



### 3. Boosting Innovation from Research to Market



*Introductory remarks by*

#### **Dr. Johannes Kaufmann, Head of the Department Innovation at the Federal Office for Professional Education and Technology**

*Chairman*



Born in the canton of Lucerne in Switzerland, Dr. Kaufmann graduated from the University of Bern School of Veterinary Medicine in 1983. Between 1998 and 2002, he was the Counsellor for Science and Technology for the USA and Canada at the Embassy of Switzerland in Washington.

Prior to this, Dr. Kaufmann was Head of International Affairs at the Swiss Federal Veterinary Office in Bern. From 1990 to 1995, Dr. Kaufmann was assistant professor and lecturer in medical parasitology and tropical veterinary medicine. He did scientific consulting in Burkina Faso, Senegal, Ghana, and Vietnam. In the USA, his main emphasis is on the public understanding of science and the role of science in the policymaking and legislative process.

Upon his initiative, a science fellowship program was introduced by the Swiss Scientific Academies in the Swiss Parliament in 2001.

Dr. Kaufmann is a member of numerous professional scientific organisations and serves on the board of the University of Lucerne. He is now Head of the Department Innovation at the Federal Office for Professional Education and Technology

In order to revolutionise techniques as well as technologies in any area it takes vision.

And it takes vision to boost innovation in and for this still new century. We are setting today the stepping-stones for progress and prosperity in Europe and worldwide for the next one hundred years. And more than ever, the innovation process is recognised as the incubator for a wide variety of value chains.

In terms of vision, Europe has come a long way. Today, key policies on the EU level, national, and regional levels are focused on the innovation process. The European Union has formulated the "Lisbon Goal": to reach by 2010 an investment volume in RTD (Research & Technology



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Development) at 3% of the GDP. At the same time, vertical as well as horizontal co-operation between programmes and innovation policies are being optimised.

An important part of vision is to keep an open mind, to be able to learn from each other and the world around us. The exchange of best practices in innovation promotion can cross-fertilise national and regional initiatives.

Creating networks of knowledge and excellence among high-innovation regions invigorates research, discovery, and development systems. A shared vision, and a healthy plurality of approaches combined with competition based on excellence, are essential ingredients in strong, innovation-fuelled regional, national, and transnational economies.

This recognition and the wish to share our vision, approaches, and best practices is the *raison d'être* of today's event. Its title is at the same time its programme and its envisioned effect: Boosting Innovation from Research to Market.

In Switzerland, the recognition of the key function of the “research to market” vector is reflected in the growing importance of the country’s first applied research and development funding agency, CTI. Labelled “The Innovation Promotion Agency”, CTI works hard to enable the transition of innovative ideas and developments from the laboratories to the market by co-funding high-innovation projects with partners from the industry and public research institutions. It does so with a lean and effective structure and a deep commitment to continuous improvement of internal as well as external procedures and policies.

Its mission does not end here, though. CTI is fast becoming Switzerland’s Innovation Policy Authority, formulating and promoting effective best practices, and engaging in the collection and assessment of such practices at home and abroad. CTI’s international division initiates, improves, and oversees Swiss participation in European and global networks and organisations aimed at catalysing innovation by strengthening international collaboration for the benefit of all participating partners. It takes an active part in developing strategies for innovation promotion, again both on a national and an international level through CTI International.

An event like today’s “Boosting Innovation” conference is an excellent opportunity for the participants assembled – two European countries, a European region, the city of Brussels, representatives from the European Union, as well as participants from California – to engage in what is so central to the ongoing push towards an innovation-driven economy: the sharing of proven ideas and thorough assessments, the exchange of fresh views and tested methods, and the lively interaction between committed people with a vision.

I am confident that the after-effects of today’s event will last a long time and I believe that the satisfaction of authentic work for our constituencies will inspire many of us to work even harder towards achieving our goals of bringing innovation to fruition on the regional, national, and international markets.

Actions speak louder than words and thus I do not want to end with words alone. I invite you to contact me and to share with me and my organisation your thoughts on today’s discussions collected in the present publication and I invite you to keep this important exchange alive.



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## *From Idea to Value – Norwegian Innovation Policy by*

### **Mr. Ansgar Gabrielsen, Minister of Trade and Industry, Norway**

#### *Speaker*



Mr. Ansgar Gabrielsen was born on 21 May 1955 in Mandal, Norway. He finished in 1976 as a non Commissioned Officer the Officers' Training School. In 1986 Mr. Ansgar Gabrielsen concluded his studies at The Norwegian Academy of Insurance. And in 1995 he followed a one-year course in law at the University of Oslo.

In 1979 he started his political career in the Conservative Party in Lindesnes Municipal Council where he was a Mayor from 1987 to 1993. Mr. Ansgar Gabrielsen became a Member of Stortinget (the Norwegian Parliament) in 1993 as Representative for Vest-Agder County. He was re-elected in 1997 and 2001. From 1993 until 1997 he was a Member of the Parliamentary Committee: Standing Committee on Health and Social Affairs. During the years 1997-2001 he was Member of the Standing Committee on Business and Industry and substitute Member of the Enlarged Foreign Affairs Committee. In addition, Mr. Gabrielsen has held various administrative offices within banking and industry. Since October 2001 he has been Minister of Trade and Industry.

Thank you, Johannes Kaufmann for the kind introduction. Also, allow me to express how pleased I am to attend this conference. I am very much looking forward to taking part, and I am sure we will have interesting discussions during the day.

In Norway, we are currently asking ourselves how we can secure future wealth and welfare. Norway is ranked as one of the richest countries in the world, and also one of the best countries to live in. If we are to maintain that position, we cannot neglect the future of our industries. The government has therefore made wealth creation a main priority.

If we are to succeed, we need to increase our innovation capacity. The Norwegian government has, like the EU, made innovation a main concern.

The vision established by the government is that Norway shall be one of the most innovative countries in the world. Companies and people with entrepreneurial spirits shall have a good chance of success in their efforts at developing profitable enterprises. Also, Norway shall be in the lead internationally within important areas of knowledge and technology.

Innovation is done by individuals, firms and institutions. The role of government is primarily to pave the way for innovation and to remove obstacles. A major challenge is to create a culture that inspires us to do new things, take risks and be excellent in certain areas. Trade and industry, individuals, institutions and government need to embark on this exciting task together.

The EU adopted the Lisbon Strategy in spring 2000, aiming to make the Union the world's most competitive region within 2010. This has been an inspiration for Norway's work on our plan for innovation.

Although Norway has special challenges in some areas, most elements of the EU strategy are relevant in a Norwegian context. As an EEA member, Norway shares the challenge of ensuring that the EU's Internal Market realises its full potential. We also face a number of the same challenges as the EU in adapting to a more knowledge-driven economy. The Norwegian government is therefore actively pursuing many of the policy areas addressed by the Lisbon Strategy.

Globalisation represents both opportunities and challenges. It does, for instance, lead to geographical shifts in activities and division of labour between countries. In Norway, we experienced a drain of labour-intensive production last year. Largely due to the government's effort to improve the general conditions for trade and industry, this trend has been reversed.

For a high-cost country like Norway it will nevertheless be hard to compete with low-cost countries in areas where technology is easily obtainable. We therefore need to develop an innovative



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and research-based industry with high quality products that are able to fetch good prices in international markets, in line with our high costs of production.

This becomes even more important when we consider the expected decrease in growth impulses from our large petroleum sector in the years to come. Furthermore, revenues from petroleum activities are expected to drop at the same time as public expenditures on health care and pensions increase. Old age and disability pensions are for instance expected to increase from 9,2 percent of GDP in 2002 to close to 20 percent in 2050.

Clearly, this increases the importance of adaptation and innovation in our economy.

We are therefore somewhat troubled by the fact that Norwegian companies at present display lower levels of innovation than firms in many other countries in Europe.

I believe Norway has a good chance at succeeding in a global knowledge economy. We have a solid and stable economy. We have made significant investments in research, education and physical infrastructure. We have natural resources with a potential for knowledge led growth, not least in the fishing industry. ICT has been adopted eagerly both by trade and industry as well as the population at large.

The government emphasises the need for an economic policy that produces stable development in production and employment. This includes a tight and responsible fiscal policy that for one thing provides ground for a competitive exchange rate. It furthermore includes the lowering of taxes on investment, capital gains and labour.

This is a necessary, but not a sufficient, condition for future competitiveness in Norwegian trade and industry. Our companies also need to develop long-term competitive advantages based on knowledge and innovation.

Internationally, innovation policy is subject to a great deal of attention these days. Several countries are in the process of establishing broad strategies for innovation and growth, such as the Lisbon Strategy in the EU. Good co-ordination across policy areas is a clear recommendation in many of these processes.

The Norwegian government recently presented its own plan for a more comprehensive innovation policy. Clearly, increasing innovation is a demanding task, which needs dedicated efforts and co-operation by both government, industry and research communities. I would therefore like to stress that the plan is only a first step in a process towards increased innovation levels in Norway. The plan is however a platform from which government, business and researchers together can start on this important mission.

There are five targets in the plan, all of which require good co-ordination across policy areas.

Good and predictable framework conditions for trade and industry includes the cost-side of production and exports, such as wages and exchange rates, but also taxes and legislation. I am told that Thomas Alva Edison had a sign on the wall in his workshop that read: "There are no rules here, we are trying to achieve something!" Clearly, rules should be judged also with regard to how they affect the efficient allocation of resources and innovation.

Norway is a country of long distances. It is as far to travel from Oslo to Hammerfest in Northern Norway, as it is from Oslo to Rome. In order to secure development and innovation in the regions, the government emphasises the important role of physical and electronic infrastructure. Roads and ICT provide for interaction and exchange of goods, services and knowledge, which are important building blocks in innovation. This is a challenge we share with the EU, and which is described in the final report from the European initiative for growth to the European Council - "Investing in networks and knowledge for growth and jobs". The community sees, as Norway does, infrastructure investments as a major source for growth and competitiveness.



Entry of new firms is essential to employment, innovation and wealth creation. The Government has therefore put a strong focus on entrepreneurship. The level of entrepreneurship is in fact fairly high in Norway, with about twenty to twenty-five thousand new entries each year. But only half a percent of these are high-tech firms with export potential. Increasing this number is an important task.

This brings me to the important area of education and research.

Developing skills and competence through education and science in line with the changing requirements of trade and industry is a major challenge. Education is a springboard for research, and the most important source for innovation is research and development. The Government is committed to reaching the OECD average of resources spent on research and development by 2005. The OECD average is currently at 2.2 percent of GDP. For a number of reasons, including our industrial structure, Norway is currently spending only 1.6 percent of GDP on research. The latest estimates do, however, give grounds for optimism in our ability to reach the OECD target.

It is a major challenge to increase private sector spending on research and development. Currently, the firms' share of total spending is at 50%. We are in this respect encouraged by the fact that a tax deduction scheme for research and development expenses has been a huge success. The scheme also stimulates cooperation between Norwegian firms and research institutions both domestic and foreign.

The EU is aiming at increasing investment in R&D to approach 3 % of GDP by 2010, as described in the Communication "Investing in research: an action plan for Europe" adopted by the European Commission on 30th April 2003. I see no reason why Norway should be less ambitious. This adds to our challenge, but also implies new possibilities through our participation in the EU Framework Programme. The programme is geared towards the realisation of an internal market for research and innovation in Europe: The European Research Area. This is an exciting development.

If we are to succeed at improving innovation through research and development, we also need to increase our efforts at commercialising the results stemming from research. The new intellectual property rights act is expected to increase the role of our universities in commercialising research. The act strengthens the stake of the institution to the property rights of an invention, as well as the revenue it generates. We trust that this will increase support for commercialisation within the universities.

In conclusion, I would like to point out that tight fiscal policies are necessary, but not sufficient if we are to increase innovation levels and develop new strengths in Norwegian trade and industry. We also need an active policy to increase innovation levels. Implementation requires interaction and contributions by a number of actors both in the private and public sector.

A new Innovation Panel at ministerial level, led by me as Minister of Trade and Industry, is already established and had its first meeting two days ago. The Government is putting innovation firmly on the political agenda in Norway and will pursue it eagerly in the weeks, months and years to come.

Thank you for your attention.



## *Boosting innovation from research to market – the Swiss Experience*

by

### **Mr. Charles Kleiber, State Secretary for Science and Research, Switzerland**

*Speaker*



Mr Charles Kleiber was born on 9th December 1942 in Moutier in Switzerland. He has a PhD in political science and a diploma in Architecture from the Swiss Federal Institute of Technology in Lausanne. Some of his previous positions were Head of Public Health and Planning Services of the Canton de Vaud, Switzerland, as well as Chief Executive of cantonal teaching hospitals in Lausanne. Some of his more important publications are: *L'organisation du changement*; *Rupture* vol. 4, No. 2 1997, University of Montreal, 1997; *Vers une société fondée sur l'éducation, la science et la culture*, Berne, 1998; *Pour l'Université. Histoire, état des lieux et enjeux*, Berne, 1999.

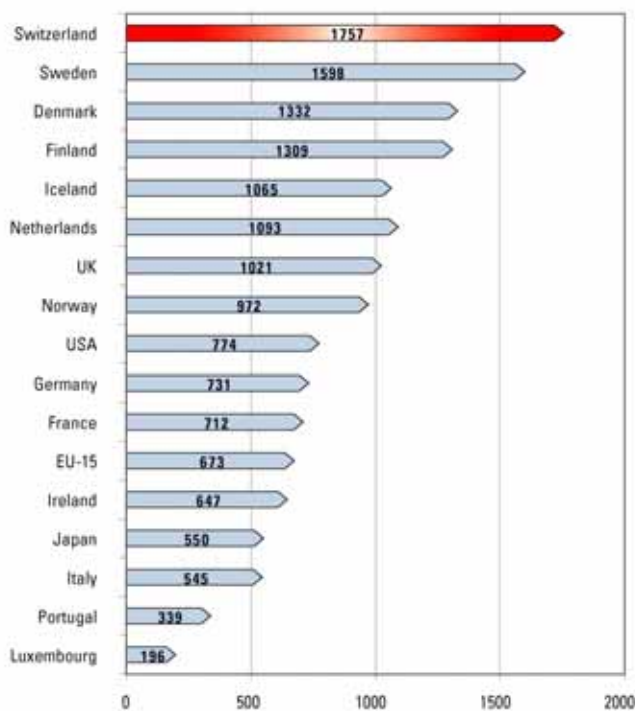
He is now State Secretary for Science and Research.

As one of the dynamic economies in Europe, Switzerland is eager to make a valuable contribution to innovation on the continent. However, not being a member of the EU, Switzerland has an individual approach to innovation policy, which partly reinforces the Lisbon Strategy. The following text will elaborate on two issues:

- *The Swiss situation in innovation policy*
- *A strategy for Switzerland in innovation policy*

#### **1. A glimpse of the Swiss situation in innovation policy**

One of Switzerland's assets is its high scientific productivity. This can be illustrated by the ratio of publications per year and per 1 Million inhabitants. This is currently the highest among OECD countries as the following chart shows:





Other illustrative facts for Switzerland's high performance in the scientific field are:

- Switzerland has the highest number of Nobel Prizes per inhabitant. Among them are Kurt Wüthrich from the ETH Zurich, winner of the Nobel Prize in chemistry for 2002 and Albert Einstein, winner of the Nobel Prize in physics 1921. Altogether, Switzerland won 27 Nobel prizes between 1901 and 2002.
- Three Swiss regions are among the top ten in European research. On the number of scientific papers per capita, the region of Geneva / Lausanne is ranked third in Europe, the Region Basel / Mulhouse / Freiburg fourth, and the Zurich Region sixth.

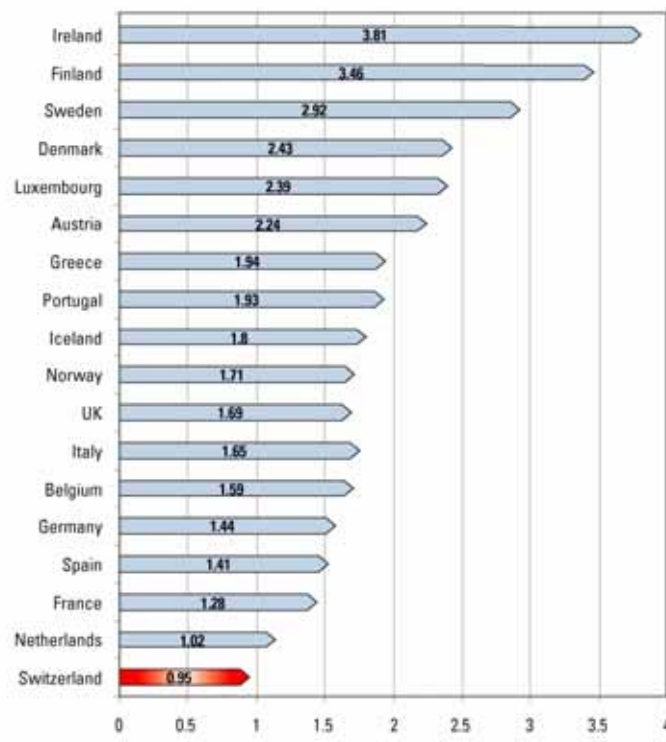
Switzerland owes this strong record mainly to two factors:

*Firstly*, it has a very open research and education system, e.g. 15% of the student body in Swiss tertiary education institutions are foreign students not educated in Switzerland and about 50% of post-graduate students in Switzerland come from abroad. Furthermore, 36% of the teaching staff in Swiss tertiary education institutions come from abroad. Switzerland therefore benefits from a broad international input.

*Secondly*, Switzerland has a modern industrial structure. Switzerland features near the top of the table considering its share of high- and medium-tech industries in its total exports. A remarkable 88% of the companies are microenterprises with a total staff number below 10. Swiss companies carry a good part of the burden of innovation in Switzerland. Approximately 70% of the Swiss R&D investment comes from the private sector.

Astonishingly for some, despite all these excellent features, Switzerland faces some rather worrying developments as well. I will try to outline them in brief:

- Switzerland suffers from a low growth in labour productivity. It finds itself bottom of the table for growth in labour productivity (see chart below):



Growth in labour productivity 1992-2001; (source Wagschal/Ganser/Rentsch, 2002)



As a consequence of the above figures, Switzerland's GNP per capita growth 1990–1999 has been negative. Switzerland's ranking in competitiveness reflects this development. According to the World Economic Forum, its rank went down from 5th to 7th between 2002 and 2003.

But undoubtedly the most problematic factors causing this development are related to business: tax increases, access to financing or an inefficient bureaucracy have been judged a problem by Swiss business circles.

A concern in the field I work in is that, while others like Sweden, USA or Japan have invested heavily in research and development in the past years, in Switzerland there has been a stagnation of resources. Switzerland R&D expenditures are currently at 2,6% of GNP and Switzerland hopes to improve to 2,8 % by 2008.

My quick presentation of the state of Swiss innovation policy therefore comes to the conclusion that Switzerland has good scientific and technological performances. But despite this, the country experiences a severe breakdown in the field of innovation.

## **2. A strategy for Switzerland in innovation policy**

The Swiss federal government has carefully analysed the weaknesses of Switzerland's innovation policy. We have developed a number of principles which underpin the measures to be taken in order to stimulate innovation in Switzerland:

1. To be sustainable, innovation must be simultaneously scientific, technological, cultural, social and political.
2. Innovation is increasingly based on a private/public/civil-society partnership.
3. It is vital to show that science and technology can still be synonymous with progress.
4. Strengthen the co-operation between universities and SMEs.
5. Innovation will be international or will not be at all.
6. Innovation in Switzerland must initially develop within the European framework.
7. There is no braindrain — just brain circulation.

Built on these principles, we have designed a pragmatic innovation strategy. The following measures – still to be further evaluated - should now be taken by a mix of policies launched by several federal offices and under the direct responsibility of the government:

- Rehabilitate work by offering it to all and by eradicating jobs that are dehumanising.
- Create a national forum for training, research and innovation.
- Increase resources: invest in order to reform, reform in order to invest.
- Develop lifelong learning on the basis of new cognitive knowledge.
- Develop employment/training contracts and thus incite pedagogical renewal.
- Set up a global and European strategy.

Furthermore, Switzerland must create coherent clusters oriented towards innovation thanks to new basic conditions. Looking at Switzerland today, there is a competent workforce, a scientific and industrial potential, and a number of autonomous, enterprising universities. But are there enough incentives for innovation? Is there enough public understanding of science? Are there enough offers for lifelong learning?

In Switzerland, there certainly are stability, security and quality of life; There is good governance, transparency and favourable IPR regulations. There is access to capital and sufficient in-



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frastructure. But are there favourable labour laws, fiscal incentives and, above all, is there a shared vision, a common project and political determination? And is there the necessary acceptance of risk?

Obviously, I cannot at this point answer all these questions and conclude with all the answers. Innovation policies must be under constant monitoring and a strategy will never be clear-cut and final. Innovation policy is always 'work in progress'.

What I gave here is an insight into Swiss innovation policy. We want to contribute to boosting European innovation from research to market. It is 'work in progress'.

Instead of a clear-cut conclusion, I therefore want to end with an African fable, which perfectly illustrates the dilemma of innovation policy. Take the conclusions home and apply the measures as you think the fable suggests:

*"Once upon a time there was a village in the heart of Africa. In the centre of this village was a single tree with two branches. These branches were laden with shiny, irresistible, superb fruits, all of them identical. And those who saw them wanted one thing only: to eat them. But nobody touched them because the fruits on one of the two branches were lethally poisoned – and nobody remembered which branch was which.*

*One day during a famine, while the inhabitants were dying of hunger, the bravest man in the village (the chief, of course) dared to eat a fruit. It was not poisonous, and the man did not die and was no longer hungry. So, the villagers ate all the good fruits, but they also cut off the branch that bore the poisonous ones. Upon which the tree died and there were no more fruits."*

I may offer you my personal conclusion as a pointer: As you will have realised, it is only by never cutting off a branch bearing poisonous fruits and by accepting both better and worse that science can achieve progress. It is when it scorns no fruits, even the most poisonous ones, that politics can make our contradictions come alive, organise reconciliation and offer us guidance. It is when each of us has the courage to make a personal commitment and to try and take risks that society truly lives, evolves and adapts.



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## *Innovation: From Vision to Action*

by

### **Professor Dr. Klaus Gretschmann, Director-General, DG C Internal Market - Competitiveness - Industry - Research - Energy - Transport - Information society, General Secretariat of the Council of the European Union**

#### *Speaker*



Before taking up his present responsibilities in 2001, Prof. Dr. Gretschmann served the Federal Chancellor of Germany as ministerial director for economy and finances i.e. the Chancellor's personal representative in the preparation of World Economic Summits (G7/G8 meetings).

Up until 1998, Prof. Gretschmann was teaching Public Finance and International Economics at the University of Cologne, at the European Institute of Public Administration, Maastricht (NL), as well as at the Aachen-based University of Technology (RWTH). He spent longer periods, holding specific research assignments, at the European University in Florence, at the John-Hopkins University (USA) and at the Center for Interdisciplinary Research of the University of Bielefeld in Germany. He has been consultant to numerous international organisations such as IMF, OECD, Worldbank and WIPO (World Intellectual Property Organisation). Prof. Gretschmann has published over 80 academic papers and 7 books.

At the Lisbon Council in 2000, the European Union adopted a far-reaching economic and social strategy to produce a full agenda for the European economy to catch up with the US, in terms of competitiveness, by 2010 at the latest.

This strategy responds positively to globalisation and takes advantage of technological change. It defines a European path to a knowledge-based economy, and restores the prospect of more and better jobs and eco-friendly production and consumption. The approach is based on the conviction that Europe must develop new competitive strength and move to new economic areas in order to cope with global economic trends and safeguard her citizens' living standards.

Focus on knowledge is a key driver for employment, cohesion and international attractiveness. New knowledge creates the benign conditions conducive to effective policy-making. The efficient use and spread of knowledge promotes economic growth and employment. The attractiveness and openness of centres of excellence promote global governance and strategic partnerships. Current European public and private under-investment in research must end. More public support for research and innovation systems is badly needed and policies to this end should be made more effective.

Two days after the Nobel Prize Day the European Council has adopted a Growth Initiative in order to stimulate competitiveness, employment and growth. This initiative contains roughly € 10 billion worth of research- and innovation-related projects. The projects which form part of the initiative are supposed to be carried out in the form of Public-Private Partnerships (bringing the private sector back in).

Among those responsible for the growth initiative and its research components, the Competitiveness Council is the most important player. It represents the Council formation bearing witness to the fact that only an integrated approach, encompassing industrial, research and single market aspects, can make a difference. Officials and authorities with responsibility for the above areas must cooperate closely in order to make innovation and competitiveness happen. The Competitiveness Council is also supposed to be the link between microeconomic and macroeconomic policies.

Preoccupations about Europe's competitiveness are not new: From Jean-Jacques Servat-Schreiber's "Le defi americain" to the Lisbon Strategy the US and Asian challenge has been a



recurring theme. Let us look back for a second: The EU started out as a trade-driven model of regional integration. Trade was the driver; a Custom Union in 1968 the objective.

This was followed by a model of factor-driven integration (free movement of factors of production) - basically the Single Market.

On top of this the EU developed a model of money-driven integration, with a single currency, a European Central Bank and a coherent monetary policy.

Today, we have entered a phase of integration based on innovation as the main driver - innovation-driven integration. This is reflected in the Lisbon economic strategy. The different phases of EU integration correspond to the main elements of economic success in every society: to increase the ability to sell, the ability to attract, the ability to adjust and the ability to learn.

Why are learning, knowledge, innovation and research such decisive factors? Because they determine productivity, growth and employment in a situation of growing global competition. A key factor explaining the recent differences in EU/US productivity performance is the ability to develop, propagate and apply research and innovation.

Europe has been lagging in terms of its investment levels in R&D. According to data compiled by COM, the average gross domestic expenditure on R&D is 1.9 % in the EU, 2.8% in the US and 3.1% in Japan. In particular regarding productivity, the EU is lagging behind the US, even though figures vary: EU reaches 70% productivity in terms of GDP per capita, but 93% in terms of hours worked. Whatever the right figures are, one thing is clear: the US is doing a much better job than the EU as regards the creation, dissemination and utilisation of knowledge. To a large extent this is private sector related: 80% of the productivity gap between US and EU are due to business investment in research. In order to catch up with US by 2010, business research investment has to go up by 10% annually. Moreover the Europeans have been too slow to adjust their business models to make best use of innovations and new technologies (business process redesign).

The quality of research investments is as important as their volume. Europe must strive to invest more in higher education and research, to direct more of its research in terms of agreed strategic goals, to address the structural weaknesses in the European Research Area, to increase the numbers of quality researchers, and to improve the environment in which researchers work. European research needs to foster its scale and excellence and strengthen bridges with the industry sector so as to optimise focus and relevance.

What has to be done and what's in the pipeline?

We must get the regulatory framework right and lower the administrative burden for enterprises in order to stimulate research and innovation ('wake up call for sleeping innovators'!).

- R&D and technology transfer are essential for long-term economic growth, while recognising that they must be accompanied by measures to facilitate the successful exploitation of results, such as prototyping, testing and adaptation, engineering, reengineering and demonstration.
- We have to put the money where the talent is: access to finance is a prerequisite for stimulating innovation. Venture capital markets have to be developed and the Research Investment and Action Plan, with the aim of approaching 3 % of GDP in 2010 as regards overall R&D spending, must be vigorously pursued.
- The use of structural funds in support of regional research and innovation and growth poles may be considered. This is justified by the public benefits of research.
- More money begs for more manpower! In order to use financial investment efficiently we lack some hundred thousand researchers and engineers in the EU!



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- We will promote innovation also in the public sector and promote leading edge and frontier technologies of a strategic nature as drivers (defence capabilities agency, space technology etc.)

We do need a more balanced equilibrium between applied and fundamental research. The old differentiation according to which basic research should be the responsibility of the Member States (subsidiarity) and applied research should be in the competence of the EU (Common Market relevance) no longer holds. Rather, today the general value of growing knowledge and its basic source, vis-à-vis basic research, make its promotion at the European level indispensable. We will witness new suggestions and initiatives to strengthen basic research in the months to come.

Innovation should be addressed in its broadest sense (not just technology take-up) and closely linked to industrial policy. Actions would include: investment in infrastructure and networks (Quick Start); strengthening bridges between universities, business and industry; improving the regulatory framework and reducing the administrative burden on enterprises, in particular SMEs; facilitating innovative start-ups and access of SMEs to R&D funding (inter alia EIB leverage mechanisms); establishing technology platforms; promotion of recruitment and mobility of researchers (including mutual recognition of qualifications); increased investment in fundamental research as the longer-term base of the knowledge society (ERC); and (possibly) a new Innovation and Industry Action Plan.

Either Europe succeeds in managing change and giving innovation new momentum, or it is bound to fall back in international competition. But I trust we can deliver if the political will is there. If not, we are about to steal our own future!



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*Boosting innovation from research to market by*

## **Mr. Mats Hellström, County-Governor of Stockholm**

### *Speaker*



Mr. Mats Hellström was born on 12th January 1942 in Stockholm. A graduate from the University of Stockholm in 1965, he has taught economics in the same university.

Between 1969 and 1996, he was a member of the Executive Board of the Swedish Social Democratic Party, of the Standing Committee on Foreign Affairs, of Parliament and also of the Swedish United Nations Delegation.

Mr. Mats Hellström was in charge of the Ministry with different mandates. He has been Minister for Foreign Trade in the Swedish Cabinet from 1983 to 1986, Minister for Agriculture, with responsibility for Nordic Co-operation, from 1986 to 1991, and finally Minister for Foreign Trade, European Union Affairs and Nordic Co-operation from 1994 to 1996.

In 1996, he was appointed as the Swedish Ambassador to Germany. Since 2002, Mr. Mats Hellström has been County-Governor of Stockholm.

I am happy to relate that an EU benchmarking study has characterised the Stockholm region as the number one innovative force in Europe. Why is this? We are also happy to note that Newsweek recently rated Sweden seventh in the world in terms of influence, second only to the USA in technology and third in competitiveness. Again, how come? Sweden, situated in Northern Europe, has a population of 9 million.

In giving you these figures, it is not my intention to brag about our position, but rather to fuel the discussion of how to keep and develop such positions for the future, in a race that we all know to be highly competitive and global.

In my view, one of the ingredients of Stockholm's and Sweden's success is openness to structural change. But in Europe today we see a general tendency for our economic development to be hampered by a kind of residual protectionism. Messerlin's study reveals different forms of protectionism within the EU – agriculture, trade policies, quotas, anti-dumping measures – which between them cost 6 or 7 % of the EU's GDP. Without protection we could have far stronger economic growth and could take up the US challenge accepted in our Lisbon Agenda.

Now to some of our considerations. Firstly, being number one per capita in benchmarking studies isn't enough. You also need access to a big market, and it is no coincidence that Sweden has one of the more fundamentalist approaches to an efficient Single Market in the EU, with no trade barriers. Access to the Single Market is especially important to small companies.

Secondly, we are trying to make the most of our new position, and Stockholm's central location, in the Baltic Sea region, with the new democracies and new EU members in the East. The Baltic Sea is about to become not so much a sea, as a lake within the EU. We are looking at a home market with a hundred million consumers. This calls for infrastructure around the Baltic Sea, and not just from north to south.

Innovation has a vital bearing today on success in the economic arena. With innovation we can gain productivity and the possibility of maintaining our competitive edge. And so we find ourselves facing the same problems as others – developing scientific achievements and patents into commercially viable products, “boosting innovation from research to market”.

Stockholm's strength lies in ICT, biotech, pharmaceuticals, media, finance and sophisticated logistics, among other things. Like many other regions, we work in this field with incubators, to aid the formation of new companies based on research results, and with venture capital, seed capital and pre-seed capital. As we all know, much of that capital has dried up in Europe (and to some extent in the USA), owing to the recession. But I am happy to report that venture capital is now returning to Stockholm.



In the recent worldwide telecom crisis, we have found in Stockholm that ICT has been unduly technology-driven, especially in the mobile sector. We are now trying to approach it from the demand side, focusing on user-friendly technologies, the consumer interest and public procurement. There is great scope for ICT applications in health services and care of the elderly, and in such diverse areas as policing, security, fire services - not forgetting service-friendly bureaucrats or “e-government”.

Prospects are made all the better by an estimated two-thirds of Sweden’s population now being Internet users.

In biosciences, the co-operation formed between Stockholm and Uppsala represents the strongest axis of its kind in northern Europe. We are working to form a creative Bioregion internally so that scientists can learn from each other, move about and meet one another, and to project this externally in order to attract foreign scientists and investments. We are in good position to achieve this, Sweden being the fourth largest country in Europe in terms of the absolute number of biotech firms. Sixty per cent of Swedish research and production is located in the Stockholm-Uppsala region.

What I think is perhaps even more important, though, is that we are discussing hi-tech less and less on a sector-by-sector basis. Instead, we are thinking all the time in terms of cross-fertilisation, of co-operation as opposed to territoriality and the staking of sectoral claims. And so we have chains of development, with biotech, ICT and genetics linking up with language research, mathematics with more engineering-oriented disciplines, such as nanotechnologies. Medicine, too, is among the beneficiaries, and there are cultural links as well, for example with design.

All this can be demonstrated with the endowment at the Royal Institute of Technology (KTH) of four new professorships in something called biophysics, and by the contract which NASA recently awarded to a young Stockholm designer-artist for the development of spaceship interiors.

This openness is important for scientific development, but also for commercial prosperity. The Stockholm region has the biggest share of foreign direct investments in Swedish industry, and the rapid growth of foreign ownership has generated an influx of new ideas and dynamism in our region.

Finally, the development of co-operation with other hi-tech regions in Europe is just as important as openness between sectors for genuinely strengthening our competitive and scientific future. We are happy to have received EU funding through the Innovative Regions programme, which itself forms part of an EU effort to make Europe more competitive. Needless to say, we want to join with other European hi-tech regions in creating a critical mass, and we want to learn from others in the globally intensive race that we are all taking part in.



## 4. Future Perspectives for Innovation



*Introduction by*

### **H.E. Ambassador Bjørn T. Grydeland, Mission of Norway to the European Union, Brussels**

*Chairman*



Mr. Bjørn T. Grydeland was born on 30th May 1949 in Molde, Norway. From 1977 to 1978 he studied administrative development and rationalisation of public administration at the Directorate of Public Management. He received a Cand.polit. degree in political science, history and public law in 1979 at the University of Oslo. In 1996 he finished the Senior Course 88 at the NATO Defence College, Rome.

In 1977, Mr. Bjørn T. Grydeland started his career in the Norwegian Public Service as a Junior Executive Officer at the Directorate of Organisation and Management. During the years 1981-1987 he worked in the Norwegian Ministry of Finance and held the functions of Project and Planning Officer, Senior Executive Officer, Head of Division and Assistant Director General. He joined the Office of the Prime Minister in 1987 as Deputy Director General. From 1988 until 1992 Mr. Bjørn T. Grydeland was Director General and from 1992-2001 he was Secretary General at the Office of the Prime Minister. In 1998, he was awarded the decoration of Commdr., Royal Order of St. Olav, Norway.

Since November 2001 Mr. Bjørn T. Grydeland has been Ambassador at the Mission of Norway to the European Union, Brussels.

On the Nobel Prize day, we had the unique opportunity to listen to different approaches to innovation policies and practice. In the plenary and parallel sessions we heard high level representatives from Switzerland, Norway, Sweden, California and European Institutions present a showcase of innovation strategies and cases. To facilitate innovation also in innovation policies, to learn from each other and to build partnerships, we need to create meeting places and take the time to talk and interact. This was also our aim for the event, which I am happy to say we achieved.

But also more specific conclusions and ‘take home lessons’ could be drawn from the speeches and the discussions. These are summed up by State Secretary Bjørn Haugstad.

Mr. Heikki Salmi, Head of Commissioner Liikanens Cabinet, gave the concluding speech. On top of the learning process we experienced through the entire event, he drew up the perspectives for innovation and growth in Europe.



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One future milestone will be the Action Plan on Innovation to be issued by the Commission in the first part of 2004. Another milestone will be the report on the implementation of the 3% investment target for research, to be published by the end of 2004.

These are two major future events, which will take further the spirit of 'Boosting Innovation from Research to Market'.



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***Key success factors and take home messages for promoting innovation from science, an impressionistic summary of a seminar by***

**Mr. Bjørn Haugstad, State Secretary, Ministry of Education and Research, Norway**

***Speaker***



Mr. Bjørn Haugstad was born on 22nd January 1969 in Oslo, Norway. He received a Masters in Engineering in Industrial Economics and Industrial Management in 1998 at the Norwegian University of Science and Technology. In 2000 he started as a PhD student in strategic decision-making within knowledge-intensive services at the University of Oxford, UK.

Between 1987 and 1990 Mr. Bjørn Haugstad was a Member, Vice Chairman and Chairman of the central board of Norwegian Junior College Students' Union. In 1988 he was Board member of The State Education Loan Fund for one year. From 1993 to 1996 he was Chairman of the board of TAPIR as an Academic Publisher. Between 1994 and 1996, Mr. Bjørn Haugstad was Secretary-General of the Norwegian Young Conservatives. During the years 1996-1998 he worked as a researcher at Delphi Consulting A/S and was Deputy member of the Oslo City Council. From 1998 until today he has been working as a researcher dealing with Industrial Management at SINTEF, The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology. In 1999 he became Member of the

Trondheim City Council.

Since October 2001 Mr. Bjørn Haugstad has been State Secretary at the Norwegian Ministry of Education and Research.

Listening to the hardcore proponents, innovation seems like panacea of many of the pressing challenges we face globally, nationally and regionally: Innovation spurs economic growth, enhances welfare through, for instance, health care and new remedies for diseases; And it promotes sustainable development through more energy-efficient production.

The interesting thing is that the promises seem to hold when exposed to critical scrutiny. Innovation is certainly not a sufficient condition for a better and fairer world, but it is definitely a necessary condition. However, the benefits of innovation are not necessarily spread “fairly”, so we also have to deal with the distribution task, among nations and within nations.

I was endowed with the rewarding task of providing a ten-minute on-the-spot summary of a whole-day seminar on research and science as a driver for innovation, with four parallel sessions. Such an exercise is bound to be somewhat impressionistic, and cannot have any ambition of doing justice to the many interesting and valuable contributions made. For the same reason, none of the speakers are referred to in this summary, as the interested reader is much better advised to read their contributions for themselves. Anyhow, it seems to me as if the exercise is ideally suited for crystallising a few important messages that were either repeatedly put forward by the speakers or by participants, or that were presented with extraordinary conviction.

I was able to identify ten key success factors of ‘boosting innovation from research to market’, and have also taken the liberty to suggest five “take home messages”. Others may of course have chosen otherwise, but I do not think the chosen ones are too ill-conceived.

It is also my impression that these points are well in line with much of the literature in the field. The overall message from the seminar may then be formulated as: “We basically know what to do. The challenge is to pull ourselves together and do it.”

That may prove to be the real differentiator between successful and unsuccessful regions in the so-called knowledge-based economy.

**THE PRIMACY OF TOP QUALITY SCIENCE:** Research-based innovation depends upon a science base of the highest quality. Mediocre science is of little value, be it basic or applied-oriented. However, high quality science is a necessary, but not a sufficient condition.

**THE NECESSITY OF AN EFFECTIVE INNOVATION SYSTEM:** Successful innovation depends upon more than science and technology; it also depends upon the innovating system as a whole and



how the different parts of the system actually fit and work together. We need innovative innovation policies and practices. The innovation economy is very much a learning economy, and we need to learn from each others' successes and failures. We must realise that we are not in a zero-sum game. Knowledge must be shared to create value. This is valid also at macro level. At the same time we must avoid copying each other: it is unlikely that the same policy-mix will do in countries as different as Switzerland and Norway, even if the generic instruments in the tool-box are much the same. The subsequent political, economical and sociological factors may in this respect be important.

**REMOVAL OF RED TAPE AND BUREAUCRACY:** Not hampering innovation is as important as stimulating it. It is well known that red tape is a real impediment both for entrepreneurs and for scientists. Such impediments may also result from too much policy: We must balance top-down policies and priorities with frameworks that create space for bottom-up initiatives and support innovation at grass roots level. The dilemma between the need to prioritise limited resources on the one hand, and the highly uncertain venture of picking winners on the other hand, must be addressed, as the track record for political picking of winners is very bad indeed. I was able to identify ten key success factors of 'boosting innovation from research to market', and have also taken the liberty to suggest five take home messages, which in this text are merged with the success factors.

**CHANCE FAVOURS THE PREPARED MIND:** Openness is generally benign to innovation, to new ideas, to structural change, to new ways of doing things, to people that challenge the traditional norms. As any viable definition of innovation will show, this is an almost self-evident condition, but too often forgotten.

**PATIENCE AND ACCEPTANCE OF UNCERTAINTY:** Science and research is a highly uncertain venture, and too much impatience may destroy the opportunities of serendipity - the unexpected outcomes that often prove to be the most valuable.

**CAPACITY IS KEY:** Europe lacks S&T personnel in general and we also lack researchers in industry. This is both a question of supply and of demand: industry must provide tempting career opportunities in order to recruit the best and the brightest for science.

**COMPETENT INNOVATION DEPENDS UPON COMPETENT CAPITAL:** Competent capital has been mentioned by many, be it seed money, pre-seed money or venture capital. Entrepreneurial scientists are often novices when it comes to marketing, building a production line, managing a cash-flow, and other activities important to turn invention into innovation.

**PUBLIC AND POLITICAL AWARENESS:** With the Barcelona target of 3 % investment rate, R&D is generally recognised as important. However, neither politicians in general nor their electorates seem to see investment in R&D as urgent. Currently, few governments win or lose general elections on their innovation policy.

**CULTIVATION OF A CULTURE THAT AMALGAMATES SCIENCE AND ENTREPRENEURSHIP:** Too often top notch science and an entrepreneurial spirit are seen as opposites, rather than complementaries. There is an obvious possibility of Pygmalion effect in this, positive as well as negative. It is important to facilitate and support strong and lasting partnerships between private companies, research, universities, and the public sector to reinforce innovation. We need more and better instruments for supporting regional innovation, and in particular innovation with an urban focus, in addition to the decentralised focus. Perhaps some old and dear sacred cows must be slaughtered in this endeavour.

**ENTREPRENEURSHIP SUFFERS HIGH OPPORTUNITY COST:** The last point is not really a success factor, but something we have to cope with. Entrepreneurship in Europe generally faces high opportunity costs, and limited potential of really paying them off. This may be the flip side of the solid and safe welfare state systems that are so dear to us in Europe.



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*Perspectives for Innovation and Growth in Europe*  
by

**Mr. Heikki Salmi, Head of Commissioner Liikanen's Cabinet,  
Enterprise and Information Society, European Commission**

*Speaker*



Mr Heikki Salmi has studied Economics and Statistics and has a Masters of Social Sciences from the University of Helsinki. Between 1970 and 1996, he worked for Statistics Finland, three years as director. Between 1996-2002, he was Head of Unit, Technical co-operation with a PHARE and TACIS countries and enlargement issues, in EUROSTAT.

Since 2002 he has been Head of Cabinet of Mr Erkki LIIKANEN, Commissioner for Enterprise Policy and Information Society at the European Commission.

‘Boosting Innovation from Research to Market’ is an important topic and one which is part of our main stream policy priorities.

The organisers of the conference - California, Norway, the Stockholm Region and Switzerland - constitute a powerful mix of global innovation leaders from which we can all learn a great deal. The policy objective of ensuring and facilitating more innovation in Europe is one of the key building blocks for us to achieve a more competitive Europe under the so-called Lisbon Strategy.

**Innovation and Entrepreneurship**

Indeed, we need a more innovative, entrepreneurial Europe. Innovations emerge where the market offers incentives to introduce new products and production methods, and where people are willing to take risks and experiment with new ideas.

An entrepreneurial culture favours innovations. While some countries have a very strong entrepreneurial tradition – and California is a prime example of that - the EU in general could do better in terms of entrepreneurship.

Earlier this year, the European Commission issued a Green Paper on entrepreneurship. The aim of the Green Paper was to initiate a wider public discussion on barriers to entrepreneurship, whether psychological, regulatory, fiscal, financial or other. In particular, we need to create a more positive perception of entrepreneurial initiative and risk-taking. We need to address means to remove the stigma of failure in Europe. Entrepreneurship is a mindset, fuelled by a desire to succeed. But failure is a natural occurrence which should not be feared, but rather regarded as a useful element in a learning curve.

Here we can learn from the United States – and notably Silicon Valley – where you are not considered a real player unless you have failed a couple of times. In Europe, a failed entrepreneur rarely gets the opportunity to get a second chance due to our very strict bankruptcy laws.

We are currently working on an Action Plan on entrepreneurship that will be presented in early January. This will provide us with a focused set of action points which we hope will help release the entrepreneurial potential to spark more innovation. This Action Plan will also be part of the discussion at next year’s EU Spring Summit.

And now a few words on innovation.

The EU’s general capacity for innovation and its innovation performance remain relatively low compared to our global competitors. We are still not good enough at coming up with new industrial and business processes, new products and services, and at exploiting them to give us the edge over the international competition. The fact that European businesses spend less on R&D



than their counterparts in the United States or Japan is undoubtedly one of the factors behind our weaker innovation performance.

In April this year, the Commission adopted its Action Plan aimed at increasing investment in R&D, from the current level of near 2% of GDP to approach 3% by 2010. The positive result that such a policy may generate is obvious from the situation in the Nordic Countries. Sweden and Finland are EU countries whose public research spending is above three percent.

We recently presented two publications on Europe's position in research and innovation. The 'Key figures 2003-2004 for science, technology and innovation', and the 'Brain drain study - Emigration flows for qualified scientists'. These reports reveal a bleak picture.

The growth rate of investment in the knowledge-based economy is declining; the R&D investment gap between the EU and the US is increasing in favour of the US; and a "brain drain" is appearing and is on the rise.

Clearly, we need to make additional efforts to keep the EU on track in its process of reaching the overall Lisbon target. We need to work towards ensuring the attractiveness of the European Research Area (ERA) for researchers. Europe is still attracting too little research on a global scale compared to the United States and recent figures even show that Europe is experiencing a net 'brain drain'.

According to our analysis, about 75% of EU-born US doctorate recipients who graduated between 1991 and 2000 have no specific plans to return to the EU, and more and more are choosing to stay in the US. The most important reasons keeping EU-born scientists and engineers abroad relate to the quality of work, better prospects and projects, and easier access to leading technologies, which were most often cited as reasons behind plans to work abroad.

There is also a deterioration of Europe's scientific and technological performance as measured by publications and patents. An agreement on a Community Patent would help reverse this trend.

### **The Innovation Scoreboard 2003**

We also recently published our annual analysis of the state of play of European innovation, entitled the Innovation Scoreboard 2003. This report also predicts that, at the present rate of progress, we will have difficulties in catching up with our main competitors – notably the United States - by 2010.

But there are also signs of encouragement.

First, regarding ICT expenditures, Europe is catching up and the EU/US gap has been halved since 1996. Now European companies should accelerate and deepen organisational innovation in order to reap the benefits of ICT investment. An increasing body of economic literature confirms the important role of ICT in explaining productivity growth. More recent studies have also revealed that the successful adoption of ICT requires simultaneous organisational reforms and investments in skills.

This is an important issue where we need to work hard to generate real results. The recent data regarding broadband penetration in Europe (100 percent growth since last year and 4 Member States above US penetration rates) is a good indicator that things are moving in the right direction in this area.

Second, we are getting more and more science and technology graduates. Here, the EU now leads over the US, even if there are signs that this lead might come under threat. Third, regarding high-tech manufacturing value-added, we are now slowly catching up with the US. Fourth, regarding R&D investment, the business investment in R&D shows some signs of recovery but a new gap with the US has appeared in public investment since 2001.



Finally, on the accession countries, the report shows that they are catching up with the current Member States. For example, Slovenia, the Czech Republic, and Hungary rank higher than the EU average for high tech manufacturing employment. And the share of innovative SMEs in Estonia is higher than the EU average.

The innovation leaders among the Member States perform equally well or even better than the US. Out of the 33 countries analysed in the scoreboard, Sweden and Finland are as innovative as the US and Japan, and Norway and Switzerland are also performing well. Innovation excellence tends to concentrate in certain regions. Highly innovative regions in Sweden – notably the Stockholm Region - are among the best innovation performers in Europe.

This Scoreboard is very interesting reading and contains much food for thought. It is available on our web-site. [see [www.trendchart.org](http://www.trendchart.org)]

In addition, early next year, we intend to issue an Innovation Action Plan to analyse how European innovation may be further strengthened. Indeed, innovation policy is multidimensional and has to be implemented through many different traditional policy areas. This requires a coherent strategy and co-ordination amongst several government players – the EU, the Member States and the Regions.

### **Regulatory framework**

This also raises the issue of the regulatory environment needed to boost innovation. Regulation is an important tool to promote societal goals, such as social justice, health and safety, environmental protection and fair competition. However, regulation also has a cost and can affect the ability of enterprises to compete, to innovate, to grow and to create jobs.

Cumbersome administrative procedures often add to the regulatory burden and divert companies' efforts away from what they are supposed to do: provide goods and services to society in an efficient way. The regulatory burden on small businesses is often disproportionate.

Regulatory action should be taken only when strictly necessary, and at the smallest possible cost to enterprises and society as a whole. We are still far from the goal of a high quality regulatory environment for European enterprises. In our regular contacts with the business community we still get reports on overly complex and burdensome rules. Consequently, the Commission has come forward with a number of initiatives to improve the regulatory framework.

First, the Commission has introduced a new Impact Assessment procedure this year. It involves more in-depth “extended” impact assessments of major initiatives in the future.

The impact assessment process should help us ensure that the Commission's proposals are of high quality and that decisions are based on the best possible knowledge of all relevant impacts, in full awareness of potential trade-offs between competing objectives.

Secondly, the Commission has established a new set of general principles and minimum standards for consultation. Our consultations are widely publicised, including through the Commission's new "single access point" on our web-site.



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### **Concluding remarks**

Our work to boost innovation is done over many fronts and mainly geared to enhance the competitiveness of European enterprises. We need to analyse the key factors which affect competitiveness, encourage innovation and entrepreneurship, and create a business-friendly regulatory framework.

This work has to be carried out not only at the European level, but in the Member States as well. Our stakeholders, including the regions and the business community, must be involved in the shaping of policies.