves to behave in a strategic fashion rather than running the risk of converging on ‘hot areas’ and leading to a loss of diversity in the wider research system.
* There are items of equipment and support services of generic benefit which are not easily attributable to individual grants. Since few funding agencies pay the true full costs of research, the long term absence of institutional funding leads to a ‘hollowing out’ of research institutions. This point was emphasised in two EUA reports on financial sustainability of universities which called on funders to reduce co-funding requirements and where possible to support research on a full cost basis.[[16]](#footnote-16),[[17]](#footnote-17)

A recent report from the Royal Swedish Academy of Sciences identifies excessive reliance on external (and hence competitive) grant funding as one of the drivers of what they perceive as the underperformance of the Swedish research system.[[18]](#footnote-18) It argues that this reliance means that universities focus on how to obtain funding rather than their own priorities, and furthermore that the scope for supporting individuals with new ideas has declined. A specific recommendation is that the ration of in house funding to external should not fall below 60/40.

There are also quite varied degrees of competition across different national agencies that award grants. Dawson et al note that the DFG in Germany has an acceptance rate for proposals in the range 50-60% while Denmark and the Netherlands are at around 30% and the UK 25%. They raise the issue of whether in a system with low acceptance rates the benefits of competition may be outweighed by the cost of proposals and their selection.[[19]](#footnote-19) They suggest an inverse U-shaped curve relating competition and scientific performance. It is interesting to note that research councils in the UK have taken steps to shift the curve by introducing ‘demand management’ measures to reduce the number of proposals. These measures have varied from agreement of voluntary restraint by institutions through to sanctions against serially unsuccessful applicants. While such measures clearly reduce the transaction costs for the funding agency, they need careful design if they are not to shift costs to the applying institutions, for example by creating a pre-screening peer review process that duplicates the external competition.

**Allocation of Funding via Peer Review**

At the core of competitive funding models is the process by which resources are allocated. In the great majority of cases this is done by peer review. However, the term encompasses range of practices, assumptions and quality standards. A widely accepted definition was formulated by Gibbons and Georghiou in the first OECD report to address the topic of evaluation:

*“Peer review is the name given to the judgement of scientific merit by other scientists working in, or close to the field in question. Peer review is premised upon the assumption that a judgement about certain aspects of science, for example its quality, is an expert decision capable of being made only by those who are sufficiently knowledgeable about the cognitive development of the field, its research agenda, and the practitioners within it.”* [[20]](#footnote-20)

The statement describes a form of peer review that is intrinsic to the practice of science. It is used in publication, career and resource allocation decisions and to an increasing extent as an instrument for ex- post evaluation. The format of peer review has also been applied to address wider criteria, notably the potential of research to contribute to economic growth and societal challenges. As these wider criteria are brought to bear the initial assumptions evident in the definition do not necessarily apply. Knowledge of wider criteria is not analogous to knowledge of science, being far more dispersed and not the result of a disciplinary consensus. These variants on scientific peer review are called modified peer review, merit review or expert review.

If we consider the core function some trends are evident. On the hand an international frame of reference is increasingly used as the standard for peer review, with the use of foreign peers being seen as the answer both to potential conflicts of interest in small communities and as a means of assuring stakeholders that the work stands up to global scrutiny. On the other hand the internationalisation of science means that foreign peers may be equally well if not better networked with those being judged than their national counterparts.

In the context of ERA, the application of the highest standards of peer review is a core means of ensuring parity of quality between systems. This was one of the recommendations of the ERA Rationales Group in the context of creating a research friendly ecology.[[21]](#footnote-21) Specifically the report saw a clear opportunity to raise standards across Europe through more transnational peer review and suggested that an ERA role could be to create a European College of Reviewers to facilitate the process.

 While there are major challenges in bringing major sections of funding into a cross-border frame, mobility of peer review is far more achievable and a challenge that Europe’s research funding agencies should find to be well within their capabilities. The practical issue of linguistic barriers is largely overcome through the widespread practice of soliciting proposals in English. This is not appropriate for culturally or linguistically based subjects, though expatriates may be able to assist in these circumstances. To the extent that international review can also be made formative, by provision of meaningful feedback, it is also a potential instrument of development. Some national funding agencies in Europe, particularly those in smaller countries make regular use of international peer reviewers. Others effectively internationalise a part of their activity by accepting the results of European Research Council evaluations to allocate some of their funding. Some transnational competitions, for example those of Nordforsk, operate with transnational teams of reviewers.

*Limitations of Peer Review*

It is important not to regard peer review as a panacea for all issues involving allocation of resources for research. As an approach it has been subject to a number of criticisms. A regular concern is that peer review approaches may promote conservatism by militating towards safe choices reflecting a consensus view and screening out work that may pose a radical challenge. Over emphasis on safe choices can come through excessive demands for preliminary data. The situation is exacerbated in situations of high competition where a less than positive view from only one among several reviewers can lead to rejection. Interdisciplinary research can be particularly at risk as it may stray from the norms of each of the disciplines whose panels take part in its judgement. A different discipline-related issue that can arise in peer review comes when panels are operating in parallel across fields. There is a risk that members may feel that low scores could damage the reputation of their own field. As a result, peer review may be characterised by ‘grade-inflation’ – a steady upward trend in the mean scores awarded - even though the level of discrimination and hence the proportion of projects awarded remains similar.

The necessary attention given to the track record of applicants can itself be a major barrier for new entrants, especially early career researchers. Concerns have also been raised about possible gender bias in peer review following a well-publicised critique in 1997.[[22]](#footnote-22) Funding bodies generally recognise these issues and seek to mitigate them by offering specific competitions for new entrants and by stressing the need for interdisciplinary approaches.

*Incentivising Reviewers*

To address issues such as potential conflicts of interest, increasing efforts have gone into pre-identification and recognition of peer reviewers, for example by giving them recognition or esteem via membership of ‘colleges’. Modest financial rewards are offered by some agencies. This approach also addresses an emergent concern in peer review, the reluctance of many researchers to take on the additional burden of review when they are already heavily overloaded and subject to their own performance being assessed.

*Role of Indicators*

The interface of peer review with indicator-driven judgements and ranking tables is also of interest. Individuals, departments, institutions, subject fields or even whole countries may be measured and ranked using bibliometric indicators or by counting other artefacts of the scientific reward system, for example Nobel Prizes. Peer review may be used to moderate such indicators or indicators may be used to assist in peer decisions? It can be argued that many indicators are simply the summary of past peer-review judgements, for example the decision to accept a paper for publication or to award a prize to an individual.

**Institutional Assessments**

In addition to competitive grant funding, which assesses prospective proposals and individual researchers or teams, there is an increasing tendency to assess the work of whole institutions or of major areas of research within them. This may be with a view to allocating block funding for research in a more concentrated (and hence competitive) manner. While the general aim is the promotion of excellence, the specific approach varies between Member States. Three cases are presented below:

*Case 1 – United Kingdom Research Excellence Framework*

The United Kingdom allocates block funding for university research by means of a periodic ex post assessment of quality. Previously known as the Research Assessment Exercise, it is a long-established procedure that has evolved through six cycles since 1986. The current iteration known as the Research Excellence Framework (REF) is due to take place in 2014. Universities will be invited to submit a package of evidence to 36 disciplinary panels of (mainly national) subject experts convened by the funding bodies. This evidence will consist of selected publications (normally four outputs per submitted individual), case studies of impact achieved and text describing the wider approach to impact and the research environment, along with data on research income and doctoral students. These expert panels will assign profiles on a five point scale (weighted 65% for the outputs, 20% for impact and 15% for the research environment). These profiles will be combined with a volume driver, based on numbers entered, and a factor reflecting research costs in the field to inform the selective allocation of research funding to HEIs, with effect from 2015-16. The exercise is also seen as providing accountability and benchmarking information. While the future funding formula is not known, recent changes have focused resources exclusively on activity judged to be internationally excellent.

**Figure 2 Concentration of Research Funding in English HEIs in 2011/12 (£)**

*Source: Own calculation based on revised allocations of HEFCE recurrent grants for 2011-12*

Figure 2 shows the distribution of research funding for HEIs in England for the Higher Education Funding Council for England. It can be seen that the top 5 institutions out of the 130 supported account for 34% of the funds and the top 30 for 81%. The great bulk of these funds were allocated on the basis of the results of the 2008 Research Assessment Exercise.

*Case 2 German Excellence Initiative*

The German Excellence Initiative was launched in 2005 to promote outstanding research projects and institutions in Germany’s universities. The aim was to strengthen cutting-edge research and to make German science and research more visible in the scientific community. A competition was organised to select outstanding projects in three areas: 39 Graduate Schools to promote young scientists and researchers 37 Clusters of Excellence to promote cutting edge research , and 9 Institutional Strategies on projects to promote top-level research . The competition was run by the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) and the German Council of Science and Humanities. A total of 1.9 billion euros was made available by the Federal and State Governments to fund the selected projects. The aim was very explicit:

“*a departure from a long-cherished – and fatally wrong – conception that all universities are equal and hence should be treated equally. Instead, the Excellence Initiative pursued a path of inequality and of funding elites.”*

The exercise is seen as highly successful, not only in academic terms but against wider indicators such as creation of jobs.

*Case 3 - Research Assessment in the Netherlands*

In the Netherlands, there has been a long term system for assessment of universities which was originally intended to be an explicit means of resource allocation but evolved to an approach which helps a drive to excellence without that explicit connection. In the current incarnation, three organisations, the Academy, the Netherlands Organisation for Scientific Research (NOW) and the Association of Universities (VSNU) have adopted a Standard Evaluation Protocol 2009-2015 – (SEP) for evaluating research. The protocol is designed for broad research assessments, including assessment of the quality of researcher training, management, policy, facilities and societal relevance. An assessment according to the SEP 2009 - 2015 consists of an external evaluation conducted once every six years. It involves preparation of a self-evaluation report (including standardised data and a SWOT analysis) and a site visit by an evaluation committee consisting of international experts. There is an internal midterm review midway between two external reviews.

After a site visit the evaluation committee reports its findings to the board of the research organisation. It assigns a rating on a five-point scale ranging from Excellent to Unsatisfactory. The board publishes the report after discussions with the assessed unit and also makes clear its own position on the findings. The system is not used to allocate resources. It should be noted that the Netherlands is the counter case to the UK in the sense of having a successful university system with a fairly flat allocation of resources across institutions.

**Small Country Perspective**

The smallest Member States face particular challenges in developing effective research funding frameworks. These issues were explored by the ERA-PRISM OMC-NET (Policies for Research and Innovation in Small Member States to Advance the European Research Area). Project membership brought together countries with a population of less than 2.5 million (Estonia, Iceland. Latvia, Luxembourg, Slovenia (plus Cyprus in some activities) with three large country partners, France, Sweden and the UK. Key points of difference identified included concerns that maintaining broad coverage of science and technology can spread resources thinly meaning that capacity in a field might be dependent upon one or two key individuals. Hence, the ability to assemble interdisciplinary teams nationally may be inhibited where key gaps exist. The report went on to state that this creates a particular vulnerability to brain drain and highlights the importance of effective measures for inward and outward mobility of researchers.

Concerns were expressed about the trade-off between danger of "overspecialisation" on the one hand and "over generalisation" on the other. Small countries needed to find an equilibrium that could survive external shocks.[[23]](#footnote-23)

**Conclusions and Issues for Discussion**

This background paper has sought to identify some of the arguments and pressure points that need to be confronted in the process of developing a balanced research funding system that drives up the standard of excellence and fulfils the goal of more effective national research systems. It is anticipated that the issues will be further illuminated through discussion and sharing of experiences in the Mutual Learning Seminar. A series of questions follows that may be used to structure that discussion:

1. **What is the optimum balance between competitive and block funding in a research system?** *Issues to explore could include:*Is that balance different according to national circumstances? What are the limits of competition? What level of concentration of funding of grant awards should a research system aim to achieve to maximise effectiveness? How can competitions for funding be designed to raise the level of effectiveness of national research systems? Which instruments are best to implement competitive funding? How can competitive funding be designed to encourage new entrants to challenge the incumbents?
2. **What measures can be taken to improve national approaches to peer review?** *Issues to explore could include:* How can the highest quality of experts be motivated to engage in peer review outside their own national contexts? How significant are the limitations of peer review and what can be done to mitigate these?
3. **What is the most effective way to incentivise institutions to improve their research performance?** *Issues to explore could include:* What degree of institutional autonomy is necessary for them to be able to respond to incentives that reward quality? What is best practice in institutional assessment? What level of institutional concentration on excellence is best for a research system? What are the effects on those not selected?

# Innovation strategies articulating supply side and demand side aspects

Lena Tsipouri

University of Athens

**1. Introduction**

The idea of the adoption of an Innovation Strategy guiding policies has gained momentum and became an integral part of RTDI policies in all Member States. Strategies and strategy documents are discussed in different EU fora, the OECD and beyond. Their design ranges from simple analyses and quick decisions based on past specialisation indicators to complex models relying on systematic data gathering and foresight exercises. There are increasing resources dedicated to analyses and other tools to help underpin findings and choices and make strategy documents better documented and, as a consequence, facilitate their adoption and implementation. One specific element of recent innovation strategies, strongly supported at the EU level, is the mobilisation of resources for demand-side policies to balance the traditional emphasis on supply side only.

Innovation strategies are designed at the local, regional, national and European level. Research and innovation strategy papers exist in all Member States and many European regions. The idea of the strategy is always to concentrate resources to promising themes combining elements of existing competitive advantages and promising future performance. This concentration is then expected to increase competitiveness through interaction and cross fertilisation of ideas. However, innovation strategies have only partly paved the way to higher effectiveness of public policies. In other cases they remained exercises on paper because they were over-ambitious, ill-conceived or misjudged the resistance to change. In particular the latter prevents the foreseen concentration of resources or adoption of new, unfamiliar policy measures. Evidence suggests that the latter applies in particular the adoption of demand-side policies.

The purpose of this document is to review innovation strategy design and implementation exercises at the national level (and its interaction with the EU) and understand how this process works at the member state level. Once this is discussed the focus will shift to the demand-side elements of strategies: despite increasing rhetoric in EU fora and more recently in national debates, the balance is still significantly skewed towards supply –side measures. Evidence from policy papers clearly demonstrates the small number of demand-side initiatives, most of them being concentrated in few countries (innovation leaders and followers) and few types of intervention (public procurement for innovation and SBIR-type programmes).

The paper is divided into two main sections: the first explains why strategy is important and what the important components of innovation strategies are, making also explicit reference to the newly-emerged concept of smart specialisation and its relevance for innovation strategy; the second explains the notion of demand-side policies and why it is crucial that they (in particular in the context of austerity policies) become a critical ingredient for the implementation of innovation strategies. A concluding section gives an overview and concludes with three consolidated questions for a debate on the topic.

**2. Research and innovation strategies in the Member States**

Strategy is about making choices and making choices is a particularly difficult task. It entails risks of outward mistakes and lock ins. This is why, despite recognising the relevance and role of strategy, very often strategies are diluted when it comes to implementation. Or they are updated and complemented with new, complementary or refined strategies, thus making the notion of strategy less clear.

**2.1 Why is strategy increasingly important?**

The need for developing innovation strategies stems from increasing international competitive pressures, whereby it is clear that developed regions can only compete with the low-wage developing world by successfully developing new, innovative products and production processes, improving quality and achieving productivity gains. This requires maximising economies of scale and scope at the company level and economies of agglomeration at the spatial level. As market forces alone are insufficient to generate such economies and individual success stories remain rare, successful strategies have incorporated policies supporting clusters and networks to generate linkages and to maximise spill-overs.

However, while the need to formulate an overall horizontal strategy is now well recognised, there is always some reticence to make sectoral and thematic choices because of the generic fear of substituting market failures with government failures; there are indeed numerous instances in the past where picking-winners policies have failed. At the same time neo-liberal policies could not ensure smooth, continuous growth. Hence, it is increasingly believed that effective innovation strategies give the business sector a prominent role and largely rely on public-private interaction for addressing societal challenges. The more traditional supply-side interventions, supporting research or even innovation without taking commercial opportunities seriously into consideration (or without being able to do so) have not generated the expected results. Supply side alone tends to prove an insufficient instrument for change. While research can lead to science-based innovations, which trigger considerable productivity growth, new products and improved competitiveness, still in many other cases conventional research support fails to produce anything more than specialised new knowledge unable to transform into economic and social benefits. At the same time, interventions embedded in the plans of the business sector (able to identify market needs) or targeted at societal challenges (creating public markets) prove highly beneficial in the long term. Stakeholder consultation has been generally adopted as a means to steer strategy towards the needs of the business sector.

Recent efforts to reinforce the role entrepreneurs play in innovation strategies have taken two different but not necessarily distinct forms:

1. Give entrepreneurs a leading role in designing innovation strategies. The notion of smart specialisation was developed relying on entrepreneurs’ knowledge for the selection of sectors, niches or themes for individual regions to specialise. This specialisation would then lead to generate investments not only in the area selected but also in related variety and even in deriving completely new areas where technologies are appropriate.
2. Use demand stimulation as leverage for increasing investments and productivity by creating or stimulating product markets that act as incentives for business investments. In addition to directly supporting entrepreneurs, opening market opportunities and giving them the possibility to compete for such new markets seems to be an important way to complement supply-side policies.

**2.2 Existing strategy documents in the Member States**

Each member state is now expected to produce explicit strategy documents, which directly or indirectly pave the way for an innovation strategy.

1. The National Reform Programmes constitute an important instrument in the implementation of the Europe 2020 strategy for smart, sustainable and inclusive growth. In these programmes, the Member States spell out how they translate the targets and policy priorities established at European level into their own national policies. Within the framework of the European Semester, in April each year governments submit their NRPs together with their Stability or Convergence Programmes that are to be prepared in line with the Stability and Growth Pact. In many Member States research and innovation are priority areas.
2. The 27 National Strategic Reference Frameworks agreed between Member States and the Commission, set out the investment priorities for the new generation of regional and sectoral programmes to be supported by the European Union over the seven-year period 2007-13. They draw their inspiration from the priorities of the “Community Strategic Guidelines for Cohesion”, where innovation plays a prominent role. New strategic documents (in the form of Partnership Agreements) are expected within 2013 suggesting strategies for the next programming period.
3. In the Member States with significant Structural Fund support there are Operational Programmes for Competitiveness, which include RTDI strategies and pave the way for the creation of a better performing national innovation system.

The basic idea is that the strategies included in these documents are not only compatible but should be complementary. In many Member States there are several national strategies touching upon innovation, delivered with different timelines, by different organisations and following different rationales. A thorough look at the Erawatch/Trendchart database[[24]](#footnote-24) suggests that there are more documents of generic nature or complementing general strategies with specific inputs for R&D infrastructure, education or internationalisation. Indicative documents, extracted from the database include:

|  |  |
| --- | --- |
| Austria | Road to innovation leaderStrategy 2020 |
| Belgium | Flanders: Policy Plan Science Communication 2012-2014Belgian Position Paper on Horizon 2020 |
| Bulgaria | National Strategy of Scientific Research to 2020 |
| Czech Republic | Back to the Top. The International Competitiveness Strategy for the Czech Republic 2012 – 2020Competitiveness Strategy FrameworkEconomic Growth Strategy |
| Finland | Government Statement on Innovation Polciy |
| France | 2011 Yellow Paper on National Policies in Research and Higher Education TrainingNational Strategy for Research and Innovation |
| Germany | High tech strategy 2020 |
| Hungary | Science Innovation Programme |
| Ireland | Report of the Research Prioritisation Steering GroupInnovation Ireland, the report of the Innovation Taskforce |
| Latvia | Priority scientific areas for funding fundamental and applied research in 2010-2013 |
| Lithuania | Lithuanian Innovation Strategy for 2010-2020Lithuanian Progress Strategy 2030 |
| Netherlands | To the top: Enterprise policy in action(s)Stability Programme of the Netherlands April 2012 Update |
| Poland | National Scientific Research and Development ProgrammePoland 2030 - Development ChallengesScience Strategy in Poland until 2015 |
| Slovakia | The Fenix Strategy: Update of the Long-Term Objective of the State Science and Technology Policy up to 2015Long-term Objective of the State S&T Policy up to 2015 |
| Sweden | The Swedish Innovation Strategy (2012) |
| UK | Annual Innovation Report 2010New Industry, New Jobs - Building Britain's FutureScience and Innovation Investment Framework - Annual Report 2009 |

Strategy documents are important and many of the documents mentioned above are highly relevant. Two reservations are, however, expressed: one is the way multiple strategy documents interact with each other; the second is that demand-side is (if at all) only sparsely mentioned.

**2.3 A new strategic approach: smart specialisation**

Smart specialisation as a notion is recent but is making a significant impact on the policy audience, as it has been adopted by the World Bank, the OECD and the European Commission. DG Region in particular has made it an ex ante conditionality for the next programming period. In addition the Commission has decided to build a platform of services (Smart Specialisation Platform[[25]](#footnote-25)) to support regions in their efforts to devise and implement a smart specialisation strategy.

In theoretical terms the Smart Specialisation “concept is not *tight* – it lacks transparency, verifiability and consensus. Many statements and arguments about smart specialisation are not yet based on sound empirical foundations so that the plea in favour of smart specialisation and the tools and instruments to support a smart specialisation strategy may reflect wishes and hopes or worse, opportunistic special pleading, rather than a robust and defensible strategic case for action. There is therefore a growing gap between the policy practice and the theory” (Foray et al. 2007).

The practical aspects that characterise Smart Specialisation are composed of four important structural processes:

1. *Entrepreneurial discovery:* SWOT methodologies and stakeholder involvement from the business sector have always been used for strategy development. The novel and persistent element in Smart Specialisation is that priorities should not emerge from theoretical models and long exercises but from entrepreneurial knowledge. Entrepreneurs in the broadest sense (innovative firms, research leaders in higher education institutions, independent inventors and innovators) are in the best position to discover the domains in which a region is likely to excel given its existing capabilities and productive assets.
2. *Imitative entry and clusters’ formation:* While entrepreneurial discovery marks the beginning of exploitation opportunities, imitative entry constitutes the confirmation that others see this discovery as meaningful. When the initial experiment and discovery are successful and diffused, other agents are induced to shift investments away from older domains with less potential for growth than the new one. Imitative entry is the *continuous* confirmation that the choices were correct and trigger further business expectations. Clustering in the form of sectoral specialisations and/or related variety comes next.
3. *Structural evolution:* Entrepreneurs are best positioned not only to discover present opportunities but are also flexible and resilient enough to redirect opportunities as clusters and technological knowledge build up. Probably the most important contribution of Smart Specialisation is precisely this evolutionary approach to strategy. In this approach specialisation changes over time responding to a constant regeneration of opportunities. Structural change is the main outcome of a successful Smart Specialisation process and invariably involves some kind of related diversification[[26]](#footnote-26), a process that builds upon existing capabilities and industrial knowledge and physical infrastructure (an industrial commons). Structural evolution is an accumulative process that bridges present with future strengths through permanent transition, modernisation and diversification which can lead to the radical restructuring of the foundations of a domain.
4. *The space of Smart Specialisation and the role of extra-regional resources:* Neither pre-defined ‘regions’ nor specific sectors can be used *ex ante* to determine the boundaries of a Smart Specialisation process. The collective R&D, engineering and manufacturing capabilities that sustain innovation are not necessarily deployed and contained within strict regional boundaries and their development and evolution is likely to defy administrative frontiers.

While the Smart Specialisation process is embraced with enthusiasm, questions are raised about its articulation with existing strategies and with the expected Partnership Agreements, the revised National Reform Programmes and specific national strategies.

**2.4 Challenge-driven R&I strategy processes: need for coordination?**

All Member States and most European regions have innovation papers, which include SWOT analyses and future trend expectations. Evidence-based policymaking – at the core of strategies - relies on a process of systematic collecting, analysing and sense making of all strategic intelligence of the area for which the strategy is formulated. In addition, analysing global trends (technological, market-related such as consumer patters and policy related such as environmental regulations) is necessary in order to be able to provide further evidence, future perspectives and options. Important global studies from international organisations (UN, OECD, EU) but also research units, think tanks and sectoral associations are used to enrich knowledge on global trends. Foresight activities play an increasingly important role in this process.

A systematic study of innovation strategies identified that “there are numerous forward looking activities both at European and Member state levels, these activities are uncoordinated and their results have a very limited impact on the actual preparation of policies and policy measures” (EFFLA 2012). EFFLA proposes a framework that builds on four main steps (Figure 1). The different steps, from Strategic Intelligence to Implementation, engage different stakeholders and integrate national and European levels. Strategic Intelligence (step I) will mainly involve “knowledge” stakeholders such as academics, thought leaders and independent researchers. This step is mainly bottom-up. The sense-making (step II) also engages the former stakeholders but the process is led by the Commission (n.b. the established ’FLA-hub’). The first part of the third step (selecting priorities) engages a wide spectrum of more formal stakeholders in open consultations (including the public, NGOs and other lobby groups) including inside the Commission (‘thematic DGs’). The most important part of this step is the decision part, which is in the hands of the Council, European Parliament and the Commission. The implementation (step IV) is entrusted to the Commission which normally is assisted by Programme Committees with representatives from Member States. However, a well-functioning first and second step should be able to feed in also to the implementation, e.g. in detecting gaps and emerging needs.

It is important to make a clear distinction in the overall strategy process between formal and informal steps. The first two – strategic intelligence and sense-making – are predominantly informal processes. This implies that they must rely on intelligence and participation on a personal level[[27]](#footnote-27). The last two steps are formal where intelligent stakeholders can further support the process. The informal stakeholders can be seen as ‘supply’ stakeholders whereas the formal stakeholders (Member States/Council, European Parliament, Commission) can be seen as ‘demand’ stakeholders.

Source: EFFLA (2012)

**3. Giving demand-side policies a nudge**

**3.1 Some definitions**

There is an increasing recognition that innovation-driven economic success depends on more than traditionally conceived S&T policies—exemplified by the emergence of ‘systemic’ rationales and new typologies of innovation policies that emphasise the role of ‘indirect’ as well as traditional ‘direct’ measures, ‘demand-side’ as well as ‘supply-side’ instruments (Flanagan et al. 2011). As there is extensive research, knowledge and policy experiences in supply side instruments, mutual learning is more important for complementing the existing wide array of supply-side measures with demand-side interventions.

Demand-side policies are those that can induce investment in technologies by enlarging markets for them. Rising expectations about future demand for new technologies increase the incentives for investments in innovation by enlarging payoffs to successful innovations. Typically demand-side policies are those addressing social and societal concerns, where the state is an important user (public procurement) or needs to regulate markets (standards, environment, radio-waves). In the case of social challenges, which address public goods (like climate change), there is a rationale for state intervention, which is not in contradiction with market and competition rationales.

Adopting demand-side innovation policies has several implications for the public sector. The combination of policy measures (sectoral, supply- or demand-oriented) to support demand for innovation makes good governance and policy co-ordination within the public sector essential. The systemic nature of demand-side innovation policies also implies that alignment needs to be achieved not only across levels of government, but also with industry and other influential stakeholders. It is therefore necessary to establish shared visions and roadmaps between the public sector and firms to implement demand-side policy instruments successfully. A demand-side innovation policy gives a more pivotal role to public administrations (e.g. through procurement, regulation, and setting and certifying standards). This requires investments in skills and competencies in public administration, as well as organisational and cultural change. It also raises the question of how the public sector can be encouraged to participate in this innovative effort (e.g. promotion of innovation-friendly public procurement) (OECD, 2011).

**3.2 Types of demand side instruments**

In the literature many authors have emphasised the importance of the demand-side of innovation. Involving users and interaction with public and private users is essential for the dynamics in innovation systems. The implementation of targeted demand-side innovation policies is a rather recent trend and is mainly designed at national level, although recent debates start to check their relevance for the regional level, indicating that “There is still a large under-used potential at regional level regarding innovative procurement. Since a large part of public spending is done at the sub-national level, a large potential exists for every region to increase the regional demand for innovations by promoting the public procurement of innovative goods and services[[28]](#footnote-28)”.

A policy typology used for demand-side instruments includes:

Public procurement

* Public procurement of innovation
* Pre-commercial public procurement (although there are doubts expressed to the extent to which this type is really a demand-side instrument[[29]](#footnote-29))

Regulation

* Use of regulations
* Standardisation

Supporting private demand

* Tax incentives
* Catalytic procurement
* Awareness raising campaigns

Systemic policies

* Lead market initiatives
* Support to open innovation and user-centred innovation

When gathering information on implementation in all Member States[[30]](#footnote-30) od demand side measures, all indications show that these measures are lopsided towards Public Procurement and there are only few cases of co-ordinated supply and demand policies. Evidence indicates that, when appropriately implemented, public demand makes a difference[[31]](#footnote-31).

**3.3. Cases of specific interest[[32]](#footnote-32)**

Demand-side policies are higher in the debate than in policy implementation. An OECD study identified growing emphasis on demand side policies and instruments[[33]](#footnote-33). A number of OECD countries, from the United Kingdom to Finland, Spain and Japan, as well as the European Commission, have made explicit policy statements on the need to give greater importance to demand-side innovation policies. Japan, for example, has re-oriented its innovation strategy towards a series of demand-oriented national goals such as the transition to a low-carbon economy and tackling the challenges of an ageing society. Finland has adopted a general plan for demand-side innovation – The Finnish Policy Framework and Action Plan for Demand and User-Driven Innovation Policy (2010). The United Kingdom’s plan, Innovation Nation (2008), introduced demand-side initiatives affecting public procurement and regulation. Spain is currently implementing the State Innovation Strategy (2010) which has a programme oriented towards public procurement. Demand-side innovation policies are now increasingly integrated in the full portfolio of government policies on innovation in a number of OECD countries.

An emerging concept, where the combination of supply and demand side measures is considered as a necessary condition for success is the *lead market idea*[[34]](#footnote-34). Lead markets are attractive because they constitute the test bed for companies to produce innovative products competitively and eventually capture the world market as first movers with high rents and appropriability. Local production then brings substantial benefits to the economy where such companies are located, in the form of job creation, taxes and investments to maintain and regenerate technological lead. Hence, national policies have every interest to create local lead markets and attract private investments in these particular sectors/technologies. An example of a Lead Market Initiative is the initiative of European policy for 6 important sectors that are supported by actions to lower barriers to bring new products or services onto the market. The European Commission, Member States and industry work together to carry out the action plans for these six Lead Markets (e-Health, Protective textiles, Sustainable construction, Recycling, Bio-based products and Renewable energies). The policy instruments deal with regulation, public procurement, standarisation and supporting activities.

Academic literature has identified a number of issues indicating the relevance of demand-side policies. The funding of scientific research is almost always justified in terms of the potential for achieving beneficial societal outcomes. In pursuing a particular societal outcome, Sarewizt et al conceptualize: (1) science in terms of a ‘‘supply’’ of knowledge and information, (2) societal outcomes in terms of a ‘‘demand’’ function that seeks to apply knowledge and information to achieve specific societal goals, and (3) science policy decision-making as a process aimed at ‘‘reconciling’’ the dynamic relationship between ‘‘supply’’ and ‘‘demand.’’ (Daniel Sarewitz, Roger A. Pielke Jr.2007).

Public procurement has been at the centre of recent discussions on innovation policy. By synthesising the broader framework of public policies to stimulate innovation: regulations, R&D subsidies and basic research at universities - conceptually and quantitatively comparing their effects on innovation success for 1100 firms in Germany - Aschhoff and Sofkaa found that public procurement and knowledge spillovers from universities propel innovation success equally. The benefits of university knowledge apply uniformly to all firms. However, public procurement is especially effective for smaller firms in regions under economic stress and in distributive or technological services (Birgit Aschhoff, Wolfgang Sofkaa 2009).

**4. Conclusions and main questions**

Resources for public policy are becoming scarcer in the context of austerity measures and there are increasing indications that demand-side policies can work effectively if appropriately planned and implemented. This can work best if strategies are suitably designed and coordinated. But more research and innovation strategies and a proliferation of policy documents does not necessarily mean better strategies and, more often than not, strategy documents do not go in-depth into the demand side of innovation policies. A number of interesting examples, in particular in the case of public procurement, are increasingly mentioned but less frequently implemented.

Three crucial questions can shape the debate for enhancing demand-side policies in the context of appropriate strategy planning in the future:

1. ***When designing innovation strategies are demand and supply side aspects equally taken into consideration***? All Member States have innovation strategy papers, some countries even more than one. When preparing strategy papers, what is the process? Repeating past rationales and interventions or organising new evidence creation and experimenting with new measures? How are demand side policies perceived during the strategy design phase? Are there specific demand side measures favoured over others? If yes, why?
2. ***How are demand side aspects implemented (in connection with strategic priorities)***? There is more experience with supply side measures than with demand side in innovation policies. This often leads policy makers to disregard demand side aspects mentioned in strategy papers and by inertia favour supply side measures. Does the actual policy reflect the role granted to demand side in strategy documents? Is the mix as planned? Are adaptations to the strategy decided explicitly and ex ante or does policy develop (partly) independently of strategy?
3. ***What are the experiences with demand side instruments***? What are the main demand-side measures implemented in your country? What are the reasons for selecting these instruments and not others? What are the experiences with them? What are the main obstacles to implement demand-side measures? How can these obstacles be eliminated?

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# Policies for high-growth innovative enterprises

Stefan Lilischkis

empirica Gesellschaft für Kommunikations- und Technologieforschung, Bonn

**Background: towards a stronger European business sector**

There is scientific evidence that high growth innovative enterprises (HGIEs) contribute decisively to job creation, innovation and economic growth in the EU. However, Europe has apparently performed relatively badly in generating HGIEs that quickly become global leaders. Thus, in recent years policy makers in Europe have shown increased interest in fostering HGIEs to strengthen the European business sector. The European Commission is currently developing a new innovation indicator taking into account HGIEs, in addition to the target of investing at least 3% of gross domestic product into research and development (R&D).

In order to further develop the understanding of effective policies for HGIEs in Europe, the Mutual Learning Seminar of the European Commission’s General Directorate for Research and Innovation on 21 March 2013 deals with policies for HGIEs as one of three main topics. Within the HGIE session, particular foci are on (a) access to private debt and equity finance for start-ups, small and medium-sized enterprises (SMEs) and growing businesses, as well as (b) targeted public schemes to support innovative firms, as part of an overall innovation strategy.

The purpose of this discussion paper is providing concise background information and facilitating the discussion at the seminar. The paper addresses the following main questions: What do we know about HGIEs (chapter 2)? What can policy makers do to foster HGIEs (chapter 3)? What can policy makers do in particular to improve access to private finance (chapter 4) and to design targeted public schemes (chapter 5)? Finally, conclusions for policy makers are drawn and key questions for the seminar discussion are developed (chapter 6).[[35]](#footnote-35)

**High-growth innovative enterprises: What do we know?**

**Some definitions: high-growth enterprises, gazelles, and gorillas**

The OECD defines **high growth enterprises** (HGEs) as “enterprises with average annualised growth in employees (or in turnover) greater than 20% a year, over a three-year period, and with ten or more employees at the beginning of the observation period.”[[36]](#footnote-36) A size threshold of ten employees is suggested to avoid the growth of micro enterprises distorting the picture. Excluded from this definition are companies that were born three years ago or less as well as companies that underwent a merger or take-over.

A certain share of high-growth enterprises are so-called “**gazelles**”, defined as “high-growth enterprises born five years or less before the end of the three-year observation period.”[[37]](#footnote-37) Animal metaphors have some popularity in literature about HGEs – there is also the notion of “**gorillas**” for companies that grow quickly from start-ups to large international players in high-technology markets.[[38]](#footnote-38) In fact this may more accurately describe what policy makers desire, since the definition of HGEs includes for example companies that grow from ten to 18 employees within three years – reaching a size that does still not make much difference from a regional or national economy point of view.

The mutual learning seminar focuses on **innovative** high-growth enterprises. However, policy makers should be aware that high growth may not necessarily be related to innovative activity. High growth may for example also be related to increased demand in a business cycle upturn or to competitors seizing the market. Furthermore, while high growth may often stem from innovation, this innovation does not necessarily need to be technology-related. It may also be related to marketing or organisational innovation.[[39]](#footnote-39)

**Statistical evidence of HGIEs: fragmentary but developing**

#### An overview of statistical evidence

Internationally comparable data about HGIEs are scarce and fragmentary. Due to different definitions and methods of data collection, there are large differences between the results of different studies.

#### The OECD’s entrepreneurship indicators programme

The OECD-Eurostat Entrepreneurship Indicators Programme provides data about high-growth enterprises. Data are available for 16 European countries and five other countries, divided by manufacturing and services.[[40]](#footnote-40) The most recent data available are for 2008. For this year, the US rate of HGEs in manufacturing was higher than in any European country for which data were available. However, in services the HGE rate in the US was lower than in most European countries; Sweden and Estonia had the highest rates. Furthermore, in 2009, France – for which no data are available for 2008 – had a higher rate than the US even in manufacturing. While this picture is only a fragment as three of the six largest European countries (Germany, UK, Poland) are missing, it shows that the US is not necessarily outperforming Europe in terms of HGE establishment.

#### Eurobarometer survey

A Eurobarometer survey in 2009 of more than 9,000 companies provided enterprise growth rates for all EU-27 countries.[[41]](#footnote-41) The dataset cannot be compared with OECD data. It found that 12% of the companies in EU-27 had grown by over 20% on average per year in the previous three years, in terms of full-time employment or full-time equivalents. The largest share of HGEs was found in Norway (27%), followed by Romania (23%), Sweden (22%), Greece (21%) and France (20%). Considering the different economic conditions in these countries, the nature of high growth can be assumed to be very different. The lowest shares of HGEs were found in Latvia (3%), Belgium (4%) and Germany (5%).

#### Bruegel study

A Policy Brief by the Bruegel think-tank in 2009 examined the age of the companies with the highest R&D expenditures among the largest enterprises from the US, Europe and other countries.[[42]](#footnote-42) Of the US enterprises, 22% were founded after 1975 and 57% before 1925, and of the enterprises from other countries, 9% were founded after 1975 and 58% before 1925. In contrast, only 2% of the European enterprises were founded after 1975, while 86% were established before 1925. Thus the share of young enterprises among large innovative companies is much larger in the US and also in other countries than in the EU. If large innovative enterprises are young, they must have passed through a period of high growth. The US is apparently a much better breeding ground for HGIEs than Europe. Illustrative examples mentioned in the Bruegel report are Microsoft (founded 1975, the US’ fourth largest R&D spender), Amgen (1980, tenth largest in R&D) and Cisco (1984, 12th in R&D). In Europe, the first relatively young company in the list is SAP, founded 1972 and Europe’s 22nd largest R&D spender.

#### Herman Simon: continuous growth of “hidden champions”

One may contest the importance of big young global leaders for overall economic wealth in a country and point to the numerous “hidden champions” in Europe: smaller global leaders, some in niche markets, enterprises that may be long established but largely unknown to the public due to their specific products and services, but nevertheless very innovative and very important for creating jobs and wealth.[[43]](#footnote-43) Economics professor Herman Simon found a particularly high number of such hidden champions in Germany (1307), Austria (116) and Switzerland (110) but also in Italy (76), France (75), the UK (67), and Sweden (49). Many hidden champions pursue ambitious growth targets but they do not aim at high growth but continuous growth. From 1995 to 2010 the 2,734 hidden champions in Simon’s sample – which also includes non-European firms – performed average annual turnover growth of 8.8%.[[44]](#footnote-44)

#### NESTA study

A study by the UK National Endowment for Science, Technology and the Arts (NESTA) published in 2010 explored business growth and contraction in Europe and the US, drawing from a purpose-built database of business growth in the period from 2002-2005 with individual records for six million businesses. Key results include the following: “European countries have on average a lower share of high-growth firms than the US. But they also have fewer medium-growth firms and fewer shrinking firms. At the same time, Europe has a much larger share of firms that neither expand nor contract in a three-year period. (...) The top half of firms grow faster in the US than in the average European country, while the bottom half shrink faster. Thus, the US has both faster-growing and faster-shrinking firms. (...) The faster successful companies grow, the faster unsuccessful companies in the same industry shrink.”[[45]](#footnote-45) These results may suggest that more high growth firms in Europe may also mean more high failures.

**Determinants of company growth: seeking opportunity is crucial**

A crucial question for evidence-based and effective policies to foster enterprise growth is: Why do some enterprises grow while others do not? This general question requires a complex answer. Hölzl/Friesenbichler (2008) found that “there are many factors which can trigger the growth process, such as, for instance, new technologies, new organisational structures, internal capabilities that allow for cost reduction or allow the firm to react more quickly to market trends, the social capital of the entrepreneur, the use of unique opportunities”.

A study by the World Economic Forum provided insights about growth determinants and strategies of young companies.[[46]](#footnote-46) The study concluded that “many prior discussions in this area over-emphasize the risk dimension”, highlighting “the importance entrepreneurs from around the globe place on taking a perspective of proactive opportunity” and the ability to survive “dark moments”. Similarly, a survey of innovative German companies in the framework of the European project INNO-Grips suggested that the single most important reason for companies’ growth was that the directors actually targeted growth.[[47]](#footnote-47)

**The importance of HGIEs in job creation – but also destruction**

The importance of high-growth companies for job creation has in recent years been widely substantiated by economic research. The number and share of enterprises with persistent high growth is small, but the number and share of jobs they create is disproportionally large. However, there is also a small share of firms contributing disproportionally to job destruction.

A **Kauffmann Institute** study of the US economy in 2010 with data for 2007 contained 5.5 million firms. Only a small number of firms, the top-performing one, created a disproportionate share of additional jobs. Importantly, however, many of the jobs created by these fast-growing firms will disappear.[[48]](#footnote-48) On a sub-national level, analysing business dynamics in 320 US Metropolitan Statistical Areas, Acs and Mueller found that “only start-ups with greater than twenty employees have persistent employment effects over time and only in large diversified metropolitan regions”.[[49]](#footnote-49)

A study by the **World Economic Forum** published in 2011 found that “the top 1% of all companies ranked by the level of revenue (job) creation contributes 44% (40%) of total sector revenue (job) creation”.[[50]](#footnote-50) It is however also worthwhile mentioning the concentration at the other end of the row: “The top 1% of all companies, ranked by the level of (..) job losses, accounts for (..) 46% of all sector (..) job losses.”

**Other studies** include for example Storey (1994) with results for the United Kingdom (4% of new start-up survivors in the UK were responsible for 50% of jobs created by all new firms 10 years later) and Birch et al. (1997) for the US (3% of the fastest growing firms generated over 70% of new jobs created by new firms between 1992 and 1996).

**Policies for HGIEs: What can we do?**

**Some helpful theory: market failure versus government failure**

Policies promoting high growth of innovative enterprises should be in accordance with principal insights of economic theory. Most relevant here are the theories of market failure and government failure. Market failures with respect to policies in support of high-growth enterprises can, above all, potentially be traced back to externalities and imperfect information.[[51]](#footnote-51)

An **externality** is an impact on a party that is not directly involved in a transaction. Externalities imply that prices do not reflect the full costs (negative externalities) or benefits (positive externalities). HGIEs can be considered to have positive externalities to society beyond the individual benefits of the entrepreneur, for example by introducing new products, services, production processes or business methods that enhance consumer welfare and that create spill-over benefits for other companies. However, growing enterprises may also produce negative externalities, for example by destroying the rents, market shares or employment of established enterprises.

**Imperfect information** may lead to inefficient investment decisions. For example, imperfect information about market conditions and resource availability can lead to suboptimal investments. A particular type of imperfect information is asymmetric information, i.e. one side is better informed than the other about a certain subject and may exploit this advantage for its own benefit or, likewise, one side is worse informed and holds up investment because of uncertainty. Access to growth finance is an example of asymmetric information: firms seeking finance are less well informed about finance options and their consequences than banks or funds offering finance.

**Government failure theory** deals with possible failures in governmental policy making. As regards the relationship between governments and companies, government failure can be traced back to one principal source: imperfect information. As regards HGIEs, policy makers’ information is above all imperfect with regard to which companies may actually perform high growth in the future. Attempts to try to “pick winners” for promoting them may thus be doubtful. A special problem of imperfect information is biased information provided from companies potentially benefiting from policy support. Even governments that try to maximise social welfare may have to base their decisions upon information provided by companies or lobby groups which act strategically.

**Country examples of HGIE policies: no evidence about efficiency yet**

#### An overview about HGIE policies in selected countries

In Europe, targeted policies for high growth SMEs can mainly be found in the Nordic countries of Denmark (the former Gazelle Growth Programme and the current Accelerace), Finland (TEKES funding for growth-oriented SMEs, Finnish Growth Company Service, Vigo) and Norway (Incubator Grant, Seed capital scheme, Nyvekst). Further European countries with such policies include Estonia (Estonian Development Fund), France (Gazelles Programme, France Gazelles fund), Ireland (High Tech Startup programme), Netherlands (Growth Accelerator “Groeiversneller”), and Spain (Neotec Fund). Beyond Europe, relevant policies can be found in Australia and the USA as well as in China, Singapore and South Korea. One of the most prominent and recent national policy activities for high-growth enterprises is the Startup America initiative by the US government. The Danish, Finnish and Dutch examples may be among the most long-standing ones in Europe:

In **Denmark**, Symbion, the largest science park in the country, runs a programme named Accelerace (http://www.accelerace.dk), a public-private partnership also supported by the European Union. According to the programme’s description, Accelerace is “helping talented entrepreneurs and growth companies to bring their product quickly and efficiently to the market”.[[52]](#footnote-52) It was started in early 2008 with a pilot phase (2008-2009) followed by an operational phase with funding from 2010 onwards. By early 2013, Accelerace supported over 100 start-ups and growth firms. Its objective is to provide knowledge, tools and access to networks of customers, partners and investors that enable companies to commercialise their innovations or grow internationally. High growth in a global market is an explicit objective of the programme.

**Finland** stands out as a country with several policy activities to promote high-growth. The most prominent may be the VIGO programme (http://www.vigo.fi) which was introduced in 2009 by the Ministry of Employment and the Economy together with Finland’s most important R&D&I funding agency Tekes and Veraventure, a venture capital investment company serving as the hub for public early-stage venture capital investments. VIGO is a type of incubator that focuses on young enterprises with high growth potential. VIGO is meant to bridge the gap between early stage technology firms and international venture funding. While an evaluation study of the Finnish innovation system is available that deals with general policies for fostering high-growth SMEs, it does not include an evaluation of specific policy measures in this direction.

In the **Netherlands**, the Growth Accelerator (“Groeiversneller”) programme (http://www.groeiversneller.nl) supports ambitious growth of enterprises with an annual turnover between 2 and 12 million euro. Within five years, the participating firms’ growth is supported by senior advice and contacts to networks of entrepreneurs and finance providers. Groeiversneller is an initiative by the Dutch Ministry of Economic Affairs and its Innovation Platform. The programme is implemented by a joint venture of PricewaterhouseCoopers, the Port4Growth platform, de Baak Management Centre VNO-NCW, Philips Applied Technologies, and AKD Prinsen Van Wijmen.

**Cross-country analyses of HGIE policies: recommended foci**

While the number of studies about high-growth firms has been increasing significantly in recent years, the number of studies about policies to support such companies is still small. Highly sophisticated analyses, applying for example cost-benefit analyses of specific instruments – also comparing the costs and benefits of alternative use of public funds – or longitudinal studies with control groups of companies not receiving specific types of support, were not identified in the course of research for this paper. This does not only apply to policies for high-growth enterprises but to entrepreneurship policy in general: Economic research can as yet give no clear answers to the question which entrepreneurship policies are particularly conducive for enterprise development.

Among the most prominent studies about policies for high-growth enterprises are the ones by the OECD (2010) and Autio (2007). The **OECD** report suggests a set of combined elements to foster high-growth SMEs: improve the business environment, encourage entrepreneurial attitude, support the provision of training in young and small enterprises, improve access to debt and equity finance when necessary, and promote innovation and internationalisation activities of new and small firms. In practice, the OECD found that countries’ policies for fostering SME growth tend to focus on R&D and access to finance, while neglecting skills upgrading and encouraging growth ambitions.

**Autio** et al. produced a comprehensive analysis of policies for high-growth SMEs in a study for the Finnish Ministry of Trade and Industry. They suggest that policies in support of HGIEs are distinctly different from SME policies.[[53]](#footnote-53) The study mentions the following lessons learned from HGE policies in the nine countries of Australia, Brazil, Finland, Hong Kong, Hungary, Italy, Netherlands, Spain, and the UK:

* *Selectivity*: Initiatives seeking to promote HGEs must be highly selective because only a very small share of firms and entrepreneurs are willing and able to achieve rapid growth. Selectivity should increase with the maturity of the company.
* *Proactiveness*: Agencies can scan the environment for potential high-growth firms in order to develop customised support for them. However, excluded firms may complain of discrimination – a proactive approach should be implemented carefully.
* *Private sector collaboration*: Active participation of private-sector actors ensures experience-based skills in managing growth and enhances credibility of the initiative.
* *Professionalism*: The support agency needs to nurture its professionalism, competence, and a certain degree of exclusivity in order to be able to provide real value and to be credible.
* *Sustained efforts*: Since growth may take time and since high-growth firms may be volatile, sustained efforts are necessary, “prepared to accept casualties”.
* *Focus on skills*: Since the management of growth is very demanding, the policy measure should emphasise the development of managerial competencies, involving experienced managers.

However, the studies do not deal in depth with the question whether there are market failures and possible government failure. It remains an open question whether the resources used in the analysed policy measures were used efficiently: Are the economic benefits created higher than the costs of the measures? Could the same outcomes have been achieved with fewer resources spent on other policy measures? Further research is needed to answer these questions.

**Improving access to private finance**

**The current situation of accessing private finance in Europe**

#### Importance of access to finance for company growth

Access to finance is crucial for new companies to set up, maintain, develop and grow their business. Some companies may be established with own funds and be maintained or grow with their revenues. Others may seek bank loans. Companies with considerable growth perspectives may be looking for venture capital (VC). Discussions and analyses about high growth of companies often focus on VC. There are empirical indications that a well-functioning venture capital market is conducive to growth not only of single companies but also of national economies: “Venture capital injects economic dynamism: An increase in VC investments of 1‰ of GDP is statistically associated with an increase in real GDP growth of 0.30 pp. Early-stage investments have an even bigger impact of 0.96 pp. The direction of causality is not always easy to establish. Yet, tests (...) in the biggest market, the US, suggest that causality runs from VC-investments to growth. There is also substantial micro-evidence that supports this view.”[[54]](#footnote-54)

Yet, bank loans are the preferred source of growth finance for European companies. In a 2009 survey, 64% of companies that expected to grow in the coming years stated that they would prefer to apply for a bank loan to realise these growth ambitions. Further 13% of companies preferred a loan from other sources. Only 6% stated that private equity would be their preferred source of growth finance.[[55]](#footnote-55) This may relativise the importance of equity finance for company growth – or it may show the relative weakness of VC in Europe.

#### Difficulties in the availability of finance

Companies have to acquire funds in a complex and changing financial environment, in an environment that is particularly difficult in the ongoing financial crisis, and they have to deal with an increasing complexity and extent of financial reporting to their debtors. The level of difficulties to acquire finance differs starkly between European countries. An OECD survey in 20 European countries found that “the success rate for requests of bank loans is consistently higher for average enterprises than for enterprises experiencing high-growth. Young high-growing enterprises are the less successful in obtaining bank loans due to their lack of credit history and higher perceived risk”.[[56]](#footnote-56)

The economic and financial crisis has had starkly deteriorating effects on the VC market. While private equity investments in Europe had been tripling from 24 billion Euros in 2001 to 72 billion Euros in 2007, investments fell to 24 billion Euros in 2009, even below the 2001 value, and recovered to 46 billion Euros in 2011.[[57]](#footnote-57) This decline and recent slight recovery is a world-wide phenomenon. Considering that the number of companies funded in 2010 was almost the same as in 2009, it is still difficult for high-growth oriented companies seeking VC to find adequate funding.

The level of development of venture capital markets and thus the difficulties to obtain VC are very different among European countries. In 2011 the European VC market in terms of investments was dominated by Nordic countries, with Sweden at the top (0.064% of GDP), followed by Denmark (0.052%) and Finland (0.044%) on position four. The UK took position three with 0.045%. At the other end of the line there were Greece (below 0.000%), Bulgaria (0.001%) and Romania (0.003%).[[58]](#footnote-58)

#### Unclear economic foundation of policy interventions

The origins of imbalance between demand for finance enterprises and finance supply are well understood in economic science terms and can e.g. be explained by asymmetric information. However, as explained in an evaluation report of the Finnish innovation system, “determining the existence, magnitude and materiality of such a gap and finding the appropriate form and magnitude of government intervention to address the gap in a given region or at a given point in time are less clear”.[[59]](#footnote-59) Notwithstanding, improving access to finance is a typical instrument of SME and innovation policy.

#### Policies to facilitate access to finance

The European Commission and Member States have implemented a comprehensive system of policies and instruments to support enterprises with the most appropriate sources and types of finance at each stage of their life.[[60]](#footnote-60) There are also instruments for HGIEs. In fact, an OECD report about policies for high-growth SMEs found that such policies in practice tend to focus on access to finance (and also R&D), while neglecting skills upgrading and encouraging growth ambitions.

An important issue may be to decrease entrepreneurs’ transaction costs in finding finance. An element of policy support for HGIEs may be to create “**pathways of financing**”. Website informing entrepreneurs about where to seek finance for certain stages in the life of an enterprise in a certain region may be helpful when all pieces of finance for this pathway exist.

There are indications that **enterprise taxation** – as a form of finance deduction, i.e. negative finance – can be even more important to enterprises than access to “positive” finance. A survey of Finnish companies in the context of an evaluation of the Finnish innovation system found that “small and young innovative firms think that reducing company and capital taxation is much more important for them than, for example, the availability of risk capital”.[[61]](#footnote-61)

**Exemplary initiatives to improve access to venture capital**

#### Creating a European venture capital market

Europe faces a “combined problem” of a shortage of venture capital (VC) supply, a shortage of VC demand and, consequently, thin markets.[[62]](#footnote-62) At present there is no integrated European VC market; the regulatory situation varies widely between Member States. The EU is seeking to unify the VC market and is promoting cross-border VC investments. Different national, administrative, regulatory and tax rules currently make cross-border investment difficult.[[63]](#footnote-63) Public VC plays a relatively important role in Europe compared to the US. The European Investment Fund (EIF), whose shares are held by the European Investment Bank (EIB), the European Commission and financial institutions, is a specialist provider of risk finance and a major player in the European VC market. Establishing funds of funds, i.e. public funds that share risks of private VC funds, also contributes increasingly to developing the VC market in Europe. Given the current situation, public support to VC in Europe may be justified in terms of market failure because VC may frequently be “impatient”, seeking swift exit of the investments, while public support may make it more “patient” for the benefit of longer-term growth.

#### Fostering business angels’ networks

Investment in early-stage research-based start-ups is very risky so that they are no preferred investments for venture capital funds. Such investments rather tend to be a domain of private investors, so-called business angels. They do not only bring in finance but also management expertise and networks. Increasingly, business angels are forming networks, private or semi-public organisations, mainly at regional or national level. In 2010 there were 174 such networks in Europe.[[64]](#footnote-64) Examples include among others the UK Business Angels Association, the Lewiatan Business Angels network in Poland, and the Business Angel Network Deutschland (BAND) in Germany. Regions and countries may seek to support such initiatives. Possible support measures include facilitating the creation and operation of business angels’ networks, tax incentives or tax relief schemes as well as co-financing schemes for business angels. However, a recent study found that the effectiveness and efficiency of such support measures is unclear and in any case depending on how they are implemented. [[65]](#footnote-65)

#### Linking R&D programmes with venture capital (Canada)

The Canadian experience suggests that a focus by governments on high-tech based SMEs combined with adequate levels of VC financing holds great potential for creation of “gazelles”. These firms, once created, show unusual resiliency as measured by low failure rates and multiple growth spurts. There are no specific policies for grants to industry in Canada that focus on HGIEs. The Canadian Industrial Research Assistance Program (IRAP) switched its focus to concentrate on high-tech SMEs in the early 1980s aiming to attract VC funds for IRAP clients and to increase gazelle creation. The VC industry in Canada did begin to support IRAP-funded high-tech SMEs. Between 1995 and 2007, VC funded high-tech SMEs contained about 12% gazelles. Over the same period the pool of high tech SMEs that received both VC funding and IRAP assistance contained 22% gazelles. These results suggest that a focus on high-tech SMEs within the proper support environment can stimulate gazelles’ creation significantly.[[66]](#footnote-66)

**Exemplary initiatives to improve access to dept capital**

On European level, two facilities support debt finance for research, development and innovation projects. In order to improve access to loans for European R&D projects, the European Commission, in cooperation with the European Investment Bank (EIB) introduced the Risk-Sharing Finance Facility (**RSFF**) in 2007. Sharing the risk between the Commission and the EIB allows the RSFF to produce additional loans for R&D projects. Moreover, projects with a higher risk than would otherwise be possible for the EIB are also considered. The loans will benefit those R&D projects, including infrastructure projects, which have a strong European dimension. Possibly beneficiaries include companies of all sizes, public and private research organisations as well as public-private partnerships. The EU and the EIB each provide up to 1 billion euro of risk coverage for potential losses for the period of 2007-2013, allowing the EIB to provide RSFF loans and guarantees of up to € 10 billion. The targeted minimum loan is 7.5 million euro.[[67]](#footnote-67)

In 2011, the European Investment Fund (EIF), the EIB and the European Commission, launched the SME risk-sharing instrument (**RSI**), a guarantee facility for innovative SMEs to help them access finance from banks. The RSI builds on the RSFF which was found to be successful. The targeted loans are between 25,000 and 7.5 million euro. The RSI is expected to unlock 6 billion euro of loans until the end of 2013. From 2014 the EC intends to expand the RSFF under the Horizon 2020 Framework Programme for Research and Innovation.[[68]](#footnote-68)

**Targeted public schemes to support innovative firms**

Overview of what policy makers can target with public schemes

There are numerous targets which public policies for HGIEs can seek to hit. The following is an overview of possible targets, suggesting covering some of the most important issues but not claiming completeness:

* Educational framework: This includes secondary education, higher education, further education, knowledge transfer from higher education institutes to business, and skills upgrading through mentoring and coaching. This is important for HGIEs in order to educate entrepreneurs and to be able to draw from a pool of highly qualified employees.
* Institutional framework conditions for businesses, comprising e.g. administrative requirements, labour law, bankruptcy law, taxation, and attitudes towards entrepreneurs.
* Specific industries deemed particularly innovative, for example technology-oriented industries. This may also include clustering policies for companies in specific industries.
* Specific regions: Policy makers may target regions not sufficiently adapting to structural change (e.g. old industrialised regions, rural regions).
* Specific types of firms: Policy makers may target spin-offs, innovative firms, new and young firms, SMEs, or firms in ownership transition.
* Specific business functions: Public schemes may target specific functions such as marketing (e.g. going international), sales (e.g. innovation-friendly public procurement), or financing (e.g. facilitate access to equity funds or debt, see above).

These possible targets cannot all be dealt in detail here. Two items shall be picked out considered as particularly relevant here: the institutional framework and coaching.

**Targeting the institutional framework for entrepreneurship**

There are ample examples of framework conditions unfavourable for high growth of firms. They may for example be related to the research and education system, investment regulation, start-up regulation, market entry barriers, labour law, bankruptcy law, taxation, and also to SME policies rewarding to stay small.[[69]](#footnote-69)

**Korea** provides in insightful case of a policy shift towards high growth firms. The Small and Medium Business Administration applies more than 100 SME promotion measures. Recently the policy concept for SMEs has been directed towards competitive SMEs, away from protection of the weak. Transforming traditional SMEs to high-growth SMEs is the new policy focus. Some of the traditional SME policies have been criticised for inefficiency and ineffectiveness. Previously, the operational definition of an SME in Korea was an enterprise with less than 300 employees. Since enterprises with more than 300 employees could not receive any support, many enterprises did not seek growth. Similar **disincentives to grow** may potentially also exist in many European countries, and it may be worthwhile for policy makers to consider eliminating them.

Access to finance may also be hampered by unfavourable **regulations related to investment** and company shares: “There are a number of European countries where provisions governing the issuance of equity shares and registration make it very expensive to launch a company and grow it quickly.”[[70]](#footnote-70)

Highly regulated **labour markets** may be an important barrier for companies to grow.[[71]](#footnote-71) As innovation policy advisor Burton Lee states: “To grow a company quickly, you need to hire staff quickly - and you need to be able to dismiss them again if necessary. It is so costly to dismiss employees in Europe that entrepreneurs and company managers are extremely cautious about hiring.”[[72]](#footnote-72) However, this argument becomes less strong considering the relatively large shares of high-growth enterprises in the Nordic countries of Denmark, Sweden and Norway with traditionally highly regulate labour markets, while Austria, a country with a fairly loose labour market regulation, has only an average share of high-growth companies.

Since the European culture is said to favour security, the risk of failure may be an important impediment to start and grow companies: “It is important to allow entrepreneurs to fail. Failing is very instructive, because next time you will do it better. This is where the need to modify **bankruptcy law** comes in. And there is a need for change in social attitudes towards entrepreneurs who failed, too.”[[73]](#footnote-73)

**Social recognition of entrepreneurs** or the lack of it, respectively, is apparently not a crucial impediment in Europe. A population survey of the Global Entrepreneurship Monitor 2010 in 21 innovation-oriented countries asked whether starting a company is considered an attractive professional option and whether successful company founders are highly respected. European countries did not perform worse than the US, South Korea and Australia in this respect and much better than Japan. In fact, the largest share of answers of “yes” for “company start-up is an attractive professional option” was found in the Netherlands (86%).[[74]](#footnote-74)

In any case, as a recent study about enterprise growth put it, “how to tear down barriers to growth is a country-specific question. (...) Each government must do its homework and identify domestic roadblocks”.[[75]](#footnote-75)

**Targeted coaching for high growth**

#### High-growth coaching: how to scale up existing schemes

As the evaluators of the Finnish innovation system for high growth enterprises state, “most first time, owner-managers of high-growth entrepreneurial firms will likely not have sufficient skill sets (at least in a fully developed and tested form), and will necessarily need to have access to human capital and further levels of professional advice consistent with the growth needs of the enterprise”.[[76]](#footnote-76) A special means of accessing knowledge in the course of running and growing a business is coaching – a way to provide managerial competence at arm’s length. Studies confirm the importance of coaching for growing a company. In the European Investment Fund’s GIF programme, an appointed business director was found to be among the most appreciated support measures in addition to funding received.[[77]](#footnote-77) The Swiss CTI Start-up programme claims that since 1996 to the present CTI reviewed 1,800 start-up projects, 200 start-up enterprises received the CTI start-up label, and 85% of them are still operating, some having shown remarkable growth.[[78]](#footnote-78) This survival rate is much higher than for normal SMEs.

#### Help “crossing the chasm”

In particular, coaching may help grow smaller firms and cross the “chasm” between pilot markets and mass markets. Many young firms with high growth potential have spun out of higher education institutions and are led by managers with extensive research experience and mentality, not approaching their business from a market-driven perspective. In their first growth phase, public funding is often used effectively to advance the technological development of the initial invention. The business model is often focused on unique solutions for pilot customers. With this business paradigm high growth is rarely achievable. Management often does not understand how to make the transition from customised products for pilot customers to scalable products for larger markets. Even when management understands how to achieve this result technically, they often do not appreciate the changes that this strategy shift entails: networks change, new investment rounds are necessary, business plans and a new business strategy need to be developed, core competencies and organisation structure need to be aligned with emerging business processes. In such a situation, experienced coaching may be crucial.

In addition, coaching may not only provide advice but also facilitate access to finance. For example, the label of the Swiss CTI Start-up coaching programme has become an important determinant in attracting venture capital, angels’ investment and other financing partners which are essential to further growth.

#### Exemplary initiatives

There are numerous coaching activities for entrepreneurs around the world, including for example the Platinn coaching association in Western Switzerland which uses the business paradigm shift concept described in the previous paragraph,[[79]](#footnote-79) the Canadian Industrial Technology Advisors,[[80]](#footnote-80) and the coaching element of the German High Tech Gründerfonds.[[81]](#footnote-81) The EU supported several coaching networks in the past:

* The **smE-MPOWER** project was funded by DG Research from 2005-2007, establishing "a learning community of SME coaches and intermediaries, strategically sharing proven operational know-how". smE-MPOWER materials that assist an SME at any and all stages of innovation activities throughout the firm’s life cycle are freely available under an open license arrangement.[[82]](#footnote-82)
* The **Intelligent Manufacturing Systems** (IMS) programme supports R&D innovation within manufacturing, supported by DG Research. IMS includes Europe, Switzerland, Korea, USA, and Mexico and is building an international business innovation coaching network focused on facilitating the development of international manufacturing technology projects.[[83]](#footnote-83)
* The **Harmony** project completed within IMS provided coaching explicitly designed to guide SMEs through the stages of developing and launching a business innovation collaboration project including e.g. strategic project planning, partner search, and intellectual property negotiations.

There are also specific coaching programmes for entrepreneurs aspiring for high growth – and high-growth programmes offering coaching. There are also “coach the coaches” activities: The European Commission supports the “high growth coach” programme, aiming “to adapt and deliver a UK development programme for coaches working with high growth companies”, to be used by agencies engaged in high growth coaching in Romania, Lithuania, Slovenia and Hungary.[[84]](#footnote-84) The Danish Accelerace programme for promising start-ups aspiring for high growth also includes coaching.

Despite these initiatives, many SMEs do not take advantage of coaching opportunities, and there is yet no appropriate infrastructure to encourage the replication of innovation-focused coaching networks throughout EU Member States. It may be worthwhile considering.

**Lead questions for seminar discussion**

The following questions shall guide the discussion in the seminar session about high-growth innovative enterprises. The answers to these questions should reflect the specific situations and approaches in EU Member States. The discussion offers a very good opportunity to exchange experiences made in Member States:

1. What measures are particularly helpful or unhelpful to facilitate **access to finance** for high-growth innovative enterprises? What barriers do Member States face on the road to a Single Market for venture capital in Europe? What experiences were made when trying to promote business angels?
2. What characteristics should **targeted schemes** for supporting high-growth innovative enterprises have? Is a focus on coaching and mentoring entrepreneurs worthwhile?
3. What **framework conditions** would most urgently need to be modified in order to support high growth of enterprises? Should the focus be on general business regulations, investment regulation, labour law, bankruptcy law, SME policies rewarding to stay small, or on other conditions? Or should the whole set of framework conditions be targeted?

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1. The Agenda of the MLS, which includes the names and affiliations of speakers, is attached as Appendix 1. [↑](#footnote-ref-1)
2. The three Background Papers are attached as Appendix 2 [↑](#footnote-ref-2)
3. Interim report available at: http://badania.parp.gov.pl/index/index/1772. [↑](#footnote-ref-3)
4. Link to the impact assessment report: http://www.dgcis.redressementproductif.gouv.fr/files/files/archive/www.industrie.gouv.fr/p3e/evaluation/evaluation-du-dispositif-JEI.pdf. [↑](#footnote-ref-4)
5. ERA Communication - Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A Reinforced European Research Area Partnership for Excellence and Growth, Brussels, 17.7.2012 COM(2012) 392 final [↑](#footnote-ref-5)
6. Ibid. page 6 [↑](#footnote-ref-6)
7. Philippe Aghion, Mathias Dewatripont, Caroline M. Hoxby, Andreu Mas-Colell, and André

Sapir, The Governance and Performance of Research Universities: Evidence from Europe and the

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8. Diana Hicks, Performance-based university research funding systems, Research Policy 41 (2012) 251-261 [↑](#footnote-ref-8)
9. Otto Auranen and Mika Nieminen, University research funding and publication performance – An international comparison, Research Policy 39 (2010) 822-834 [↑](#footnote-ref-9)
10. Achilleas Mitsos (chair), Andrea Bonaccorsi (rapporteur) , Yannis Caloghirou (rapporteur), Jutta Allmendinger, Luke Georghiou, Marco Mancini and Frédérique Sachwald, High Level Panel on the Socio-Economic Benefits of ERA, Final Report, European Commission DG Research and Innovation (June 2012) EUR 25359 [↑](#footnote-ref-10)
11. Proposed by Alfred Lotka in 1926 this can be stated as being that the number of authors producing n articles is about 1/n2 of those publishing 1 article. [↑](#footnote-ref-11)
12. Government of Poland, National Research Programme, Assumptions for the Science & Technology and

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16. Thomas Estermann and Enora Bennetot Pruvot, Financially Sustainable Universities II - European Universities Diversifying Funding Streams, European University Association, 2011 [↑](#footnote-ref-16)
17. Thomas Estermann and Anna-Lena Claeys-Kulik, Financially Sustainable Universities – Full Costing: Progress and Practice, European University Association, 2013 [↑](#footnote-ref-17)
18. Gunnar Öquist and Mats Benner, Fostering breakthrough research: a comparative study, Royal Swedish Academy of Sciences, December 2012 [↑](#footnote-ref-18)
19. Dawson J., van Steen J. and van der Meulen B., Science systems compared: A first description of governance innovations in six science systems, Science System Assessment Report 0914, Rathenau Institute, August 2009 [↑](#footnote-ref-19)
20. Gibbons, M and L Georghiou (1987), Evaluation of Research: A Selection of Current Practices, Paris: OECD [↑](#footnote-ref-20)
21. ERA Expert Group, Challenging Europe’s Research: Rationales for the European Research Area (ERA), Commission of the European Communities, EUR 23326 EN, 2008 p.47 [↑](#footnote-ref-21)
22. Wenneras C. and Wold A., Nepotism and Sexism in Peer Review, *Nature* Vol 387 22 May 1997 pp 341-343 [↑](#footnote-ref-22)
23. Quotes taken from ERAPRISM Deliverables D 5.2: Report on the challenges faced by R&D public funding systems in small (and transition) countries http://www.eraprism.eu [↑](#footnote-ref-23)
24. http://erawatch.jrc.ec.europa.eu/ [↑](#footnote-ref-24)
25. s3platform.jrc.ec.europa.eu/ [↑](#footnote-ref-25)
26. See Koen Frenken, Frank Van Oort & Thijs Verburg (2007), “Related Variety, Unrelated Variety and Regional Economic Growth”, *Regional Studies*, 41:5, 685-697 [↑](#footnote-ref-26)
27. These are referred to as “knowledge stakeholders”, which highlights the fact that these participants are selected because of their ability to contribute to these processes through their personal insight and competence and are only representing themselves in these processes and not any background organisation with vested interests to influence the outcome of the process. Sometimes the same persons might later participate in the formal processes as representatives of “formal stakeholders” with vested interests, but at this stage they are not bound by their affiliation and only represent themselves as individuals. A “knowledge stakeholder” can also be an organisation engaged solely or mainly in strategic intelligence and/or sense-making activities, as long as it is fully independent from any “formal stakeholders” (EFFLA 2012). [↑](#footnote-ref-27)
28. Technopolis et al (2012) [↑](#footnote-ref-28)
29. Eqduist et al, (2012) [↑](#footnote-ref-29)
30. Izsak, K. and Edler J. (2011)  [↑](#footnote-ref-30)
31. Underpinn project, <http://underpin.portals.mbs.ac.uk> [↑](#footnote-ref-31)
32. Part of these examples were already discussed in the 2012 Mutual Learning Seminar [↑](#footnote-ref-32)
33. OECD (2011), Demand-side Innovation Policies, Paris, <http://www.oecd.org/fr/science/inno/demand-sideinnovationpolicies.htm> [↑](#footnote-ref-33)
34. The lead market concept became fashionable with its inclusion in the seminal work of M. Porter (1990) [↑](#footnote-ref-34)
35. This discussion paper is further developed from research for a policy brief in the framework of the project INNO-Grips on behalf of the EC; see European Commission (2011). [↑](#footnote-ref-35)
36. OECD (2009), p. 28. [↑](#footnote-ref-36)
37. See OECD (2009), p. 30 and Eurostat/OECD (2007), p. 61. [↑](#footnote-ref-37)
38. See Moore (1998). [↑](#footnote-ref-38)
39. See for example Rigby/Bleda/Morrison/Kim (2007), p. 18. [↑](#footnote-ref-39)
40. See OECD (2012), pp. 87. [↑](#footnote-ref-40)
41. See Gallup Organisation (2009), p. 15. [↑](#footnote-ref-41)
42. See Veugelers (2009), p. 2. [↑](#footnote-ref-42)
43. See Simon (2009) and (2012). [↑](#footnote-ref-43)
44. See Simon (2012), p. 113 in chapter 4 about “growing continuously”. [↑](#footnote-ref-44)
45. Bravo-Biosca (2010), p. 2. [↑](#footnote-ref-45)
46. WEF (2011), p. 6. [↑](#footnote-ref-46)
47. See European Commission (2011), p. 83. [↑](#footnote-ref-47)
48. See Stangler (2010). [↑](#footnote-ref-48)
49. See Acs/Mueller (2008), p. 1. [↑](#footnote-ref-49)
50. WEF (2011), p. 7. [↑](#footnote-ref-50)
51. The following elaborations have been adapted from European Commission (2009), sections 3.2.3 and 3.2.4. See Murray/Hyytinen/Maula (2009), section 5.2.1, for a summary of possible market failures in the context of promoting high-growth SMEs. [↑](#footnote-ref-51)
52. See http://symbion.dk/en/business-development/accelerace/. [↑](#footnote-ref-52)
53. See also Autio’s paper for the Mutual Learning Seminar in 2012. [↑](#footnote-ref-53)
54. See Deutsche Bank Research (2010). [↑](#footnote-ref-54)
55. See Gallup (2009), p. 9. [↑](#footnote-ref-55)
56. OECD (2012), p. 108. [↑](#footnote-ref-56)
57. See EVCA (2012), p. 4. [↑](#footnote-ref-57)
58. See EVCA (2012), p. 32. Figures according to market statistics which are an aggregation of the figures according to the location of the portfolio company. At European level, this relates to investments in European companies regardless of the location of the private equity firm. [↑](#footnote-ref-58)
59. Murray/Hyytinen/Maula (2009), p. 153. [↑](#footnote-ref-59)
60. See http://ec.europa.eu/enterprise/policies/finance/financing-environment/index\_en.htm. [↑](#footnote-ref-60)
61. Murray/Hyytinen/Maula (2009), p. 167. [↑](#footnote-ref-61)
62. European Parliament (2012), p. 11. [↑](#footnote-ref-62)
63. See http://ec.europa.eu/enterprise/policies/finance/risk-capital/venture-capital/index\_en.htm. [↑](#footnote-ref-63)
64. See Centre for Strategy Evaluation Services (2012), p. 12. [↑](#footnote-ref-64)
65. See Centre for Strategy Evaluation Services (2012), p. 37 and 44. [↑](#footnote-ref-65)
66. See the related case study in European Commission (2011), p. 68-73. [↑](#footnote-ref-66)
67. For further information see http://www.eib.org/products/rsff/index.htm?lang=en and the related links. [↑](#footnote-ref-67)
68. See http://www.eif.europa.eu/what\_we\_do/guarantees/RSI/news/2011/2011\_RSI.htm for further information about the RSI. [↑](#footnote-ref-68)
69. For a very recent and detailed study about the importance of framework conditions for new firms as well as high-growth firms see Stenholm et al. (2013). [↑](#footnote-ref-69)
70. Statement from professional investor Burton Lee in an interview for a Policy Brief of the INNO-Grips project, quoted from INNO-Grips Newsletter 1/2010, p. 6. [↑](#footnote-ref-70)
71. See Baughn/Sugheir/Neupert (2008) who found that “labor flexibility is a significant predictor of the prevalence rates of high-growth entrepreneurship”. See also Minniti (2008), p. 787, suggesting that in developed countries labour market reforms may be particularly conducive to “support the growth of high-performance ventures”. [↑](#footnote-ref-71)
72. Quotation from INNO-Grips Newsletter October 2010, p. 5. [↑](#footnote-ref-72)
73. Statement from Burton Lee in an interview for this Policy Brief, quoted from INNO-Grips Newsletter 1/2010, p. 6. [↑](#footnote-ref-73)
74. See Brixy et al. (2011), p. 19. Answers translated from German by the author. [↑](#footnote-ref-74)
75. Rubin et al. (2012), p. ix. [↑](#footnote-ref-75)
76. Murray/Hyytinen/Maula (2009), p. 168. See also Autio et al. (2007), p. 85. [↑](#footnote-ref-76)
77. See Centre for Strategy and Evaluation Services/EIM (2011), p. 65. See section 4.1.1 of this Policy Brief for GIF. [↑](#footnote-ref-77)
78. See http://www.ctistartup.ch. [↑](#footnote-ref-78)
79. See http://www.platinn.ch/eng/ . [↑](#footnote-ref-79)
80. Provided by the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP); see http://ventureconnection.sfu.ca/index.php?/grow/nrc\_irap\_industry\_technology\_advisors\_ita/. [↑](#footnote-ref-80)
81. See http://www.high-tech-gruenderfonds.de/coaching. [↑](#footnote-ref-81)
82. See http://www.sme-mpower.net. [↑](#footnote-ref-82)
83. See http://www.ims.org. [↑](#footnote-ref-83)
84. See http://www.exponentialtraining.com/about/eu-projects. [↑](#footnote-ref-84)