

Knowledge for Growth

**S&T policy in times of crisis:
Prospects for the knowledge-based economy**
25 June 2009, Brussels

Conference Documentation

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CONFERENCE RATIONALE

The conference **"Science and technology policy in times of crises - Prospects for the knowledge-based economy"** is designed as a high-profile forum for the international S&T policy community. All EU member states have been invited. Focusing on knowledge policy and holding it in Brussels will give the event a unique flavour with a strong emphasis on EU challenges, problems and potential solutions.

The conference has been organised to increase the visibility and impact of the work done by Science and Research Commissioner Janez Potočnik's "Knowledge for Growth" (K4G) expert group during its four years of operation.¹ However, the aim of the conference is not to present faithfully all results and findings that have been delivered by various reports and policy briefs. The idea of the conference is rather to address a few "hot" S&T policy issues for the future and to use the potential of the K4G Group to start setting the agenda for these topics.

The audience of the conference will be the larger S&T policy community as well as fellow researchers. This audience needs to know the state of the art, policy implications, and where we need to go from here.

The conference will have an opening address by Commissioner Potočnik, followed by two plenary sessions, each with keynotes and a roundtable discussion. The conference will also provide the opportunity for interaction among the speakers and with the audience. Both roundtables will bring together key stakeholders from industry, academia and the Member State policy.

The two plenary sessions will address global crises and prospective solutions for the knowledge economy respectively.

Session 1: R&D and innovation policies to address global systemic crises and challenges

This session, chaired by Professor D. Foray, the vice-chair of the K4G group, will address the systemic global crisis and its challenges, and will cover the economic crisis as well as the crises caused by climate and environmental challenges, food security and healthcare problems. Topics touched on will include:

- The need to strengthen long-term objectives in Europe for research, education, and innovation as a way to recover from the crisis and for structural reforms by public/private investments.
- Addressing global systemic crises and challenges through R&D and innovation implies working not only on the 3% Lisbon target but also on the direction of R&D and innovation, i.e. to be "non-neutral" in the allocation of resources.
- How to address "grand challenges": What kind of EU policy should be implemented to address global challenges; which form of cooperation, and what relation with national policies should get preference?

¹ A brief summary of the K4G group's activities is available at http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm

The keynote will focus on a comparison between the United States and Europe. Professor B. Van Ark, the chief economist of the US Conference Board and a member of the K4G group, will compare and contrast the US approach and reaction to the economic crisis with those of the EU. His keynote is entitled: "Whose lessons to be learned? Reflections on new orientations in US and European innovation policies."

Professor P.A. David from Stanford University and ParisTech will take the adverse potential consequences of climate change as a case-study for addressing the centrality of R&D in government strategies for responding to this challenge. How can the EU meet the dual needs of, on the one hand, encouraging private sector R&D expenditures and developing an EU comparative advantage in certain areas of "climate change ameliorating" innovations, and on the other, the creation of a new areas of scientific and engineering job creation that will fuel the demand for human capital formation for the future? His keynote is entitled: "Preparing for the next, very long crisis: towards a 'cool' science and technology policy agenda for a globally warming economy."

Session 2: Research strategies and instruments for Europe after the crisis

This session, chaired by Professor R. Marimon, author of the K4G Policy Brief on the governance of European science, will deal with governance issues of research and specialisation in the knowledge economy, as well as with prospective research policies. Specific issues and questions to be treated are as follows:

A basic premise of S&T policies is that social returns may exceed private returns, providing a role for public intervention in the market of ideas and innovations in the European Research Area (ERA). However, while Europe as a whole can benefit from enhancing European R&D, these spillover effects often also have a more local dimension, providing a rationale for national or regional local "research strategies and funding institutions". In other words, R&D in the ERA has a dual character: its capacity to strengthen the competitive position of Europe in the world, while at the same time strengthening the competitive position of a specific region or country within Europe. To find the right balance of this duality, i.e. to have regional, national and European policies mutually reinforcing each other, is one of the most challenging aspects of European S&T policy. This challenge is exacerbated by the need to improve the efficiency of R&D policies in times of crisis, as well as after the crisis.

- The economic recession emphasises the need to make efficient use of R&D resources, creating an opportunity for undertaking reforms in the regional, national, and EU S&T systems. Is the current institutional design adequate to face the challenges which lie ahead in S&T policy? Should new governance structures such as the ERC, EIT and ERA-Nets be expanded?
- What does the heterogeneity of Member States imply with regard to governance and R&D funding and how can the catching-up of less advanced countries be supported?
- Does the ERA provide the opportunity to better design Member States' S&T policies, and how can regions and countries less advanced in R&D take advantage of EU-wide knowledge to achieve their own specialisation in the knowledge-based economy?

The two keynotes will deal with pressing research policy and knowledge economy issues. Professor R. Veugelers, member of the K4G group and former advisor to President Barroso, has delivered a report on the catching-up countries in Europe. She will open the debate on "smart

specialisation" as an overriding theme of the K4G group. Her keynote is entitled: "National strategies in Europe and the role of smart specialisation."

Professor L. Soete, director of the United Nations institution UNU-MERIT, has been an advisor to the Commission on research and innovation policies for many years. His keynote is entitled: "Focused policies governing the knowledge economy."

The Chairpersons - Professor D. Foray for Session I and Professor R. Marimon for Session II - will summarise and highlight the main issues of their sessions. Finally, Commissioner Potočník will bring the conference to a close.

CONFERENCE PROGRAMME

9:00 - 9:30	Welcome of Participants/Registration
9:30 - 9:40	Welcome Dominique Foray Vice-Chair of the K4G Group Professor, Ecole Polytechnique Fédérale de Lausanne - EPFL (CH) Dean, College of Management, EPFL
9:40 - 10:00	Opening Speech Janez Potočnik Commissioner for Science and Research and Chair of the K4G Group
Session 1:	R&D and innovation policies to address global systemic crises and challenges
10:00 - 10:15	Keynote address: "Whose lessons to be learned? Reflections on new orientations in US and European innovation policies" Bart Van Ark K4G Group member Vice President and Chief Economist, The Conference Board (US) Professor, University of Groningen (NL)
10:15 - 10:30	Keynote address: "Preparing for the next, very long crisis: towards a 'cool' science and technology policy agenda for a globally warming economy" Paul A. David K4G Group member Professor, Stanford University (US) Professeur Titulaire, Ecole Polytechnique & Telecom ParisTech (FR)
10:30 - 10:50	Coffee
10:50 - 12:30	Debate: Roundtable on Session 1 Chair: Dominique Foray <u>Participants:</u> Armel de La Bourdonnaye Head of Department, General Directorate for Research and Innovation, Ministry of Higher Education and Research (FR) Leif Kjaergaard President "Leif and Food Science" Deputy chair, European Research Area Board - ERAB Past president, European Industrial Research Management Association - EIRMA Former CTO of Danisco A/S (DK)

	<p>Georg Licht K4G Group member Director, department "Industrial Economics and International Management", Centre for European Economic Research - ZEW (DE)</p> <p>John Smith Deputy Secretary General, European University Association - EUA</p> <p>Roland Sommer Federation of Austrian Industries, Department Education, Innovation and Research (AT)</p> <p>Pierre Vigier European Commission, Directorate-General Research, "Economic analysis and monitoring of national research policies and the Lisbon strategy"</p>
12:30 - 13:00	Questions from the audience
13:00 - 14:00	Lunch
Session 2:	Research strategies and instruments for Europe after the crisis
14:00 - 14:15	<p>Keynote address: "National strategies in Europe and the role of smart specialisation"</p> <p>Reinhilde Veugelers K4G Group member Professor, University of Leuven (BE) Former member, Bureau of European Policy Advisers to the President of the European Commission - BEPA</p>
14:15 - 14:30	<p>Keynote address: "Focused policies governing the knowledge economy"</p> <p>Luc Soete Director, UNU-MERIT - The United Nations University - Maastricht Economic and Social Research and Training Centre on Innovation and Technology (NL)</p>
14:30 - 14:50	Coffee
14:50 - 16:00	<p>Debate: Roundtable on Session 2</p> <p>Chair: Ramon Marimon K4G Group member Professor, European University Institute, Florence (IT)</p> <p><u>Participants:</u></p> <p>Léopold Demiddeleer Future Businesses Director, Solvay (BE) President, European Industrial Research Management Association - EIRMA</p> <p>Tassos Giannitsis K4G Group member Professor, University of Athens (EL)</p> <p>Xabier Goenaga Beldarrain</p>

	<p>Head of Unit, European Commission, Joint Research Centre, Institute for Prospective Technological Studies - IPTS, Sevilla (ES)</p> <p>Michael Jacob Ministry of Enterprise, Energy and Communications, Division of Research, Innovation and Industry Development (SE)</p> <p>Gerhard Stahl General Secretary of the Committee of the Regions - CoR</p> <p>John Wood Senior International Relations Adviser, Faculty of Engineering, Imperial College London (UK) Chair, European Research Area Board - ERAB</p>
16:00 - 16:30	Questions from the audience
16:30 - 17:00	Conclusion of panel chairs
17:00	Conclusions by Commissioner Janez Potočnik

OPENING SPEECH

JANEZ POTOČNIK

Commissioner for Science and Research

Chair of the K4G Group

Dear Vice-Chair Dominique
Dear Ladies and Gentlemen

Wouldn't it be great to be able to look into the future, perhaps through a researcher's crystal ball?

Just think of all the things you could do...I could have won a lot of money for example by betting on Slovenia to beat Italy in the 2006 World Cup qualifiers.

I know there are more noble objectives to predicting the future with any accuracy. Anyway, perhaps someone, somewhere, is at this moment developing such a device. But I suppose I should not hold my breath.

But then the question must be, if we can't see into the future, what can we do to prepare for it?

This was a question I asked myself four years ago. And the answer is in front of me, because the Knowledge for Growth (K4G) Group was that answer. I turned to a group of economists with the skills, experience and the foresight to make the right kind of informed predictions about where we might take knowledge and mould it into growth and prosperity, better policies and a more informed knowledge society.

As we come to the end of this particular phase of the experiment, I think we can congratulate ourselves on a job well done...so far. We have succeeded through the power of knowledge and information, expressed in the reports and policy briefs that have been put out under the K4G brand and through that almost intangible commodity...of influence.

You have dealt with the real nuts and bolts of getting European research right up there where it belongs:

- 'The work on 'smart specialisation', the pragmatic and targeted realisation of research potential based on what can really be achieved (be it at regional, national or European level) by making sure those involved concentrate on what they do best and don't 'bite off more than they can chew';
 - the analysis of R&D Globalisation and the R&D deficit;
 - the correct identification of the issue of governance as vital in furthering sustainable knowledge policies;
-to just mention a few.

K4G has been a major contributor to the debate and to the policies we have put in place over the last four years.

If K4G had achieved 'only' this, it would still have been judged a success – but I'm happy to say that it leaves a legacy to be proud of and – importantly - a stepping stone to build on.

And I am pleased to be here today to witness this conference, K4G's first and last, a parting shot, if you will, as well as a green light to raise our profile and our ideas to a higher plane and to help those coming after us make better sense of this faster, bigger, more complex and interconnected world we inhabit at the beginning of the 21st Century.

But why do we still need to try so hard to pre-empt the future for knowledge and for research?

I think it is because of how much we have learned about the importance of investing in research and knowledge and the innovation, growth, jobs and prosperity that can come from it.

Nine years ago we gave a name to a strategy – the Lisbon Strategy – and investments in research, education and innovation have been made continuously since then in its name. I don't intend to lecture this audience about the importance of research and innovation in turning round flagging/paralysed economies – I think that particular mantra is in your blood. But I wouldn't deserve the job I have now if I didn't mention it. It's pretty straightforward – history has shown us that investments made in innovation and research when the prevailing advice has been that these are a luxury, have proved to be anything other than that.

The K4G group have played such a crucial role in this process. Its recommendations have been extremely influential in making the idea of a European Research Area – about which I will speak more later – a truth rather than a blueprint. They have also given credence to the very idea of the Lisbon strategy, using research and its products to work for Europeans and by embedding innovation into European policies.

And looking into the future means that, quite rightly, our conference doesn't dwell too much on past achievements, but instead looks forward, just as it should.

This is right for lots of reasons, not least because we haven't finished our work yet. And because there are new challenges that have come even further into the foreground, the challenges of the global recession for example, or the so-called 'grand' challenges, of the environment, of energy, of illness, of our ageing society, to name only a few.

And in case you might have lost touch with the statistics, it is unlikely that we will reach our 3% of GDP Lisbon target. There is no point trying to gloss over it or avoid it. The overall EU research effort hasn't ground to a halt, but it's not going as fast as we would like, either. There are wide variations between Member States in terms of research performance, which we have to address. But we are not alone in treading water, because despite their higher rate of investment in research, the Japanese and the Americans have not been immune to the global slowdown either. And even the Chinese have felt the tremors of the economic crisis and experienced a slowdown in their spectacular recent rates of growth.

In Europe, we know that one of the main reasons for this underperformance compared to our major competitors is the relatively low level of private investment in research.

How can we leverage more investment from the private sector? This is not just a question of the Commission encouraging companies to put more money into R&D!

We have been doing this now for nearly a decade, but now we need to try something else. We need to apply the right incentives. I think it comes down to the fact that we need to **enable rather than encourage**, and we need to do it in two ways:

- First, we have to make sure that private sector funding in Europe has the right framework conditions. It has to allow industry to achieve adequate returns on its investments in research and innovation. And it also needs to help the private sector to invest in research and innovation in places where their strategic help is needed, in tackling the big European societal challenges, for example;
- And second, we have to make sure that national Governments take up their responsibilities and support these policies.

We still need Lisbon, and we still want to use the ERA to make our economy knowledge based and competitive...but just like in a 4 x 100 m relay race, we need to make sure that there is someone ready to take hold of the baton rather than dropping it on the track.

So what would the research crystal ball say about where we need to go from here?

If you had asked me that question a year ago, you would have had a very different answer; but now, as the current Commission begins to look to the end of its term in office, with the Lisbon Treaty on the verge of acceptance and as our current Framework programme reaches its mid-term evaluation, I think now is a good time to reflect.

I have spoken before about research coming to a crossroads. And this does seem to be the case. There are several directions where we could go, but I think, and I think you would agree with me, that there are others where we should go.

There is a need, in my opinion, for a greater degree of integration of our actions and policies on research and technology. Drawing together these cooperative strands would mean acting on three main areas:

- Cooperation among and getting more from the **Member States**, as I have mentioned before
- Creating a single **Market** for knowledge, allowing researchers, ideas and technologies to freely flow across Europe
- Investing more **Money** in research and doing it in a smarter way, getting more excellence and impact from limited resources

These might be christened 'the 3Ms' but there is another one that one could add on a fourth 'post-it' note:

- More **Modern** research and innovation **policies**, interfaced and coherent with sectoral policies in efficient governance structures.

I believe, and I know that you know, that **Member States** work together better than apart. It's a truism we accept, and in research we have promoted the idea of collaborative cross-border partnership specifically under the Framework Programmes.

But even the Framework Programme is too small to address the really large scale challenges on its own. We now work towards 'Joint Programming' to enable a new, more strategic and forward looking type of R&D partnership between Member States- a partnership that is based on a common vision on how to meet and beat the global and systemic crises of our time.

And this partnership goes beyond research collaboration or developing joint research programmes or even planning and financing the large scale research infrastructures that we so urgently need in Europe. It extends to the policies that Member States and the Commission need to develop to truly make researchers, industry and stakeholders of all Member States and the European Research Area to be able to work together and exchange their ideas and technologies wherever they want. And these researchers, ideas and technologies have to be of the best quality.

The future of research and innovation depends on our capacity to attract the best brains into research, technology and innovation. We must find ways to make Europe the 'preferred continent' for the world's best researchers, a place where they can move around freely and where they want to spend their most productive years.

We need to create a single **market** for knowledge and establish what we call the fifth freedom. This single market, once fully established will create more competition and therefore support excellence in research - the basis for a competitive knowledge economy.

This is the thinking behind the **European Partnership for Researchers**, which aims at enhancing mobility of researchers and knowledge flow in Europe. By 2010, and under this Partnership, we want to have made substantial progress on:

- Open Recruitment and portability of grants
- Social security and supplementary pensions
- Attractive employment and working conditions
- Training of researchers.

Member States, the Commission, stakeholders and experts are working on real outputs for each of these issues. All this combined effort should help to establish a future in which researchers, even more so than today, will benefit from their 'European Status' and even move around freely to pursue their careers further, after all, this is what we want from them.

But in addition to this, and if we really want to build economic growth, we have to effectively exploit the results of public research. **Knowledge transfer**, from academia to industry, across sectors and borders, is essential in order for this to happen and the successful management of intellectual property in knowledge transfer activities is a key.

We know that much of this management will take place in Member States, in the public research organisations and in the universities. And this is why the Commission – alongside the Member States and all the stakeholders - is working on policy guidelines and a Code of Practice to help the process along.

This Member State momentum has to be taken even further – to ensure that ALL relevant bodies, from the largest programmes to the smallest research centre or university can collaborate, or pool resources. The SET Plan has already given birth to a potential model for this new type of collaboration, the EERA, the European Energy Research Alliance, a group of ten research institutes working together on clean technologies. This kind of joint work echoes what is happening with the Networks of Excellence and Knowledge and Innovation Communities of the European Institute of Innovation and Technologies. This has to be the direction we need to go in.

When it comes to **money**, we are faced with the fact that Europe accounts for only a quarter of global R&D spending. We need to both increase these resources and make better use of them. We have to support excellence better in science and increase its impact. This is the only way we are going to get the maximum 'bang for our buck'.

In particular, in times of crisis, R&D spending should not be cut. It must be invested in. This is straightforward thinking - because it can create both immediate demand - for highly skilled workers and high-tech lab equipment and infrastructures- , but also as investment into the future, to enable countries and companies to emerge stronger when the upturn comes. We have the examples of Finland, Japan and South Korea that you all know about – but there are others. The iPod and more fuel efficient engines were both developed during the last crisis – and Microsoft invested 20% more in R&D in the last quarter of 2008 than it did in the same period in 2007.

But we need to stretch our research Euro even further. With the advent of the European Research Council, we have created a true competition at European level for excellence in science – and word of its success is spreading. This can only help to increase Europe's attractiveness and strengthen its position as a global science player.

I spoke about making more impact with the resources we have and this also means looking at avoiding duplication and fragmentation. One way of approaching this, and one we favour, is the pooling strategy. Because pooled resources can be spent coherently, maximising impact and efficiency.

The third area where we need to act concerns making **more modern policies**, which brings research, innovation and sectoral policy objectives closer together. The Joint Technology Initiatives, born out of the European Technology Platforms, group public and private research investment around industrial 'fields', like nanotechnology or aeronautics. They are public-private partnerships in research. It doesn't take much imagination to see that a JTI could serve to build our own European industrial policy. It may be based on the idea – as seen often in the US – which could support a model of public procurement, rather than continuing research funding at supranational level.

And bringing together the public and private 'strands' is something we have done in the Commission's recovery package through three new PPPs in the industrial areas of energy efficient buildings, factories of the future and green cars. These are investments which are both green and smart. And we need to integrate supply side policies, such as research support and public-private R&D partnerships, with demand side policies, such as public procurement, standardisation and when necessary regulatory action. This is the thinking behind our lead market activities.

Ladies and Gentlemen:

We are faced with some difficult choices these days – perhaps even our crystal ball would not really have helped us. But what is sure, is that we really need to act now. Many times I have heard people talking about turning crises into opportunities. This has lost its meaning underneath a tsunami of cliché. But it retains more than a grain of truth.

If we want to pull ourselves together – in every sense of the expression, we have to do it now. If we really want an integrated European research system, one that is understood by its citizens, reflects expertise in all the Member States, uses all the 'actors' in the places and ways they can fully contribute and one that will really make us look forward with anticipation rather than with irritation, then now is the time.

You may not have noticed, but this has been a difficult keynote speech for me...not because of the content you understand, but because I'm anxious to get on with the conference.

I will leave you with some wisdom from Henry Ford, who knew a little about the world of research, innovation and business.

He once said that "if money is your hope for independence you will never have it. The only real security in this world is a reserve of knowledge, experience, and ability."

This is why the group was established. I'm happy to say that without doubt you have added to that 'reserve'.

I would like to thank you all for your consistent and expert contributions over the last four years and for helping us interpret and improve the world we live in. Your knowledge has inspired us to take our work further.

I have no regrets about this being the first and the last conference, because as far as I can see, the knowledge economy is in very good hands...

Thank you for your attention!

SESSION I:
R&D and Innovation Policies to Address
Global Systemic Crisis and Challenges

KEYNOTES:

**"Whose lessons to be learned?" Reflections on new orientations in
US and European innovation policies**

BART VAN ARK
K4G Group Member
Vice President and Chief Economist,
The Conference Board (US)
Professor, University of Groningen

**"Preparing for the next, very long crisis: towards a 'cool' science
and technology policy agenda for a globally warming economy"**

PAUL A. DAVID
K4G Group Member
Professor, Stanford University (USA)
Professeur Titulaire,
Ecole Polytechnique & Telecom ParisTech (FR)

Main points:

- The depth and length of the recession has pushed many businesses close to the survival line, increasing the pressure to focus on operational issues rather than tactical or even strategic issues.
- The current and future (medium-term) economic environment will be characterized by continued underutilization of tangible capital and a potential threat of erosion in human, knowledge and other intangible capital.
- Fiscal stimulus plans cannot be the only or even the most effective tool for long term increase in living standards along a path of growth through innovation and knowledge creation requiring a new agenda for growth and competitiveness.
- A dual strategy focused on technology and innovation diffusion across leaders and followers together with large strategic innovation initiatives ("smart specialization") provides an opportunity for sustainable recovery.
- In Europe, such a strategy will require strong policy commitments to cooperation between nation states in several knowledge areas, and to allow specialization strategies which are in the overall European interest rather than being based on national priorities.
- The most urgent matter in both the US and Europe now is to devise an investment plan that focuses on maintaining, strengthening and renewing the resource base of the economy, that includes investment in strategic (or intangible) capital

The current economic downturn has created challenges for advanced economies to continue increasing its living standards along a path of growth through innovation and knowledge creation. Already before the crisis, both Europe and the US were on a downward trend in productivity growth, even though Europe has been at a lower level than the US. The huge output gaps that have been created as a result of the recession create an opportunity for recovery, but many factors are likely to make this a long and slow process which may take a decade or even more. One of those factors is that the incentives for innovation and investment in knowledge are under strong pressure.

Even though economic crises have historically shown to provide breeding grounds for economic renewal, strategy and policy to realize the recovery on the back of this principle is easier said than done. Firstly, the large output gaps which have arisen in almost all advanced economies suggest there is a huge amount of underutilized capacity, which reduces incentives to innovate through investment in new machinery and equipment. Secondly, the systemic crisis in financial markets will take time to resolve and continue to be a constraint to capital, in particular risk capital. Thirdly, the current recession has generated major constraints on the demand side of the economy, as domestic and global demand show little opportunity for a quick rebound, so that incentives to innovate are further reduced. Fourthly, the likelihood of a long recovery path poses risks of an erosion of intangible capital, notably of human capital.

As a result of this crisis the strategic and policy challenges to support technological change and innovation are huge in the current economic environment. The depth and length of the recession has pushed many firms close to the survival line, increasing the pressure on them to focus on operational issues (notably cost-savings) rather than tactical or even strategic issues

(including the improvement in performance and the development of new markets). Major changes in the business landscape, with some large losers and some new winners, are likely to emerge in coming years. These changes provide an important key to a new sustainable growth path – provided markets show some dynamics on the demand side. At the same time, new competitors from emerging economies are changing the contours of the global business landscape as well.

Policy makers in advanced economies have a major task on their hands to provide a breeding ground for renewed organic growth. Policy instruments will need to focus not only on closing the output gap in the short term, but on strengthening potential output and productivity growth itself in the medium and longer term. The current fiscal stimulus plans cannot be the only or even the most effective tool for long term recovery. Part of the long term policy framework, in particular in Europe, will need to continue to focus on improvements in operational efficiency, that is, narrowing the gap between average and best practices among businesses by putting the emphasis on diffusion of technology and innovation practices. Many of the policy instruments to achieve this goal are not exclusively related to research and innovation policies, and need to be integrated in a broader framework to be effective. Hence a renewed commitment to many aspects of the Lisbon agenda, to make the European economy more dynamic and competitive, is a likely part of a new growth agenda. Such an agenda should clearly go beyond the 3% R&D target, and put greater emphasis on technology diffusion.

The United States, while historically more successful than Europe in creating a dynamic growth environment that supports technology diffusion and innovation, is currently facing its own challenges to maintain a flexible labor market, to re-create capital markets for venture capital, and to invest in worker training and human capital. European and US companies and governments could benefit from learning from each other in these areas, notably with regard to innovation practices in services industries.

The other policy approach to strengthen the growth environment is to focus on new strategic growth initiatives, supported by a policy framework which is more explicitly geared towards the creation and use (commercial and non-commercial) of knowledge. Such knowledge areas, often identified as general purpose technologies (GPTs), require a comprehensive innovation strategy that involves government, business and society in creating demand and supply for research, development and applications.

The United States has traditionally been much better in supporting and nurturing strategic innovation initiatives, and the current administration appears to be committed to strengthen such initiatives in several areas, including biotechnology, ICT and combinations thereof. The key to future success will be the ability to align government and business interests in the longer term, and to build an integrated network of regional innovation systems that involve education and knowledge institutions.

Europe does not have a lot of experience with specialization strategies in innovation, and where it tried in the past it has either been unsuccessful or it has, at best, been very costly. The concept of “smart specialization”, as proposed by the "Knowledge for Growth" Expert Group and which builds on the concept of general purpose technologies, represents an original way for Europe to benefit from its scale and diversity to merge strategic innovation initiatives with an emphasis on diffusion and learning between leading and following regions and firms. It therefore essentially marries its (potential) strengths in diffusion with the need to build scale and create focus in knowledge creation. The smart specialization strategy will require strong

policy commitments to cooperation between nation states in knowledge areas, and to allow specialization strategies which are in the overall European interest rather than being based on national priorities. It also requires a broad commitment to diffusion strategies based on investment in R&D, human capital and other economic competencies.

As the current and future (medium-term) economic environment will be characterized by continued underutilization of tangible capital and a potential threat of erosion in human, knowledge and other intangible capital, the most urgent matter is to devise an investment plan that focuses on maintaining, strengthening and renewing the resource base of the economy. This resource base does not only consist of the traditional factors of production (labour and tangible capital) but also of strategic capital (intangibles) and financial capital. Strategic capital, which includes ICT (software, databases, etc.), knowledge capital (R&D, patents, licenses, non-technological innovations in services) and economic competencies (worker training, organizational restructuring, brands, etc.), is key to a firm's strategic advantage and provides the backbone of any innovation strategy. It is here that the interests of government and business coincide and complement each other. It is also here where the strengthening supply (better inputs) and demand (more sophisticated customers) for innovation meet.

PAUL A. DAVID

"PREPARING FOR THE NEXT, VERY LONG CRISIS: TOWARDS A 'COOL' SCIENCE AND TECHNOLOGY POLICY AGENDA FOR A GLOBALLY WARMING ECONOMY"

Abstract:

This short presentation on a very big subject is a worry – a worry that the present economic crisis is likely to contribute to the already-existing temptations of governmental and private actors alike to behave in a time-inconsistent fashion when responding to the challenge of climate change. The specific concern here is that science and technology research commitments be launched soon enough on the scale that is likely to be needed, and that timely steps be taken toward the supportive adaptations in long-standing institutional and regulatory readjustments that can render those investments in knowledge more effective. Institutional changes, new incentive mechanisms and a rethinking of national policies with regard to exploitation of the international regime of intellectual property protections – are needed to successfully address the looming crisis of global climate change.

Keynote:

The motivation for this short presentation on a very big subject is a worry – a worry that the present economic crisis is likely to contribute to the already-existing temptations of governmental and private actors alike to behave in a time-inconsistent fashion when responding to the challenge of climate change. The specific concern here is that science and technology research commitments be launched soon enough on the scale that is likely to be needed, and that timely steps be taken toward the supportive adaptations in long-standing institutional and regulatory readjustments that can render those investments in knowledge more effective.

Given the numerous serious but essentially transient occasions on which the attention of governments is susceptible to being deflected from dealing with chronic economic problems, it is hardly too early, and now risks being too late for major actions that would have payoffs in terms of affordable green house gas reductions two decades in the future, when they really will be needed. The world is confronted with a problem that simply is not “storable”; the challenge of global warming is one that grows in size and severity if counteraction is deferred, until it will reach a point of instability beyond which ameliorative measures will cease to be feasible. This really is different from the Y2K problem.

As obvious as that might seem, justification for continuing to call attention to it can be found in the halting progress toward coordinated international agreements to address climate change issues, and the recent indications that the effect of the current economic crisis – aside from some marginal influence on the allocation of expenditures scheduled by “stimulus” programs – has tended to sap the policy momentum that had developed during 2006-2007 behind public R&D programs and institutional initiatives to expand the portfolio of affordable technological means of controlling global warming.

International negotiations about concerted actions among the leading industrial countries to reduce green-house gas (GHG) emissions are preceding slowly, and in many respects the initial “bargaining” stance taken by some important players, notably Japan and the US, has been a disappointment. Certainly, they have fallen far short of the EU Member Countries’

endorsement (in December 2008) of the package of EC Directives designed to active its “20-20-20” renewable energy strategy: 20% reduction of green-house gas (GHG) emissions by 2020, and 20% of energy consumption from renewable sources. Indeed, Europe has gone farther by pledging a 30% reduction in GHG emissions if the UN negotiations that will be held in Copenhagen this coming December manage to arrive at a general agreement.

At this juncture however, perhaps as is only to be expected in the negotiations of this kind, there is scant sign that the economically advanced nations are preparing to address the specific calls by major developing countries, including China, India and Brazil. The latter’s initial position is that the wealthy countries should commit to make disproportionately larger emissions reductions, technology transfers and programs of financial aid not only for climate change infrastructure investments in the developing world, but also in compensation for restrains on further intensive exploitation of their coal and forest resources. Whatever will be the “bargained outcome” of the present efforts to put in place a successor to the expiring Kyoto Treaty, one can anticipate – and hope – that it will emerge as just a small and comparatively easily achieved step in the extended sequence of increasingly difficult negotiations which yielded an adequate collective response to the unfolding long-run crisis of climate change.

“A crisis” can be defined as a situation in which the need for decision and action is both apparent and urgent, but in which exactly what one should do remains uncertain and undecided. This would seem to characterize the present challenge of mobilizing the commitment and coordination of global resources necessary to stabilize green house gas (GHG) concentrations at 450-750 parts per million (ppm) – which the 2007 Report of the Intergovernmental Panel on Climate Change (IPCC) concluded would be sufficient to hold global warming at the level of 2 degrees centigrade. Nonetheless, it is possible to say in very broad outline what can and should be done.

We can identify three ways in which government can constructively respond to the “climate change crisis.” One is by pricing the damages caused by GHG emissions, through “carbon tax” or “cap and trade” programs that introduce transferrable emissions licenses. This could induce individuals and firms to “internalize” the costs of the potential emissions-related damages resulting from their present operating routines and contemplated changes therein. Moreover, if the issuance of licenses were set so that they gave rise to binding constraints for a sufficiently large number of enterprises, the result at the margin would mimic the effects of regulatory emissions standards in raising incentives for private investment emission-reducing technologies.

It is important at the outset to notice that this approach – favored among a wide consensus of economists – relies on the market the allocate resources used directly and indirectly in activities that result in GHG emissions, as well as in investments that will affect the future costs of reducing such emissions. The potential deficiencies of market processes in allocating resources when the good to be produced and distributed possess “public goods properties” are well known among academic economists, and reductions of GHG emissions un-contestably qualifies as global public goods. Further, tradable permissions to emit (on which a market is expected to put prices) are intangible assets, and there is today for regrettable reasons a far more widely shared perception the potentialities of unregulated markets for financial assets and derivatives to function badly. Viewed from these perspectives, the sanguine reception the has greeted government announcements that the first-line public response to the climate change crisis will be to rely upon a new market, and the absence of scepticism and

precautionary attention to the institutional structure and regulation of emissions-permission markets, is really quite remarkable. This is not the occasion to further detail doubts on this score, but taking note of them should serve to further emphasize the likely importance of the two other items that appear on the thinking economist's "to-do list".

The second mode of response is through publicly funded research and development programs to stimulate the search for new knowledge, and novel combinations of existing knowledge to generate a broad portfolio of technologies that directly or indirectly could yield significant reductions in GHG emissions. This could be seen as a continuation of recommendations for "public business-as-usual" in the form of or as calling for a rethinking about how best to both stimulate and direct the search for knowledge, its effective dissemination and application in technological innovations.

A third line of response is precautionary in a different sense, namely, undertaking and encouraging the development of technical and organizational expertise that will reduced the future costs of actions aimed a mitigating the disruption and damage that would ensue from the rise in GHG concentrations during the coming decades – during which it is likely that the struggle to stabilize them will not meet with complete successes. Here too there is a need for knowledge-portfolio widening and deepening, to which a differently focused category R&D programs can contribute by exploring the possibilities of reducing vulnerabilities of structures and people to "extreme weather", including adaptive population redistribution and geo-engineering. Projects of this kind are highly context-sensitive, and call for close interaction and knowledge exchanges, and extensive feedbacks among solution providers and solution-users in a multiplicity of specific industrial and environmental setting.

Although 2007 and 2008 saw a salutary awakening of governmental and private sector attention to the long-term climate change "crisis" — notably in the EU, where it brought forward ambitious and far-reaching policy proposals such as the Economic Commission's Strategic Energy Technology (SET) Plan [COM (2007) 723], it is quite evident that that relevant policy actions in both the public and private spheres will be subject to serious coordination and "time inconsistency" problems. Immediate social and economic, not to say political concerns always intrude and compete for the attention of public agencies; at each moment these distractions from "chronic problems" a special locus, demanding attention to this industry or that sector, to some provinces and social groups but not others; or they curtailing the abilities of governments dependent upon tax revenues to honor long-term programmatic commitments while meeting short-term public expenditure needs.

This is happening around us at the moment: the current financial and macroeconomic "crisis" has been serious enough to deflect attention from strategies that would address global warming through by means of sustained major public sector commitments of scientific and technologically research investment, and the adverse macroeconomic demand situation has compounded the difficulties of inducing business investment in appropriately "green" production and distribution facilities. What has become more attractive to the governments of the Member countries, and hence for the European Commission, are the variety of shorter-term tactics aimed at stimulating aggregate demand in ways that would *implement already available technologies for "green" purposes*: retro-fitting buildings for greater energy efficiency, supporting the automotive industry to increase production of low-CO₂ vehicles using electric batteries and second generation bio-fuels, investment subsidies for grid infrastructures to create more integrated European markets for electricity current generated by wind- and water-turbines.

Without argument, it is desirable that this “low- hanging fruit” be quickly plucked; that “stimulus” funding and induced private sector investment be steered towards those form of employment-generation, rather than other projects where the social rates of return are not as high. Nevertheless, settling for these measures leaves un-addressed “the climate change crisis” – defined as the state of not knowing what eventually will be both necessary and practicable means to stabilize GHG concentrations at a level that will not melt the polar caps, and trigger a runaway process that will put large areas of the world’s developed and developing countries under water. It is generally agreed in scientifically and technically informed circles that to avert this will require the development and eventual global deployment of a range of technologies -- for energy supply and end-use, land-use, agriculture, and transportation support of adaptive population redistributions -- that either have still to reach the proto-type stage, or if they have done so, remain far from widespread commercial feasibility. For example, even in the field of electric vehicles, lithium-ion batteries for plug-in electric vehicles that would have a 40 mile range still cost about \$10,000 a piece.

The precautionary principle argues against waiting for the needed breakthroughs to happen spontaneously, or for the private sector to step forward and gamble on the prospective profitability of owning the intellectual property on critical technologies to avert environmental catastrophes (especially not when it is likely that truly critical patents would become subject to compulsory licensing). Due weight therefore should be given in government climate change and energy strategies to the key potential benefit of undertaking major programs of focused scientific and technological research and development investment at this time, because they could dramatically reduce the costs of having drastically to restrict GHG emissions by other means in the future.

The commitments of global resources that one should envisage are really quite daunting. A back-of-the-envelope calculation may serve to underscore this, by starting from an estimate made for the McKinsey Global Institute [see Enkvist, Nauc  r and Riese, in *McKinsey Quarterly*, 2008(2): pp.36-43] that the projected growth of global energy demand could be cut in half by an investment of \$170 billion a year (earning a private internal rate of return of 10 percent per annum) in each of the 12 years from 2008 to 2020. But considerably more than a 50 percent cut in global energy use concentrated on GHG emitting sources would be required. The IPCC Report called for a reduction in annual GHG emissions from just under 50 billion tons in 2007 to 5-10 billion tons in 2050, an implied reduction of 80 to 90 percent. More recent studies suggest that that may be insufficient to stop the planet’s temperature from rising above the 2 degrees centigrade level, because the initial simulations underestimated some of the positive feedback effects of transitional warming. (More heat-absorbing ground becomes exposed by the retreat of glaciers, the seas’ will become less absorb CO₂, and, worse, climatic changes and polar ice sheets that break up and float into more temperate waters may disrupt the oceanic convex ion cycles and cause the release of gases that otherwise would remain compressed in the cold depths.)

If we therefore allow that the 50 percent cut in projected demand for carbon-fuel sourced energy – effecting a 40-45 billion ton reduction in GHG emission -- would still leave another equal cut in emissions to be achieved, this implies the need for a further, 100 percentage point reduction from the level achieved by the first \$1.70 trillion worth of investment. To take into account the likelihood that the second equal volume reductions in GHG emissions will be more costly than the first, suppose that the investment requirements are proportional to the percentage reductions at each stage, so that the second step will cost twice the capital sum on the first step, or \$3.40 trillion. The total bill, at \$5.1 trillion is manageable, but nonetheless

considerable: about 12 percent of 2008 global GDP, and almost 50 percent of global fixed investment expenditures in 2008 prices. While this can be spread out over more than a decade, the bulk of it probably would have to be concentrated within the coming decade and a half in order to have the capital formation in place by 2030.

What could be achieved by a successfully focused program of exploratory R&D investment – not considered, nor included the foregoing calculations based upon the MGI study – is the creation of technologies that would lower the investment costs of achieving the required GHG reductions, and make it rational to delay the most lumpy and irreversible of the capital formation commitments in order to preserve the option of implementing more efficient technologies when these emerged. But exploratory research is particularly uncertain, and risks therefore call for an early start with a diversified research portfolio from which the more promising lines can be selected for further development.

Viewed from that perspective, it is disappointing to observe the signs that the current macro-economic crisis has deflected the EC's focus, at least temporarily away from its SET Plan for Europe, in favor of emphasizing the near term approach of lowering the region's GHG emissions by establishing regulations and a market mechanism to price such emissions. As recently as November 3rd of last year, EU's Energy Commissioner, Andris Piebalgs, in a speech in London [EC SPEECH/08/573] was setting out the elements of "the Commission's vision for renewables" in terms of the role that a range of available technologies would play in achieving the "20-20-20" targets proposed by the Commission, and emphasizing the very modest costs that would be entailed in deploying biomass-using Combined Heat and Power installations, solar-, wind- and tidal-generation technologies for electricity, and second generation biofuels for the transport sector. The concluding point of his message was the affordability of the SET Plan's "package" for energy-intensive sectors, even in the current economic crisis. This was because provision had been made to use the revenues raised by the proposed Emissions Trading Scheme to compensate the carbon-fuel using sectors that were most affected by the pricing of GHG emissions. The thought that such compensation would work to offset the pressures on those firms to alter their production methods or energy sources, however, did not stop the Commissioner from concluding that "it is time to realize that we don't have a long-term choice about developing a low carbon economy. Climate change, vulnerability to high fossil fuel prices and energy security mean that we must not let current market turmoil distract us." Indeed, would that he had not already been distracted.

The passage of 6 months, and the deepening economic recession has only reinforced the shift of the Commission's focus away from science and technology policies as a key response to the challenge of climate change. May 24th-25th found the Energy Commissioner at the G8 Energy Ministerial Meeting in Rome, calling for a "good investment climate to take the energy sector out of the crisis." The press release reporting his speech mentions that the Commission also was "trying to increase to increase its efforts on research for technologies that will help reduce CO2 emissions, such as carbon capture and storage." [see <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/830>], but Commissioner Pieblags' intervention in the working session devoted to Energy Strategies to Respond to Global Climate Change, stressed that "Our main tool to drive the energy sector toward a low carbon system is the price of CO2 in an open market." He therefore reminded the audience of "the importance of open and transparent markets in order to assure energy security, together with permanent dialog between producers and consumers in order to create the necessary climate to ensure investment in new generation capacity, infrastructures and the promotion of renewable energies and energy efficiency." The goal of encouraging investment in energy

production is evidently stems from energy security concerns, and the virtue of the Emissions Trade Scheme appears from that perspective to consist in providing a source of subsidies to major energy-users that will help maintain European demand for the required increase in domestic energy generating capacity. Evidently, the GHG emissions reducing purpose of pricing the use of carbon fuels, and the need to sustain a good investment climate for R&D that would lower the costs of renewable energy sources, are being pushed from the center of the energy policy stage and how long it will be before they regain it remains obscured in the uncertainties surrounding the timing of the recovery of aggregate demand in the European economy.

This situation is regrettable and fraught with potentially serious risks. The scale and complexity of the scientific and technological efforts that will be required warrant giving consideration to measures that would enhance the effectiveness of both public and private research investments and technology transfers in a wide array of “green technologies.” Beyond the needs for international coordination, and coordinated funding action on the part of governments at different levels, there would seem to be a good case to be made for raising the payoffs from R&D expenditures by avoiding excessive correlation of public and private research portfolio and consequent un-necessary duplication of domestic as well as international efforts. Perhaps in this pressing connection there is a compelling rationale for devising and implement agreements and focused funding for “smart specialization” in applied research and pre-market development of GHG emissions reducing projects on both sectoral and regional basis, venturing even beyond the “entrepreneurial discovery” policy approach that recently has been proposed as the mode through which to pursue “smart specialization” in research, development and training policies in the European Research Area [see Foray, David and Hall, EC-DG-Research *K4G Brief No. 9* (June), 2009].

Furthermore, urgent attention should be given to a range of measures that could enhance the effectiveness of both public and private R&D investment in a wide array of “green technologies,” by facilitating knowledge-sharing, adaptation and diffusion of innovations. This would entail a critical rethinking of ways to mitigate the inhibiting effects on exploratory research and cumulative incremental technology development that arise from both long-standing and recently developed features of the intellectual property rights regime. Targeted domains for research exemptions, defined fields in which a combination of a liability approach to IPR infringement and greater reliance on prizes for inventions in defined fields supplements the existing property rights approach are one part of the agenda for careful consideration. But competition policy adjustments to permit efficient pooling of patent, copyright and database rights, and the exercise of existing governmental rights to use patents for public purposes without paying licensing fees, and to mandate compulsory licensing of such inventions to third parties also should claim attention under this heading.

However radical the foregoing may be deemed to be in some quarters, these proposals for institutional adaptations and innovations to improve the efficiency of resource allocation in the production and distribution of useful knowledge hardly are new and most of them will be found to have been cogently elaborated by legal scholars and economists. If the challenge of the “climate change crisis” does not create a context warranting their receiving a serious hearing in forward-looking EU public policy deliberations, what would?

SESSION I:
R&D and Innovation Policies to Address
Global Systemic Crisis and Challenges

ROUNDTABLE CONTRIBUTIONS

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DOMINIQUE FORAY

(Vice-Chair of the K4G Group; Professor, Ecole Polytechnique Fédérale de Lausanne)

1. Addressing global systemic crises and challenges through R&D and innovation implies the formation of coalition of countries and other stakeholders committed into significant public and private R&D investments in one broad area (climate change, food security, healthcare, etc.). This cannot happen unless a broad political consensus has been reached about priorities and about the centrality of R&D policy to address the selected challenge. But the EU is experiencing much more difficulties than the US or Japan to generate such broad political consensus.

- What are the solutions and mechanisms to manage this “European” problem?
- Where are we today in Europe in terms of such kind of consensus in areas (healthcare, climate change, etc.)?
- Where large scale and European R&D policies would potentially be very valuable?

2. Addressing global systemic crises and challenges through R&D and innovation implies working not only on the *rate* but also on the *direction* of R&D and innovation. It implies therefore to be “non neutral” in the allocation of resources.

- How to mitigate distortions created by the delivery of subsidies to favored firms, sectors and other organized interests?
- How to design programs which involve top down (non neutral) initiatives while maintaining market driven allocation logics allowing for multiple decentralized experiments?

3. Addressing global systemic crises and challenges through R&D and innovation implies the activation of policy instruments at both national and community levels.

- What kind of EU policy instruments should be mobilized to address one particular global challenge?
- What are the relations with national policies?

DISCUSSANTS (IN ALPHABETICAL ORDER)

ARMEL DE LA BOURDONNAYE

(Head of Department, General Directorate for Research and Innovation, French Ministry of Higher Education and Research)

It is indeed a difficulty in Europe to generate broad social consensus on research priorities. But it is not so easy elsewhere. For instance, what kind of consensus is there in India, with respect to experiments on animals? What kind of consensus in China on the use of ITC for informal democracy development? What is the status of the debate on climate change in the USA?

Furthermore, we have to turn the specificity of Europe into an advantage: the need for debate among us to create a consensus strengthens the end result: as social construct goes, this makes our final compromise exceptionally “robust”.

As an example, for climate change, Europe is currently a major driving force, ahead of any other region of the world, both for the quality of the political consensus and for the activity at the frontier of knowledge. For food security there is a strong debate going on in Europe on questions related to the quality and links between food and health. The growing European request to include the social dimension at every stage of the research leads to original investigations into uncharted interdisciplinary topics, potentially rich in innovation. (low cost more than high tech, public transports which both create social inclusion and are energetically efficient, IHM designed for disabled ...).

Policies aiming at tackling global crises are most valuable to insure strong commitments from both concerned scientists and worried citizens over the time scale relevant for impact of research results. The construction of a concrete Europe belongs to the same time frame and contributes to the same objective: a competitive sustainable Europe with more jobs and more innovation and thus more European enterprises, more and better higher education and research institutions, more mobility of knowledge, technologies, students, researchers, engineers...

There is a real opportunity for Europe, at that stage; to take the leadership for Climate Change mitigation and reduction research, for instance, and this can be a driving force to transform a large part of the economy into a competitive producing system for the second quarter of the century.

Should we seriously try to protect our social model, then Europe has also to be very soon a leader regarding the demographic transition to an ageing society.

The relation between top down policies and fairness of the competition is a very classical question. It already exists in the Framework Program and in equivalent national tools. There are at least two issues. The first is that in new sectors, before organizing competition, one needs to create and train the teams, otherwise one may face monopolies. This plurality is also important at the level of funding agencies. This needs long term public investment and to create confidence in the duration of the political engagement. The second issue is that once there are a sufficient number of actors, one has to separate the level of strategic decisions from the level of R&D programs' management and from the organizations performing R&D. This also needs some transparency to install trust.

For the moment the national investments are more important than the EU ones. So EU policy should be focused on giving efficiency to national ones. The coordination of strategies and programs is clearly an important point. Joint programming is a step in the right direction. Fostering the mobility of people, venture capital and intellectual property is also a strong tool for the overall efficiency. Finally, EU should focus its R&D investments on a few policies for which it has the main responsibility and for which, in accordance with MS, it has been decided that Europe should take to leadership worldwide, Agriculture and Climate Change being two areas that could be considered, at least as examples.

LEIF KJAERGAARD

(President "Leif and Food Science"; Deputy chair, ERAB; Past president, EIRMA; Former CTO of Danisco A/S)

- A crisis often requires drastic changes and it could be the time to look for a paradigm shift in businesses and consequently also in industry and innovation policies. This is so much more likely as innovation is as much a matter of mindset as a matter of scientific and technological knowledge.
- There is now in a crisis where visionary innovation is needed in order to address the world's challenges such as climate change, health issues, security issues, bio-sciences. Member states, regional and international institutions need to play a role in the process - together with business.
- The financial crisis can lead to a revisiting of the role of markets and of financial incentives. Some innovation objectives will not be dictated by the market, but by political objectives and these objectives may sometimes be transformed into market instruments (but not always).
- Entrepreneurship can flourish only if there is reward for success, but real entrepreneurship is not driven by the expectation of short-term financial gain. Networks and partnerships will be more than ever the key to success.
- The focus should be much on the possible outcome of the networks and partnerships than just to establish a large number of these. A stronger involvement of larger enterprises and strong research institutions may have at least as high a priority as the existing focus on technology transfer to SMEs.
- The current recession leads business to go beyond short-term adjustments. Some of the underlying trends are being accelerated so there may be a need to for a new world. Innovation is both a way to help restart the economy, and a way to make it different.

JOHN SMITH

(Deputy Secretary General, European University Association - EUA)

The K4G Policy briefing on how universities can contribute to enhancing Europe's innovative performance provides a valuable input to the European debate on the building the ERA and the modernization agenda for Europe's Universities. In the domain of university-business research collaboration EUA's empirical evidence from studies undertaken with its university membership provides some validation for the views put forward that there is no "one size fits"

approach and there are many different models of successful collaboration that importantly respect each other's interests and missions. Enhanced innovative performance from Europe's universities is linked intricately with necessary progress being made in granting universities greater autonomy and overcoming the historical underfunding of universities in Europe in comparison with global competitors. External funders of research, which accounts for a growing and substantial proportion of university research budgets, need to move towards providing full-cost support if university-based research is to be put on a sustainable footing. These are essential requirements for universities to play their full role in their city, regional and national contexts in terms of skills training, research excellence and innovative capacity in all aspects of economic, social and cultural activity.

ROLAND SOMMER

(Federation of Austrian Industries, Department Education, Innovation and Research)

Challenges that need to be tackled multinationally are ever increasing. At the same time Europe is hard hit by the economic crisis, the financial crisis and an energy crisis. As a response to these trends the author calls for a paradigm shift of European research and innovation policy.

Increasing efficiency

In industry not the companies that invest most in R&D are necessarily most successful but those that leverage their investments smartly and efficiently. There is evidence that companies that integrate the finding of ideas, selection of projects, research, development and marketing built on a smart and convincing business model are most successful². Such an integrated approach could also be started in the public administration (e.g. European Commission, Member countries) by integrating the various components of the research and innovation cycle.

Base the ERA on grand challenges

A broad process including all major stakeholders should be started to identify grand challenges of global or European significance. In a second step, for each grand challenge targets should be defined including milestones where appropriate. These targets would if successful reflect the common vision of the European Commission and the member states. The way how to reach the defined targets should be a pure bottom up process, i.e. there should be no bias on any field of technology or any research area. This integrated approach should be reflected by the instruments of the European Research Area (ERA).

Include non technological and social innovations

Many grand challenges do not only lack technology but also non technological and social innovations. Therefore it is necessary to include these components as core features as well.. Examples are facilitating the diffusion of innovation, the development of new business models, addressing the public acceptance of new technologies, etc. There are cases where good inventions are made in Europe but the corresponding innovation takes place somewhere else due to a lack of the development of new business models.

² Booz Allen Hamilton, 2006

Start a communication strategy

These measures should be accompanied by public relations (PR) activities targeted towards the general public. The basic idea is to make clear to the European citizens that Europe works on tackling problems that might affect everybody. If these PR activities are successful this could contribute to tackling the Euro-scepticism and show an added value that would not have been achieved without European initiatives. Additionally these could be first steps towards a more risk prone society that is open for new innovations.

One measure would be to shift policy making from an input orientation to an output orientation. The input orientation (e.g. the 3% target) has been very useful in the past to raise the attention for research and innovation. Yet this input orientation should be complemented by showing results and positive impacts. In the past it was always difficult to identify output oriented goals. With regard to grand challenges this output orientation is much easier as there will be an abundance of concrete examples.

Develop existing instruments further

The broad integrated approach to tackle grand challenges should be reflected within ERA instruments, e.g.:

- A future framework programme could be designed around grand challenges putting also emphasis on technological and non technological innovation.
- National funding programmes that are pooled ("Joint Programming") should have such an integrated approach.
- A budget fraction of the European Research Council could be targeted to addressing grand challenges.
- Instruments towards internationalisation could have a focus on grand challenges.

There are some instruments that already share a more holistic view:

- The EIT already takes this approach by addressing the knowledge triangle.

The JTIs also follow a result oriented approach

PIERRE VIGIER

(European Commission, Directorate-General Research, "Economic analysis and monitoring of national research policies and the Lisbon strategy")

Please note that these points are for debate and do not represent an official position of the European Commission

This debate takes place at a very crucial moment for the design of the European and Member States research policies. As described by Commissioner Potočník: "European research at the cross-roads":

- we are in the process of rethinking our Lisbon strategy for competitiveness and sustainable development for the 2010-2020 period;
- the mid-term review of the FP7 framework programme will take place this year;
- most importantly, the decisive trend towards the internationalisation of research capacities will not be stopped, but on the contrary might be accelerated by the current economic crisis;

In this context, this debate might contribute to the emergence of a consensus on the most urgent priorities for the European and Member States research policies. Let's summarize it: *can the MS and the Commission agree on the most urgent political reforms to make the spending in research more efficient and relevant for our K4G group*, but also on the state of Europe in terms of R&D competitiveness, four priorities emerge:

- Placing a greater focus of research resources towards societal challenges
- Making the increase of the efficiency of the research system an explicit political objective
- Facilitating structural change in Europe with concrete measures
- Mobilising the MS and the stakeholders around well supported innovation and R&D specialisation strategies.

Do these priorities constitute a right response? Let me briefly outline their rationale.

A greater focus of research resources towards societal challenges

Claiming that research must be more relevant to address the pressing societal challenges, such as climate change, ageing population, pandemic risks, scarcity of energy resources, etc. might not seem a new approach. Indeed, the thematic focus of the FP6 and FP7, for instance, was largely following such an approach. What in my view should be new is twofold:

- a demand-led approach;
- a higher coordination between MS.

As regards public research, a demand-led approach implies that the *evaluation of the future needs* must be much more considered as a key criteria for the allocation of resources. It is also crucial that the joint programming of research activities between member states become a main stream feature of future policies;

But the scale of the challenges to face implies above all that private research must also be mobilised. There, a demand-led approach means that the enterprises should have framework conditions making easier to respond to emerging demand. The lead-market policies that have been initiated by the Commission must probably play a greater role in the future, with an acceleration of the agenda in terms of defining new open standards, good practice in public procurement, but also in term of public support for demonstration applications. The extension of this policy to new domains might also be rapidly explored.

Increasing of the efficiency of the research system

This is of utmost importance. Post crisis financial resources are becoming scarce. The European Commission has recommended to the MS to increase public spending in research as part of their recovery plans. A majority, like Spain, Slovenia, Portugal or Germany have done so. A minority, such as Latvia or Romania have not followed that route. But it is clear that the only way to justify on the long run to the citizen the maintenance of an upward trend, is to demonstrate an increase in the productivity and efficiency of research. This need cannot be underestimated.

One positive aspect in that respect, is that there is a positive correlation between an increase in investment in research and an increase in its efficiency. This correlation justifies a higher investment in public research. However, it is not sufficient by itself to justify the scale of the effort needed in crisis and post-crisis times. Comprehensive policies are crucial, to enhance the competition within the research system, for instance through competitive funding for research programmes, as well through as a more optimal allocation of resources resulting of a higher degree of mobility of researchers. We should aim at the realisation of a real internal market for research, researchers and technologies. Of course, the avoidance of duplication of

efforts, notably through the programming and sharing of open infrastructures for research is also crucial to this end.

Structural change

The third priority relates to structural change. To a certain extent, this is something that has been often considered as outside the scope of research policies. However, when we analyse the 2000-2007 period, we can see that the main cause of the absence of growth in the R&D intensity in Europe is the inability of business to invest more. Most importantly, that constraint was mostly linked to the insufficient share of high tech sectors in Europe's manufacturing structure, as well as the still insufficient increase of R&D spending in SMEs and in services.

In other terms, without an acceleration of the structural change of our economy, including change in its sectoral composition, we might well face a rapidly decreasing competitiveness in large shares of our economy. We cannot afford to "miss the train" that other economies in the world are taking.

This implies, for instance, that not only the birth rate, but also the growth rate of High tech SMEs must become an explicit indicator of the ability of Europe to shift its economy focus. In the same spirit, the reason why some sectors, such as biotech, nanotechnologies, renewable energy, marine technologies, for instance, are not growing as rapidly in Europe as in other places of the world, in spite of huge public investment, must be explored further, in view of implementing specific policies. As regards framework conditions, the impact of maintenance costs for patents, which are 60 times higher for SMEs in Europe than in the USA should be evaluated and if need be consequences must be drawn rapidly. The European Commission in its recovery package asked the MS to reduce their patent fees by 75%. It is unfortunate if up to now, the MS seem to have avoided any concrete progress to meet this need. Among the concrete measures to envisage, one could also for instance think of monitoring the use of structural funds for supporting such structural change, or to evaluate the promising Eurostars initiative, to see whether it might be increasingly supported.

Finally, structural change relates also to the public private relations. The modernisation agenda of the Universities should not be seen as a purely internal reform of the Universities, but as an opportunity to open them more to the society and to the enterprise world, in view not only of transfer of technologies, but in a more profound way in view of developing a cultural breeding place for future entrepreneurs and innovators and in view of a real co-development and knowledge sharing between the campus place and its economic environment. Hopefully the future KICs of the EIT will effectively act as flagships in this respect.

Mobilise the MS and the stakeholders and R&D specialisation strategies

Last proposed priority but not least, the link between Research and development, notably national and regional development should be better enhanced and systematised. I am for instance stricken by the fact that even if the role of clusters for industrial policy as been for long emphasised, the role of knowledge within the most successful of these clusters has not been analysed, even less supported. What is needed to ensure success? A highly specialised University? Multidisciplinarity? Technical schools? International networks? Support to pooling of patents and to non exclusive licensing as advocated by Paul David?

At a broader scale, in an ever more competitive world, where countries and regions compete for location of knowledge-based enterprises, the issue of specialisation becomes crucial. The key issue there is to find a balance between specialisation and cooperation. It is likely that new policy instruments needs to be developed to answer this question. The development of initiatives within the ERA to address that issue might be envisaged. Could some use of the

structural funds be more targeted, to support lead markets, initiative to meet grand challenges and specialisation strategies? Policy development in that respect is still in process, but the issue is real.

SESSION II:
Research strategies and instruments for Europe
after the crisis

KEYNOTES:

**"National strategies in Europe and the role of
smart specialisation"**

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"Focused policies governing the knowledge economy"

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Abstract:

The past catching-up experience in the EU shows a strong economic convergence. But on innovation, the gaps are more substantial and convergence much slower. For several countries their catching-up is not build on knowledge-based convergence, and for those countries where economic growth is innovation based, there are still considerable vulnerabilities to a robust knowledge-based economy development. Particularly their concentration of economic and creative capacity in few sectors, their dependence on foreign markets, foreign investors and foreign know-how sources, make their innovation-growth process more vulnerable, as the current crisis has made clear.

When evaluating the case of specialisation for a knowledge-based growth process, the scope for “smart” specialisation is discussed in more detail. Are there better, more smarter ways of specialising? And what is the role of governments? Is it a picking winner, classical sectoral policy? Does a broader horizontal policy providing framework conditions suffice? Or is there is “smart” specialisation policy? And particularly, what role for the EU to support specialisation policy in the ERA?

Presentation:

Knowledge-Based Growth Strategies in the EU (with a focus on "Member States catching-up dynamics" and the role of "smart" specialisation)

1. Knowledge based catching-up

- See Veugelers & Mrak, K4G-PB No 7
 - "catching-up MS"³ have made significant progress in reducing their economic development gap vis-à-vis the EU average
 - The performance of the “catching-up MS” with respect to their knowledge economy convergence has been much slower
 - Linking knowledge economy catching-up to economic convergence suggests a positive correlation, but with considerable country specifics.
 - Knowledge-growth nexus: e.g. Ireland, Slovenia, Estonia
 - Non-Knowledge-based growth: e.g. Latvia
 - Slow-growth- knowledge base: e.g. Portugal

³ With the term "catching-up MS", the Report covers the 10 transition "new" MS and the 4 former cohesion MS (Greece, Portugal, Spain and Ireland).

Matrix of economic and knowledge economy convergence performance of “catching-up MS”

IV. Time to catch-up to EU-27 average

GDP per capita / Innovation	Indefinite	Long	Medium	Short	Reached
Indefinite		Romania, Bulgaria	Slovakia		
Long		Poland, Hungary	Latvia		
Medium	Portugal		Lithuania, Czech Republic	Greece	Spain
Short			Estonia	Slovenia	Ireland
Reached					

Note: Reached implies the country is at or above EU-27 average in 2007

Short: less than 10 years for catching-up (extrapolating average annual growth rates from the past 93-07);

Long: more than 30 years for catching-up. Indefinite: with given growth rates, no catching-up possible.

2. Scope for a Knowledge-Based Growth Process? Assessing countries scoring on Key Drivers

- Key Drivers: Framework conditions (Institutional quality, Macro-Stability, Efficiency of Markets), Technology Access, Absorptive capacity (quality & quantity of Human Capital), Creative capacity (S&E skills, quality and links to Public Research, IPR, Venture Capital)
- The top performers, Ireland, Slovenia, and Czech Republic show that drivers for a innovation-growth nexus (combining absorptive and creative capacity drivers) need to be **systemically** developed.
 - o The evidence from Portugal and Hungary suggests that doing well on some flanking indicators, but not on others, is not likely to lead to an overall good performance.
 - o Countries at the bottom, such as Bulgaria and Romania for transition countries and Greece among former cohesion countries, score on average also low on most flanking conditions.
- Most divisive factors are absorptive and especially creative capacity drivers,
 - o especially **ICT availability and use** seems to be the most divisive
 - o **quality of human capital** and **public research infrastructure** is more divisive than quantity
 - o **FDI as a channel of technology absorption** varies across countries

3. Assessing the scope for a Knowledge-Based Growth in the near future (transition countries)

	Institutions	Macro-Stability	Markets	Technology Access	Absorptive Capacity	Creative Capacity
Lithuania	4,19	5,23	4,81	4,69	4,50	3,99
Slovakia	3,85	5,31	5,23	4,99	3,87	3,64
Estonia	4,85	5,72	5,14	5,50	4,71	4,40
Czech Republic	3,87	5,37	5,23	5,01	4,54	4,16
Slovenia	4,40	5,48	4,45	4,59	4,85	4,36

Countries in ascending order of GDPpc2007;

In red: close to (but still above) transition average: sensitive areas

Source: On basis of WEF-GCI

- **Lithuania, Slovakia, Estonia, Czech, Slovenia** have scope for a knowledge-based growth process:
 - o These countries currently have at least some Innovation Activities (Buy and/or Make)
 - o These countries have no « weak » link in any of the Pillars for a Knowledge-based Growth (cf. systemic performance)
- **Poland, Latvia and Hungary** have at least one weak link.
- **Bulgaria and Romania** have at least one weak link, and are in addition currently insufficiently innovation-active

4. Crisis and post-crisis vulnerabilities for catching-up Member States

- For several catching-up countries their path to economic convergence is not knowledge-based:
 - o Post-crisis growth recovery?
 - o Sustainability of growth model when catching-up window is closed?
- For those countries where economic growth is knowledge based, there are still considerable vulnerabilities,
 - o From absorptive capacity to more emphasis on own creative capacity when closer to the frontier
 - o Dependence on foreign markets, foreign investors and foreign know-how sources: In 2004, foreign affiliates accounted for over 60% of business R&D in Hungary, around 50% in Czech Republic and around 20% in Slovakia, Poland and Portugal (EC-RTD-Key figures, 2007).
 - o Concentration of economic and creative capacity in few sectors: In 2004, ICT sector accounted for 33% of business R&D in Ireland; pharmaceuticals for 41% in Slovenia, and ICT & cars for 35% in Czech Republic (EC-RTD-Key figures, 2007).

5. How to smart specialise?

- Specialise or not?
- "Bad" versus "good" types of specialisation?
 - o Russia et al resources-curse (over-reliance on natural resources (oil/gas/minerals)
 - o Are there smart choices or only lucky shots, e.g. ICT, e.g. Finland?
- What are “good” types of “sectors” to specialise in?
 - o Sectors with growth opportunities where country can hold on to a “deep” comparative advantage on world markets
 - o Sectors with high connectedness to other sectors (Hausmann & Klinger, 2006)
Occupy the “rich” parts of the forest, where it is easier to “jump” to other trees

→ Develop “flexible” specialisation: Occupy “rich” parts and have capacity to jump to new areas of comparative advantage

6. Role for government S&T policy?

- “Smart” or “flexible” specialisation requires (see Foray, David & Hall, Policy Brief No 9)
- Developing strength in generic technologies/skills that allow easy switching: General Purpose Technologies
- Flexible PM, LM, FM supporting churning/creative destruction: Supporting the entrepreneurial process
- Avoiding sunk investments amap: Evaluating effectiveness

→ Cf. Horizontal “industrial” policy

7. Role for a vertical industrial policy (especially for catching up)?

Some insights from Hausmann & Rodrik (2006)

- Incentives to accumulate specific capabilities useful for new activities are rife with coordination failures.
- Unless purposeful action is taken to move towards new activities, countries may not be able to overcome the market failures that affect the process of structural transformation.
- Industrial policy is a central part of any development strategy. “we are doomed to choose”
- Industrial policy in the large implies thinking of an industry or an activity one would want to see develop, and then “backing up all its public input needs plus some stimulus to get the private juices going”. Focus on complementary public investments; Public-Private Partnerships
- Policy needs to have “open architecture” and to be transparent
- The ultimate test of whether industrial policy is working is not whether a government can reliably pick winners (no government reliably can) but whether a government is able to let losers go.

8. Smart specialisation in the European Research Area

- Regions should be competing globally for becoming “global hubs”. This requires an open, integrated, competitive ERA.
 - ERA plus: a large integrated competitive space for smart specialisation and strong agglomeration
 - The extra-ERA dimension:
 - Within ERA, regions need to be able to smart specialise on basis of “deep” comparative advantages in areas with prospects to become “global hub”
 - ERA as an attractor for “global hubs”
- In this perspective of ERA, transnational R&D institutions are important. The governance of these institutions need to support this open, integrated, competitive ERA (Marimon & Carvalho, Policy Brief)

1. Outline

As first non-K4G speaker, let me point to the particular role and importance of the K4G group

- In many ways the K4G expert group has become the economic backbone for European knowledge policies,
- Particularly important at the present moment: despite the usual macro-economic priority in Member States going to short term, demand led economic recovery plans, K4G emphasis on the need for long term structural reform plans.

The impact of the crisis on the European policy debate on knowledge investment:

- Short term impact of the financial crisis on knowledge investments;
- Long term European impact and opportunities.

2. Impact of crisis on research

Traditionally, one views private research investments as evolving in an *anti-cyclical* way:

- Negative impact of the recession on profitability forces firms to focus on the most productive segments of their output: the opportunity costs of achieving productivity growth is lower in recessions, providing incentives to undertake research activities in downturns (Aghion and Saint-Paul, 1998);
- R&D-personnel will be subject to “labour hoarding”; the most qualified scientists and engineers will be kept at the expense of lower skilled personnel.

However, with respect to innovation, a *cyclical* view appears more logical:

- Innovation or the implementation of new ideas, will be postponed in a recession till the boom period (Shleiffer, 1986);
- Recent evidence for OECD report highlights collapse of venture capital market.

Central assumption behind this: firms consider their R&D investments as costs “of last resort”: essential long term investments for the future of the company. However:

- Present crisis is also one of spreading of lack of trust in future risks with private investors as a result of the huge write-offs over the last year and growing distrust in society (Van Ark);
- The current dominant philosophy of “*Cash is king*” in Europe has a direct negative impact on knowledge investments *particularly in Europe* due to credit market constraints.

3. Policy responses

On the supply side: national structural policy reforms in research:

- Broadening of existing R&D support schemes for the private sector;
- Complementary policies within broader trend of increased (global) specialisation of private R&D within large firms with a growing trend towards “outsourcing” in the direction of small firms.
- Use opportunities for increased “outsourcing” of a number of specific R&D-activities in the direction of public sector (universities and other public research institutions); potential new role, with partly public (local) funding support for some of the large private R&D labs as “open” systemic innovation infrastructure;

- Arguments similar to the support for systemic banks but with one major difference: not aimed at stabilisation but at enhancing growth dynamics. Example of dismantling of Bell Labs in the 80's and impact on private R&D in US of many of those underutilized R&D managers.

Primarily national based...

4. Long term growth opportunities

On the demand side broad focus on societal challenges:

- Fasten the development of various possible “lead markets” using technology procurement; involve the private sector more actively in technology development and innovation in so-called societal innovation programmes (health, education, mobility and logistics, security);
- Thanks to internal EU rules, such national “innovation procurement” will not result too easily in hidden support for the own national industry.;
- Use the immediate local growth and employment opportunities associated with the application and diffusion of green technologies to the full. E.g. “green” construction represents a long term productive investment both for both the public and private sector, including house owners; green cars, factories of the future
- Focus the recognition of “grand challenges” on sustainable development. use this new “mission” focus so as to bring about a brake in the current lack of trust with private investors and starters in future risk taking;

Primarily European based?

5. A less flat research area in Europe after the crisis?

Historically there have been continuous shifts in public versus private funding of research and innovation, sometimes in favour of public funding (2nd World War and post-war period), sometimes in favour of private funding (80s and 90s).

- Today given the risk aversiveness on the financial side, there is a need for stronger role of public funding;
- Crucial for the effectiveness of research and innovation is not so much the funding origin but the performance location.

EU countries with high R&D investments (Finland, Sweden, Germany) typically embrace the view that the financial crisis offers opportunities for domestic structural reforms strengthening R&D and innovation, including the deployment of “green” technologies and eco-innovation; countries with low private R&D investments appear to only marginally refer to research and innovation stimulation measures within their domestic recovery plans;

In the long term these different policy responses are likely to signal a further growing divide between EU countries: a forced crisis knowledge specialisation with technologically leading countries which have the policy room for investing more public resources in knowledge taking a further lead and a group of falling behind countries adjusting their specialisation towards less technologically advanced goods and services.

6. From a K4G to a K4SD expert group?

Knowledge contributes to much more than growth: life expectancy, quality of life, “fifth” freedom...

- K4SD in ecological terms (little to add to Paul David);
- K4SD in financial terms: private/public balance in 3% R&D targets, FP;
- K4SD in social terms: fifth freedom and barriers to researchers mobility;
- K4SD in governance terms: towards a European paradise?

At the same time the present economic crisis opens up opportunities, particularly in Europe, to reflect on more efficient use of knowledge resources: sketching-out an ideal European policy “if-world”; even if its political feasibility remains today non-existent...

- Unfortunately and rather quickly when first signs of recovery emerge, the European debate shifts back into the daily reality of the institutional policy constraints.
- So this is a very timely conference, in which I’ll rather cherish the crisis mood rather than the recovery one...

Three levels of K4SD governance: national, European, regional.

7. National (higher) education...

It could be argued that higher education remains first and foremost a nationally organized and funded activity even though the curricula, the evaluation and accreditation of an increasing number of study fields are becoming increasingly internationally organised.

Over the last decades students in Europe and beyond have become partially mobile thanks to the Erasmus programs and the Bologna reforms with the growing transparency of the amount of study points allocated to studies abroad. But full student mobility, with the exception of the inflow of foreign students in the UK and Ireland, and cross border flows in studies limited in terms of admissions, has been limited.

Overall though the dominance of national students in higher education is such that national (regional in those federal member states where higher education is governed at the regional level) governments remain both in terms of administering as well as in terms of financing, in control.

This being said it is clear that higher education in Europe must be subject to substantial structural reforms in the coming years with the establishment of a European higher education area and the proposed minimal national investment target of 2% of GDP.

8. European Research

Research excellence is heavily dependent on *scale*: the European scale is the logical scale for most publicly funded research activities, for reducing costs in selecting and evaluating research proposals and for enabling high quality research specialization.

The flurry of individual MS's plans for research excellence provides a perfect example of “locational tournaments” at European level. The normative claim which can be made here is that European research policy should ultimately evolve into a ***Common Research Policy***.

The current existence of a ERC *next* to 27 individual member countries research councils is unsustainable: *joint programming* as way out: a “soft” but rather ineffective European policy tool?

Need for revision of FP’s in terms of content and governance with as ultimate target *better* performance than any national programme. Along the lines of the EIT? Along the lines of the European energy alliance mentioned by the Commissioner?

9. Regional innovation

Technology transfer, the use and re-use of technology from elsewhere as well as innovation and entrepreneurship have a strong regional and local focus and governance need.

One of the core problems of the “locational tournament” tendencies amongst competing regions in innovation policy is precisely their lack of local anchorage. What Foray describes as the “innovate here, benefit elsewhere” pattern characteristic of poorly locally integrated regional innovation policies.

Regions are likely to lack though the capacities to design the sort of “smart” innovation policies discussed by the K4G expert group. Could Europe help?

- Regional “best practice” expertise from other European regions that have been successful in designing “smart” innovation policies.
- There are in Europe numerous cross-border, so-called Euregions confronted in a more direct way with the lack of integration of national research and innovation policies.

A comment though on the smart specialisation concept: I would propose in the year of Darwin the notion of a strengthening of European *smart speciation* bringing to the forefront the way Europe, characterized by diversity, must have a long tail of “*untapped innovative potential*”.

10. Conclusions: on the need for knowledge investments

Remains surprising how current economic crisis is being discussed primarily in national terms...

Research and knowledge investments are a priority area for rethinking the governance level of national, European and regional knowledge policies:

- Continuous higher, catching-up growth in new member states will crucially depend on diffusion and technology transfer (Georg Licht);
- European institutional changes needed to make Europe in Commissioner Potočník's words: the preferred continent for researchers, attracting the best brains who can move freely...
- Global and local environmentally sustainable growth crucially dependent on access and fast diffusion/use to research and eco-innovations (Paul David).

New central challenge to technology and innovation policy: move away from the old obsession with technological competitiveness to a global view in which access, diffusion and effective use become central elements... Citizens in Europe (as in the US and Japan) are ultimately dependent on the speed and effective use of (green) knowledge diffusion in *both* their countries as well as those in the rest of the world.

SESSION II:
Research strategies and instruments for Europe
after the crisis

ROUNDTABLE CONTRIBUTIONS

CHAIR

RAMON MARIMON
(K4G Group)

DISCUSSANTS

LÉOPOLD DEMIDDELEER
(Solvay, EIRMA)

TASSOS GIANNITSIS
(K4G Group)

XABIER GOENAGA BELDARRAIN
(JRC, IPTS)

MICHAEL JACOB
(Swedish Ministry of EEC)

GERHARD STAHL
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JOHN WOOD
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CHAIR

RAMON MARIMON

(K4G Group member; Professor, European University Institute, Florence)

A main rationale for the European Research (and Innovation) Area is to provide a wide-open playing field where research groups (or centers) and innovative firms can compete and, as a result, specialize. A basic premise of S&T policies is that social returns may exceed private returns, providing a role for public intervention in this ERA market of ideas and innovations. However, while Europe as a whole can benefit from enhancing European R&D, these spillover effects often also have a more local dimension, providing a rationale for national or regional local ‘research strategies and funding institutions’. In other words, R&D in ERA has a dual character: its capacity to strengthen the competitive position of Europe in the world, while at the same time strengthening the competitive position of a specific region or country within Europe. To find the right balance of this duality - to have regional, national and European policies mutually reinforcing each other - is one of the most - if not the most - challenging aspects of European S&T policy. This challenge is exacerbated by the need to improve the efficiency of R&D policies in times of crisis, as well as after the crisis.

1. The current institutional design for public R&D funding is characterized by having most public R&D funding and research strategies at the local level, delegating –through the Framework Programs - some R&D funding to the EU level, with some limited forms of coordination.
 - Is the current institutional design adequate to face the challenges that lie ahead in S&T policy?
 - An innovation of FP7 has been the launching of the ERC, and now of the EIT: what role can these new governance structures play in enhancing competition and coordination?
 - FP7 has also developed new instruments for S&T policy coordination (e.g. ERA Net and ERA Net +): are these instruments enough? How can S&T policy coordination be improved?
2. These institutional innovations of FP7 can also be seen as a tendency towards outsourcing EU funding from the EC by creating ‘Executive Agencies’, implementing Article 171, etc. Similarly, some EU countries have engaged in institutional reforms, for example delegating their public funding to ‘autonomous’ national agencies (France, Spanish new law, etc.). Implicit in all these designs is that research strategies are still at the core of R&D governmental (or EC) policies.
 - In setting research strategies and implementing research programs, what should be the right level of delegation?
 - How should ‘autonomous’ agencies be made accountable at the EU at national or regional levels?
 - In light of the answers to (1), has this outsourcing process reached an adequate level of decentralization? In particular, regarding EU funding, will it resolve some of the complexity (contracts, auditing, etc.) often associated with EU funding?
3. For relatively less R&D-advanced countries or regions, the European Research Area provides the opportunity to better design their S&T policies and advance in the Knowledge-based economy. However, ERA is also sometimes seen as a deterrence when,

for example, it is perceived that large and relatively more advanced R&D countries may be the main beneficiaries of ERA competitive schemes.

- Are the current instruments for cooperation in FP7, or of R&D funding linked to structural funds, adequate to overcome this problem?
- How can relatively less R&D advanced regions and countries take advantage of the EU-wide knowledge to achieve their own specialization in the knowledge-based economy?
- What strategy may countries and regions apply in order to invest more resources in the knowledge economy?

DISCUSSANTS (IN ALPHABETICAL ORDER)

LÉOPOLD DEMIDDELEER

(Future Businesses Director, Solvay; President, EIRMA)

- Crisis impact today on industrial R&D:
 - o Few cuts in R&D expenses. General rule is to maintain the R&D budget so far...
 - o No recruitment, only very sharp profiles can be hired.
 - o Strong trend in off-shoring (out of EU)
- Crisis opportunities:
 - o Good ground for open innovation shift
 - o Connection to "big real problems" : energy, water, low cost access to high tech ...sustainable development focus
 - o Good ground for Universities/Industry/Public partnering (from local to EU level)
- Looking forward:
 - o Global ecosystems of R&D Labs
 - o EU guidelines for open-inno IP policy
 - o EU funding of medium & small size projects with limited numbers of partners

TASSOS GIANNITSIS

(K4G Group member; Professor, University of Athens)

I will focus on four issues, the answers to which can affect the longer-term position of Europe in the world and its capabilities to address crucial global problems in the not so distant future, probably after this crisis, but before the next ones.

1. My first point is on crisis. We are discussing S&T policies in times of crisis, but to which crisis are we referring to? Besides the present economic downturn, we are living already in a climate change crisis and probably we are approaching an energy crisis. In my view, what is at stake today differs from the typical technology race for new knowledge as a driver for higher GDP. If social costs and global imbalances have to be kept within an acceptable range, there is an urgent demand to find answers within predetermined time limits. Such answers go beyond the Lisbon strategy, even with its environmental dimension.

My point is that research and technology strategies should focus on a longer and much more complex cycle than what typically is discussed as a post-crisis period, and the policy agenda should address also global and quite different topics, than those preceding the present crisis. This, however, means policies with more explicit targets, selection mechanisms and risk-taking. Otherwise, we will face the risks and costs of 'non-selection'. In case of failure to support the advancement of critical technologies, the impact could be significant in terms of growth, employment, market shares and environmental quality. In such a blurred landscape, a significant difference between more targeted and neutral strategies might be that in the case of the latter, broader systemic failures to address timely major risks, rather than being a probability can become a certainty.

2. My second point is a question. What do we mean by Europe? From the point of view of research and technology capabilities and performance one can distinguish roughly four

different clusters of EU countries. Even if the question is related to the issues of convergence and catching-up, the answer goes well beyond this discussion, because in the light of the present crisis, there is a need to reconsider the issue of divergence. We need a better understanding of whether the intra-European technology, knowledge and innovation diversities determine simply the national performance or, in addition, they affect the overall macro-performance of the EU or the eurozone, in ways that go much beyond their impact on statistical indicators. In such a case, convergence and catching-up issues become a question of systemic efficiency. These intra-European differences on knowledge and technological capabilities call for different mixes of policies rather than for one-size-fits all strategies. Each of these strategies has its own logic and advantages, but there is no one option which is exempted from conceptual or practical weaknesses and risks. Risks depend on goals, national environments, forms of governance and on the timing.

3. My third point is that the success of technology policies is determined by a multiplicity of factors, among which the narrowly defined technology variables are interacting with many others. This makes the game of who can succeed complicated and non-linear. What I mean is that technology factors and new knowledge are integrated into the different parts of the complete value chain of firms in very different environments and ways, with very diverse locally available labor forces, capital or other inputs, and, in particular, the prices of these. Such combinations allow firms to construct very different and unpredicted specific or niche advantages.
4. Some remarks on the concept of policy efficiency:
 - a) The economic reasoning on efficiency tends to focus the discussion away from questions of “policy to what end?” to the technical questions of “how”. Economic efficiency is of paramount importance, but in times of crisis, value questions and policy ends are as important as the technical questions. In fact, a policy can be efficient but non-effective if it fails to ensure real goals.
 - b) My second remark is that in S&T policy very often efficiency can be judged only ex post. The area of S&T policies is associated to inherently high uncertainties and unpredictability and rarely the outcome is visible ex ante.

My final point is that research and technological advancement is not only a question of the spending as a percentage of GDP or of institutional arrangements. It is a question of how goals, policies and appropriate absolute amounts of financial and human resources are best articulated. Finally, the question is what can take us further? In my view the answer should be searched along policy concepts which are based on a plurality of flexible approaches, can be tailored to the very different realities and targets, enrich the existing policy-making process and can better reflect the politically accepted balance between policy action, social risks and benefits.

XABIER GOENAGA

(European Commission, JRC, IPTS, Sevilla)

Private investments in research mainly take place either close to production sites or in regions where the quality of the research and human resources are most attractive. Good research is also that which has greatest impact in the scientific literature. Therefore, the promotion of excellence of research and human resources must be at the heart of S&T policies. The current institutional design of public R&D funding is not optimal because it is not leading to the creation of a sufficiently large number of world class research centres and groups in Europe, and Europe is not attracting a sufficient share of the mobile private R&D.

More than ever the crisis is an opportunity for S&T and innovation policy to play a bigger role in changing Europe's industrial structures. The weight of medium and high-tech industries that create added value and skilled jobs needs to increase in the European economy. Therefore, SMEs in these areas should have the opportunity to grow into market leaders worldwide.

All countries and regions do not need to achieve a 3% R&D intensity objective but most of them would benefit from an increase in the knowledge intensity of their economies and this will require more and better investments by the public and private sectors. Governments would be well advised to invest their public resources in such a way that they promote excellence of their research base and leverage private investment. They have to make their regions more attractive to people and business that can contribute to their knowledge base and specialisation strategies. They also have to encourage and fund partnerships of local research groups with other European and worldwide groups which would allow them to find better and quicker solutions to local problems. Some people argue that increasing investment from the public sector too quickly would be inefficient and this is probably the case particularly in regions where the R&D intensity is already very high. However, there are good examples of countries and regions with lower R&D intensities where sustained increases in public funding of 10-15% per year have been effective in increasing the quality of the research and in leveraging private investments.

MICHAEL JACOB

(Swedish Ministry of Enterprise, Energy and Communications, Division of Research, Innovation and Industry Development)

The main challenges for European competitiveness are global, not mere within EU, nations or regions. These challenges can only be met by excellence, and it is important for the whole of EU with a distribution of specialised excellence. Excellence should be interpreted in a wide definition, including also knowledge transfer, innovation and diffusion. The challenges for European policy makers on community and national level are supplying the instruments for creating milieus of excellence, and stimulating regional distribution.

The current predominant thematic approach in research may limit coordination between funding mechanisms. A shift towards a demand oriented structure, for example towards challenges on global, EU, national or regional level, would enhance coordination, since the strive would be towards common goals and solving problems. Such a shift would also stimulate the important coordination between different policy areas, both within COM and MS. This way research can be better linked to market stimulating activities such as lead

markets and public procurement, as well as framework conditions such as a community patent, standardisation and regulation.

The approach towards challenges needs, however, to be balanced by a scientific bottom-up approach, for instance for the development of enabling and emerging technologies, for ensuring an important base for solving today's challenges, as well as the challenges of tomorrow.

Of special importance for coordination are the areas within the knowledge triangle (education, research and innovation) for creating excellence and for driving innovations - like in the EIT model. The involvement of industry and other users are vital in such collaborations to ensure that a larger portion of research activities will result in innovations or in other ways come to use in society.

Also the coordination between different funding mechanisms is fundamental for synergies and maximising the build-up. Among community research, coordination between FP, SF and CIP are important, and these in turn need to be coordinated with national priorities.

Governance of ERA, and the coupling to other policy areas, such as innovation, is an issue that needs attention. To get an effective research and innovation system in Europe it is important with a structure enabling close collaboration between COM and MS, for instance in priority settings, and with influence from major stakeholders, such as industry. A main strive should be towards increasing the impact of investments, maximising sustainable growth in Europe.

GERHARD STAHL

(General Secretary of the Committee of the Regions)

The economic and financial conditions are evolving quickly in an inter-dependent world. New economic actors, such as China and India, are becoming increasingly integrated in the international economies. Unsustainable macro-economic imbalances which, for example, characterised the situation of the United States in the last decade with the three deficits - external account, public debt and private indebtedness - have to be corrected in the aftermath of the financial crisis.

The biggest financial and economic crisis since the depression of the thirties, which spread from the United States to all parts of the world, requires a re-thinking of economic strategies and has to be taken into account for the future Lisbon strategy of the European Union. The social and employment consequences of the current crisis might be much longer-lasting than the financial problems. The regions are the front actors for managing social integration strategy in the longer term.

The EU has made an effort to coordinate national and European policy answers to mitigate the negative effects, but governance in the Economic and Monetary Union still needs improvements.

Innovation policy has to take account of the new economic pattern which has to be found to overcome the systemic crisis and to ensure employment and sustainable economic growth, being confronted with the risk of lower growth rates in the US and the EU for some time to come.

Recent studies show that regional innovation strategy can play a major role in increasing productivity and economic growth.

In the past, innovation and economic policy were very often associated with the strengthening of the large urban centres and research funding was likely to be concentrated on supporting the process of creating world class centres of excellence. New economic theory concludes that concentration does not always lead to the most desirable outcome and that growth is not automatically led by the core. In more than half of the OECD countries, the wealthiest regions contributed less than 25% to national growth over the period from 1995 to 2005.

In spite of globalisation, proximity still matters; promoting innovative regions is a paradigm shift. For instance, in 1994, Finland introduced a specific urban policy to foster innovation and growth in eight city regions, but excluding Helsinki as the strong centre with the aim of achieving balanced territorial development.

Such a policy might become even more attractive if one of the conclusions of the changed international situation after the economic crisis might be that export-led growth has to be balanced by internal growth.

Successful innovation policy needs a holistic approach.

Innovation performance clearly depends on more than the number of researchers or the per-capita R&D effort.

Multi-level governance is needed, horizontally between different ministries and the private sector and vertically between local, regional, national and European levels.

The success of multi-level governance depends on proper management and implementation

- Shared strategic planning. Sub-national authorities are very often better placed than national authorities to decide on priorities for regional innovation strategies and to organise a partnership approach with different actors.
- Explicit contracts between levels of government increases efficiency
- Private-public partnerships to finance larger investment projects and to mobilise business
- Cross-border and macro-regional cooperation can address barriers in the form of national frontiers for successful innovation policy

The Committee of the Regions, in its various opinions

- highlights the need to intensify the process of the creation of the European Research Area and the significant contribution from regions through supportive actions
- acknowledges the need for improved synergies between EU cohesion, research and innovation policies
- shares the concern that research investment and activity within the EU is highly concentrated in a few regions and has noted that research and development expenditure in more than 100 regions in Europe is below 1% of GDP
- recalls that the concept of "excellence" must also account for highly specialised smaller research centres and less research-intensive players, as "low-tech" research can also be very important for the implementation of innovation and development in regions

- calls for continued debate on the appropriate balance between institutional and competitive funding
- recognises a need to dedicate a substantial and growing share of the Structural Funds (SF) to research and innovation and, for example, to dedicate a minimum of 20% to investment in innovation and knowledge in future SF programmes

JOHN WOOD

(Chair of the ERAB)

- The need to modernise European Universities and how this might be achieved.
- The need for more risk taking in innovation and research. Putting funding decisions at arms length from the Commission
- Increase mobility and the need for a European research charter and pass for researchers
- How Europe is represented in a global environment
- The need for a joined up ERA if we are to remain competitive and able to tackle grand challenges
- The need for more pre commercial procurement research funding
- Actively link research and innovation to the political process to ensure parliamentary and Commission decisions are based on real evidence
- Fostering open innovation – the need to actively develop a common European patent
- Raising the public expectations on what can be delivered

SUMMARY REPORT ON THE CLOSING REMARKS
OF
JANEZ POTOČNIK
Commissioner for Science and Research
Chair of the K4G Group

SUMMARY REPORT ON THE CLOSING REMARKS OF THE COMMISSIONER

Contributions of the K4G expert group

The Commissioner recalled the main contributions of the Knowledge for Growth (K4G) expert group, noting that these had been fundamental to the discussions at the conference:

- On **globalisation of R&D and the concept of smart specialisation in the EU** by D. Foray, which prompted very lively discussions and led to the analysis of options and risks of such a policy identified by T. Giannitsis and M. Karger.
- On the **EU R&D deficit**, first analysed by M. O'Sullivan, showing that the gap is largely due to the **structure of EU industry**, especially in high-tech sectors and in particular in the ICT sector, which is smaller and invests less in R&D than in countries like the US and Japan. A recent analysis by B. Hall and J. Mairesse concluded that **too few EU SMEs have become big multinationals in the last decades** and that **growth of SMEs is the major problem**.
- How **"Universities and R&D organisations in the ERA"** can better contribute to Europe's innovation performance was taken up by the report of P. David and S. Metcalfe.
- The need for better **governance and coordination of S&T policies** in the European Research Area (ERA) was addressed by R. Marimon and M. Carvalho, where the Commissioner noted that the governance issue would be of central importance at the "New Worlds - New Solutions" conference taking place in Lund on 7-8 July, one of the first activities organised by the Swedish Presidency with support from the Commission.
- Factors and drivers in the knowledge economy affecting the **convergence of "catching-up Member States"** and policy options presented by R. Veugelers and M. Mrak complemented by a report by G. Licht on the importance of technology diffusion.

Issues raised in conference sessions

The Commissioner addressed the issues raised on R&D and innovation policies in relation to the global systemic crises and challenges for research strategies for Europe after the crisis. He said that the crisis would drive Europe towards a **paradigm shift** and that this called for a new impetus for action. A reinvigorated approach would be required for a **new deal for research addressing grand societal challenges**. Furthermore, a stronger focus would be needed on demand-oriented measures.

Concerning mechanisms, he stressed a **"policy mix" approach** that would require **higher coordination between different policies** both within the Commission and between the Member States. The policies concerned would be, for example, competition policy, internal market, procurement policies, social security and environmental regulations. He added that the Commission is developing policies to enhance the so-called **Fifth Freedom**, meaning the extension of the first four freedoms of movement of people, goods, services and capital to the areas of R&D, higher education and innovation.

As Member States have different knowledge economy structures, the Commissioner agreed with R. Veugelers that countries with large knowledge economy gaps will need to improve technology absorption capacities, while more advanced catching-up Member States will have to sustain productivity growth through knowledge creation. In this context, **"smart" or "flexible" specialisation** may play a crucial strategic role.

The crisis

As a comment on the crisis and on the challenges ahead, the Commissioner recalled the mission of the K4G expert group. He said that this mission was associated with the core Lisbon objective of exploring and assessing the sources of economic growth which are assumed to be found in knowledge creation (research) circulation and diffusion. In this context, it might be assumed that in the light of Lisbon the US serves as a hidden benchmark or model. If this would be the case the model assumption would again have to be assessed. Two keynote speakers with an US background B. Van Ark and P.A. David claimed an **unsustainable growth model of the US** and that new ways for knowledge-based growth have to be identified.

B. Van Ark said that the US model for economic growth (and for research) is based on fiscal and financial stimulus plans and does not offer a sound solution to increasing living standards, as the financial crisis and its economic impact in the US will probably last for more than a decade. The Commissioner also underlined that the **crisis is a systemic one**, in the sense that it is not only associated with financial issues but also with "grand challenges" in the research policy community. These challenges concern climate change, energy shortages, environmental problems, and critical aspects of health, security, ageing, and population growth in non-European areas, as spelled out in P.A. David's keynote.

The Commissioner called for stronger ERA governance and for exploring the concept of "Smart Specialisation" (Policy Briefs N° 1 and 9) as the notion and the practice of specialisation in Member States and in regions were the subject of intense debate. Specialisation of knowledge and research would concern the ERA, Member States and its regions.

The last keynote speaker, L. Soete, suggested exploring in greater detail the challenges for research policy, namely issues arising from the economic recession and indebtedness and their effect on the post-Lisbon strategy, issues of the systemic crisis for growth, structural conditions for research intensity and issues of specialisation in the light of the sustainable growth of research investments. A new expert group of knowledge economists, **K4SG (Knowledge for Sustainable Growth)**, could be instrumental in the exploration of these crucial policy issues. The Commissioner said that this was an appealing idea and could be assessed by the next Commissioner for Science and Research.

Closing the conference

The Commissioner repeated that the reports from the group have been a very valuable input to policy-making and have triggered wider policy discussions – the **Lund conference** was cited as one example.

The Commissioner said that the input of the conference and the K4G group would be important for the discussion and formulation of a **post-2010 Lisbon strategy** and that the K4G experts were already busy preparing input for this discussion as part of another expert group.

The Commissioner announced that the reports and policy briefs of the K4G group would be published and that he would like to further contribute to such a final report.

He warmly thanked all the experts again for their dedication and the very fruitful discussions, which he had greatly enjoyed being part of. His thanks specifically included the contributions from the conference.

CONFERENCE SPEAKERS AND DISCUSSANTS

Janez Potočnik – Chair of the K4G Group



Dr Janez Potočnik was born in 1958. He graduated with honours from the Faculty of Economics at the University of Ljubljana. He continued his studies at the same University where he did his Master's degree in 1989 and a Ph.D. degree in 1993.

For several years (1989-1993), he worked as a researcher at the Institute of Economic Research in Ljubljana. In July 1994, he was appointed Director of the Institute of Macroeconomic Analysis and Development of the Republic of Slovenia. In April 1998, the Government of the Republic of Slovenia appointed Dr Potočnik Head of Negotiating Team for Accession of the Republic of Slovenia to the European Union. From June 2000 to December 2000, he was also the acting director of Government Office for European Affairs. In June 2001, he was appointed a Minister Councillor at the Office of the Prime Minister. On January 24, 2002, the Government of the Republic of Slovenia appointed him for the Minister without portfolio responsible for European Affairs.

From 1991 until 2004 Dr Potočnik has also been an assistant professor at the Faculty of Law at the University of Ljubljana, where he lectured on statistics and economy.

Dr Potočnik became a Member of the European Commission on the May 1 2004. He is currently responsible for Science and Research. In May 2008 he was awarded the honorary degree of Doctor of Science by London Imperial College.

Session Chairs

Dominique Foray – Vice-Chair of the K4G Group



Prof. Dominique Foray is the Director of the "Chaire en Economie et Management de l'Innovation". He is currently a member of the National Research Council (Switzerland), the Advisory Board of the Swiss Economic Institute (KOF) and the World Economic Forum's Global Agenda Council. He serves as the 2009-President of the EPIP (European Policy for Intellectual Property) association.

Between 2004 and 2008, Prof. Foray was the Dean of the "Collège du Management de la Technologie". Before joining EPFL, he was a Research Director at the Centre National de la Recherche Scientifique (CNRS) and a Professor at the Institut pour le Management de la Recherche et de l'Innovation (IMRI) of the University of Paris-Dauphine (from 1993 to 2000); he was then a Principal Analyst at the Organization of Economic Cooperation and Development (OECD) from 2000 to 2004.

Prof. Foray's research interests include the economics of science and technology with a particular focus on high-tech sectors, the management of large-scale technological projects, international comparisons of institutions, and systems of innovation within the context of the new economy. Intellectual property and competition policies, information technology and the new economy, capital market and entrepreneurship, national systems of innovation are fields of high relevance for his research.



Ramon Marimon – K4G Group member

Prof. Ramon Marimon is the Director of the Max Weber Postdoctoral Programme of the European University Institute and a Professor in the Economics Department (Florence). He is a Research fellow of the NBER (since 1992) and of the CEPR (since 1993), as well as a member of the Council of the European Economic Association (since 2000).

Full professor at the Universitat Pompeu Fabra (UPF, since 1990) and at the European University Institute (1994-2000), Prof. Marimon was previously assistant and associate professor at the University of Minnesota (1984-1993) and has been visiting professor at Stanford University, Cambridge University, the Federal Reserve Bank of Minneapolis, the International Monetary Fund, the Santa Fe Institute, Ente Einaudi and Luiss University. Prof. Marimon was the co-founder of UPF as Dean and Chair of Economics and Business (1990-1991) and Secretary of State for Science and Technology in the Spanish Ministry of Science and Technology (2000-2002).

His research interests include Macroeconomics, Monetary Theory, Labor Theory, Political Economy, Contract Theory, Learning Theory, and the Economics of Science and Innovation.

Keynote speakers

Bart van Ark – K4G Group member



Bart van Ark is Vice-President and Chief Economist of The Conference Board. He leads a team of 20-plus economists who produce a portfolio of widely watched economic indicators and growth forecasts, as well as in-depth global economic research. Since 2000, he holds the chair in Economic Development, Technological Change and Growth at the University of Groningen in the Netherlands.

Previously, Prof. van Ark was The Conference Board's consulting director of international economic research for 10 years, responsible for its annual flagship publication on productivity. From 1988 to 1990, he worked as a research associate with the National Institute of Economic and Social Research (UK) on international comparisons of economic performance in Europe. He has participated in international research projects as the Productivity Research Program of the McKinsey Global Institute, the CEPR Program on Comparative Experience of Economic Growth in Postwar Europe, and European Commission programs on productivity. He also was director of the Groningen Growth and Development Centre, a research group of economists and economic historians examining long-run economic growth and international comparisons of economic performance for Europe, Asia, and North and South America.



Paul A. David – K4G Group member

Prof. Paul A. David is Professor of Economics and Senior Fellow of the Institute for Economic Policy Research at Stanford University. David is also Professeur Titulaire of the Ecole Polytechnique & Telecom ParisTech and Professorial Fellow of The United Nations University - Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT).

David's research contributions span the economics and economic history of technological, demographic, and institutional change, and including topics in theoretical and empirical research focused on the nature and sources of path-dependent dynamics in economic processes. His recent policy-related work is focused primarily on the impact of IPR protections upon collaboration in open science, innovation, standards and technology diffusion in network industries, and the organisation and performance of open source software communities.

Prof. David's experience as a consultant to international organisations has included work for the World Bank, the United Nations Commission on Trade and Development, the United Nations University Institute, the OECD, several directorates of the European Commission of the EU – including the EC DG-Research Experts Group on Knowledge for Growth (K4G), the US National Science Foundation and National Academies of Science. He currently serves (*ex officio*) on the US National Research Council Board on Research Data and Information and is a member of the Advisory Board of Science Commons.

Luc Soete



Prof. Luc Soete is Director of The United Nations University - Maastricht Economic and Social Policy Research and Training Centre on Innovation and Technology (UNU-MERIT). He is also Professor of International Economic Relations (on leave) at the Faculty of Economics and Business Administration, University of Maastricht. Professor Soete is a member of the Dutch scientific advisory body (AWT).

Before coming to Maastricht in 1986, Prof. Soete worked at the Department of Economics of the University of Antwerp, the Institute of Development Studies and the Science Policy Research Unit both at the University of Sussex, and the Department of Economics at Stanford University.

His research interests cover the broad range of theoretical, empirical and policy studies of the impact of technological change and innovation on growth and development.



Reinhilde Veugelers – K4G Group member

Reinhilde Veugelers is Professor of Managerial Economics, Strategy and Innovation at the Katholieke Universiteit Leuven, Belgium. She is currently a Senior Fellow at Bruegel, a CEPR Research Fellow, and also co-promotor for the Flemish Government "Steunpunt" on R&D Statistics.

From 2004-2008, Prof. Veugelers was advisor at the European Commission (BEPA). She was a visiting scholar at Northwestern University's Kellogg Graduate School of Management, at Sloan School of Management (MIT), Stern Business School (NYU), ECARES/Université Libre de Bruxelles, Université de Paris I (Panthéon-Sorbonne), Universitat Pompeu Fabra & Universitat Autònoma de Barcelona, Universiteit Maastricht.

With her research concentrated in the fields of industrial organisation, international economics and strategy and innovation, Prof. Veugelers has authored numerous publications on multinationals, R&D cooperation and alliances, industry-science links and market integration in leading international journals.

Roundtable participants

Armel de La Bourdonnaye



Primarily a mathematician and a civil engineer, Dr Armel de La Bourdonnaye is currently the director of the department for the transversal policies and the coordination of the research and innovation strategy in the French Ministry for Higher Education and Research.

He formerly served as vice president in University Paris-Est which he contributed to create in 2007 and was the head of the research department of the oldest French Grande École, the "École Nationale des Ponts et Chaussées".

Before this, he occupied various positions in the ministries for transport and for energy, being concerned with safety, risk management and the technical aspects of the opening of the markets. He began his career as a researcher in applied mathematics at INRIA.

Léopold Demiddeleer



Dr Léopold Demiddeleer is currently President of the Board of the European Industrial Research Management Association (EIRMA) and Future Businesses Director of Solvay, a large pharmaceutical and chemical company based in Brussels, Belgium.

Dr Demiddeleer started his career in 1976 teaching mathematics and physics and joined Solvay in 1981. From 1981 to 2001, he was responsible for several research and development initiatives in catalyst, high performance materials and global polyolefins. In 2001, he was appointed New Business Development Director. He has been active as a member of the EC Advisory Council on Fuel Cells.

Tassos Giannitsis – K4G Group member



Prof. Tassos Giannitsis is Professor of Development and International Economics, Department of Economics, at the University of Athens (since 1984).

Prof. Giannitsis was Chairman of the Council of Economic Advisers of the Greek Ministry of National Economy in the periods 1989-1990 and 1993-1994. From 1994 to 2000, he was Chief Economic Counsellor to the Prime Minister. In 2000, Prof. Giannitsis became Minister of Labour and Social Security. He was appointed as Alternate Minister of Foreign Affairs (Oct. 2001 - Feb. 2004) and Minister of Foreign Affairs (Feb. 2004 - March 2004).

His teaching and research fields are Development Economics, Greek Economic Policies, International Economics, and economics of Technological Change.

Xabier Goenaga



Dr Xabier Goenaga has been Head of the Knowledge for Growth Unit of the European Commission's JRC-IPTS since 2007. He leads a team of 40-plus economists and social scientists doing research and providing policy support at EU level on (i) sector dynamics and the impact of R&D, physical capital and other factors on company performance, (ii) the development of the European Research Area, and (iii) the macro-economic impact of Regional Funds. Amongst others he is responsible for the Industrial R&D Scoreboard.

Before that, Dr Goenaga held various other positions within the European Commission. Notably, he was responsible for the application of the open method of co-ordination to research policy, for the management of SME measures in the 6th Framework Programme and for the management of agriculture and agro-industry research programmes of FP5. Goenaga holds a Ph.D. in Chemical Engineering from the University of Wales and a Masters degree in Public Management from the École Solvay.

Michael Jacob



Prof. Michael Jacob is an advisor to the Swedish Minister for Enterprise, Energy and Communications in the fields of research and innovation. He is Swedish delegate to CREST and FP7 Specific committees, and to the former EU Innovation Policy Expert Group. He is an associate professor in chemistry, with a background spanning from basic research to industrially applied, and innovation.

He has held positions at universities and institutes of technology in Sweden and Switzerland, and leading positions at research institutes, involving very close collaboration with industry.



Leif Kjaergaard

Leif Kjaergaard, Ph.D., is currently the President of Leif and Food Science, a consulting firm to the food and industrial Biotech industry. Prior to that he was the Chief Technology Officer and a member of the executive committee at Danisco A/S, an international food ingredients and biotechnology company based in Denmark from 2006 to 2008. He was responsible for new technology ventures and business development throughout Danisco. From 2002 to 2006, he was Senior Vice President of Danisco, and, from 1993 to 2002, he served as Executive Vice President and Department President of Danisco Cultor (formerly Danisco Ingredients).

Dr Kjaergaard is a board member in start-up Biotech companies in EU and US, in venture fond in Denmark and in a well established Danish food and feed company. Further, he is the deputy chair of the European Research Area Board (ERAB), past President of the Board of the European Industrial Research Management Association (EIRMA), and (a member) deputy chair of the Advisory Council on Research Policy in Denmark.

Georg Licht – K4G Group member



Dr Georg Licht is director of the department "Industrial Economics and International Management" at the Centre for European Economic Research (ZEW) in Mannheim, Germany, since 1992.

He obtained his Ph.D. in 1990 at the University of Augsburg and worked at the German Cancer Research Centre in Heidelberg. At ZEW, he is responsible for the German innovation survey. The focus of his research department is on research infrastructure and technology transfer, evaluation of instruments of research, technology and innovation policies, as well as on international trends in research and innovation policy. His research interests include Industrial Economics, especially innovation and start-ups.

John Smith



Dr. John Smith has worked at the EUA since September 2004 as Deputy Secretary General with responsibility for its activities in the fields of research and innovation.

After completing his Ph.D. in political science (University of Kent, Canterbury, UK) he took up a career in the field of science administration and policy at the Economic and Social Research Council, London, UK (1976-84), and the European Science Foundation, Strasbourg, (1985-2000). Based in Vienna from 2000-2003, he was Executive Director of the Institute for Human Sciences until December 2001 and then worked as a Research Consultant on several commissioned studies, including those for the Austrian Ministry of Education, Science and Culture; the European Centre for Social Welfare Policy and Research; and the European Commission Directorate-General for Research.

From October 2003 to September 2004, he was based in Lisbon, Portugal, as a Gulbenkian Foundation Visiting Professor in European Science Policy at the Instituto Superior De Ciencias Do Trabalho E Da Empresa (ISCTE) of the University of Lisbon.

Roland S. Sommer



Roland S. Sommer serves as an expert for research and innovation policy at the Federation of Austrian Industries. His main fields of activity are research funding, technology policy, research policy, co-operation of science and industry, international trends and European research programmes. He also works at the department of European and International Programmes of the Austrian Research Promotion Agency, where he is responsible for the coordination of the Austrian activities for the European Institute of Innovation and Technology (EIT).

Roland S. Sommer represents the Federation of Austrian Industries in the BusinessEurope Research and Technology Working Group and in the Business and Industry Advisory Committee (BIAC) to the OECD.

Gerhard Stahl



Gerhard Stahl has been Secretary-General of the Committee of the Regions (CoR) since 2004 where he was appointed Director for Consultative Work in 2002.

Previously, he worked in the European Parliament and on the regional level in Schleswig-Holstein at the Ministry for Economics, Transport and Research and later on as Director-General for European and International Affairs at the Ministry for European and Federal Affairs. From 1995-1999, he was a Member of the Cabinet of European Commissioner for Regional Policy, Dr Monika Wulf-Mathies. From 1999-2002, he was Deputy Head of Cabinet for Pedro Solbes, the European Commissioner for Economic and Monetary Affairs.

Gerhard Stahl is a Member of the Advisory Committee of the Ifo Institute for Economic Research in Munich and the author of several publications on economic, regional and European policy issues.

Pierre Vigier



Pierre Vigier, graduate in Law of the University of Paris and holding Masters Degrees in both Economics and Political Science (ESSEC and Paris "Sciences Po"), is a specialist in European industry, research and innovation. He began his career within a number of ministerial cabinet offices in France and at the Territory Planning Agency. Joining the European Commission in 1988 he was notably responsible for automobile industry, achieving the negotiation of the EU-Japan Trade Agreement in this sector (1991-2000). He subsequently coordinated Industrial cooperation of EU with Asia. As member of the Cabinet for the Commissioner in charge of RTD, Innovation & Education (1995-1999), he notably launched the 1995 Green paper on Innovation in Europe and was responsible for industrial research and space policy (Galileo, GMES, etc.).

From 2000 to 2008 in the Enterprise and Industry DG, he has presided over the creation of the Enterprise Policy Group, the extension of the European Charter for Small Businesses, the drafting of the new European SME definition, the launching of the broad based innovation strategy and of the Lead Market initiative for Europe and contributed to the European Small Business Act. Since July 2008, he is in charge, in DG Research, of Economic Analysis, the Monitoring of National Research Policies and the Lisbon strategy.

John Wood



Prof. John Wood holds the Chair of the European Research Area Board (ERAB) and is currently Senior International Relations Adviser to Imperial College, London.

Prof. Wood was elected chair of the European Strategy Forum for Research Infrastructures and chair of the International Steering Committee for the European X-Ray Free Electron Laser. He was Chief Executive of the Council for the Central Laboratories of the Research Councils (CCLRC) from 2001 to 2007 on leave from Nottingham University. His research has been in the area of materials processing of non-equilibrium structures where he has over 240 publications and 14 patents.

LIST OF PARTICIPANTS



Knowledge for Growth Conference
S&T Policy in times of crisis: Prospects for the knowledge-based economy

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EXPERT GROUP “KNOWLEDGE FOR GROWTH” (KNOWLEDGE ECONOMISTS – K4G)

In 2005, Commissioner Potočník established a group of prominent economists in the field of ‘Knowledge for Growth’, called the ‘knowledge economists’, in order to provide him with high-level advice on the contribution that knowledge can make to sustainable growth and prosperity and related policy aspects in order to support the Lisbon Strategy goals. The K4G Expert Group meets three times a year, under the chairmanship of the Commissioner. The Commissioner appointed Prof. Dominique Foray as Vice-Chairman to lead the work of the Group.

As a matter of fact, the Group decided not to undertake original research, given that all members have their own research agenda and are also heavily involved in other types of professional activities. The mode of operation of the Group was, therefore, more that of a forum where members of the group present written contributions based on existing knowledge and data, which are then critically discussed at various stages. The final outcome is a *report* developing a policy structured discussion. Each report is complemented with a *policy brief* that summarises the key messages.

The Reports and Policy Briefs may be downloaded from:

http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm

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