"Europe's Search for Excellence in Basic Research"

Symposium

February 16 & February 17, 2004, Dublin Castle

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An Roinn Fiontar, Trádála agus Fostaíochta
Department of Enterprise, Trade and Employment

Forfás

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Foreword by Ms. Mary Harney, T.D.

Tánaiste and Minister for Enterprise, Trade and Employment

I am pleased to present this Consensus from the Dublin Castle Symposium on Excellence in Basic Research and hope that it will provide greater clarity on the issues facing Europe to-day in enhancing its approach to basic research.

This Symposium hosted by the Irish Presidency and the European Commision, convened a unique gathering of representatives from the highest levels of Member States, Acceding States and Associated Countries, senior industrialists, leading academics, representatives of national funding organisations and other representative bodies in order to achieve this Consensus. The two day Symposium provided the opportunity to share experiences and approaches in our respective countries and bring to the fore new approaches or initiatives for dealing with the issues at European level.

Europe's capability in basic research has been widely debated in recent times. An important contribution to this debate was the publication of the Commission's Communication "Europe and Basic Research" in January 2004.

I welcome these contributions; however, we must now ensure that significant progress is made at the European level.

The Consensus was subsequently brought to the attention of the Competitiveness Council in March 2004 where Council conclusions were adopted on Basic Research. These Council conclusions recognised that there is a clear challenge for Europe to enhance its levels of creativity and excellence in basic research and acknowledged the need for a European initiative to promote excellence in this area. In this regard, they represented an important contribution to the Commission's June 2004 communication on "the future of EU Policy to support research".

Europe has within its grasp the opportunity to lead the world in research and to become the most attractive location for researchers to do excellent research for industry to perform to the highest quality and to have access to the best people.

I am confident that the Consensus reached in Dublin will make a valuable contribution to the debate, over the coming year, on the means of strengthening Europe's performance in basic research.

Mary Harney, T.D.,
Tánaiste and Minister for Enterprise, Trade and Employment

"Europe's Search for Excellence in Basic Research"

Symposium, Dublin Castle, February 16 and 17, 2004

Preface

The EU Heads of State at Lisbon agreed the objective for Europe to "…become the most competitive, knowledge based economy in the world by 2010". The development of the European Research Area was agreed as a key pillar for achieving this objective.

The importance of investment in basic research and scholarship was recognised and reinforced at the Competitiveness Council in September 2003, where it adopted a resolution on "Investing in Research for European Growth and Competitiveness". This resolution recognises that basic research and scholarship are crucial for the sustainable development and competitiveness of the knowledge based society. It is also crucial for the training of researchers.

In addition, the Council requested the European Commission to bring forward a Communication covering the entire issue of basic research and the role of the European Union in this area. In response, the European Commission published its Communication 'Europe and Basic Research' on January 14, 2004.

In order to progress the debate on European performance in basic research in Europe, the Irish Presidency Symposium sought to bring clarity to the issues and identify areas of consensus. The Symposium, hosted by the Irish Presidency and the European Commission, was aimed at identifying areas of possible consensus at European level.

The Tánaiste and Minister for Enterprise, Trade and Employment, Ms. Mary Harney T.D., invited a unique gathering of Ministers for Research and senior Ministerial Representatives from 27 EU Member, Acceding and Associated States, high level representatives from industry, national research funding organisations and academia.

Concensus

The Symposium agreed that there is a clear challenge for Europe to enhance the levels of creativity and excellence in basic research in the context of global competition.

There is a need to create a more attractive basic research environment, supported by high quality education, appropriate research funding, research infrastructure and science-innovation links, where excellent researchers are recognised and can excel, thereby, strengthening Europe's performance in basic research. Europe should be open to the experience of other parts of the World.

It was agreed that industry needs excellent research, and excellent people, across the full spectrum of research activity, including implementation of the knowledge generated through basic research, as a basis for competitiveness.

It was agreed that there is a need to enhance the excellence of European research through the partnership of national initiatives. However, it was also agreed that national initiatives, on their own, would not be sufficient and, therefore, a European initiative is required. The objectives of this European initiative would be to promote excellence in basic research by promoting international competition among individual research teams. The sole selection criterion should be excellence, identified by international peer review.

It was also agreed that there is a need to provide specific funding for basic research of high quality in the next Framework Programme (7th), while maintaining an appropriate balance with other priorities and activities in the research area.

In this context, the Symposium welcomed the Commission's proposals for significant increase in EU research funding, including for basic research.

It was agreed that the Commission should bring forward to the Competitiveness Council proposals for the governance, management and accountability of a European initiative. This initiative, which must have the complete trust and confidence of the scientific community, should involve a new facility characterised by minimum bureaucracy, involve the scientific and engineering communities, both enterprise and academia, in its strategy and overall management. It should award individual grants on a competitive basis.

The Symposium stressed the importance of reinforcing support for basic research in the context of developing the European Research Area. Europe's policy should be vision-oriented as it moves to regain its dominant research position. Basic research should be established as a strong pillar of the ERA.

Background to the Symposium

A seminal international meeting on the topic of basic research in Europe was organised by the Swedish Committee for a New European Research Policy (CNERP) in April 2002. Discussions gained momentum during the Danish Presidency of the European Union, when the Danish Research Councils organised a conference in Copenhagen, in October, of that year, entitled 'Towards the European Research Area: Do We Need a European Research Council?' The conference concluded that there was a need to promote the excellence and visibility of European basic research. This issue was considered by the Competitiveness Council in November 2002, but did not achieve political consensus.

France, at the Competitiveness Council in September 2003, requested the European Commission to bring forward a Communication covering the entire issue of basic research and the role of the European Union in this area. In response, the European Commission announced a two-stage approach comprising:

- *a first Communication with the objectives of making a broad analysis of the basic research situation in Europe, prompting clarification about various points raised during the debate and putting forward suggestions for avenues which should be explored to strengthen European performance ('Europe and Basic Research' published on the January 14, 2004); and*

- *a second Communication, to be published in the second quarter of 2004, setting out proposals for the operational translation of the conclusions of the debate on basic research.*

In the past two years, the momentum of discussion has been maintained in research policy circles as various positions have been developed by key stakeholders. Bodies such as the All European Academies (ALLEA), the European Science Foundation (ESF), Euroscience, (a European Association for the Promotion of Science and Technology), the European Union Research Organisations Heads of Research Councils (EUROHORCs), the European Research Council Expert Group (ERCEG), set up by the Danish Minister for Science, Technology, and Innovation and chaired by Professor Federico Mayor, the EIROforum (a collaboration between the European inter-governmental scientific research organisations responsible for research infrastructures and laboratories) and the European Life Sciences Forum (ELSF), have all published views on the need for a new initiative at European level to promote excellence in, and funding of, basic research.

Some of the issues raised during these discussions include:

- *a perceived gap between Europe and its competitors (and this has also been challenged);*
- *the need to improve the environment for researchers;*
- *the perceived brain-drain of the best scientists to the United States;*
- *the respective roles of national governments and the European Community in funding of basic research;*
- *the role of inter-governmental research organisations;*
- *support for European research infrastructure;*
- *the extent of basic research funding in the Framework Programme;*
- *bureaucracy associated with the Framework Programme;*
- *the need for selection criteria based on research excellence;*
- *the need to facilitate competition between individual scientists at a European level;*
- *the benefits of introducing support mechanisms in keeping with basic research i.e. individual grants to researchers;*
- *governance of initiatives by scientists;*
- *the need for new money for basic research;*
- *a need for a new initiative at European level, e.g. a European Research Council.*

In October 2003, forty five Nobel Laureates sent an open letter to Commissioner Busquin calling for the establishment of a European Research Council "…in a bid to fully develop European competitiveness, through a true 'European-added value' promoting excellence".

Many of the statements and comments by organisations to date relate to the mechanisms and structures associated with basic research at European level. In recent months, the requirement to clearly define the need has become more apparent. The debate has a particular relevance as it comes at a time when initial concepts for the Seventh Framework Programme (2007-2010) and new Financial Perspectives for the European Union are being considered.

This Symposium, hosted by the Irish European Union Presidency and the European Commission, was aimed at identifying areas of possible consensus at European level.

Key Questions of the Symposium

As an aid to identifying areas of consensus, the following four questions were put to the Symposium:

Question 1

Is there a consensus at the Symposium that there is a significant gap in excellence in basic research developing between Europe, the US and elsewhere?

Is the level of excellence in research in Europe declining while the level of excellence in research in the US, Japan and other regions is increasing? Is Europe a less attractive location for world-class researchers? What are the principal causes of the gaps in research excellence? Is it due, for example, to lack of competition in Europe?

Question 2

On the basis that a gap exists, is it of a scale that is critically impacting on enterprise development and European competitiveness?

Is Europe an increasingly less attractive place for industry to carry out leading-edge research? What are industry's requirements in terms of research excellence in Europe? Is the shortage of excellent researchers a potential danger for Europe?

Question 3

What should the vision for Europe be in relation to basic research for 2015?

Question 4

Is there a need for a new initiative at European level?

Is the gap in research excellence an issue that can be resolved at national level? Is there a need for a new initiative at European level and what should the objectives, scope and scale of a European initiative be?

The core of the discussion was centred on the four key questions. Three keynote speakers addressed these questions: Prof. Sir Tim Hunt, Prof. Jerzy Langer and Prof. Peter Nijkamp. The Symposium Participants were divided into three groups, consisting of individuals from academia, industry, funding agencies and national science policy making organisations. Each group discussed the four questions and the summary was presented at a plenary session. Keynote addresses were also made by Ministers present, by Commissioner Phillippe Busquin, EU Commissioner for Research and Mr. Achilleas Mitsos, Director General for Science, Research and Development. This discussion was the basis for the consensus achieved at the Symposium.

Attendance List

Austria

BONN, Prof. Dr. Gunther
University of Innsbruck
Deputy Chairman
Austrian Council for
Research & Technology
Development

HEIN, Mr. Wolfgang
Ministry for Transport
Innovation & Technology

WEITGRUBER, Ms. Barbara
Bundesministerium für Bildung,
Wissenschaft und Kultur

WICK, Prof. Dr. Georg
President of the Austrian Science
Fund

Belgium

GENTGES, Minister Bernd,
Minister for Education, Training,
Culture and Tourism

BERWART, Mr. Jacques
Personal Staff
Minister for Education and Training
Culture and Tourism

BONIVER, Prof. Jacques
Fonds National de la Recherche
Scientifique

de DUVE, Dr. Christian
Nobel Laureate and President
International Institute of Cellular and
Molecular Pathology

VANHELLEMONT, Mr. Jan
Technology and Innovation Division,
Ministry of Flanders

Cyprus

LILLIKAS, Minister Yiorgos
Minister for Commerce, Industry and
Tourism

ZAVROS, Mr. Spyros
Industrial Extension Officer
Ministry for Commerce, Industry and
Tourism

Czech Republic

KRENEK, Mr. Peter
Director of Department of
R&D Co-operation
Ministry of Education,
Youth and Sports

Denmark

DIDERICHSEN, Prof. Dr. Boerge
Vice President
Novo Nordisk A/S and President of
European Federation of
Biotechnology

BESENBACKER, Prof. Dr. Scient.
Flemming
Institut for Fysik og Astronomi
Aarhus Universitet

LARSEN, Dr. Knud
Asst. Permanent Secretary
Ministry of Science,
Technology and Innovation

ROSTRUP-NIELSEN, Dr. Jens
Director R&D
Haldor Topsoe A/S

Estonia

ENGELBRECHT, Prof. Juri
President
Estonian Academy of Sciences

HALLER, Prof. Dr. Kristjan
Deputy Secretary General
Ministry of Education and Research

Finland

ARAJARVI, Ms. Mirja
Counsellor of Education
Ministry of Education and Science

KEKKONEN, Mr. Timo
Director General
Technology Department
Ministry of Trade and Industry

OJANPERA, Dr. Tero
Senior VP and Head
Nokia Research Centre
Nokia Corporation

PAULI, Dr. Anneli
VP Research
Academy of Finland

France

HAIGNERÉ, Minister Claudie
Minister for Youth, Education and Research with responsibility for Research and New Technology

ARRIBART, Mr. Herve
Scientific Director
Saint-Gobain

CROZAT, Mr. George
Embassy of France in Ireland

GAGNEPAIN, Mr. Jean-Jacques
Directeur de la Technologie
Ministere delegue a la Recherche et aux Nouvelles Technologies

GIACOBINO, Mrs. Elisabeth
Directrice de la Recherche
Ministere Delegue a la Recherche et aux Nouvelles Technologies

MONFRET, Mrs. Jeanne
Diplomatic Adviser to the Minister for Youth Education and Research

VERNEAU, Mr. Eric
Ministry of Youth
Education & Research

Germany

GRÜBEL, Mr. Hartmut
Deputy Director General for European and International Co-operation
Ministry for Science, Technology and Development

LANGE, Mr. Ulf,
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Max-Planck-Institute fur Informatik

RUBSAMEN-WAIGMANN, Prof. Dr. Helga
Vice President
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Symposium Parallel Session Chair

SOBOLL, Dr. Horst
Director, Technology Policy
Daimier-Chrysler AG

THEIS, Dr. Dietmar
Dept. Head for R&D Policy and Academic Liaison
Siemens AG

WINNACKER, Prof. Dr. Ernst-Ludwig,
President of the Deutschen Forschungsgemeinschaft

Greece

DENIOZOS, Dr. Dimitris
Secretary General for Research and Technology, Ministry of Development

SPILIOTI, Dr. Agnes
Head of Directorate
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General Secretariat for Research and Technology, Ministry for Development

VAYENAS, Prof. Constantinos G.
Editor
Modern Aspects of Electrochemistry and University of Patras

Hungary

BALOGH, Dr. Tamas
Head, Department of R&D Strategy
National Office for Research & Technology

MAKARA, Prof. B.Gabor
President
Hungarian Research Fund

VIZI, Prof. Szilveszter
President of the Hungarian Academy of Sciences

Ireland

The following attended the symposium and/or working dinner

HARNEY, T.D. Ms. Mary
Tánaiste and Minister for Enterprise, Trade and Employment

WALSH, Dr. Edward M.
Symposium Chair and Chairman
Irish Council for Science, Technology and Innovation (ICSTI)

BARRINGTON, Dr. Ruth
Chief Executive
Health Research Board

BEGG, Mr. David
Secretary General
ICTU

BRANDON, Mr. Bill
Office of Science and Technology
Dept. of Enterprise, Trade and Employment

BRADY, Dr. Hugh R.
President
National University of Ireland Dublin

CABALL Dr. Marc
Director General
Irish Research Council for the Humanities and Social Sciences

CONNOLLY, Mr. Enda
Press/Communications
IDA Ireland

COSTELLO, Mr. Ned
Assistant Secretary General
Dept. of Enterprise, Trade and Employment

CRONIN, Mr. Martin
Chief Executive
Forfás

DORGAN, Mr. Sean
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ENGLISH, Mr. Michael
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Dept. of Enterprise,
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ENTERPRISE STRATEGY GROUP MEMBERS

FLANAGAN, Dr. Jim
National Director, Teagasc

GAGE, Dr. Pat
Chairman
Dublin Molecular
Medicine Centre

HALPIN, Dr. Killian
Manager
Science and Technology Division
Forfás

HARAN, Mr. Paul
Secretary General
Dept. of Enterprise,
Trade and Employment

HARRIS, Dr. William C.,
Director General
Science Foundation Ireland

HEFFERNAN, Dr. Peter
Chief Executive
The Marine Institute
and Member, ICSTI

HEGARTY, Prof. John
Provost, Trinity College Dublin

HORN, Dr. Chris
Chief Executive
IONA Technologies

HUGHES, Mr. Declan
Science and Technology Policy
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HURLEY, Ms. Geraldine
Research Counsellor
Permanent Representation
of Ireland, Brussels

McCABE, Mr. Mattie
Director of Corporate Affairs
Science Foundation Ireland

McCARTHY, Dr. Sean
Hyperion Ltd
Cork

McCONNELL, Prof. David
Prof. of Genetics
Trinity College Dublin

MEEHAN, Dr. Eucharia
Head of Research Programmes
Higher Education Authority

MITCHELL, Prof. Tom
Chairman
Irish Research Council for Science,
Engineering and Technology (IRCSET)

O'CARROLL, Dr. Conor
Conference of the Heads of Irish
Universities (CHIU)

O'SULLIVAN, Mr. Turlough
Director General
IBEC

RYAN, Mr. Frank
Chief Executive
Enterprise Ireland

RYAN, Dr. Michael
President
Royal Irish Academy

SHANAGHER, Mr. Martin
Office of Science
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Science Secretary
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THORNHILL, Dr. Don
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Higher Education Authority
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WRIXON, Prof. Gerry
President
National University of Ireland Cork

Italy

GOUZENES, Mr. Laurent
Planning and R&D Programmes
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TENENBAUM, Prof. Alexander
Advisor for International
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JANSONS, Prof. Juris
Vice Chair
Latvian Council of Science

VIESTEURS, Prof. Uldis
Vice Chair, Board of the Latvian
Academy of Sciences

Leichtenstein

BUCHEL, His Excellency, Hubert
Director of the Office of Economic
Affairs

Lithuania

VAITKUS, Vice Minister Rimantas
Vice Minister for Education and
Science

Luxembourg

HENRION, Monsieur Romain
President
Fons National de la Recherche

KERGER, Dr. Robert
Charge de Mission
Ministere de la Culture, de l'Enseignement Superieur et de la Recherche

Netherlands

Van der HOEVEN, Min. Maria
Minister for Education, Cultural Affairs and Science

BREIMER, Prof. Douwe
Rector
Universiteit Leiden

FENGER, Mr. Pim
Ministry for Education, Cultural Affairs & Science

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Research Counsellor
Permanent Representation, Brussels

NIJKAMP, Prof. Peter
President
Netherlands Organisation for Scientific Research and Vice President, EUROHORCS
Symposium Keynote Speaker and Parallel Session Chair

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Ministry for Education
Cultural Affairs & Science

TAVERNE, Mr. Joost
Ministry for Education
Cultural Affairs & Science

t'HOOFT, Dr. Gerardus
Nobel Laureate
Spinoza Institute

WILLEMS, Mr. Rein
President Director of Shell Netherlands

Norway

GABRIELSEN, Prof. Roy
Division Director of Division of Science
Research Council of Norway

ØISETH, Ms. Kari Balke
Deputy Director General
Department of Research
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Poland

KLEIBER, Minister Michal
Minister for Science
Chairman of the State Committee for Scientific Research Ministry of Scientific Research & Information Technology

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MOTA SOARES, Prof. Carlos
Instituto Superior Técnico
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Minister for Education

SUCHA, Prof. Vladimir
Advisor to the Minister for Education

Slovenia

FINK, Tatjana, Dr
Director General
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ROZMAN, Prof. Dr. Ivan
Rector
University of Maribor

STANCIC, Dr. Zoran
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Director General
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SAMUELSON, Dr. Mariann
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Minister for Science and Innovation

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Novel Laureate and Principal
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MITSOS, Mr. Achilleas
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CANNELL, Mr. William
DG Research, European Commission

DOYLE, Mr. Peter
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PAQUET, Mr. Jean-Eric
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SMITS, Mr. Robert-Jan
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EU Organisations

ANDERSSON, Prof. Bertil
Chief Executive
European Science Foundation

DRENTH, Prof. Dr. Pieter
ALLEA (European Federation of
Academies of Sciences and
Humanities)

FLENSTED-JENSEN, Mr. Mogens
Vice Chair of the ERC Expert Group

FROMENT, Prof. Eric
President
European University Association
Brussels and Ancien Président,
Université Lumière, Lyon

NOWOTNY, Prof. Dr. Helga
Chair of EURAB

Van DUINEN, Dr. Reinder
President
European Science Foundation

Keynote Speakers

Prof. Sir Tim Hunt, Cancer Research, UK

Dr. Tim Hunt is a Principal Scientist at Cancer Research UK. In 1982, he discovered cyclins, which turned out to be "Key Regulator(s) of the Cell Cycle", and led to a share of the Nobel Prize in Physiology or Medicine in 2001.

Dr. Hunt is a Fellow of both the Royal Society and the Academy of Medical Sciences, a Foreign Associate of the National Academy of Sciences of the USA, a Member of EMBO, a Foreign Member of the American Academy of Arts and Sciences and a Member of Academia Europaea.

Prof. Jerzy Langer, Institute of Physics, Polish Academy of Sciences

Advisor to the President of Polish Academy of Sciences.

Prof. Langer is an honorary Vice President of EUROSCIENCE, Member of the Programme and Advisory Committees of Int. Conferences (about 50 times), Polish Academy of Sciences' Delegate to the European Science Foundation, Polish Representative to JRC Board of Governors, Member of ISTAG, Member of ESF-HLWG for the concept of ERC.

Prof. Peter Nijkamp, President, Netherlands Organisation for Scientific Research

Prior to his present position, Prof. Nijkamp was an advisor to several Dutch Ministries, the Commission of the European Union (EU), the Organisation for Economic Cooperation and Development (OECD) and many other private and public institutions.

He has been a guest professor at several universities in Europe, Asia and America. He is Doctor Honoris Causa at the Vrije Universiteit in Brussels and Fellow of the Royal Dutch Academy of Science, the World Academy of Arts and Sciences and the Royal Belgian Academy of Science.

Prof. Sir Tim Hunt

Nobel Laureate & Principal Scientist, Cancer Research UK

It is a great honour and privilege to be invited to speak at this Symposium. I never dreamed that I would ever have an opportunity to influence anything as grand as European Science policy. This is not my normal habitat. Yet the question and problem of supporting science is something that has bothered me for a very long time - more than half my life, in fact. This is not because I have ever had reason to complain about the way, I myself, have been treated. Far from it. I have been lucky enough with support throughout my career, and even one memorable time I had no pay for four months was entirely my own fault. I have never been unemployed, and always (to my mind) generously provided with funds and equipment for research. So what bothers me is how others are funded; others in my own country and abroad.

Especially in Europe, the twin pillars of excellence and competition are all too often, in my view, subverted in order to preserve boring, unimaginative second-rate science. Boring science can, of course, be sometimes useful; sometimes it does pay to be unimaginative to get the job done, but supporting the second-rate is almost always a complete waste of time, money and, especially, of spirit. Although, perhaps, one should not be too dogmatic: Paul Dirac said of the 20's and 30's in quantum physics, *"This was a time when second-rate men did first-class work".*

People often ask what is the use of it? In a world where there are pressing problems, why doesn't one devote one's efforts to the practical benefits of mankind? I need only recall the answer of the great Michael Faraday, when at a public lecture he was demonstrating the production of electricity. "Of what use is your invention, Mr. Faraday"? demanded an important lady. "Madam", he replied, "of what use is a new born child"?

Aaron Klug, 1982

I feel we are on the cusp of something very great to-day. For the first time, Europeans are talking seriously about putting knowledge first, of accepting the urgent need to make discoveries, of recapturing the initiative we enjoyed a century ago. Most of the centrally funded European programmes that we have had recently have been those that try to promote the interactions of academia with industry, and, while in my view from the academic perspective, these have been not an unmitigated failure, they have not been as successful as they should have been. I urge those of you in positions of power to grasp the opportunity and, at least, to make the experiment of supporting basic research for its own sake. You will, I assure you, be richly rewarded in the years to come by the secondary consequences flowing from such a simple step.

Let me give some examples from the past. I love this quotation from Aaron Klug, taken from his Nobel after-dinner speech, "Of what use is your invention, Mr. Faraday…? (see box) Another quotation from probably the greatest scientist of the last century, Albert Einstein, comes from his 1905 paper where he talked about the quantum of light -- so simple, yet so profound -- basically, the message is that if the great Maxwell, the giant of 19th century physics, was right, we would not be able to see the stars because the energy would have

faded out." Energy is not distributed continuously over ever-increasing spaces, it consists of a finite number of energy quanta at localised points in space that move without dividing and can be absorbed or generated only as a whole". Even I can understand that. My Physics friends tell me that it takes about four years of graduate school to properly understand quantum physics, and I cannot possibly understand it, but I can at least understand what Einstein was getting at.

Who am I? On the forms that insist one declares a 'Profession', I always put "Biologist". I suppose I would have to admit that I am, or really rather was, a fairly successful biologist. I grew up in Oxford, was inspired by a great teacher at the age of 11, went to Cambridge where I trained as a Natural Scientist, ending up as a graduate student in the middle-to-late 1960s in a Department of Biochemistry. In those halcyon days, my friends and I were clear that doing research was the highest calling. We did not expect rich financial reward, although I think we did expect that we would not starve, and that we would have a roof over our heads with a warm bed to sleep in. We expected little more. I settled on studying how red cells were filled with haemoglobin, after a single false start, ended up understanding how cells divided by a long and rather tortuous path that I don't have time to explain here. For my contributions to understanding the control of cell division, I shared a Nobel Prize with Lee Hartwell and Paul Nurse, but actually, the field had attracted a host of extremely talented scientists from all over the world and we were extremely lucky to be pioneers. Parenthetically, I think it's pertinent to observe that for more than 100 years, the question of how cells divided, and how it was controlled, had puzzled people. It was obviously something important, but no amount of head-on study had ever told anyone, anything, about it until the late 1980s, when the truth emerged by a series of lucky accidents, coupled with some important technical advances, mainly in the way of DNA cloning.

What is "Good Science"?

How can it be identified and encouraged?

Why is the UK so successful in science?

In November 2001, a friend called Peter Swetly asked me if I would come to Vienna and give a talk at a Symposium organised by Austrian Television. Peter was much involved with a very successful research institute in Vienna called the Institute for Molecular Pathology, of which I was a member of the Scientific Advisory Board for some time. Peter was concerned for me to address a few key points: what is good science and how do you recognise it? Why is the UK so successful in science? (This is a good and interesting question, to which I do not really know the answer). Peter's other questions concerned more local issues and I guess the key points are these: how do you recognise good science and what makes for a successful background and why is it that America is so dominant at the moment, at least in the life sciences? An article written for the 'New York Times' by two distinguished American biologists, Harold Varmus and Marc Kirschner, concluded that *America remains the world leader in basic research because of enlightened policies.* That is all it takes. Easier said than done! The problem is that not all scientists are very enlightened policy makers – as Jim Watson wrote in 'The Double Helix', *"A goodly number of scientists are not only narrow minded and dull, but also just plain stupid"* and some of them are in positions of power. Of the helix that he and Francis Crick discovered, these were Jim's words *"In place of pencil and paper, the main working tools were a set of molecular models superficially resembling the toys of pre-school children".* Max Perutz, whom I quote at length, said *"When Watson and Crick lounged around, arguing about problems for which there existed as yet no firm experimental data, instead of getting down to the bench and doing experiments, I thought they were wasting their time. However, like Leonardo, they sometimes achieved most when they seemed to be working least, and their apparent idleness led them to solve the greatest of all biological problems - the structure of DNA. There is more than one way of doing good science".*

The point about good science is also this: one cannot contract to make a discovery. I was very shocked when I discovered that in the EU, contracts are issued for doing research. I guess that a contract is an excellent thing if you are trying to build an airplane, but I do not think it is such an excellent thing when you are trying to find something out, because the fact of the matter is you cannot guarantee to find things out. What you are looking for usually may not be what you find out; you usually stumble on what you are trying to find out by accident. As the great Haldane said *"One can be quite sure the future will make detailed predictions look rather silly".* (Although he, himself, was amazingly good at telling what the future would hold. When he was still in my old Department in Cambridge he wrote a set of joke exam questions for answering in 25 years' time. One question was: Write down the structural formula of oxyhaemoglobin. Haldane was five years out, it actually took 30 years, not 25, to figure that out).

Thus, imaginative and clever people with vision can see a long way down the road. The problems with politicians is that their limited tenure does not give them the luxury of those tens of years and I do not know how we deal with this. The problem is: who do we get to judge the science? My friends and I argue that the best thing is to get the scientists themselves to do that. I think the example of the National Institutes of Health in America is a really excellent one, where, as far as I am aware, the scientists judge the proposals, the scientists rank them and the administrators simply fulfil the judgments of the scientists. For America, at least, this has proven to be an amazingly simple and satisfactory system in the biomedical sciences. I cannot speak for chemistry, physics, mathematics or other disciplines.

George Orwell published an essay in 1945, rather surprisingly, entitled *"What is Science"* in which he wrote *"Scientific education ought to mean the implanting of a rational, skeptical, experimental habit of mind, it ought to mean acquiring a method, a method that can be used on any problem that one meets, not simply piling up a lot of facts…The idea that science means a way of looking at the world and not simply a body of knowledge is a practice strongly resisted".* At the end of my time as a teacher in Cambridge, I noticed that many of our best scientists were going to work for banks and other financial institutions, for the very qualities that a proper scientific training provides are those same qualities that are appreciated by leaders in any great profession. I was sorry to see these people leave science, but the lure of big money was irresistible for them.

What does it do to make successful science? Francois Jacob wrote in his autobiography of the Pasteur Institute *"A house, which, as I got to know it, appeared a little strange, a little unusual in certain respects, a curious mixture of excellent science and laissez faire, of boldness and routine, of paternalism, incompetence, and also a highly flexible organisation which differentiated the institute from public establishments, like the university or the CRNS, and helped it to avoid the stagnation and the burden of bureaucracy".* Words that are echoed again by Max Perutz, who, when asked *"What is the secret of your success?"* said that he felt tempted to draw his questioners' attention to 15th century Florence, with a population of less than 50,000, from which emerged the great artists of the Renaissance, and wondered if the questioners had investigated whether the rulers of Florence had created an inter-disciplinary organisation of painters, sculptors, architects and poets to bring life to the flowering of great art. He goes on to say *"Creativity in science, as in the arts, cannot be organised. It arises spontaneously from individual talent. Well run laboratories can foster it, but hierarchal organisation, inflexible bureaucratic rules, and mountains of futile paperwork can kill it".* These are what many scientists, of my acquaintance, feel about the dead hand of Brussels, as experienced by them in the Framework Programmes. Perutz's words absolutely describe it – *"inflexible, bureaucratic rules and mountains of futile paperwork"* -- that is what we really want to avoid, if we possibly can.

Something else important I said for Peter Swetly on Austrian TV – *"Let us as scientists not be ashamed to be elitist".* Nobody would suggest for a moment that Real Madrid should employ second-rate footballers for its first team, just because they wanted to play. Nobody will pay to go to the opera to hear somebody who cannot sing. But there seems to be, even in Britain, a tendency to claim or believe that science is something that is easy, something that anyone and everybody can do. Let me assure you it is not. It is very rare to find good scientists; it is extremely difficult to nurture their talent. I am all for equality of opportunity, but we must take the utmost care to recognise talent, to treasure and promote it when we find it.

The second point is to use European-wide, non-nationalistic peer review. I have sat on several committees in England which are supposed to be absolutely the best thing, but I noticed, first of all, that they tend to use national peer review, so that actually their peers do not know what they are doing because their real peers are actually elsewhere in America or in Europe. Surprisingly, too, an awful lot of the grants around the table seemed to me to go to the people sitting around the table. I think when you have grants' panels, it is really important that the people making those decisions are sterilised for the period of being on that panel, from actually receiving largesse from the committee which they administer. I think that is really important.

A surprisingly common problem in Europe, however, is the granting of tenure at too young an age. I think I was very lucky to avoid getting a job for a long time. I was actually very cross at the time when I was turned down for a job in Cambridge, but I went on, and on, and on being a three-year grant holder and living from hand to mouth, and it gave me the freedom to do what I did and to go where I wanted. I would also like to forget about networks; if you fund good scientists, they will network as necessary.

On the question of competitiveness, I would like to remind you what happens if you have a lot of competition and rather slender resources -- you get a climax vegetation which is a pine forest, not a lot of variety or abundance there. Whereas, further south, tropical rainforests support an amazingly wide diversity of vegetation. I suspect these same ecological principles apply precisely in the funding of research.

Finally, let me quote from a friend, Stanley Cohen, who won the Nobel prize for Physiology or Medicine in 1982. I went to visit him a few years later, by now in his 70s but still in a lab coat, still working away, and I said to him, "Stan, what the hell are you doing here?" and he said, "*Tim, it's pain and suffering, pain and suffering. I just can't stand not knowing what the answer is*". That is where I am coming from. Thank you very much.

Prof. Jerzy Langer

Institute of Physics, Polish Academy of Sciences

Basic research in Europe - Can we help it to become more "European"?

Vision is the art of seeing things invisible.
The Battle of the Books and Other Short Pieces

This short line was written by one of the most famous Dubliners, Jonathan Swift, some 300 years ago and is characteristic of a discovery and an essential part of basic research. This is where basic research starts, but where does basic research end and the applied research begin? It is not just a semantic question. It is first of all a key limiting issue when planning the budget and defining financial vehicles for the new European initiative. Costs grow significantly when research moves from a discovery phase to commercialisation. On the other hand, however, risks become smaller.

Will Europe finally learn from lessons of the past?

It is obvious that a key component of most modern devices is a transistor. Its history illustrates perfectly all European problems which we are debating today: the Intellectual property right issue, the brain drain, inadequate funding of basic research, fragmentation of research and lack of venture capital to commercialise the vision.

The transistor was invented in the USA, in Bell Laboratories. However, all of its scientific roots are here, in Europe, where semiconductors were discovered, where, also, all principles of the physics of contacts between various semiconductors, metals and insulators were formulated and experimentally tested and where key enabling technologies were invented. An example of this is the most popular method of growing silicon, which was discovered and mastered by Jan Czochralski – a Professor of Warsaw Polytechnic, before the 2nd World War.

Unfortunately, after the War, many European top physicists left for the USA and contributed vastly to the development of the modern semiconductor electronic industry. Who in the end capitalised on this discovery? Anybody going into electronic shops knows the answer. It is worth reminding you of the amazing story told by the founder of SONY Akio Morita. In 1953, 6 years after the making of the first transistor, he wanted to buy a licence for a transistor from the Western Electric (WE), Bell Laboratories who were then part of WE. The Americans were curious what for and, finally after some bargaining, they set a price – 25 thousand dollars. Morita paid the bill and his team quickly made these transistors into more applicable devices and also a fortune. As a bonus, 20 years later, a Nobel Prize was awarded to Leo Esaki - a member of the Morita team for the discovery of a tunnelling effect in a semiconductor diode – just a side discovery made during the developmental work on a transistor at SONY.

What is wrong in Europe?

How come, then, that Europe, which as the host of this meeting, An Tánaiste, Ms. Mary Harney, noted "has a long and proud tradition in basic research", is nervously trying to catch up instead of a being a leader?

Furthermore on January 22, 2004 the Irish Minister for Labour, Mr. Frank Fahey, told the European Parliament: "Investing greater resources in innovation, education, training and the development of human capital is key to stimulating growth and jobs. Given that priority, we have to seriously question why it is that 400,000 EU science graduates are on the other side of the Atlantic. Some of Europe's best brains are working to make the US more competitive and that trend must be reversed and that talent must be enticed home".

The diagnosis is very clear in all available documents. As we say in science – the numbers do not lie. They just make us concerned.

Europe simply loses its talent or just trades them almost freely. Young people go into business and fewer stay in research. However, many very talented kids just leave Europe.

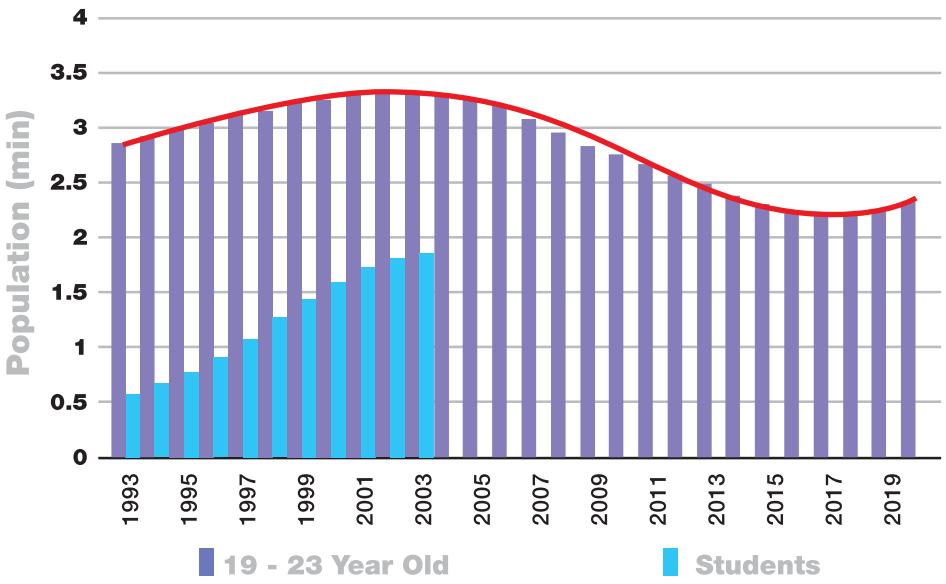
How does our problem compare with that of Russia or Ukraine? At a very recent meeting at the Kremlin it was announced that, in the last decade, about 1 million people employed in the research sector left it. It is more than a 50% drop. Almost 30,000 talented Russian researchers went abroad, some to Europe, but most to the USA.

This is only one bleak side of the coin. There is another one, much more optimistic.

A major change in the CEE countries after 1989 has been a gold rush for higher education. In Poland alone, the number of students more than quadrupled to a current level of near 2 million students.

Figure 1:

Students in Poland - a demographic projection



It means that, in the coming years, somewhere between 300 and 400 thousand graduates each year will enter adult life with a degree on their CV and some extra knowledge in their heads. Even if only a few percent of this army would consider staying in research, it could be an enormous asset for Poland and for Europe. This process will clearly last for a few years to come, as shown on the demographic projection. The same happened in all Acceding Countries.

Table 1

Ranking of Research Disciplines in Poland

Strongest	Physics, Mathematics, Chemistry, Astrophysics
Medium, but quickly catching up	Biology, Earth Sciences, Medicine, some Engineering sciences
Lagging	Most Engineering Sciences, Ecology
Strong nationally	Sociology, Literature studies, History, Archaeology

The level of higher education in Accession and Acceding Countries is generally high, especially in natural sciences. The reason is simple: basic research was always quite strong in Central Europe and this was fuelled by the academic teaching. Post-War, there were not so many avenues to reach personal satisfaction and high social status without compromising independence at the same time. Money was more or less the same for everybody, so the best brains stayed at universities or at the Institutes of Academies of Science. It was no surprise that in all rankings high esteem and trust was given to a University professor or an Academy researcher.

What, then, may still attract the most talented of these young people to stay in research - basic research to be more precise? My short list of what still makes basic research attractive to young people is as follows:

- *Curiosity & internal must (a feeling of a mission)*
- *Endless frontier*
- *Joy of discovery, amplified even after a small success*
- *Sense of freedom and uniqueness (membership to a better part of a society)*
- *Fame and recognition (less anonymity than on the applied side – everybody knows who invented the transistor, but most cannot list the names of those who made transistors real purchasable devices)*

A financial reward is really not an issue, except for those originating from poorer regions of Europe, including Russia and Ukraine.

According to EUROSTAT, in the year 2002, researchers in the Acceding Countries constituted a sixth of all European researchers. But if we go to real numbers, we arrive at almost a quarter of a million highly educated people – many of them trained at the best laboratories abroad. You may not expect large financial contribution from the newcomers, but you do get good brains and a lot are willing to compete at the European level.

Why Should Basic Research Remain a Prime Target in Acceding Countries?

Currently, in Poland, about one third of the total financial support for science goes to basic research (1/3 GERD). In terms of the national budget (2/3 of GERD), this equates to approximately 50%, as the budget is the dominant source of funding for science-driven research in Poland. The situation is similar in other Acceding Countries, and percentage-wise, it is clearly much more than in Europe or in the USA. Is this a reasonable policy? In my opinion, it was the only wise move during the turmoil of a transformation period. An obsolete industry collapsed. What was good, and competitive, found a private, quite often, a foreign owner. Companies were

slow to invest in developing research laboratories outside its core, and there was no contribution to basic research. However, to stay competitive, they will soon need a constant flow of well-educated young people.

There are clear signs of such a change occurring. Apparently the Hungarians, Czechs and Slovenians are at a forefront of this new change. A start signal was given by the information technology sector, dominated by young, bright, skilled and very aggressive entrepreneurs.

After 1989, a very competitive grant system was implemented in all Acceding Countries. Very limited resources went almost exclusively to the best individuals and groups. This is where excellence has been developed and cultivated over the last decades – natural sciences and humanities – in other words, basic science.

In terms of institutions, most recipients are employed either in one of the "Ivy League" of Polish higher education institutions or in the Polish Academy of Sciences. Research activity in these institutions is directly connected with graduate and post-graduate education. The result of this is that the highest salaries are being offered to physicists, chemists and mathematicians after graduation – at the moment outside the research sector.

This leads me to the first key conclusion and advice:

Basic research is the least expensive of all kinds of research and, thus, is affordable for all those with modest resources. It does not bring immediate economic results, but it creates a very solid base for long term economic and social growth. To achieve this, basic research should be coupled to graduate and post-graduate education and, very importantly, must openly communicate with society at large and political circles by informing, advising and warning.

Therefore, any country willing to become more than just an amusement park, a tax heaven, or just a cheap labour source, must build and cultivate a solid higher education base. This is inseparably connected with the quality of basic research. Of course this imperative applies to all Acceding Countries and Europe as a whole.

Having stated this, let me go directly to the key question of the Symposium:

Is There a Need for a New Initiative at the European level?

My clear answer is the same as most researchers – definitely yes, and it should be done quickly.

One of great paradoxes of Europe is that major financial support of long-term research is on the national level, except in very few areas like elementary particle physics or controlled fusion and, to some extent, molecular biology. It is a paradox coming from evident conceptual flaws in the European Treaties. Though, first of all, it is a consequence of a highly, nationally guarded, higher education system, which is the prime arena of basic research everywhere, including the USA.

Therefore, one of the prime targets for any European initiative on basic research should be European universities. However, to my great surprise, apparently their representatives are not participating so much in this discussion. The 'Bologna Process' is a truly grand undertaking, but when coupled with initiatives on enhancing basic research at the European level, it may bring fruits much faster and much better.

A new European Perspective to Support Basic Research

The ideas are indispensable but, without money, they will be just intellectual exercises. It is not only money, but also the programme and the way it is distributed among the recipients. We have at least three concepts of organisational arrangements:

1. A part of the Framework Programme;

2. A new EU Agency distributing extra budgetary resources;

3. A European Research Council.

I wish to strongly emphasise that all of the models have merits but, to some extent, the choice is secondary, mostly a political issue. Whatever the modus operandi chosen, there are common boundary conditions on which I believe a consensus already exists.

The findings and recommendations made in most of the reports, including that of the ESF expert team, of which I was a member, may be summarised in six points:

- *Bring a European context to the support of long-term, fundamental, curiosity-driven research;*
- *Focus on excellence as the basis for its funding decisions;*
- *Competitive decision process with the scientific community involved at all stages, including final decisions;*
- *Significant degree of operational freedom, simplicity of procedures and transparency;*
- *Financially meaningful budget;*
- *Complementary, and not competitive, with other major financial sources.*

Operational rules of this new mechanism to support basic research in Europe should be efficient and credible and must address exclusively the top level of researchers in Europe (groups but, also, individuals). In the case of individual grants and awards, age and origin must not be used as a criterion.

All granting procedures must also be highly competitive. It will help to create benchmarks, which could then be adopted at a national level, conforming with the very fact that basic research is country independent and is either excellent, or simply not worth support from public money.

From its very inception, the general policy should be to clearly support only the best individuals and groups, so that they can become even better.

Basic research has its own specificity. With the exception of very few areas, requiring large and expensive installations, research is done by rather small groups of people and, very often, in solitude. Scientists should, and wish to, exchange their ideas freely, either travelling to their colleagues and collaborators or gathering at dedicated workshops and topical symposia. This is part of an environment, which to be efficient, must fulfil several seemingly contradictory criteria:

- *A critical mass;*
- *Pressure to exchange views – not only via publications but also in an open, personal debate;*
- *In experimental sciences, quality laboratories are a must;*
- *Finally, and most importantly, the quest for truth in science is a very demanding process. Therefore, a quest for resources to participate in this challenge must be done in an uncompromised, but fair, competition.*

Excellence Versus Solidarity

There is one point requiring clarification – should this new funding mechanism of basic research also include some compensation measures? My personal answer is no. My opinions on this have support from the leading figures of Academia, and not only in Poland. About a year ago, there was a meeting of the Governing Bodies of Four Academies – Czech, Hungarian, Slovak and Polish. There was clear support for the creation of the new European body, operating solely on the excellence criteria, but financed primarily from the Union budget – not via dedicated national contributions. It was unanimously seen as a great chance for the research community in all our countries.

This new scheme must not support what is being covered nationally. Furthermore, it can not be used in any kind of non-selective rescue operation. Europe has other solidarity instruments - structural and cohesion funds. As research and education is the future of Europe, the use of these regional development tools should be much more streamlined into the development of modern research and higher education infrastructure. It should become a very clear Commission directive and policy. However, research and education-directed structural funds should have the national contribution either levied, or minimised, down to no more than 10%. Otherwise, they would consume a significant portion of an already very small budget fund for research, thus creating more problems and strains rather than being of any real help. The argument for such an approach is quite simple: these resources, for capacity building, will bring measurable economic profits indirectly and in a distant future.

Why in Europe is there such an elaborate system of direct subsidies to chicken, pigs, fish and hectares? Maybe it would be better to subsidise more of the human resources of Europe, especially those most talented. Do political masters of Europe want the intelligentsia of Europe to go on strike? There is not much we can throw in front of Parliaments or on European roads, but a recent French example is quite instructive.

Do We Need Further Tests?

Hopefully, a political agreement will soon be reached. Some cautious, but important, voices argue that small-scale tests are necessary. In my personal opinion, these are not needed, as enough experience has already been accumulated in various pan-European initiatives. They can easily be amalgamated under the umbrella of the new body financing basic research.

Most importantly, all of them fit perfectly with the way basic research is conducted. Not by huge consortia so typical for FP6, but by individuals and small groups. Funding is not the signing of a contract, but grants awarded after highly competitive, not too bureaucratic, two-stage peer-reviewed process as follows:

a) Run by the European Commission:

- *Marie Curie award scheme;*
- *FET (Future Emerging Technologies), run by the DGINFSO;*
- *NEST (New Emerging Science and Technologies), run by the DG Research;*
- *Centres of Excellence (especially the initiative addressing Acceding Countries within the FP provisions);*

I have a hand on information on FET and NEST and they are exactly what the basic research community was appealing for. The only drawback is that their financial scale is tiny and leads to an unacceptably low success rate (less than 5% in the case of NEST), but the advantage is minimal bureaucracy and superb Commission teams running these programmes.

b) Run by the European Science Foundation:

- *EURESCO conferences;*
- *Forward looks;*
- *EUROCORES programmes;*
- *EURYI scheme.*

The first two are superb and prestigious first class, small gatherings of top researchers. The financial support for them is an absolute priority for the new basic research funding scheme. The EUROCORES is a grand novel research scheme, combining national and central financial resources to address great research challenges by European scientists.

Europe Needs a Grand Vision

Europe needs a great vision more then ever before and this vision is simply a common Europe.

- *We live on a common, not an enlarged, European ground;*
- *Soon we are going to have a common, not an enlarged, currency;*
- *We all have a common history, not enlarged by anybody.*

The first step has already been taken. This is the decision by the European Commission to build a European Research Area, with all tools and programmes open to all European scientists. It literally means recognising that if Europe wants to use all its intellectual capacities, it must be viewed as a whole.

The next initiative of paramount importance for the intellectual future of Europe will be a major financial move to increase support for basic research in Europe at the Community level.

There is also a third one directly related to the central theme of this meeting. It has not been so vigorously debated, because it is also a somewhat sensitive issue. It is European higher education. The time has come, not only to acknowledge the very existence of a European "Ivy League" of grand Ecoles across Europe, but also to reconsider a concept of a network of European Universities, co-financed from the Union resources. New Europe needs new Universities and a new higher education structure open to most talented young people from all Europe. But this challenge may be left to a new Commission and another Presidency - maybe Polish one day.

The Window of Opportunity

Not often has there been such a window of opportunity in Europe as it exists today:

- *More and more, high level politicians clearly state that the only way forward for Europe is to invest into and support our intellectual capital;*
- *Europe is, today, more stable than ever. A tragic Yalta divide comes slowly to the end, and the Enlargement is a key process in this direction. We must, however, remember our neighbours: they are also Europeans, not only by culture;*
- *Average level of education increases and the Enlargement brings "new blood" of young, ambitious and determined people;*

- *The Americans are Europe's closest allies. In science, especially, this alliance is very strong. We should not constantly point out that America is a potential brain drainer. Partnership is the only and efficient way;*

- *There is also a new astonishing wave of building science and education-based societies where the sun rises. We must create many stronger partner links with Asia.*

But I must also say a word of caution.

This great window of opportunity of to-day will not last forever. If we do not invest in the human capital now, we may soon face insurmountable problems. Demography works against Europe. Also, if current gradients across Europe are not made smaller, social unrests may endanger the great hopes of to-day. Basic research is one of the key enabling instruments to avoid this, especially if coupled to higher education and open to public.

I am also a scientist, and thus an optimist. Critical, but optimistic. Therefore, observing what is being said to-day at the political European scene, especially about science and education, I hope that the great Dubliner - Jonathan Swift, with whom I started my considerations, would be more reluctant in writing:

> *How is it possible to expect that mankind will take advice, when they will not so much as take warning?*
> *- The Battle of the Books and Other Short Pieces*

Prof. Peter Nijkamp

President, Netherlands Organisation for Scientific Research

Preamble

In the long European history, science has always been the trademark of Europe. In the ancient Greek period, the famous statesman, scientist and writer, Euripides, once stated "knowledge is more important than a strong arm". This premise has been confirmed in the long history of Europe. The message – to-day more relevant than ever before - is that the best way to serve society is to invest in education and research; we have thousands of examples confirming this claim. For example, what would have been the position of Europe in international trade in the past centuries, if Europe had not invested in cartography as a leading scientific discipline in the 17th century? Basic research is of critical importance for economic progress and prosperity!

My presentation to-day will centre around a few distinct messages. First, I will argue that actually Europe's basic research potential is great, but we can do much better. In improving our position, we have to face several challenges. I will next map out six challenges and I will try to convert these challenges into six opportunities. Based on these six opportunities, and by exploiting these, I would like to map out selected action lines and strategies which are necessary, and I will end with a plea for policy action.

The European Research Landscape

I would like to offer you now a guided tour through some of the arguments in my presentation. Europe has been the cradle of civilization, thanks to its strong science base. Europe has been in the past centuries, also, the home of science. Europe has also provided a source of innovation in many fields of industrial and economic activity, as, for instance, exemplified in the Industrial Revolution some 150 years ago. At present, the position of Europe is less firm and even slightly hesitant. Nowadays, Europe sometimes tends to be a follower – fortunately, not in all respects - and sometimes it tends to be more a science consumer than a science producer. Hence, there is a danger that Europe may be losing momentum. There are also good elements: sign-posts for hope; the Lisbon Declaration; the Barcelona Agreement; the more recent communication by Commissioner Busquin on Europe and Basic Research. Increasingly we are moving, in Europe, towards the intriguing question: do we have sufficient scope for an open market for research in Europe? This question is, in fact, not new; it has been discussed already several decades ago, but politically, this issue has never materialised in the form of a common market for research. But we have, at least, various examples of research co-operation all over Europe, bi-lateral, tri-lateral or multi-lateral agreements, we have inter-governmental arrangements and we have network arrangements put forward by the European Commission. All of them have their own merits. Nevertheless, the bitter reality is that, nowadays, we still have, to a large extent, closed national research markets. If we put forward a call for tender from our Research Council, in most cases, we would limit ourselves to our Dutch colleagues, while, in general, our colleagues from Spain or Finland would not be able to apply for our funds, and vice versa. The European research systems have quite some fragmentation and closed national borders, even though Europe as a whole is an open market. This results in restricted competition and, essentially also, limited co-operation.

The benefits of a more open market, however, are rather evident. We would be able to achieve much higher scientific quality through competition. We would be able to have a better flow of researchers all over Europe and, also, maybe from outside of Europe. We would certainly, also, be able to put in place high standard review protocols, which, so far, maybe do exist in individual countries, but are not commonly shared with other countries, so that we do not know exactly how research performance in a given country compares to other European countries. We might have a more efficient use and better access to large-scale research facilities. An important element also in view of the demographic cycle in European universities where in ten years' time some 40% of the existing staff will retire is, of course, the question of the next generation: how do we get the next generation incorporated into our educational and research systems? It would be a major benefit, if that could be achieved. Finally, we would need better benchmarks for funding agencies. These issues have been discussed rather intensively in recent years. The question is how much time do we have to wait and to discuss?

It is timely here to make a reference to a recent interview with Commissioner Busquin, which is included in Cordis Focus, on the 15th December of 2003, where he comes up with the alarming message that the statistics confirm a decline in EU research investment and performance, and his closing sentence in this interview is "Progress is being made at the level of words but we must now take action".

Clearly, the scene in Europe is certainly not negative overall; we can be proud of many scientific highlights that have been achieved, but, as said before, we could do much better if we would organise our life as research funding agencies and our funding possibilities in a - sometimes drastically - different way.

Challenges

I would like to address now, quickly, six challenges which, from my perspective, ought to be addressed. The first one is capacity building vis-à-vis the industry, or vis-à-vis the public sector. This leads to the need for proper applied science to overcome the knowledge paradox in Europe, where we have sometimes excellent research results with an enormous number of international publications in the most prestigious journals, but low application rates in industry and in government. Apparently, at present, European competitiveness is not always leading to the best results.

A second challenge which ought to be addressed is talent scouting, especially the younger generation, also in the light of the demographic cycle referred to above. The next generation ought to be addressed more explicitly. International mobility should be favoured, including non-Europeans who might be willing to come to Europe. I found it rather stunning on a recent tour through Asia to see that almost automatically in countries like Japan, Taiwan, China, Korea or Singapore, most of the universities would send their PhD students to the United States. They would not even think of Europe. Why not? We are convinced that the research climate can be very interesting in Europe, but the mindset in many non-European countries is oriented towards other parts of the World. Consequently, we need a dedicated policy to attract young people towards Europe. It is of critical importance, that Europe is a learning house for scientific development and training for scientific talent all over the world.

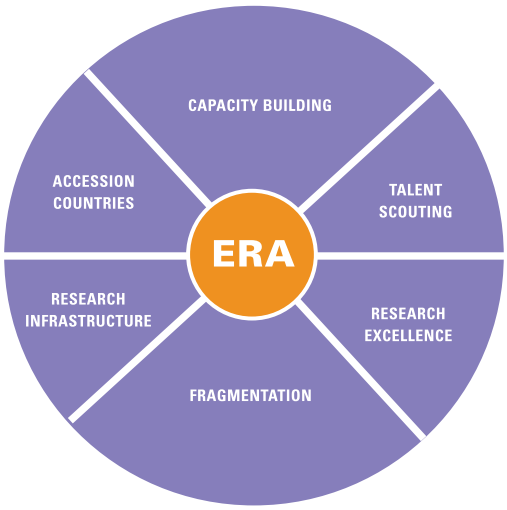
The third challenge to be addressed is the need to further research excellence. I would not argue that research in Europe is not excellent, but I am convinced that we could do much better. We would have to go for world-class leadership in Europe and create the excellency goal also out of Europe. We would also need better benchmarks in terms of scientific quality, and new review mechanisms would have to be put in place; this is also the responsibility of Research Councils in Europe. Finally, we would have to address the question of focus and critical mass for very promising world-class teams.

The fourth challenge to be addressed is fragmentation. This is a different challenge compared to research excellence. Fragmentation has to do with lack of co-operation inside Europe, and sometimes also, with a feeble, uncoordinated innovation potential within our European countries.

Often, we tend to concentrate more on intra-European competition i.e. competition between countries in Europe, rather than putting our efforts together at a global worldwide level. It ought to be recognised that essentially the playing field of scientific research is not exclusively Europe, it is the World as a whole. The fragmentation in Europe may also lead, sometimes, to duplication of research efforts in different countries. I refer here to various OECD studies where it has been clearly spelt out that in many countries almost all research groups tend to do the same things. It may be questioned whether this is a good spending of public money.

A fifth challenge is the national bias in large-scale research facilities. This is a domain where Europe certainly should improve its performance. There are questions of open access, but also of co-ordination of decision-making. Our colleague from the UK, Ian Halliday, has recently made a convincing plea to improve the situation, because we know that young people are also attracted by excellent research facilities. If we do not have the most sophisticated research facilities in Europe, we will not be able to keep the young generation inside Europe. This means that the strategic needs for Europe have to be mapped out more precisely on a long-term basis.

Finally, also, the question has to be addressed on equal, long-term, opportunities for Accession countries and pre-Accession countries. There is a great potential, because in many of these countries we have, indeed, intellectual magnets with fantastic scientific performance - though not in all cases – and, hence, we need to develop a pathway towards equity conditions from a longer-term perspective. But it would not help very much if we would create a situation of positive discrimination.



Six Opportunities

The bigger challenge we are facing now is whether one single institutional reform would help us in solving all these questions lying behind these challenges. It might be a dangerous step if we try to solve all of them in a simple way by creating a new institution which would be responsible for all these challenges. I take here a rather pragmatic approach; I have said we have six challenges, let's try to identify for each of the challenges a direction for solution, an action strategy which might help us out. I would like to go now quickly through each of these six challenges.

The first challenge is capacity building. Capacity building is very important for the industry, but also for governments in Europe. We might need, perhaps, a slightly more focused Framework Programme system, but we would not destroy the existing system, if it is still functioning rather well. It could be more demand-driven; it ought to be, perhaps, less bureaucratic and maybe slightly more flexible. The new system of technology platforms might be helpful to address also the needs of European industries, to get them at the forefront. Several things have to be changed, but that can be done within the existing system.

The second one would be talent scouting with a view to the next generation. Here we have already several things in place, like Marie Curie and other mobility and human resource programmes; open access is important, not only within Europe but all over the World, because we should be able to attract young researchers from all over the World. There are also complementary initiatives, from the EUROHORCs, for instance, the EURYI-scheme; money for scientists; money for co-operation and other initiatives which are already in place; care for the Accession Countries is certainly an important topic and I may add the argument I made before on the career aspects of young people.

The third challenge, from my perspective, is the challenge to improve European excellence. This is a different type of challenge. This is where the European Research Council could play an important role in realizing this specific challenge in Europe, leading to European, innovative and scientific top quality of Europe on a World-wide scale in scientific research. Only merit based-research, via strict competition and highly exclusive scientific quality standards and only the best teams with a clear critical mass, might be seen as candidates for this type of new institutional funding arrangement.

Fourth, collaborative programmes between Research Councils are another type of mechanism for coping with fragmentation issues. This is, again, different from excellence, this is a fragmentation issue. This is where the Commission, individual countries, Council of Ministerys and Research Councils, of course, would have to sit together and develop as partners new models and institutional arrangements. The famous Articles 169 and 171, which specify the conditions under which the Commission, together with governments and Council, can do things, could be excessively important and certainly would be very promising. It would also put the Research Councils and European Science Foundation together on the same platform, provided that additional money for research - and not only for overhead costs - would be available; this constellation would be based on a strong partnership between all the players in the field, the Council and the Commission.

Number five is a European Research Infrastructure Fund. As I told you before, this is one of the weaker points in Europe. That is also where several things still have to be sorted out. Parallel to the principles of the Trans-European Network Policy (the TEN Policy) a similar type of arrangement might be developed by the Commissioner for Research, leading to a large research infrastructure fund with an international flavour, with international aspirations for recruiting and attracting people from inside Europe, but also from outside Europe, leading to a new system dealing with major types of strategic decisions and joint financing schemes.

Finally, for the Accession countries - apart from being involved in regular schemes which I have described before - there might be new mechanisms to be incorporated in the Cohesion Funds, like the European Regional Development Fund and the European Social Fund, so as to address questions of research infrastructure, training and mobility and educational schemes in these countries. The funds might, in principle, be allocated in part for these purposes, but everything would, of course, at the end, be based on research partnership in Europe. I was very pleased to learn recently that the Austrian Research Council (FWF) has planned to hold a meeting with all the Research Councils from Accession and pre-Accession countries to develop new initiatives which might help us to mitigate fragmentation. So, altogether, I am fairly confident that we might be able to solve this to a large extent.

Conclusion

What I have tried to put forward here is a simple message depicted in the circle above of six challenges, which are mapped out here in the inner part of the circle, while each of the challenges is here related to a specific action line. Capacity building, for instance, is more focused in Framework Programmes; talent scouting and reinforcement of the existing mobility programmes are, for instance, incorporated in Marie Curie; the research excellence challenge is to be solved by the ERC (and exclusively by the ERC); and the fragmentation issue is to be addressed by new forms of partnership; the research infrastructure challenge may be solved by creating a European Research Infrastructure Fund; and the Accession countries issue may, temporarily, be assisted by seeking new types of partnerships. In a rather pragmatic way, I have tried to map these forces in the multi-layer circle.

Since time does not allow me to go through all the other elements, I would like to come immediately to my concluding part: I am absolutely convinced that we are in a great need for a science revitalisation in Europe, also in light of the demographic cycle.

From a pragmatic policy perspective, I think it might be wise to go for a multi-target approach in the next Framework Programmes, rather than create one institution which would try to solve everything in Europe, with the risk that nothing would be solved. There is, of course, a need for institutional re-modelling, starting soon and certainly before 2007, when the new Seventh Framework Programme will be put in place. I think that we would have to avoid an exclusive focus on the European Research Council, important as it is, but there are other elements to be solved in Europe, as I have indicated before; so we need a balanced portfolio of actions. It would be important that the science community in Europe would be seen as clear partners of the Council and the European Commission, with a shared responsibility. The same applies to research funding agencies. Of course, in the light of the urgency of the issues and the time frame involved, certainly, there would be a need for fast policy decisions in the course of this year. This brings me to a final message. If you see birds flying to some destination, they might fly at random. If they form a V-formation, then we know from biological research that, on average, their additional action radius is 71% higher than when they fly separately. This would also be my message in terms of European co-operation. It is time for shared partnership.

European Commission

Presentations

Mr. Philippe Busquin,
EU Commissioner for Research

Mr. Achilleas Mitsos,
Director General for Science, Research and Development, European Commission

Mr. Philippe Busquin

EU Commissioner for Research

Ministers, Ladies and Gentlemen,

First of all, let me thank the Irish Presidency of the European Union and Mary Harney for organising this Symposium. For the past two years, a debate has been going on regarding basic research in Europe. The conclusions of this debate will have a significant effect on the European Union's place on the world stage and the state of the European economy in 20 or 30 years' time.

This debate has mobilised the scientific community and the organisations which represent and organise the community. I have been particularly interested in the work of the Mayor Group, of course, and in the comments made by EUROHORCS and the ESF. In January 2004, the Commission issued a Communication on Europe and Basic Research and, in doing so, put the debate on the political agenda. The question is currently before the Council of Ministers and the results of the Council on 11 March (2004) will help complete the transfer of the debate to the political arena. However, the politicians needed an opportunity to meet and talk with the scientific community, research bodies and industry. This Symposium aims to do just that, and it is, therefore, a very timely and welcome event. If the European economy is to become the most dynamic economy in the world, as set out in the Lisbon Objectives, we need to do more at European level for basic research in Europe. This view is widely supported by public administrations, but also by industry.

Why do we need to increase our basic research activities?

- *Basic research is the key to social and economic progress;*
- *Europe is doing less than other technological powers;*
- *Lastly, activities at European level offer added-value. Excellence and visibility are guaranteed.*

Every year, European research spending is €120bn lower than in the US. Around 90,000 European researchers work on the other side of the Atlantic and American campuses now boast more than twice as many Nobel Prizes for physics, chemistry, physiology and medicine as their European counterparts.

Several decades of European research demonstrate the value of EU-level action in this area and the benefits in terms of achieving excellence and ensuring visibility in European research. Finalised, targeted and applied research will be the primary beneficiaries, but not the only ones: the EU Framework Programme supports basic research (Marie Curie funding, infrastructure, research projects, NEST). We also have CERN, EMBO and the ESF.

In spite of all these efforts, the organisation of basic research in Europe does not compare well with the situation in the United States. The main difference is, that in the United States, there is a lot of competition between universities to win federal funding, which is mainly awarded through the National Science Foundation. Teams of researchers develop a strong competitive spirit, which stimulates creativity, excellence and visibility. Although some European laboratories are involved in very high-level research, Europe clearly lacks an equivalent driving force.

Consequently the proposals for creating a European Research Council focus on creating a comparable European mechanism: a support mechanism that would encourage competition within Europe. What will this mechanism look like? Between now and the Summer (2004), the Commission will clarify its views on the subject, after first studying the question in detail and consulting stakeholders.

Three key conditions must be met if we are to achieve these objectives:

- *Firstly, funding must be guaranteed without endangering national activities in the field, which we certainly do not want to cut (our objective is to see total EU research efforts receiving 3% of GNP by 2010), and without reducing European support for targeted research, which remains as important as ever;*

- *Secondly, we need to create adequate links with national efforts to ensure that activities are complementary;*

- *Finally, this new initiative should not be independent of other activities in other fields. I am thinking of infrastructures, programmes promoting mobility and support for networks and for coordinating national programmes. Initiatives currently in preparation – by EUROHORCS in particular – with a view to preventing fragmentation and duplication of national efforts will play an important role.*

As I said at the start, last Tuesday, the Commission adopted the proposed Union Budget for 2007-2013. Research will become a top budgetary priority, with funding more than doubled. In line with our aim of achieving greater efficiency and maximum impact, EU funding for research will focus on five main priorities which reflect the five structural weaknesses holding Europe back:

- *Firstly, a support mechanism for research projects by individual research teams competing at European level, particularly in the field of basic research, along the lines of the US National Science Foundation;*

- *Secondly, European research capabilities will be strengthened through additional support for research infrastructures which are European in nature or of interest to Europe, and by developing human resources within research;*

- *Next, developing European public-private partnerships in the major technologies of interest to the public, using technological platforms to implement a common research agenda with long-term objectives;*

- *Fourthly, developing centres of European excellence by creating networks of laboratories which can then work together on joint projects;*

- *Finally, coordinating national and regional research programmes using special support mechanisms designed to help create networks, develop mutual openness, and encourage cooperation.*

More than simply the future of basic research, or research in general, is at stake here. We are talking about the future of the European economy and society, and, therefore, the future of Europe and its citizens. The scientific and industrial communities have done their part by drawing our attention to the matter and outlining the best response. This dialogue needs to be continued over the coming months. The Commission will propose detailed measures before the Summer which will allow the Dutch Presidency to prepare the ground, ready for a decision to be taken on the Financial Perspectives under the Luxembourg Presidency. It is up to you, as Ministers of Research, as well as the Finance Ministers, to rise to the challenge.

Dr. Achilleas Mitsos

Director-General for Science, Research and Development, European Commission

Ministers, Ladies and Gentlemen,

Several months ago I had the opportunity of visiting Dublin to speak on the question of a European Research Council. At that time, I outlined two major dangers, of which only half a danger now remains. We have, therefore, made great progress in this debate.

The first danger that we faced was that of putting 'the cart before the horse'. At that stage, the focus of the discussion was too much on the need to create a European Research Council and very little on what this European Research Council would do and the needs it should seek to fulfil. I, therefore, urged a change in the orientation of the debate: a consideration of the importance of basic research funding at European level should first lead to a common consensus and then to an evaluation of how this could be achieved in the best possible way. In this respect I believe that this Symposium has been a great success, with the discussion having taken place on exactly this basis.

The second danger that we faced was what I call that of the "soft consensus". Those of you who have had experience of the Council of Ministers in the past will know that hours of negotiation are needed in order to reach a decision on each word and yet we have, to-day, managed to unanimously approve our two-page conclusions in one short session. Although this could be seen as a positive sign, there is always the risk that different parties are bringing their own interpretation to them. This danger is much less now than it was some months ago, but considerable care must still be taken.

My task, to-day, is to establish what lessons the European Commission can take from your conclusions and what commitment I will, therefore, make on behalf of the Commission Services. The recommendations of this Symposium will be invaluable in ensuring that we are able to address all relevant issues appropriately as we draw up the Proposal over the course of the next few months.

In order to define this commitment, I will refer to eight key questions. The first is the most obvious and one on which I believe real consensus has been reached to-day, but a number of points should be raised in order to put it in its full context.

1. Is there a need for European funding of basic research?

As we have heard to-day, the overwhelming answer is yes. Leaving aside the exact definition of Basic Research and what it does and does not include, allow me to address a rather provocative question that was raised earlier to-day: what will happen if the overall Budget for Research does not increase as has been proposed in the Financial Perspectives?

It is important to recognise, first of all, that the issue we are discussing to-day does not represent an isolated action on the part of the European Union. Instead, it is part of the initiative to move towards a European Research Area, and of the overall aim of developing a European Science Policy.

Our proposals for research spending over the period of the next Financial Perspectives must, therefore, address all of the five areas of weakness that we have identified in European Research, each of which corresponds to one of the five axes that Commissioner Busquin outlined this morning:

- *Supporting the development of European centres of excellence;*
- *Investing in research infrastructure and general capacity building including – and putting the emphasis on - human potential;*
- *Improving the coordination, not of projects, but of national and regional research programmes and policies;*
- *Setting up technology platforms or major long-term, public-private partnerships aimed at generating growth;*
- *Promoting excellence in Basic Research through a major new initiative based on competition between individual teams at European level.*

These five axes together constitute our proposals for the Financial Perspectives. I should stress here that this is the Commission's proposal only and that we are a long way from having the Council and the Parliament adopt these Perspectives. So what will happen if we do not receive this very substantial increase of funding for science?

Let us be clear: we are not setting out these five axes simply because we have the luxury of asking for more money; they represent a global proposal which responds to the different needs that European Research much cope with. Having established these five axes, we must try to see how they can all be achieved. I am not suggesting that if we do not get the funding increase that we want, then we must have a linear reduction in funding for each area, but it is important that the final result strikes the appropriate balance between centres of excellence, capacity building, coordination, platforms, and basic research.

At this point, I would like to highlight a number of other key elements that are beyond the scope of these five axes, but which should not be ignored in this discussion. Space related activities and security related research are two new areas which we must mention, along with something that I see as a very important step forward made by the Commission's proposals on the Financial Perspectives. This is the enhanced role of knowledge creation and research in the Structural Funds. For the first time, the Commission has clearly set out that in less developed areas, knowledge creation and the objectives linked to the Lisbon process must be top priority. A new task for DG Research is, therefore, to see how Structural Funding and not just research money, should be used in the direction of promoting and improving the research infrastructure and research potential of our regions.

The next element that should not be forgotten is that we have already launched actions that go beyond funding. I am referring to the 3% objective and, more specifically, to the aim that two-thirds of the total investment in R&D should come from the private sector. I should emphasise that when we refer to the 'two-thirds objective', we do not mean that the public sector should wait and see how the private sector responds. We are saying that the public sector must take significant steps to create the most appropriate environment for the private sector to invest in research in Europe through, for example, intellectual property protection, competition rules, fiscal measures etc. These are not simple things to achieve but we have launched the so-called "Open Method of Coordination" and are closely following its progress.

Finally, everything we are doing must be part of a more general knowledge policy. I make a distinction between 'research policy and knowledge policy here, because knowledge policy includes strengthening and stimulating a more general dialogue between science and society; it includes the aims of establishing scientific expertise as an integral part of policy making and of restructuring our educational systems at all levels in order for science to play its proper role.

2. *Should there be strategic priority setting?*

It is clear that giving maximum freedom to researchers through a bottom-up approach has a number of advantages, but it is also clear that it can create huge problems of over-subscription, duplication and lack of direction. What I would like to make very clear is that, if priorities are to be set or specific areas of research to be selected in the field of basic research, they should be entirely determined by the scientific community, with no intervention by policy makers.

A number of people have made reference to this issue to-day and we must recognise that this creates major problems: how does the scientific community decide, for example, how much money should go to life sciences, or to certain areas within life sciences? I do not know what the answer is. I would only emphasise once again that it is for the scientific community to provide these answers. Political relevance is not an issue here and science alone must drive the priorities.

3. *Should the existence of an international consortium be a precondition?*

As demonstrated by the conclusions we have agreed upon to-day, the existence of international consortia will not be a pre-condition for funding. I am aware that this creates problems for certain Member States in relation to the so-called additionality issue: what is the additional element that the European scheme brings over and above schemes at national level?

We can liken this to the question of what the internal market at European level adds to the market within any of our countries. The fact that competition is to be on a European scale, drawing on an enlarged pool of researchers, is a very important characteristic and the significance of this should not be under-estimated.

Until now European value added has been defined in terms of the international collaboration of teams. Now we must introduce the principle of allowing a researcher in any Member State to compete with all other researchers to win funding. Competition, therefore, becomes the essential element of a new definition of European value added.

4. *Should scientific excellence be the exclusive selection criterion?*

The question of how to define scientific excellence remains a very difficult one but, nevertheless, the answer to this question is clear: scientific excellence as defined by the scientific community will be the sole criterion for the selection of projects. Factors such as the participation of all countries, equal opportunities, or regional policy considerations are all important concerns, but the Commission will not allow this key principle to be altered, or criteria other than scientific excellence to be added, during the decision-making process.

5. *Should the selection procedure be exclusively on the basis of peer review?*

Yes - selection will be on the basis of peer review, as defined by the scientific community. The Commission has no role to play in this discussion, but I would like to point out that, contrary to what many people believe, this is the method by which we already operate.

6. *How can "Brussels bureaucracy" be avoided?*

We have heard the phrase "Brussels bureaucracy" mentioned on a number of occasions during the course of the last two days. The simple fact that we are asked to participate in the cost of a project should not be forgotten. If the Union is asked to provide 50% of the cost of a project, then, we must have proof of what the cost of the project is. We cannot avoid the "Brussels bureaucracy" while we have the cost sharing method and it is, therefore, this method that must be changed. A move towards grants will be a move away from red-tape and it is, therefore, only through grants that excessive bureaucracy will be avoided.

7. *Where will the funding come from?*

Although our Proposal is that the source of funding will be the European budget, I also recognise that there are very interesting ideas on pooling money coming from the national agencies and that some sort of collaboration of national agencies could provide part of this new scheme. We remain very open to this possibility, but only as additional money, with the bulk still coming from the Community Budget. We must not allow the issue of 'juste retour' to undermine a credible process in which funding is based on scientific quality above all else.

8. *How will this fund for basic research be governed?*

This final point is the most difficult and I am afraid that we have a long road ahead of us. We are agreed that the selection process must promote the highest quality science, but I do not know how, and on what exact basis, it will operate. I can only commit myself to a number of principles. These principles are:

- *Accountability;*
- *Legitimacy;*
- *Credibility;*
- *Efficiency.*

Above all, it is crucial that the scientific community feels a sense of ownership of this project. The European Commission has already begun the process of consultation with every possible representation of the scientific community at European level to try to see how we can arrive at a proposal that will incorporate these essential principles and promote this sense of ownership. At the same time, we must bear in mind that the Proposal must be adopted by the Council and the European Parliament and we should not pretend that this will be an easy task.

To-day I have outlined my own commitment to this new initiative. Allow me to conclude by asking all of you who have been promoting it and who have reached such broad consensus here to-day to work hard with us as we move to the next stage. We need your advice and we need you to continue to demonstrate your commitment during this crucial implementation phase.

Thank you for your attention.

Contributions by Ministers

Speeches

Belgium, Cyprus, France, Ireland, Lithuania,
Netherlands, Portugal, Slovakia, UK

Mr. Bernd Gentges

Minister for Education, Training, Culture and Tourism, Belgium

Minister, Commissioner, Ladies and Gentlemen,

Belgium welcomes the proposal by the European Commission to create an EU support and funding mechanism for basic research. We are, therefore, very grateful to the Irish Presidency for having organised this Symposium at the highest level.

Our aim here is to clarify the issues and to achieve a consensus on how to enhance the European Union's role in promoting basic research. Perhaps we will not reach a consensus on every point, but our conclusions will, in any case, provide a valuable input into the process of finding the right approach for the EU. After this Symposium, the debate at political level will begin and the policy decisions that result will, subsequently, be translated into concrete measures.

In this context, I would like to highlight a number of points that we consider to be important:

- *The form of competition that is to take place between individual research teams of acknowledged excellence must be clearly defined;*
- *The selection process must be fair and transparent and based exclusively on scientific criteria. The evaluation of proposals must be done by peer review;*
- *The additional finance should be provided not by the Member States but by the EU, which should make a special effort in the area of basic research;*
- *In order to avoid duplication and the dispersal of resources, mechanisms should be built in for the coordination of European and national/regional funding systems. It would also be desirable for a link to be created between basic research funding and the Framework Programme, so that the results of basic research could feed into concrete applications;*
- *The relationship of the research area to industry and the wider economy should become more flexible.*

But all this is, perhaps, a question of quality more than of quantity.

I agree with the Irish Presidency that Europe should provide an attractive environment for the best researchers. We must become more ambitious and self-confident: it is a matter not only of money, but also one of perception and culture. We must put a stop to the brain drain of scientists leaving for other Continents. We must motivate our young people to study the sciences and to become researchers. Fostering such a culture begins in secondary, or even in primary, school. But on the basis of what I have heard to-day, I look to the future with confidence.

Mr. Yiorgos Lillikas

Minister for Commerce, Industry and Tourism, Cyprus

I would like to thank the Irish Presidency for its warm hospitality. I am very grateful to Mrs. Mary Harney who started this initiative and did her best to achieve a good debate on the issue of basic research. This is certainly a topic, which is strongly linked to the future of Europe and the future of societies.

I would like to congratulate all those who contributed in the preparation of all relevant reports and, in particular, in the preparation of reports containing comparison information about research in Europe and USA. Reports that help people, like many of us, who are not specialists in research or scientists, to understand the importance of research, our strengths and our weaknesses, to see and understand the difference between applied research and basic research.

I am afraid I am not an expert in research, so I do not know if it is a good thing to try to separate applied research from basic research. If we make such a differentiation, we run the risk of putting one against the other, kind of a competitive situation between these two types of research, and Europe needs to develop both kinds of research.

I do not think we can put figures on how much money should go to applied research and how much to basic research, but it might be interesting to compare them and consider the different structures that are needed in order to guarantee a good development of both types of research.

I am totally in agreement with the ideas of Commissioner Busquin and I do not have much to add to the comments already expressed by the previous speakers. However, I am asked to take the floor, in order to express my concerns about the possible establishment of a European Research Council as a European platform to coordinate research. Its establishment might be also of concern for other small countries, which might soon become full Member States of the EU. These countries might have some relevant proposals at a later stage. There are National and European efforts in research and everything will be orchestrated by this European Research Council. I am persuaded that we need such an infrastructure, but let' s not forget that each country is different from each other. When I say they are different, I have in mind the size of the different countries. Research must be developed at two levels, but at the national level this is dependent on the research infrastructure of the country, which is dependent on how much money goes into research and how much is industry contributing towards research. In some countries the market is small and if you have a small market it means that industries and firms are medium and small enterprises and, consequently, very few firms would invest in research, especially if you are talking about SME's. I think that research at the European level must take into consideration the characteristics of these small countries and that there are support programmes so as to ensure that the research infrastructure of these small countries is enhanced to enable them to contribute towards European research.

I have some proposals to make: the first one is about the participation of private enterprises in research. At European level, we are far behind compared to the participation of American industry in research. We all know that research is an investment. We must, therefore, motivate private firms to invest in research, either basic or applied. We must convince them that this is a kind of investment. We must, therefore, have a European policy so that all the European countries can offer relevant incentives. These can be tax incentives for firms so that they are attracted to invest at all the levels of research;

My second proposal is the European approach towards research. What is the difference to the American approach to research? How can we make sure that we attract other countries' researchers? We have seen in the Commission's report how the States make certain that all researchers in the World are desperate to go to the States for their research. What does America offer that we don't? I do not think Europe should try to copy the same concepts and the same philosophy the Americans use in attracting researchers. Europe has its own history and it has a very different background. Therefore, the European strategy must be a different one. We must use our own cultural background. We should propose to countries like Asia, Middle East, Africa to collaborate with us on common projects, thus creating with them the necessary infrastructure. Because in the case of Africa, for example, there is very little with regards to research infrastructure so we could help them, but at the same time, we could benefit ourselves without weakening the national potential of African or Middle Eastern researchers. This is another effective approach for increasing the European research capability which could be very useful for Europe, but at the same time, for our neighbours, too.

Ms. Claudie Haigneré

Minister of State for Research and New Technologies, France

Mr. Chairman. Ladies and Gentlemen,

I would like, first of all, to thank all the scientists who, for the last few months, have been working to stimulate research policies, to encourage excellence in research, in particular for basic research, and it is thanks to all these people that we can discuss these subjects to-day at the political level. Thank you to Mary Harney, in charge of the Irish Presidency, who offers us this opportunity to discuss. Thank you to the Commissioner, who has already suggested a few subjects for the discussion. I think that the scientific community and the research community will be able to work together and I think it is a reason for optimism. We also have a huge challenge facing us. The international competition, in which the industrial countries are involved, the increase in the Japanese and American research budgets, are a challenge for Europe; it is a challenge for each of our Member States. It has already been said, but I think it is a revolution in Europe, there is a risk of failing behind in some domains, even though European research is at a very high level.

We see, as well, the loss of some of the most intelligent people, who go abroad, and we want to bring them back to Europe. It is time now to react. It is time to reinforce our poles of excellence in Europe and our potential to attract companies - industries which will be able then to foster the development of Europe. We would like also to increase the support given to research in Europe, as discussed by Commissioner Busquin. The mobility of researchers is also a great concern. France thinks that Europe must be able to stimulate European basic research by supporting competition between European teams. We can promote poles of excellence and we can try to encourage the birth of new creative ideas. It might not necessarily be the primary objective of the European proposals until now, but I think that thanks to this creativity through excellence, and through competition, we will be able to increase the visibility and the excellence of basic research in Europe. Basic research, and we all agree on this, represents the main building blocks for research in Europe. It will make the link with targeted research. We will develop the links between industries and individual companies, which will work with laboratories, and our universities, where young scientists are based. There will be a constant expectation of new techniques, so that the students and researchers will be able to see their activities recognised through the new developments brought about by discoveries in the scientific communities, and in the best laboratories as well.

Without basic research, and without the excellence of basic research, we will not manage sustainable development. I insist on basic research, because I think that we will have to cover the whole spectrum of the scientific domains: mathematics, and also human science and social science, whose relationships are essential to understand the World, and also to accept progress that we can see everywhere in France, and in other European countries. We must also understand the difficulties. Sometimes there are ambiguities regarding what science can bring to the World and I think it is time to make people understand the positive benefits.

So, what will be our approach for 2015? We have already said it. We have ambitious objectives, the objective of 3% of our revenues invested in research, defined in Lisbon and Barcelona. Now we need to also have a qualitative and perspective vision for the years to come. I think we need

to think together about the best way to reach this long-term vision. I am not going to repeat what has already been done in the last few years through the Framework Programmes, through the CREST committee, through the Marie Curie grants. All the financial support from Europe will help, but we must go further with the development of our scientific community, to have the best teams in the European Union enter a competition with peer review based on scientific excellence of the best level in Europe, and also in the World, without different nationality criteria, without a consortium at the national level, etc. I think that this system must come into our approach, with an external management, a flexible management, a decentralised management. I think that the European Research Council, or the European Research Agency, could be a very efficient mechanism to develop research based on excellence in Europe. This could be set up by the European Commission through the Framework Programme. I know there is always a link between basic research and applied research and the economic benefits that can be drawn from it, but we also need to have a flexible management, flexible setting up possibilities, so that we can nurture the basic research through flexibility. A complementary budget, of course, is needed, but that means that we will have to define a scientific vision, a strategy per domain, a strategy through inter-disciplinarity – I think that will be very interesting for basic research and it will be one of the roles of the European Research Centre.

I would like to conclude by saying that my feeling over the last few weeks is very optimistic. I can see the commitment of the scientific community that wants to promote its capacities, and I think we need to transpose this feeling. We need also to create a certain level of trust between the scientific community and the financial means that we will give to the scientific community. The scientific community, as you know, is wondering about is own role.

Excellence, of course, but also recognition, recognition of the excellence and the quality of the researchers: a new environment so that they can express themselves. Scientists to-day need to be reassured of their own capacities to stay at the best level on the World stage. We will have to show them that they can progress without the pressures that sometimes are set upon them in the research institutes. Imagination and creativity are ideas that cannot be driven by a pre-set programme. We have to be able to give them more flexibility. I think we must also talk about the public feeling, you will be a public asset. This public policy will be a guarantee of independence for researchers for their works and the independence of their expertise as well. In public policies, as you know, we need independence. For all this, we need to think about the means that we need to give them. I think that Europe must find the best way of working, by analysing our strengths, our weaknesses, and we heard about it last night, find the best organisational ways and the best mechanisms to recognise excellence. There is a certain urgency in terms of results, because the challenge is very important.

As a conclusion, I would like to insist on the relationship between training, education and research. It is a wish already expressed a few times at the Competition Council. We need to understand this better, in particular at the European level, and to help universities. I wish to have a very open discussion on this subject, so that we can together find the passion and together share this beautiful challenge. Thank you.

Ms. Mary Harney, T.D.

Tánaiste and Minister for Enterprise, Trade and Employment

Tánaiste Calls for New Initiative to Promote Science in Europe

'Initiative should be developed with minimum bureaucracy and red tape' – Harney

A new initiative to support basic scientific research should be developed within the European Union, with "minimum bureaucracy", the Tánaiste and Minister for Enterprise, Mary Harney, has said.

Speaking at a Symposium in Dublin on 'Europe's Search for Excellence in Basic Research' Ms. Harney said the best approach to improving the EU's research and development performance, particularly vis a vis the US, was to generate competition among the best researchers, "supported by independent, global peer review".

"I believe in the powerful influence that EU-wide funding of scientific research can bring to bear, where our best research scientists are continually subject to international peer review and benchmarking and we should pay particular attention to nurturing new research talent", she said.

EU Research Ministers, scientists and industrialists are attending the two-day meeting as part of consultations and preparations for a new European strategy on basic research designed to close the gap with the US. The meeting, which is being chaired by the President of the Irish Council for Science, Technology and Innovation, Dr Edward M. Walsh, has been organised jointly by the Tánaiste's Department and the European Commission.

Ms. Harney said global competition for technology and scientific talent was increasing and Europe was already lagging behind when it should be leading. "The question, therefore, arises as to whether there is a need for a specific EU initiative designed to stimulate the quality of basic research", she said.

"I do not want to pre-empt the work of the Symposium, but I believe we should move swiftly and with determination to develop such an initiative. A clear focus on scientific research, which is the fuel that drives innovation and growth, and the prioritising of particular areas of research for targeted EU funding, is not incompatible with a flexible new mechanism to implement such an initiative with a minimum of red tape", she continued.

Ms. Harney added "that the EU as a whole, and Member States at a national level, needed to re-examine their procedures for transforming research into commercial applications. Any fundamental review of EU R&D strategy must involve industry at an early stage". European universities had much to learn from their US counterparts in this area, the most successful of which better understood that partnership with industry was imperative in terms of accessing private funding and expertise.

Ms. Harney welcomed the publication this week of a study by the UK-based Demos think-tank which found that the key element of global competition was no longer the trade of goods or services or flows of capital, but the competition for people, particularly "creative workers" in the scientific, technological and engineering sectors. She said "Europe has huge potential for gains in a world where technology, talent and tolerance are growing in importance and it seems to me that this is a powerful argument for the role of research in driving Europe forward".

"Comparing the EU as a whole with the US in terms of investment in R&D, a clear gap had emerged and the gap was widening", the Tánaiste said. In 1995, the US public and private sectors combined were spending €15 billion more than the EU, but by 2001 the gap had widened to €140 billion, with 80% of the gap due to lower business investment in the EU. In addition, there were an estimated 400,000 EU science and technology graduates currently in the US, some 90,000 of whom were working in the research area.

Ireland began serious investment in science, technology and innovation in the late 1980s and our initial focus was very much on applied research, Ms. Harney stated. But, over time, it became increasingly apparent that we could not continue to sustain applied research without a solid base in underpinning science and as a small country it was clear that we needed to focus our resources".

"To date Science Foundation Ireland has committed €320 million in research investments and it has achieved this with a core staff of 30 people, guided by a board of top quality people from the worlds of science and business. All of this confirms that excellence in science, and focus and direction, are not mutually exclusive. It also shows the value of an approach which is lean and effective and not hamstrung by bureaucracy", said Ms. Harney.

(A copy of this press release is available on the EU website @ www.eu2004.ie and on the Department's website @ www.entemp.ie).

Mr. Romantis Vaitkas

Vice-Minister for Education and Science, Lithuania

Commissioner, Excellencies, Ministers, Ladies and Gentlemen,

We support very much the idea of creation of the European Research Area. It will be an additional instrument for financing of appropriate and basic research. It will increase competitiveness, so it will make better research. The time for discussions is chosen very well.

Here, I would like to express my warmest acknowledgement to the Irish Presidency for the nice organisation of the Symposium, the time chosen for the discussions, and also best regards to Denmark, who started the discussion at the end of 2002. But, we should realise that this is not the only instrument to reach the Lisbon strategy. As has already been mentioned by the Commissioner, of course, when we add national budgets devoted to science and development, they would be bigger than we expect to have for the budget of the European Research Council. That means that this extra funding might be seed money for some scientific projects and the questions still remain as to what to do.

Of course, we discussed yesterday target oriented science. It was mentioned already by the Commissioner, and possible public opinion changes were mentioned in the media because usually people are raising cautions: what is the science devoted to, what are scientists doing? When we are talking about basic research what are we saying, you know who are preparing papers, what are papers for, and, of course, we should change the opinion of media, of the public, and work in this direction.

Also, I think we should go into better co-operation with researchers, networking with group of excellence, and also we should co-operate better in solving scientific problems. Good examples might be: new centres for nuclear physics and projects for space investigations, we might create research centres for biomedical research which might be equipped by new instruments where scientists could gather for their investigations.

Of course, when we talk about the European Research Council, we should bear in mind that this might not cover the wide range of problems required to solve the European Research Council. Of course, some targets should be very well defined, priorities mentioned, otherwise the success rate of the projects submitted will be less than we now have in Framework 6.

Concluding, I would say that, really, it is so important to re-orientate science into target based investigation, to increase implementation of scientific investigations into practice, to co-operate, and only efforts in the wide range of fields could really increase our speed to reach the Lisbon goals.

Thank you very much.

Mrs. Maria van der Hoeven

Minister of Education, Culture and Science, Netherlands

Ladies and Gentlemen,

First of all, I would like to thank our host for taking this initiative. Once again, it emphasises the good and fruitful cooperation between our two countries during the European Presidency.

The theme of this Symposium is "excellence in basic research". I heartily subscribe to this. We all want the European Research Area to be a success. To this end, we will have to discuss a wide range of topics. The quality of the training programmes for researchers, the infrastructure and the application of research, for example.

All these subjects deserve our attention. But, to-day, we are focusing on the stimulation of basic research. We need to give ample leeway to such research. Research that is driven by curiosity, whereby we cannot predict if, and how, it can be used, the type of research that is the breeding ground for innovation. In my opinion, a truly European Research Area can only flourish if we give sufficient room to such basic research within the Member States and the Union and provided we can relate this research to the problems facing our society.

I was, therefore, very pleased with the Communication on basic research recently published by the European Commission. In this Communication, the situation of basic research in Europe is compared with that in the United States. Two significant differences emerged. One of these has received the most attention up to now: the so-called European paradox - good research but too little application thereof. But the Communication exposed another striking difference: the European research system does not achieve the excellence that is achieved in the United States.

One might conclude that Europe has unquestionable strengths in the field of basic research: the quality of the European education system, the outstanding level of a large number of university teams, the existence of Centres of Excellence in practically all fields. However, Europe also has several weaknesses: first of all, the lack of adequate competition between researchers and research groups at European level. But also the lack of cooperation and coordination as a result of the shielding of national support programmes and systems. In some cases, there is also a lack of critical mass, due to the limited number and size of the Centres of Excellence. I, personally, should also like to mention the lack of accessibility to research data.

To sum it all up: we will have to ensure that Europe capitalises more on its strengths in the field of basic research, while also performing more excellent basic research. We must make sure that researchers and research groups compete at an international level. Such broad international competition will ultimately lead to outstanding excellence. In this way, we can give new meaning to the term "European added value". A great deal of "European value" has already been added through the various Framework Programmes. Significant economies of scale have been realised with the new instruments of the Sixth Framework Programme, for example. The time has come to add even more "European value" by bringing the best European researchers and research groups to compete with each other. It goes without saying that we shall also have to examine these issues in relation to the priorities set in our national scientific research policy.

At the same time, we will have to ensure unhindered, open access to both existing and future research data in the public domain. This last point is in keeping with our tradition of free traffic in scientific data, information and knowledge, which is an increasingly important precondition for the performance of sound research. I am, therefore, particularly pleased with the OECD's Declaration on Access to Research Data from Public Funding.

The Communication by the Commission clearly shows that there is room for European support for basic research. The Communication also indicates a number of steps that will be taken in the short term. One of these is to initiate a debate in, and with, the scientific world, a process in which industry is also given a voice, during this Symposium, for example. But we must do more than just talk about it. The time has come to take action! Sufficient reports have been published: by the Mayor group, the European Science Foundation, EURAB and the EUROHORCS. Now, as you, Ms Harney, have correctly stated, political decisions must be made.

One of the main objectives in developing European support for basic research, in my opinion, should be to create conditions in which research groups can participate to the full in international knowledge competition and to ensure that scientific criteria outweigh other considerations when determining who does, and who does not, qualify for funding.

This weighty role assigned to scientific criteria calls for scientific expertise. That brings me to the national research councils, because, there, we have concentrated this expertise. Most countries have already gained experience with national research councils. We can use the experience gained at national level in the search for an optimal financing model for basic research in the Union. We can then also enter into the debate on the setting of general priorities.

I hope, thanks to efforts made by the Irish Presidency, that the Competitiveness Council will reach a positive conclusion about the Communication by the Commission on March 11 (2004). Subsequently, when the Netherlands takes over the European Presidency, in July, steps can be taken to channel the next concrete phase of the ERA initiatives, as various speakers have already indicated. The example to be followed will be that of the National Science Foundation. I would like to add something: not just to look at what NSF has achieved, but also to look at the weaknesses of the NSF and what we could do better.

Your input in all this is vital. After all, political decisions must be made in consultation with the people in the field. I am, therefore, very pleased about this Symposium and the essential issues you will be discussing to-day and tomorrow. Please keep me informed of the outcome of your discussion.

Mr. Jorge Moreira da Silva

Deputy Secretary of State, Ministry for Science and Higher Education, Portugal

Chairman, Minister Mary Harney, Commissioner, Ministers, Ladies and Gentlemen,

First of all, I would like to congratulate the Irish Presidency for this Symposium and for making basic research a priority for their Presidency. I would also like to welcome the European Commission's help on this debate.

A separate focus on basic research is needed for different reasons, but first of all, because there is an undeniable impact of basic research on well-being. I think that even if there is no gap between -- and I think there is a gap, but even if there was no gap between the European Union and the United States on basic research, there is a justification to improve our policies on basic research. There is no future, there is no guarantee that the Lisbon process will be achieved if we are not able to improve our policies on basic research.

Basic research policy at European level depends, on our opinion, on clear strategy with targets and time tables, it depends on a new funding mechanism and it depends on new governance procedures. These governmental procedures should provide a focus on excellence, provide independent peer review, they should provide a competent environment, should provide mobility and co-operation and a wider range of funding, particularly involving the private sector. This can be done by changing the actual instruments and institutions, but it can also be done with a new institutional framework.

I think that there is, at this stage, a consensus about this last option, but it is very important if we follow this option that there are guarantees that will combine excellence with accountability, fairness and equity. Accountability does not mean bureaucracy.

We believe as well, like Commissioner Busquin, that the European Union project is based on law. Therefore, accountability is crucial. We hope that excellence can be combined with accountability procedures, in order to provide cohesion and equity.

The desire for the EU to become more competitive towards the United States should not contribute, as a consequence, to increase the gap between the EU Member States.

Thank you very much.

Mr. Martin Fronc

Minister for Education, Slovakia

First of all, I would like to show appreciation to the Irish Presidency for organising this important Symposium. I am glad that I have had the chance to participate in this Symposium, despite the travel adventure. It was caused by strike and I travelled over here via Paris, via Southampton to Dublin, and I know within this travel period I could reach Australia!

The Slovak Republic welcomes all background documents published in the recent weeks concerning the role of basic research in the European Research Area, mainly communication by the European Commission on basic research and report from the Expert Group concerning the European Research Council. We welcome a broad discussion on this subject and hope that the Dublin seminar will contribute significantly to final decision on greater support of basic research at the European Union level.

The Slovak Republic underlines the importance of basic research for development of a knowledge based society and European competitiveness. We agree that the gap between basic research in the European Union and the United States exists, but we invite relevant institutions to provide a more detailed study to identify the reason for the gap, including all aspects of education and social assistance, perspectives of development of research career, level of competition and co-ordination.

When focusing on the United States, we should not forget potential basic research of other world players, like, for example China and India; recall the importance of creating a set of measures to support the basic research and creativity in Europe, measured through the strength, co-operation and co-ordination among the Member States; contribute to building the European large-scale infrastructure facilities accessible to European researchers from all countries and to mobility; create excellence for supporting the excellent individual scientists and scientific institutions; and increase the interest of non-European scientists.

Financial instruments should be flexible to allow mobility of grant holders within Member States, including the salary of researcher into the grant budget; open to other partners from different institutions and different fields of science to create bottom-up networking based on research needs and, in simple administrative terms, to stimulate the best scientists to apply.

Thank you.

Lord David Sainsbury of Turville

Minister for Science, UK

I am very grateful to the Irish Presidency for organising an event which draws together so many high quality participants from differing backgrounds to discuss some of the most vital issues facing Europe to-day - how to promote high quality research and, most importantly, how to ensure that this high quality research feeds through into the wider European economy to improve the competitiveness of our industrial base.

The crucial importance of this second point was explicitly recognised when setting the target of spending 3% of European GDP on research and development activities. I do not have to remind this audience that two thirds of this expenditure (2% of GDP) is intended to come from private sector, industry, sources.

The present Symposium deals with basic research. The Commission have recently published a Communication on this subject. I think this paints too bleak a picture of the current state of European basic research.

Professor Sir David King, the UK Government's Chief Scientific Advisor, has recently undertaken a detailed analysis of the effectiveness of research in 10 European countries (UK, Germany, France, Italy, Spain, Belgium, Netherlands, Sweden, Denmark, Finland) by comparison with that in the US. In population terms, the EU-10 was larger - the US population in 2001 was some 278 million and that of the EU-10 some 346 million. Public expenditure on research (Government R&D expenditure plus expenditure on Higher Education) was very close - $53.5 bn in the US in 2001 and $52 bn in the EU-10 for the same year. Comparing citation figures for articles published by researchers in these countries produced some revealing results (since most peer reviewed research comes from researchers in universities and research institutes it can be taken as a reasonable proxy for publicly funded basic research). The full figures will, I hope, be published shortly in "Nature", but in summary, they show that EU and US basic research are more or less on a par and EU researchers deliver better value for money. While the EU-10 are behind USA on total citation share (37 – 40), they are outperforming USA in Maths, Physics and Engineering. The EU-10 are actually ahead when it comes to the number of most cited publications (36-32). Looking at inputs and outputs, the EU-10 perform better on citations per unit of GDP, publications per researcher and citations per researcher. These figures do not suggest that the European science base is doing badly. On the other hand, this doesn't mean we shouldn't try to do better. Not being worse is not an ambitious goal. We should seek to lead the World.

So where does the problem lie? Another comparative expenditure figure may give a strong indication. In 2001, the US private sector invested $180 bn in research and development. The equivalent figure for the EU - and this is for all 15 current Member States, not the 10 covered in Professor King's study - was $106 bn. The shortfall is dramatic. It underlies my view that the real, continuing, problem lies in the private sector and in a failure to translate the excellent basic research done in publicly funded European universities and institutes into products and processes which can underpin and improve the competitiveness of the European economy. This also seems to be the view of the OECD in its recent experts' report. It therefore follows that I feel the focus of European level funding for research ought to lie in initiatives to address these

issues. I believe we, as European policy makers, ought to be putting a major emphasis on finding ways of pushing industrial research expenditure in Europe up to the 2% target. Even if we would not necessarily imitate the US model in which 14% of industrial R&D is directly funded by Government (as against 8% in the EU), I firmly believe that any additional funds should be used to leverage greater research expenditure from industry.

The EUREKA scheme has already funded EU "success stories" in such research-based sectors as IT (STM in microelectronics, ASML in steppers) and may offer a useful model for future developments.

Having said all this, I certainly would not want to deny the vital importance of maintaining and improving the science base in the university and research institute sector. Without a fertile base the roots of innovation will surely wither. At a European level, the most important funding mechanisms for supporting and enhancing the science base already exist. These can be found in the Marie Curie actions under the Framework Programme, which have already done an immense job in stimulating research on a genuinely European basis by encouraging greater researcher mobility. The UK has traditionally supported spending money in this area - we still do so to-day and would regard this as an area which should be continued and strengthened in the future. It should be expanded to ensure appropriate support for business needs, including the transfer of knowledge from the research base.

I might also add that we all, at national level, need to look hard at how we organise and fund our national universities and other research institutions. The much-cited article in "Time" magazine, to my mind, showed that many of the worst problems facing researchers in Europe derived from factors entirely within our gift to remedy at national level. We need to eliminate the barriers and hindrances to excellent researchers which may lie in university career structures or funding systems. And we should not think that by introducing a European Research Council, which is unlikely to amount to more than 4% of all the basic research in Europe, we will put the other 96% right.

Having made these points about where we should concentrate additional funds, let me say that the UK Government is greatly impressed by the work which has been done on a European Research Council. If it is going to be independent, focused solely on scientific excellence, and based on a transparent peer review process, we would see it as a valuable mechanism for allocating money to basic research as part of the next Framework programme. We don't think the Framework Programme is so good that it can't be improved.

It is too easy to ask the question "Do we want more money to fund a European Research Council"? We need to ask this question in the wider context of how we distribute money between basic research and near market research, and what are the best mechanisms in each case for allocating money to particular scientific and technological projects? We also need to ask ourselves how we can best leverage up the amount of industrial research. We need to ask these hard questions. If we do ask them, I think we will decide that a European Research Council focused on basic research excellence, has an important part to play in the European Research Area. In fact we will, I believe, have a better case for one because it will be based on a tough-minded analysis on how we achieve our ambitious goals for Europe.

Synthesis of the Symposium Workshops

In order to address the questions set to the Symposium, three parallel sessions comprising mixed groups from different backgrounds were conducted. These sessions, chaired by Prof. Sir Tim Hunt, Prof. Helga Rubsamen-Waigmann and Prof. Peter Nijkamp, allowed policy makers, academia and enterprise to discuss of Europe's performance in basic research and to ultimately determine areas where there was a consensus.

One of the key themes throughout these discussions was the position of scientific research in Europe compared to the rest of the world and more precisely the US. In other words, is there a considerable gap developing between Europe and other countries and, if so, why? It was generally agreed that gaps do exist in the 'excellence of basic research' being undertaken in Europe and the US.

'…85 of the most quoted scientists are American'

Some of the indicators of a gap that were noted included the increase in Nobel Prizes awarded to US scientists since 1985, especially in medicine and chemistry, and a higher number of US publications than EU publications. There was a general agreement that the US dominates the fields of Life and Natural Sciences, although it was noted that the gap in the latter two areas is to be expected, considering the scale of investment by the NSF and NIH . The different sessions agreed that the gap, if any, varied between fields, with Europe dominating areas such as Humanities and Social Science.

It was stressed that differences exist between disciplines and countries and, though publications and citations can be useful indicators, their weight and meaning can vary. Thus, statistics should be interpreted cautiously.

It was noted that we must also look at how basic research interfaces with industry in Europe. There was a general perception that while industry is willing to invest in research, it lacks a risk-taking approach. The need for a supportive regulatory and fiscal environment in order to overcome this problem was emphasised. It was also emphasised that, at present, multinational companies are increasingly moving research to other parts of the world, such as Asia and the US. Europe is not seen as a favourable area for generating new research and development. Europe should not solely concentrate on the larger global companies, but should also focus on the small companies, and technology transfer in them. One advantage that Europe could have over the US is its future policies and legislation on intellectual property rights (IPR). In the US, industry/academia co-operation is becoming more difficult due to the complexity of the IPR negotiations. This could be an area where Europe can learn and adopt simpler and more efficient IPR rules.

'….academia often does not know what industry needs and industry often does not know what academia is doing'

'the gap is not in the generation of knowledge – it is in the implementation of knowledge'

Overall, the links between industry and academia are an area for improvement. Europe needs to create a more innovative society with agility and freedom, where universities, industry and policy makers can interact constructively. There should be freedom to work at both ends of the basic-applied spectrum. It was also agreed that the focus for Europe should be on research excellence and not 'basic research'.

It was also noted that in order to foster such public-private collaborations in the scientific community, a change in mindset or attitudes is needed in European Universities. As in the US, Europe must ensure that industry recognises the value of universities.

'Europe needs to find a way to compete on the strength of excellence'

One of the most worrying trends noted in Europe, however, is the flow of young scientists in favour of the US. Several times throughout the Symposium, references were made to the 400,000 European science and engineering graduates residing in the US. The 'brain drain' of top researchers was thought to be one of Europe's key weaknesses, impacting European Universities and the EU's attractiveness for industrial investment.

Several factors influenced the decision of so many graduates to move to the US. These included the esteem and recognition of achievement shown for scientists in the US and the freedom to practice science. The US is also perceived as a location for scientific excellence amongst young scientists. Europe, while diverse in its research activity, is segmented.

'Europeans are scholars, Americans are researchers'

Europe must not only maximise the potential of each country, but also ensure that fragmentation is reduced across the EU if it is to turn the 'brain drain' to a 'brain gain'. Europe should also be aware that Asia (Japan, Korea and China) is attracting researchers back, and in 5 to 10 years could be another significant competitor.

'Young scientists are voting with their feet'

'….to be the world's leading knowledge economy inspired by the world's leading scientific minds'

There was a consensus that the vision of Europe for 2015 should be international recognition as a globally competitive, open, dynamic system that serves and benefits society and one that is based on excellence and that leads to improved economic prosperity. The new European system should have a level of international competition that leads to higher ambition, higher quality and, therefore, is more attractive to young people. To achieve this aim, there needs to be a reform of the basic systems, including universities. Europe must produce and retain excellent researchers and also ensure a net flow of excellent researchers into Europe and not out of it. Europe must also attract mobile enterprise investment. To do this, Europe needs to recreate confidence in its research capabilities and take leadership in selected areas. Europe as a whole needs to be more ambitious. It is envisaged that by 2015 Europe should dominate as a base for scientific discoveries.

However, excellence cannot be measured in research output alone. It is important, for example, to make a clear distinction between vocational universities, taught post-graduate universities and research based universities. The missions of these institutes can vary significantly and, therefore, the indicators used to measure excellence in each of these cases will be different.

'Swarthmore has no research activity and yet, they train fantastic researchers'

In order to achieve this vision, the need for co-ordinating national and European support for basic research was emphasised. Participants agreed that competition is needed at the European level for the best researchers, with excellence as the sole selection criterion. To be successful, Europe must have common goals, and fragmentation across Europe must be minimised.

The Symposium agreed that the expansion of basic research in Europe cannot be realised without the provision of additional funding. A new structure could be established under the Seventh EU Research Framework Programme, with the integration of successful existing approaches to basic research support such as the Marie Curie Mobility Programme and New and the Emerging Science and Technology (NEST) initiative. The Symposium also stressed the importance of reinforcing support for basic research in the context of developing the European Research Area.

Europe has already shown, with examples such as CERN, EMBL and the EUREKA models, that initiatives at the European level can be successful. These examples should be followed and new initiatives should be kept simple, non bureaucratic and have a bottom up approach.

Lastly, any new European research body/instrument should ensure that members of both the academic and industrial communities are represented. This will guarantee that gaps between the two scientific spheres are closed and also that grants are awarded solely on scientific merit. It will also reduce bureaucracy.

Overall there was a wide range of views from academia, industry, public officials and national funding agencies.

The major points of the discussions were:

- *Academic – Industrial collaborations;*
- *Brain Drain;*
- *Fragmentation across EU;*
- *Increased EU funding;*
- *Structure of new EU research body/instrument.*

The Symposium agreed that there is a clear challenge for Europe to enhance the levels of creativity and excellence in basic research in the context of global competition. Participants expressed the hope that the consensus reached would encourage 'a new scientific spirit in Europe'.

Formal Submissions by Country

Submissions

Estonia, Germany and Slovenia

Formal Submission by Estonia

Estonian Informal Position Paper

Addressing Communication from the Commission on "Europe and Basic Research"
[COM (2004) 9 final]

Estonia welcomes the Commission Communication "Europe and Basic Research" and also the recent work undertaken by various high level and scientific groups on furthering excellence of basic research in Europe. We find it obvious that basic research, and its funding, deserve the most thorough attention. This need is particularly urgent now, when a political will to build the European Research Area is increasingly more apparent.

In order to identify the key policy issues related to basic research, we first need to define the concept of basic research. It has been pointed out in the Communication, that there is no strict, unanimously, accepted definition of what basic research constitutes. However, for policy debates we need a common ground and we can still use a working definition, according to the mission and key characteristics of basic research. In our opinion, one of the best definitions comes from the Natural Science and Engineering Council of Canada:

A working definition of basic research

- *Its object is discovery;*
- *Its context is the state of knowledge in the field worldwide;*
- *Its format is a programme of research activity defined by the researchers;*
- *Its merit is in the importance and excellence of the programme, as judged by peers;*
- *It educates highly qualified people in finding sources of current knowledge, in creating new knowledge in the context of current advances around the world, and in understanding its trends and limitations;*
- *Its results are exposed to the review of the peers and published openly without delay;*
- *Priority of discovery is the issue, more than ownership of intellectual property;*
- *It may lead to profound benefits to humanity in the long term, but they cannot be predicted in the short term;*
- *If it has any short-term benefits, they are incidental, and their presence or absence should not skew either the funding decisions or the policies of research support.*

As regards the impact, new and useful information is the most obvious output of basic research. This leads to an expectation, that any economic impact of basic research is probable only in a very long term. However, skills, especially skilled graduates, may well form the key, short-term link between basic research and industry. From an Estonian point of view, one of the most important functions of basic research is the provision of trained research personnel, who start working in applied activities and take with them, not just the knowledge resulting from their research, but also skills, methods and a network of professional contacts that will help them tackle the problems that they face later.

When it comes to "big science", which requires expensive or extended research infrastructures, Europe has, in many cases, opted for a European rather than a national approach (CERN, EMBL, ESA, ESO). These international success stories are echoed by multi-lateral successful collaborations. Through different mobility schemes (for example FP6), there is an access to those facilities also for individual researchers.

For less costly science, though, centred on individual investigators, in small teams and laboratories, Europe acts through national policy schemes. Estonia is concerned about the current situation where there are not enough pan-EU mechanisms to support, and indirectly guide, long-term, investigator-driven research. At the moment, most of the latter is covered by national research agencies and other sources, which are often scattered.

We are pleased to observe that the document underlines scientific excellence and peer review concerning basic research. In the early 90's, when Estonia re-organized its research financing system, the first step was to introduce peer review process. We are very thankful for the help given by the Member States, in particular by the Research Councils of Sweden and Finland, who helped us to launch the system where Estonian grant applications are evaluated by international peer review boards.

Estonia welcomes the Commission`s position concerning the need to introduce a European level support mechanism for individual teams' research projects, modelled on the "individual grants" given by the NSF. In this regard, we also welcome the ongoing discussion in the European Research Council.

Estonia fully understands, that broad discussions on these topics have only been started. Nevertheless, we would like to raise a few questions and make some comments:

The intention of the initiative is to see ERC functioning within the EU Framework Programmes (FPs). However, to drive the ERC as an independent body, it inevitably needs an administrative staff of its own to cope with the peer review system and all the other tasks. The proposed budget indicates the size, which is comparable to NSF, whereas the scope of the fields mentioned in the document is by far larger. How costly would it be?

The intention of the initiative is to cover all research fields, including humanities and social sciences. Estonia fully understands the reasons for that. However, we are concerned as to whether the number of applications after such a call would be reasonably manageable. While the recent experience with "expressions of interest" for FP6 brought in around 10,000 "expressions", it is highly likely that the number of projects to be handled by a fair peer review process will be bigger under the proposed conditions.

The project proposals must be ranked, threshold levels established etc. Here, the question of success rate arises. The very concept expects that the best researchers and the best groups will apply. These top-level scientists are already supported by national grants. It seems to us questionable to expect that excellent groups will, seeing another funding agency, create entirely novel projects. The very aim of the ERC scheme foresees financing projects that concentrate on basic questions – people usually do not change their basic research direction too often. The question as to how to find so many top-level reviewers arises. It might well end up as the recent experience with the expressions of interest showed – the procedure allowed, at best, to catalogue the received projects.

One of the major questions to be decided will clearly be the geographic eligibility criteria – would the support be accessible for consortia of teams from different countries only, or just for single-team projects? In case of the latter – how does it contribute to the building of ERA? In case of the former – how is the geographically equal access of research teams ensured?

We are also concerned about the representativeness of the present funding schemes of the EU FPs, such as NoEs. Shifting these schemes under the ERC probably arises the need for quite big changes. To the taste of several scientists, the current NoE huge conglomerates in FP6 have not too much in common with an investigator-driven initiative, and for many co-ordinators they look like a bureaucratic punishment.

FP6 made a very long step ahead in its attempt to encourage mobility of researchers. The scheme is truly popular, as judged by the number of applications. Therefore, it should be further and deeply analysed, whether there is a need to change the "cover" of the current system, which functions well. It is also obvious, that it takes a few more years to evaluate the operational fitness of the new initiative.

We fully support the intentions to provide basic research with the resources it needs to achieve its rightful position in the ERA. From Estonia`s point of view, it is particularly essential to:

- *strengthen European support for research infrastructure and support the creation of centres of excellence in the enlarged European Union;*
- *increase the support for developing human resources, researchers training and development of careers in science;*
- *improve the coordination of national activities, policies and programmes in the field of basic research.*

Summing up: Estonia fully supports the idea that basic (strategic, long-term, risk-taking, investigator-driven) research in every way deserves a place in the ERA strategy. We are enthusiastically seeking a more deep discussion of how this goal can be achieved so that the European added value would be maximised.

Formal Submission by Germany

Federal Ministry of Education and Research (BMBF)

Funding of Basic Research at European Level

Division 113, "European Research Policy, Eureka", 53175 Bonn, Germany

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BMBF "Basic Research at European Level / ERC"

Increasing investments in research and technological development, together with the promotion of innovation and the transfer of knowledge, are key factors for improving Europe's ability to compete. Outstanding, internationally competitive basic research at European level will play an important role in achieving the goal of making the European Union the world's most competitive and dynamic knowledge-based economic area by 2010. It will create the basis for innovations and thus for growth, jobs and prosperity, particularly in high technology sectors such as the information and communications sector, the life and materials sciences, or the fields of aviation and space, transport and energy. In many cases, the dimensions of integrated research projects based on a division of labour will far exceed the financial and logistical potential of individual states. The establishment of the European Research Area will thus become an essential precondition for Europe's ability to compete.

Over the last few decades, various approaches have been adopted towards promoting basic research at European level, some of them very successfully. Examples are CERN, EMBL, ESRF, ILL, ESO, as well as areas within the EU's Research Framework Programme.

Europe's starting position in basic research is good as far as human resources and research infrastructure are concerned. It is now a question of making use of this potential. Important points of departure are improvements in Europe's attractiveness as a research location for young researchers and outstanding scientists as well as measures to bring European basic research up to top international standards. A key instrument for achieving this objective is the allocation of EU research funds for basic research within the framework of a Europe-wide competition based on the criterion of excellence. At the same time this should instigate a process for overcoming the fragmentation of national funding systems.

The following seven points represent the BMBF's basic principles for funding basic research at European level:

Excellent basic research as a complement to industrial and precautionary research:

This supports basic research as a complement to European research which, in the past, has tended to focus on the needs of industry and society. Scientific excellence measured according to the highest international standards must be the decisive criterion in order for Europe to once again assume an internationally leading role in research.

Funding from the Seventh Research Framework Programme

The expansion of basic research at European level cannot be realized without the provision of additional funds. This should not be at the expense of existing research and development capacities at national and European level. An independent field of basic research with its own corresponding funds should be set up under the Seventh EU Research Framework Programme. Existing successful approaches under the Sixth EU Research Framework Programme are to be integrated (NEST, industrial grants and the establishment of junior research groups in the Marie Curie Mobility Programme, access to infrastructures).

Lean management – autonomous project selection

Top-quality research is characterized by a high level of dynamism, inter-disciplinarity, and an increasing blurring of the boundaries between basic and applied research. These demands must be met by ensuring efficient and flexible research management and, in particular, uncomplicated and transparent application and selection procedures. The framework conditions on which the funding activities of the European Commission are currently based are not particularly suited for these purposes. It is, therefore, necessary to establish new framework conditions for project administration. Scientists select the individual projects in a transparent selection procedure (peer review). Projects are submitted "bottom-up" within a topic area.

Concepts for establishing a European Research Council

Research funding organisations at national and European level should be charged with devising and managing the new activity of basic research. This could be organized largely autonomously in the form of a European Research Council (ERC), respecting the competence of the European institutions (European Council, Council, Commission). The research organisations are called upon to present clear concepts for the realization of this idea in advance, taking into account the points mentioned in this paper.

Selection of topics by consensus

Representatives of the fields of research, industry and politics must jointly identify forward-looking areas of research which should be dealt with within the framework of the new activities of basic research and assess these as to their fundamental focus. A clear specification of the interplay between the fields of basic research and the thematic priorities is of central importance in order to avoid the duplication of funding, to make the best possible use of synergies, and to guarantee an efficient transfer of technology. In this context, interaction with a large number of national funding activities is to be taken into account in order to ensure European value added.

Subsidiarity of national and EU funding

The Member States continue to be responsible for providing an efficient national basis, including the corresponding research infrastructure, as the basis for first-rate European basic research. In this context, the EU Structural Funds should be used increasingly in the field of research and development in order to extend the basis for successful involvement in competitive research projects.

Evaluation

An independent evaluation of the new activity should take place after three years. After this period, the activity can only be continued if science, industry and politics are entirely positive about the results achieved to date.

Formal Submission by Slovenia

Q. 1 Is there a consensus at the Symposium that there is a significant gap in excelence in basic research developing between Europe, the US and elsewhere

There is a challenge for Europe on the global level to improve excellence in basic research, because there is still a difference between the most developed parts of the world on this particular type of research. But the balance between the two stands - one which acknowledges the most important meaning of excellence a the factor of competitiveness and the other which keeps in minds also other agents, should remain the most important feature.

Is the level of excellence in research in Europe declining while the level of excellence in research in the US, Japan and other regions is increasing? Is Europe a less attractive location for world-class researchers What are the principle causes of the gaps in research excellence? Is it due, for example, to lack of competition in Europe?

Q. 2 On the basis that a gap exists, is it of a scale that is critically impacting on enterprise development and European competitiveness?

The main objective of the basic research is the aim of reaching the knowledge based society, as it impacts the society as a whole, in all sectors, also in the sector of the sustainable economic development. Therefore it is important to gain support for involvement of the private sector and promote the on-going growth of the enterprises. The high-tech industry should be accomplished by the common base of best quality researchers all over Europe and reach out for the fulfilment of the need for innovation.

Is Europe an increasingly less attractive place for industry to carry out leading-edge research? What are industry's requirements in terms of research excellence in Europe? Is the shortage of excellent researchers a potential danger for Europe?

Q. 3 What should the vision for Europe be in relation to basic research for 2015?

Europe should promote and support basic research with the impact on competitiveness, growth and quality of life, through the following outstanding issues: supporting research careers and training of the researchers, stimulating the world class excellence in all sectors, improving the use of the results with particular role of the universities and co-ordinating European, national, regional and global levels.

Q. 4 Is there a need for a new initiative at European level?

There is a strong need for the initiative at the European leve, having in mind the analysis of the pre-existing national policies, while incorporating the basic research in more intense way to the next framework programme. Beside, it is of crucial importance not to overwhelm the content of the next framework programme with this sole issue, but to find other proper bodies, public autonomies, mixed actor systems for supporting the excellence in the basic research on all levels of the scientific and innovative areas. The objective should therefore lead to the common innovative environment, where the leading role of the best researchers with adequate support, should be constantly recognised.

Is the gap in research excellence an issue that can be resolved at national levels? Is there a need for a new initiative at European level and what should the objectives, scope and scale of a European iniative be?

Submissions by Organisations

Submissions

ALLEA (All European Acadamies)
European Science Foundation (ESF)
and ST MicroElectronics

Submission by ALLEA (All European Academies)

Excellence and Equal Access to the European Research Area

Position paper with regard to the further development of the European Research Area after the incorporation of the Accession Countries into the European Union.

All European Academies (ALLEA)

This memorandum forwards some ideas on the potential tension between the principle of competition for excellence and the objective of equal development with respect to the further development of the European Research Area and the funding of European research.

The incorporation of the Accession Countries (AC) into the European Union by May 1st, 2004 will have a profound impact on the further development of the European Research Area (ERA). First of all, it will result in a significant increase in human research potential (to be assessed at 200,000). This increase concerns, in particular, younger researchers, given the substantial growth of students applying to universities in these countries in recent years. On the other hand, the general level of R&D infrastructure in the ACs is significantly lower than in the present EU countries, due to lack of resources and other urgent social and economic needs in a period of transformation, especially the R&D expenditure in the industrial and private sector, and, consequently, the level of applied, industry related research is relatively low. A fortunate circumstance is that networks of high-level research institutions (mostly at the top universities and research institutes of those Academies that decided to retain their research part) in AC's already exist, presenting a significant potential for multi-lateral collaboration and world class research. Some of them have already received the status of 'centres of excellence' from the EU and, in the long run, will become natural linkage points.

One particular subject in which the potential tension between the principle of competition for excellence and that of equal development may become explicit is that of the envisaged European Research Council. According to the European Research Council Expert Group (ERCEG), the establishment of a European Fund for Research Excellence and the further creation of a European Research Council (ERC) to manage the Fund is a crucially important step to be taken in order to achieve the goals set by the Lisbon Summit for Europe to become the most competitive and dynamic knowledge-based economy in the World. The first and main task of this ERC is to support investigator-driven research of the highest quality in Europe selected through a competitive process of international peer review.

In the preliminary reactions of the European Commissioner Busquin and the Director of DG Research, Mr. Mitsos, to the work of the ERCEG, and in their further views on the European funding of fundamental research, emphasis is repeatedly being placed on the idea of fostering basic research solely on the basis of competition without a requirement of collaboration or the fair distribution of funds between Member States. As the sole criterion for the acceptance and funding of research proposals, open competition, international peer review, and scientific quality undeniably comprise a sine qua non for the promotion of top-level research in Europe.

At the same time, it should be acknowledged that an exclusive emphasis on top quality and competition for excellence may not contribute to the realization of another important objective for Europe's scientific development. That objective is to assure that the growth of science and technology in the Accession States (and, eventually, in the other Eastern European countries) is accelerated, so that in due course these countries have equitable opportunities for scientific development that are comparable to those in the Western European states. The final report of the

ERCEG (The European Research Council; a Cornerstone in the European Research Area, Copenhagen, Dec. 15, 2003) also recognizes this danger in its discussion of the tension (at least in the short term) between the primary objective of the ERC, pursuing excellence in basic research, and one of the additional tasks, making better use of and developing the scientific potential of weaker regions, geographically or thematically. Due to less favourable economic conditions and sub-optimal infrastructures, many excellent scientists in Central and Eastern countries cannot compete on an equal footing with their Western colleagues.

Such a situation is objectionable not only for reasons of fairness and solidarity, but also for reasons of benefit and self-interest of European science: we need to mobilize all the scientific expertise available (cf. ALLEA's reaction on the ERC-proposal). This concern is even more pertinent in the pre-Accession Countries, as well as other European countries, that envisage joining the EU further into the future. As said, many of the Central and Eastern European countries have an increasing number of well-trained, highly motivated students. Moreover, a great deal of these students have a strong interest in science and technical subjects - an interest which is declining at an alarming rate within the student population of Western Europe.

The same concern was raised in a recent open letter to Research Ministers in the EU Member States, written on behalf of the major European academic and research organisations (All European Academies (ALLEA), the European Science Foundation (ESF), the European Academy of Science and Arts, Academia Europaea, and Euroscience) stressing the need to make the "Constitution for Europe" more useful to the scientific community in an enlarged Europe. The letter articulates the desire of the European scientific community to alleviate the threat of creating a situation in which parts of Europe cannot participate in the envisaged acceleration of the research efforts. The scientific communities of the periphery countries and regions must be well integrated into the European mainstream of research.

The European Parliament has expressed similar concerns. This has become apparent in a recent report "On investing in research: an action plan for Europe" (COM (2003) 226 2003/2148 (INI)) of the Committee on Industry, External Trade, Research and Energy. The Report argues that in view of the EU's growing global responsibility, international research cooperation should be intensified. In this connection great importance is attached, among other things, to increased cooperation between Member States and Accession Countries. In an explanatory statement, the Report defends the claim that "....even if the applicant countries were to raise their expenditure, they would still be dependent on additional help from the EU.....".

The issue being addressed in this memorandum was discussed by a number of representatives from Research Councils and Academies of Science at the recent General Assembly meeting of the ESF, Nov. 27-28, 2003 in Strasbourg. There, the following views and suggestions were brought to the fore:

With respect to the envisaged funding of fundamental research within the scope of the ERC, no compromise or concession should be allowed as far as the requirement of scientific excellence is concerned. Grants and subsidies should be given only to the best proposals and the best researchers or research groups in an open competition and based on reviews by international panels;

The same uncompromised criterion of quality should be applied to the granting of scholarships for the promotion of talent (Curie type programmes);

The disadvantaged position of scientists from a number of Accession and pre-Accession States with a less favourable economic status is, however, cause for concern. The general view was that specific measures should be taken to ensure that these countries are able to gain on Western European countries. It was also argued that such measures should be temporary ones, since there is no reason to assume that these countries will not draw level with the rest of Europe in due time.

In line with these views, the following recommendations were made:

In order to make the environment for research more equal throughout Europe a part (say 10%) of the structural funds (in particular the European Regional Development Fund) should be reserved for research infrastructure in the Accession Countries. At present such funds are largely used by the receiving countries for purposes of building physical infrastructures, such as railways, roads, etc. Earmarking for the benefit of research facilities could also improve "roads for Europe" - but this time roads for brains rather than for cars. Means should be explored to intend (as a strategic demand or by agreement) an appropriate share of the Structural Funds for research, higher education and innovative infrastructures. It will also be clear that the matching condition for these funds would mean a disproportional encroachment on the already very modest AC R&D budgets, and that exemption of this requirement should be considered;

A share of the coordination funds (coordination of national research priorities) should be reserved for collaborative agreements with (pre-) Accession Countries;

Part of the Social Funds should be used to make up arrears with respect to the quality of secondary school education in science in Accession Countries. This could be accomplished by means of a programme for upgrading of science teachers, and particularly for those based in rural areas;

In order to counteract the danger of brain drain, which, on a large scale, is detrimental for many pre-Accession Countries, some of the scholarships for young researchers should be awarded within the country of residence. Such scholarships should include support for infrastructure, so as to make the research environment "at home" more attractive. Alternatively, scholarships that enable researchers to spend a number of years in a laboratory in another country, should provide support for their return (including employment for a specific period of time, as well as support for infrastructure and facilities). Some remedy instruments created within the FP6, including the centres of excellence programme, return grants, and bilateral research grants (with at least one partner from the current 15 EC members and one from the 10 AC's) should be continued;

With an eye on specific needs and potential contributions of Accession countries, participation of experts from these countries in European planning, advisory, and review-committees should be warranted and encouraged. They are the persons par excellence who can bring in the necessary information and insight with respect to these countries. In this connection, it may be noteworthy that EUROHORCS have started an initiative to map out the status of review systems in various Accession countries, and to offer assistance when desired;

An over-emphasis on young researchers (Curie fellowships and others) in Accession Countries could have negative consequences for the necessary support of the older middle-range researchers - who are often lagging behind, but who are still responsible for managing and monitoring the research of younger staff members. In terms of the age of grantees leniency could be prudent;

The goal of preparing and upgrading pre-Accession States may be best served by using Central European States as intermediaries. Scholarships and grants, as well as support for collaboration between those countries and the stronger and larger States like Poland, Hungary and the Czech Republic, could create a good intermediary stage on the road towards equality within the greater Europe;

Let high profile research institutions in Accession Countries, including the national Academies of Sciences that have successfully made the transition to a new definition of tasks and different financial ruling, be involved in internal European Union grant procedures (for both students and researchers) as well as in the monitoring of the process. They know best how these programmes and grants could best fit the needs of the country.

We express the hope that (some of) the measures suggested above will prove feasible, and that their acceptance and implementation will contribute to the alleviation of the fear of a European science divide after May 1 and in later years.

Amsterdam, Jan. 5, 2004, Prof. Dr. Pieter J.D.Drenth, President ALLEA.

Submission by the European Science Foundation (ESF)

Future Aspects on European Fundamental Research

Views from the European Science Foundation (ESF)

Background

The European Science Foundation (ESF) is committed to promoting high quality science at a European level. It is the European association of national organisations responsible for the support of scientific research. Established in 1974, the Foundation currently has 76 Member Organisations (research councils, academies and other national scientific institutions) from 29 countries. The ESF is a not-for-profit, non-governmental organisation, although its Member Organisations are usually publicly funded agencies. It maintains close links with other international bodies with interests in scientific research, including the European Commission.

The scientific activities sponsored by the ESF include research in the medical sciences, the life and environmental sciences, the physical and engineering sciences, the humanities and the social sciences. In these domains, five disciplinary Standing Committees, composed of leading scientists nominated by the Member Organisations, are responsible for identifying scientific priorities, formulating strategies and developing the research agenda. In addition, a number of Expert Committees provide further advice in areas requiring specific attention.

The ESF works with two communities, its Member Organisations (funding agencies, national research organisations and academies of sciences and letters) and the European research community at large, which ESF and its Member Organisations exist to serve. More recently, the collaboration with the European Commission has become more pronounced, not least through ESF running the COST office in Brussels.

Scientific Activities

Within its new Action Lines, as set out in the ESF Plan 2002-2006, the principal instrument is EUROCORES (ESF Collaborative Research Programmes). The aim of EUROCORES is to provide a variable geometry mechanism for funding basic research at the European level. Within the first two years already 15 EUROCORES are either in development or up and running. EUROCORES aims to coordinate national research funding in the Member Organisations on priority topics through a common call for proposals and a single peer review system. As part of the aims of the 6th Framework Programme activity to encourage closer cooperation between research funding agencies, the EUROCORES scheme will receive a grant of up to 20 million euros for the period 2003-2006. This will help to further develop EUROCORES as a major funding initiative for fundamental research in Europe.

Based on an initiative by EUROHORCs, and with additional support from the European Commission, ESF has established a new European research funding instrument: the European Young Investigators Award – EURYI Awards. The aim of EURYI Awards will be to assist in promoting careers in Europe of outstanding young researchers, irrespective of their nationality.

Another new Action Line being developed by ESF is that of ESF Scientific Forward Looks. They will enable Europe's scientific community to develop medium to long-term perspectives and analyses of future research developments in multi-disciplinary topics viewed from a European level and to interact with the policy makers from ESF Member Organisations.

ESF Exploratory Workshops enable scientists to come together and to examine topical scientific issues. They frequently lead to further collaborative action on a longer-term basis.

Other ESF instruments include Scientific Programmes, which are longer-term coordination and networking activities focused on specific themes. They bring together substantive research projects carried out by multi-national teams of researchers with participation from an average of ten countries, and may include limited fellowship schemes.

One of ESF's most successful and visible ventures are the European Research Conferences (EURESCO), which consist of series of top-level scientific discussion meetings in all areas of research. The aim is to stimulate free discussion to explore research frontiers. Younger researchers are especially encouraged to participate in discussions with leading experts in a specific field. The ambition is to create a European alternative to the American Gordon Conferences.

ESF Present Position

ESF looks very positively on the policy paper on fundamental research as recently outlined by the European Commission. It is our firm opinion that investment into fundamental research is of crucial importance for Europe, not least for development of the human capital and improving innovation for the benefit of industry and society. This conviction led ESF in 2002 to establish a high-level group to explore the possibility of creating a European Research Council (ERC). This group, under the chairmanship of Sir Richard Sykes, gave strong arguments and support for an ERC, and that document, together with similar documents from other organizations, paved the way for the creation of the so-called "Mayor Group" with a mandate to further investigate the ERC issue.

The Mayor Report and the Commission Paper provide a common ground for focusing on European Research Competition, thereby somewhat changing the original ERC concept. The view of ESF is that research competition of individual top class teams is a crucial addition to the ERA, with the potential of vitalizing European research as well as providing a benchmark for the national peer review systems. However, according to ESF, fundamental research in Europe needs more than a competition programme and issues relating to the scale and scope of research need to be addressed. It is, therefore, of interest to note that the Commission Paper on Fundamental Research contains several elements to promote fundamental research beyond the competition aspect. Thus, the prospect on an extended ERA-NET to provide funding for research in scientific networks could be a real asset. In fact, such funding could further develop the successful EUROCORES programmes.

It is the ESF view that the Commission's Policy Paper on Fundamental Research could provide a basis for a new kind of partnership between the Commission and the national funding organizations (of which ESF is an operational unit for multi-national networking research management and science policy activities). Such a partnership would, in a direct way, reduce European fragmentation, provide pan-European funding for research, as well as provide a crucial link between the Commission and the scientific community engaged in fundamental research. Such a new partnership could involve aspects of setting up and implementing the European Research Competition and running an extended ERA-NET programme. The joint competence and experience from the EUROHORCS and ESF would provide a solid pillar in such a partnership, but should not exclude the involvement of other organizations (i.e. EMBO, EUROSCIENCE) whenever appropriate.

ESF looks forward to further discussions with the scientific community, with national research funding organizations, as well as the Commission, during the coming year to provide a strong case for more emphasis on fundamental research in FP7.

BA/VSH
12.02.04

Submissions by Individuals

Submissions/Comments

Prof. Thomas Ebbesen (Comments)

Mr. Laurent Gouzenes, Italy (Submission)

Prof. Jean-Marie Lehn, France (Submission)

Prof. Alexander Tenenbaum, Italy (Submission)

Prof. U. Viesturs, Latvia (Submission)

Prof. Denis Weaire, Dublin, Ireland (Submission)

Prof. George Wick, Austria (Submission)

Comments by Professor Thomas Ebbesen, Université Louis Pasteur, Strasbourg

Issues that need addressing at the EU level:

ERC, A European Research Council:

Most European scientists in academia and industry are in favour of the establishment of a European Research Council dealing mainly with fundamental research. The justification for this has been presented in detail in a summary document by the ESF. Among other things it would make EU funding more responsive, more competitive and more efficient.

Marie Curie Intra-European Fellowships:

The Marie Curie Fellowships is one of the most successful and useful instruments of the EU. However, it remains insufficiently funded. Last year, this programme we awarded about 450 post-doc fellowships for the whole of the EU. This is a drop in the bucket compared to the needs. This should be expanded at least 5 fold, in particular, if the enlargement of the EU is taken into account.

Evaluation of EU Proposals :

Problem:

Currently evaluators are asked to come to Brussels with typically 3 to 4 weeks' notice and, then, are expected to spend a week there. The most active potential evaluators are not available on such short notice and for such a long time. In addition, the proposals are only provided to the evaluators when they arrive in Brussels.

Consequence:

The evaluators who have that kind of available time are often far from having the required expertise and the evaluation process is seen by a majority as being a random process at best.

Solution:

Contact the potential evaluators much earlier, provide documents in advance of meeting in Brussels so that the period spent there is reduced to a couple of days. This is what is done at the NSF in the US for similar situations and, nationally, in many EU countries.

Intellectual Propertty Rights I:

Problem:

Although Knowledge generated under contracts belong to the Contractors, under regulation* pertaining at least to the NoEs, the Knowledge is now managed by the Commission:

If a Contractor does not intend to protect Knowledge, the Commission must be given 45 days' notice so that it can decide whether this was an appropriate decision or not;

The Contractor must give a 30 day notice prior to any planned publication to the Commission, and may request a copy of said publication at which time it has another 30 days to decide whether it will adversely affect protection of Knowledge.

Comment:

The Contractors know better than anyone if the Knowledge can be protected and if it is worth it. As a consequence, EU scientists are held back unnecessarily by such useless bureaucratic control and waiting periods. They may lose out to competitors in the US or Japan who have no such restrictions. Finally such policy scares away the best scientists from seeking EU contracts.

Solution:

The Commission should change the rules and allow the Contractors (whether academic or corporate) decide about the protection of Knowledge as is customary in other major industrial countries.

* see section II.32 and II.33 Annex II (General Conditions) Decision C(2003)3834 dated 23.10.03)

Intellectual Property Rights II:

Problem:

Every EU country has different patent laws. The national laws are often in contradiction which each other which adversely affects EU collaborations. For instance, patent laws in some countries require that its citizens patent first nationally. So two parties collaborating from two different countries cannot patent something together without violating the law in at least one of the two countries;

In the USA, a planned publication can be submitted the same day as a Provisional Patent Application (PPA) and to a journal. The PPA gives the authors protection for one year to decide whether or not to patent the information contained in the planned publication. So US scientists can be first to publish and first to patent. The PPA is also very inexpensive (a few hundred dollars). So European scientists are at a tremendous disadvantage compared to those in the US or Japan.

Solution:

Europe needs an EU-wide patenting area with a single patent law. It will render EU patenting more efficient, less expensive and more competitive.

Such EU-wide patent law must include a PPA system as in the US.

Submission by Dr. Laurent Gouzenes, STMicroelectronics, France

Group VP, Planning and R&D Manager:

Q.1 Is there a consensus at the Symposium that there is a significant gap in excellence in basic research developing between Europe, the US and elsewhere?

Is the level of excellence in research in Europe declining while the level of excellence in research in the US, Japan and other regions is increasing?

The metrics of excellence are numerous (number of Nobel Prizes, Fields medals, number of papers, technical patents, citation indexes, balance of technology payments, number of companies or employees in high-tech fields, public and private R&D spendings…), and taken abruptly, they do not position Europe as the most efficient Continent. However, many of them can be discussed on a matter of methodology. We could even argue positively about the high level of excellence in Europe by the high export rate of very good students at high salaries to the USA!

Public R&D spending is clearly a widening gap between USA and Europe : more money for research means also more brains and equipment for research and, ultimately, results.

It seems that there is a clear gap in some critical fields for the future, notably in computer science and information technologies (as seen from our point of view).

A more detailed assessment should be done and presented.

Is Europe a less attractive location for world-class researchers?

Europe has a lot of potential for world-class researchers, far above the others regions. First, because of its size, general level of education and cultural history, Europe is by far the largest area with the largest quantity of educated people going to upper education. Europe has also a huge multi-cultural heritage in a small span of space, making it a extremely rich cultural environment. Europe has a tradition of democracy, freedom, safety for its citizens, culture of knowledge, generous and effective health care, free education for kids and social networks that are also very attractive, and that put it ahead of other areas.

However, this attractiveness has to be modulated for the activity of researchers:

- *Advanced research requires more and more advanced equipment for performance, notably the availability of well and very well equipped, but also costly research bases. Critical size matters and due to dispersion, many European centers and budgets do not match the US or Japanese centers;*
- *Europe lacks some very visible, pluri-disciplinary attractive centers like the Boston Area or the Silicon Valley;*
- *similarily, many possible jobs in the same place for career management allowing people to do research, but also to go to industry or education, create a start-up, etc. Europe has dispersed forces and areas;*
- *levels of salaries, which are quite low as compared to other activities like marketing, finance, etc. : ambitious and scientifically able people do not necessarily enter research with a vow of poverty;*

- *language remains a barrier;*
- *present culture in the media does not promote neither technical culture, nor researchers and talented people.*

What are the principal causes of the gaps in research excellence?

1) Organization, not people: the lack of critical mass in some fields, with a lot of redundant research being done in many countries, do not allow researchers to compete with bigger and better organized countries.

2) Lack of communication and cooperation between institutes of different countries: all main research institutions have scientific committees. However, it seems that most of these committees originate from the same country, or have little European participation, thus reducing cross-fertilization of ideas and research programmes. A systematic European cross-participation in these scientific committees should be encouraged.

3) Absence or significant gap in strategic fields in basic science and equipment.

For example, the gap in computer science and high performance computing has deep consequences on many fields of research. Computer science and supercomputing are pregnant in many fields of research: because science is about developing understanding and then prediction methods, and because complex predictions can be calculated only with computers, high performance computer modelling becomes mandatory for the understanding of complex processes (climate modelling, protein folding, nanotechnology simulations…). For this reason, the gap in very high performance facilities in Europe should be a real concern.

Is it due, for example, to lack of competition in Europe?

The real competitors for Europe are outside: USA, Japan, and now China.

Q.2 *On the basis that a gap exists, is it of a scale that is critically impacting on enterprise development and European competitiveness?*

Is Europe an increasingly less attractive place for industry to carry out leading-edge research?

It is difficult to assess a global position for Europe, given so many fields of research and industrial activities.

European industry has leading positions in many fields (aeronautics, automotive, energy efficiency …), which means that research done in Europe has advantages and fields of excellence.

In particular, in the very competitive field of microelectronics, the ST/Philips/Motorola technological research agreement shows the possibility to develop a structural advantage for research by combining joint forces, some of them coming from the USA.

What are industry's requirements in terms of research excellence in Europe?

Attractiveness for industry to leading-edge research is related to :

- *utility: adequate field of research related to industry needs, and in many cases in time with global markets;*
- *infrastructure: access to adequate specific equipments not available in industry for complementary studies;*

- *performance: access to most advanced knowledge in the field;*
- *accessibility: openness of the research organization to R&D collaborations;*
- *independence: access to a key technology not available otherwise, or not easily recreated (time/money).*

Flexibility and adaptability of public research are also key factors of success, for generating new fields of research: in the last 20 years, the US has succeeded not only in developing large, completely new, industrial corporations, but also large R&D laboratories on new topics which pave the way for future industry.

Is the shortage of excellent researchers a potential danger for Europe?

It seems that the largest difficulty in Europe is to attract and retain the most talented people to do research in public laboratories, to integrate them into dynamic structures and to give them responsibilities. This could be solved by proposing better recognition (public/access to research funds and pay-check).

Q.3 What should the vision for Europe be in relation to basic research for 2015?

Distinction between basic and applied research is becoming blurred, as basic research sometimes produces useful products, and applied research also produces a lot of knowledge. Europe should promote a target of excellence and competitive research versus other regions.

Europe should develop its research with the needs of its citizens in mind, and should not be a follower of the US or Asian countries:

- *Develop research in information sciences and technologies, so as to be able to become independent of US and Japanese advances and products which are critical for the development of our industry and the preservation of our cultural heritage. Matching the present technology gap will require a lot of basic and applied research;*
- *Develop the fields of energy production, savings and management which are critical for the wealth of the European citizens, and its relation to pollution;*
- *Develop the fields of life sciences related to health and food with the objectives to improve health and quality of life, and reduce costs;*
- *Contribute with co-operation at the World level for fundamental knowledge advances and where no short term applications can be seen (high-energy physics and astronomy, archaeology, species inventory, etc.).*

Q.4 Is there a need for a new initiative at European level?

Is the gap in research excellence an issue that can be resolved at national level?

No, due to external competition, European level is mandatory, and in this case and because of its size and general level of education, Europe could be in a winning situation compared to Japan or USA.

The European Research Council (ERC) is a good idea to promote the search for efficiency in the European research area: define objectives, avoid redundancies, create critical masses and knowledge networks …

Is there is a need for a new initiative at European level and what should the objectives, scope and scale of a European initiative be?

The target has been defined by the Heads of State and Governments of the European Union Member States at the Lisbon Summit in 2000: for Europe to become the most dynamic and competitive knowledge-based economy in the world by 2010. We can hope this target remains effective for a long time afterwards!

Defining the objectives of an initiative in research could lead to endless debates on allocations of resources and useful or not-so-useful research. However, we believe that the debate should be enlightened with the following facts:

- *Legislation and ethics are important factors for research, slowing or cutting down R&D efforts (ex: stem cells in France), or accelerating them (development of security efforts). For industrials, banning or defining markets by standards, normalization or laws means closing or opening a door for more research;*

- *Population problems and needs should be addressed: As an example, demography/aging population is driving all aspects of research (basic, applied, public, private) in medical, genetics, pharmaceutical, etc. fields, without clear cut distinctions between all these aspects. Other basic needs are mobility, communication, energy access, food, culture …*

Applied research in public laboratories can not sustain competitiveness without a significant industry trial base.

There is, commonly, a long and very expensive research path from public laboratory ideas to industrial products. Furthermore, for complex technologies or products integrating many scientific fields, a critical advance in a single field is often only a little part and step of the applied research and development to be done.

For these reasons, the 2010 target requires the cooperation of the three main actors (the citizens, research and industry) for developing goals and means to achieve them. For this reason, coordination of research should be done not only at the level of the ETP (Technology Platforms) that are currently in a set-up phase with the Commission, the industrials and the laboratories of a given field, but also at the higher level: there should be representatives of industry on the ERC.

First actions of the ERC, among others already proposed, could be :

- *Developing metrics of comparison, setting up a benchmarking methodology and activity should be a prioritized action organized by the ERC, which should mix classical parameters of science performance (publications, patents) with economic parameters (patents revenues, total industrial revenues, valuation of companies …) and social parameters (effective gain/utilization for the citizen);*

- *Restore confidence in the research system: Europe should be proud of its researchers and of their works. An inventory should be done and promoted (highly publicised prizes, …) on a yearly basis. Develop a culture of excellence in research at the European level in more fields.*

Submission by Prof. Jean-Marie Lehn, Universite Louis Pasteur, France

BASIC RESEARCH

Basic research needs strong and lasting support, whether by national funding agencies or by providing support to collaborative basic research.

Basic research is the source form which all the rest proceeds.

It is the source of:

- *new KNOWLEDGE*
- *new TECHNOLOGIES*
- *INNOVATION*

Knowledge-based economy can only exist if new knowledge is produced.

The correct attitude is to await what one has not foreseen (to parapharase the philosopher Alain) and not to ask for immediate return.

- *It is essential to strongly INCREASE FUNDING either within the Member States or at the EU level.*

Some Actions

a) EVALUATION, perform per-review on the European scale:

- *either by EU committees; use EU, USA, Japan experts (Fund ALLOCATION by ESF);*
- *or, by including foreign scientists in national panels;*
- *promote the best and make the process highly competitive.*

b) HARMONIZATION
OPTIMIZATION of EFFICIENCY of programmes of the national research agencies:

- *maximise synergies;*
- *one country may take responsibility for managing a given programme.*

c) MOBILITY:

- *at the post-doc level;*
- *but, also, at the PhD student doctoral level;*
- *very important, but it is a means rather than a goal.*

Means for improving, helping Basic Research in the EU

- *select and invest in the Best Brains;*
- *couple Research and Higher Education;*
- *support Young Scientists;*
- *set up powerful Infrastructure;*
- *link to Innovation Industry.*

Quality First

INVEST in the BEST BRAINS and let them do whatever they want.

QUALITY must come FIRST in selection of people and projects.

Research Infrastructure

State of the art research infrastructure is crucial. It should be set-up

- *locally for small and medium-size equipment so as to optimize efficiency;*
- *bi or multi-lateral or EU-wide funding should be a must for large and very large equipment centres. Means must be found to reduce the risk that such centres become too large, heavy and difficult to manage.*

Higher Education

Research/Teaching

I personally, and with many others, do not favour pure research institutions/organizations or lifelong research-only positions.

Research must be directly linked to the universities. All researchers should participate in teaching to an extent which should be adaptable to the activities pursued.

The question is not whether researchers should teach, but how much?

Excellence in research should be grounds for diminished/smaller teaching load.

I suggest that one extends to the European scene the Institut Universitaire de France (IUF) scheme (wherever and whenever it is desirable):

- *set-up an Institute without walls, European University Institute (EUI, Institut Universitaire Européen: IUE);*
- *select its members on the basis of quality first;*
- *provide specific funding;*
- *positions limited in time, for instance*
  senior chairs: 5 years term, twice;
  junior chairs: 5 years term, once;
- *strongly reduced teaching load (for instance 1/3 of "normal" load);*
- *provide the University to which a member belongs with support for the teaching to be compensated for.*

Young Scientists

It is crucial to give young scientists as soon as possible:

- *independence and support;*
- *generating responsibility;*
- *implying evaluation.*

No acquired advantages:

- *set up a scheme for supporting young highly promising scientists;*
- *promote mobility by rewarding departments hiring young scientists from another country.*

Industry/Technology/Innovation

Industry reduces its in-house long-range research:

- *basic, long range research must be done at public institutions, universities or research centres;*
- *set-up conditions for the creation and facilitate the formation of start-ups by appropriate legislation and by providing matching funds;*
- *give return to those who dare.*

Innovation in large companies occurs more and more by acquisition of start-up i.e. by in-sourcing:

- *The innovation path in the future:*
  Basic research fuels;
  HighTech Ventures - Innovation.
- *Set up an EUROPEAN VENTURE FUND to promote the creation of high-tech start up companies;*

- *provide recommendations for university/company relationships and for conflict of interest issues;*
- *give financial advantages;*
- *facilitate participation of researchers/professors in start-up companies.*

The Light Motive! (leitmotiv):

- *make the administrative rules and procedures LIGHT ! LIGHT ! LIGHT;*
- *reduce administration and paperwork to a bare minimum.*

The Wider Scene:

- *widen the scope to European Area of Education, Research and Technology, E R T.*

Education of broader public in science, also in order to infuse a scientific attitude:

- *rational;*
- *supra-national;*
- *without barriers of nation, race, religion, etc.*

Science and Research

Represent a major factor and actor for European integration, for Europe's Future.

Submission by Prof. Alexander Tenenbaum, Italy

In my capacity as Italian delegate, I would like to have the following two issues circulated among the Ministers and the participants to the workshops of the Symposium.

A) Is the European Research Council (ERC) a new structure - the best answer to the challenge of raising the level of basic research in Europe? Instead of creating a new structure, the cost and the efficiency of which has still to be evaluated, why not rely on (improved) existing structures and procedures of the EU?

B) The proposed structure of ERC, and the procedures for assigning grants, raise the danger that resources will be drained from the weaker to the stronger regions within the EU. This could create a two-speed system, instead of supporting the integration of all parties in the European Research Area. This danger is openly acknowledged in the Report issued by the ERC Expert Group (in Annex 1), but there is no credible mechanism - within ERC - to avoid it.

Thank you for your help, and best regards.

Alexander Tenenbaum

Prof. Alexander Tenenbaum

Physics Department
University "La Sapienza"
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Italy

Submission by Prof. U. Viesturs, Latvia

ERTDI and INNOVATION PROBLEMS in ECONOMIES IN TRANSITION: The Case of Latvia

Key words:

Innovations, Technology transfer, IRC,

Technological centres, Business incubators, ERTDI

(+ I) P system in Latvia,

RTDI performance, IP Protection and trade/enforcement, where:

E - higher education,

RTD - development of technologies /products/, services,

I - implementation,

+I - special methods (innovations) for facilitation of implementation of RTD results.

P – production of something market value/demand having

For information, please visit:

http://www.lza.lv/viesturs/inn-1.htm

http://www.lza.lv/viesturs/inn-2.htm

http://www.innovation.lv/wif/default.html

http://www.innovation.lv/AAA_NIC_MK_ENGL.doc

http://www.innovation.lv/publications_ECTT.htm

Background and professional activities:

1) http://www.lza.lv/scientists/viestursu.htm

2) http://159.148.90.160/eng/izgudrotaji/viestursu.asp

3) http://www.internet.lv/btc/

4) http://www.innovation.lv/irc/Publikacijas/5/Default.htm

5) http://www.innovation.lv/irc/Publikacijas/6/KatowiceInternet.pdf

6) http://www.lu.lv/jauna/strukt/mbi/index.html

7) http://www.petpat.lv

Prof. U.Viesturs

Submission by Prof. Denis Weaire, Ireland

Enhancing the contribution of European professional organisations and academies

Numerous European professional organisations and academies have been founded in the last twenty years. Two examples are:

- *The European Physical Society (largely a confederation of national Societies, which retain an independent role);*
- *The Academia Europaea (an independent academy that aspires to playing a central role in European scholarship and providing high-level advice through workshops etc).*

Such new organisations have already contributed significantly to the cohesion of European scholarship and basic research, and they are ambitious to expand their scope and influence. There are serious practical obstacles to this process, which is painfully slow at present. Governing bodies and committees, drawn from all over Europe (in its widest sense), are difficult to coordinate and expensive to convene. Budgets are typically much smaller than those enjoyed by national organisations, and their inadequacy can even threaten extinction at times.

This is in sharp contrast to the United States where their more stable counterparts are:

- *The American Institute of Physics (subsuming the American Physical Society). Long established, large, well endowed, with worldwide influence and membership;*
- *The National Academy of Sciences. High prestige. Recognised as a major source of expert, authoritative information and advice.*

It should be an objective of European policy to strengthen and support those independent European organisations that can best serve the further development of European research by creating a more effective community, running international conferences, offering advice, and representing Europe at a global level.

Already they benefit from opportunistic support for specific actions/projects. This mode of support is very appropriate, but it should be greatly enhanced and extended to include comprehensive multi-annual programmes, in order to create a much greater "market" for such funded activities, within which the organisations might compete.

Submission by Prof. George Wick, Austria

Q.1 Is there a consensus at the Symposium that there is a significant gap in excellence in basic research developing between Europe, the US and elsewhere?

[Is the level of excellence in research in Europe declining while the level of excellence in research in the US, Japan and other regions is increasing? Is Europe a less attractive location for world-class researchers? What are the principal causes of the gaps in research excellence? Is it due, for example, to lack of competition in Europe?]

There is certainly a widening of the gap between the level of excellence of the research in the US and Europe. Since scientists are not only devoted to research, but are also human beings with extracurricular activities, families, etc. it seems to me that – in addition to working conditions and scientific climate – general living conditions are also an important factor to be considered when discussing the question of an attractive location for world class researchers. Although the professional conditions are much better in the US, including financial support of basic research, the private living conditions are certainly more attractive in Europe. World class researchers obviously allot greater importance to working conditions than to living conditions and this is the main reason for the past and present brain drain. Thus, if working conditions - especially infrastructure - could be improved in Europe the fact that living conditions are better here than in US may not only prevent the brain drain but also bring back scientists from abroad.

One of the reasons why European science lags behind that in the US certainly is the lower degree of competition, a problem that will be ameliorated after establishing the ERA.

Q.2 On the basis that a gap exists, is it of a scale that is critically impacting on enterprise development and European competitiveness?

[Is Europe an increasingly less attractive place for industry to carry out leading-edge research? What are industry's requirements in terms of research excellence in Europe? Is the shortage of excellent researchers a potential danger for Europe?]

Again, the most attractive sites for industry, in principle, had been officially identified to lie in Europe rather than in US or Japan from the viewpoint of living conditions, traffic connections, etc. However, there seems to be less scientific entrepreneurship in Europe. This is in part due to the relatively low number of scientists. In addition, European scientists and industries, respectively, are less flexible. Thus, there is less readiness for transdisciplinary research, e.g. cooperation between social scientists, mathematicians, biologists and medical doctors to solve problems that are centred to stakeholder demands, such as e.g. those concerning problems of aging.

Q.3 What should the vision for Europe be in relation to basic research for 2015?

The idea to establish an ERA is certainly a great step forward in strengthening European basic research. Furthermore, as the President of the Austrian Research Fund, I am delighted to see my constant argumentation towards politicians reflected in the recent document "Europe and Basic Research" issued by Commissioner Busquin propagating a shift of funding from applied to basic research. If this paradigmatic change is executed throughout the EU Member States, the scientific gap between Europe and the US will certainly diminish. Furthermore, as again demonstrated by the US and Japan, economic prosperity follows basic scientific achievement.

My vision for basic research in Europe in the near future is the following:

strong national research achievements via better funding allowing for unified progress within the ERA.

Q.4 Is there a need for a new initiative at European level?

[Is the gap in research excellence an issue that can be resolved at national level? Is there is a need for a new initiative at European level and what should the objectives, scope and scale of a European initiative be?]

The establishment of an European Research Council (ERC) similar to the large funding agencies in the US (such as an NIH) is a good idea. However, I am afraid that this will entail shifting of money from the national funding agencies to a European level. This would be a completely contra-productive signal. The various Member States must have the opportunity and the means to identify and foster the brightest young heads and allow them to establish their own strong research groups before they become major players on an European and worldwide level. If such instruments are lacking, the most important factor, i.e. our human resources, will dry out. The success of applications to the ERC should exclusively depend on the scientific quality of the project without explicitly emphasising the aspect of networking.

Georg Wick, MD
President of Austrian Science Fund (FWF)
05.02.04

Annexes

Annex 1:
Symposium Programme

Day 1: Monday, February 16, 2004

14.00 -15.20 hrs

Welcome by Symposium Chairman, Dr. Edward M. Walsh,
Chairman of the Irish Council for Science, Technology and Innovation (ICSTI)

Research Excellence – Key Questions for Europe

Keynote Speakers

Prof. Sir Tim Hunt, Nobel Laureate and Principal Scientist,
Cell Cycle Control Laboratory, UK

Prof. Jerzy Langer, Academy of Sciences, Poland

Prof. Peter Nijkamp, President, Netherlands Research Council

Three Parallel Sessions

15.30-18.00 hrs

Three parallel sessions comprising mixed groups from different backgrounds to discuss the Symposium Questions.

Session 1:

Chair:
Prof. Sir Tim Hunt,
Nobel Laureate and Principal Scientist,
Cell Cycle Control Laboratory, UK

Session 2:

Chair:
Prof. Dr. Helga Rubsamen-Waigmann,
Vice President, BAYER AG, Head of Antinfactives Research

Session 3:

Chair:
Prof. Peter Nijkamp,
President,
The Netherlands Organisation for Scientific Research and Vice President EUROHORCS

19.30 hrs

Drinks Reception and Working Dinner

Host: An Tánaiste and Minister for Enterprise, Trade and Employment

Addresses by the following:

An Tánaiste and Minister for Enterprise, Trade and Employment, **Mary HARNEY, T.D. (Ireland);**

Claudie HAIGNERÉ, Minister of State for Research and New Technologies **(France);**

SAINSBURY OF TURVILLE, Lord. Minister for Science and Innovation **(UK);**

Day 2: Tuesday, February 17, 2004

08.30-09.30 hrs

Addresses by the following:

Maria van der HOEVEN, Minister for Education Cultural Affairs and Science **(Netherlands);**

Rimantas VAITKUS, Vice Minister of Education and Science **(Lithuania);**

Yiorgos LILLIKAS, Minister for Commerce, Industry and Tourism **(Cyprus);**

Bernd GENTGES, Minister for Education and Research **(Belgium);**

Martin FRONC, Minister for Education **(Slovakia);**

Michal KLEIBER, Minister for Science **(Poland);**

Jorge MOREIRA DA SILVA, Secretary of State and Head of Delegation **(Portugal);**

Pedro MORENES, Secretary of State and Head of Delegation **(Spain);**

Philippe BUSQUIN, EU Commissioner for Research **(EU).**

09hrs.30-10hrs.30

Feedback to Plenary Session from the Session Chairs and Plenary Discussion

11.45-12.15 hrs

Preparation of Symposium Conclusions by the Session Chair

12.15-12.45 hrs

Presentation of Symposium Conclusions

12.45-13.15 hrs

Address by Mr. Achilleas Mitsos, Director General for Science, Research and Development, European Commission

Annex 2: Steering/Organising Committees

CONNOLLY, Mr. Enda, IDA Ireland

ENGLISH, Mr. Michael, Office of Science and Technology, Department of Enterprise, Trade and Employment (DETE);

HALPIN, Dr. Killian, Forfás

HUGHES, Mr. Declan, Forfás

LYNCH, Ms. Josephine, Forfás

McCABE, Mr. Mattie, Science Foundation Ireland

O'DONOGHUE, Ms. Kathy, Office of Science and Technology, DETE

O'MORÁIN, Mr. Feargal, Enterprise Ireland

SLEVIN, Prof. Jim, Royal Irish Academy

With the advice of

BREEN, Ms. Clare, Forfás

COSTELLO, Dr. Gerardine, Forfás

CUSACK, Dr. Lucy, Forfás

GRACE, Ms. Anne-Marie, Office of Science and Technology, DETE

KENNEDY, Dr. Sinéad, Forfás

KERRIGAN, Ms. Marion, Forfás

QUINN, Ms. Deborah, Forfás

Annex 3:
Background Documentation for the Symposium

Lead Documents	*Date*	*URL*
European Commission Europe and Basic Research COM (2004) 9 of 14.1.2004	Jan. 2004	http://europa.eu.int/comm/research/press/2004/pdf/acte_en_version_ final_15janv_04.pdf
David Gronbaek **A European Research Council:** an idea whose time has come? Science and Public Policy (volume 30, number 6)	Dec 2003	http://www.ercexpertgroup.org/documents/gronbaek_article.pdf
The European Research Council Expert Group, chaired by Professor Federico Mayor Report: The European Research Council – A Cornerstone in the European Research Area		http://www.ercexpertgroup.org/documents/ercexpertgroup_final_report.pdf
Nobel Laureates Letter to Commissioner Busquin		http://www.embo.org/organisation/endorse/erc_endorse.php
European Community Competitiveness Council Extracts from Council Meetings: Competitiveness – internal market, industry and research, Brussels, 22nd September 2003 (page 32) & 26th November 2002 (pages 20-23)	Sept. 2003 Nov. 2002	http://ue.eu.int/newsroom/makeFrame.asp?MAX=&BID=88&DID=77295&LANG=1&File=/pressData/en/intm/77295.pdf&Picture=0 http://ue.eu.int/newsroom/makeFrame.asp?MAX=&BID=88&DID=73375&LANG=1&File=/pressData/en/intm/73375.pdf&Picture=0

Background Documents	*Date*	*URL*
UK Royal Society The future funding of the European science base: a Royal Society background working paper: V1.0 Policy Document 28/03	Jan 2004	http://www.royalsoc.ac.uk/files/statfiles/document-243.pdf
Report to the European Research Council Expert Group Towards a European Research Council: Structured Review of Evidence by Maria Nedeva (PREST), Barend van der Meulen and Remi Barre	Dec. 2003	http://les.man.ac.uk/PREST/Publications/documents/ERCEGreport.pdf
European Science Foundation ESF comments on the ERCEG draft summary report	Nov. 2003	http://www.ercexpertgroup.org/documents/esf_comments_on_erceg
European Molecular Biology Organisation (EMBO): EMBO and the ERC		http://www.embo.org/erc/indexa.html
European Life Sciences Forum-EUROSCIENCE Report on the ELSF-EUROSCIENCE Dublin conference on the European Research Council		http://www.euroscience.org/WGROUPS/SCIENCE_POL/Dublin2003report.pdf
EUROSCIENCE The position of EUROSCIENCE on a European Research Council (ERC) revisited	Oct 2003	http://www.euroscience.org/WGROUPS/SCIENCE_POL/ERC_update.pdf
European Research Advisory Board (EURAB) The European Research Council A Possible Implementation Model		http://europa.eu.int/comm/research/eurab/pdf/eurab-03051-implementation model recommendations.pdf
EIROforum Response of the EIROforum to the draft report of the European Research Council Expert Group		http://www.eiroforum.org/efpolicy/efpolicy_3.html
European Academy of Sciences and Arts Comments on the summary document of the European Research Council Expert Group		http://www.ercexpertgroup.org/documents.asp

European Life Sciences Forum European Research Council: the life scientist's view. A document from the European Life Sciences Forum based on consultations with the life scientists' community	Oct 2003	http://www.elsf.org/elsfbrochures/elsferc03.pdf
European University Association EUA Policy Paper concerning the establishment of a European Research Council: Systematic involvement of the universities in the debate	July 2003	http://www.ercexpertgroup.org/documents/eua._ercposition_final.pdf
UK House of Commons, UK Science & Europe: Value for Money? Sixth Report of Session 2002/03, HC Paper 386-1		http://www.ercexpertgroup.org/documents/euscience.pdf
Independent High-Level Study Group established on the initiative of the President of the European Commission, chaired by André Sapir Report: An agenda for a growing Europe: Making the EU Economic System Deliver		http://europa.eu.int/comm/dgs/policy_advisers/experts_groups/ps2/high_level_study_group_index_en.htm
Academia Europaea Towards a European Research Council: A further contribution to the debate		http://www.acadeuro.org/downloads/SecondAcademiaCouncil.pdf
EUROHORCS Declaration on reinforced research cooperation in Europe	May 2003	http://www.ercexpertgroup.org/documents/eurohorcs_declaration_0503.pdf
European Life Sciences Forum Life sciences in the European Research Council: Concrete proposals concerning grants, infrastructure and delivery mechanisms		http://www.elsf.org/elsferc/elsfercs2.pdf
European Science Foundation New structures for the support of high-quality research in Europe – a report from a High level Working Group constituted by the European Science Foundation to review the option of creating a European Research Council	April 2003	http://www.ercexpertgroup.org/documents/esf_position_paper_about_erc.pdf

European Commission Investing in research: an action plan for Europe COM (2003) 226 final	Apr. 2003	http://europa.eu.int/comm/research/era/3pct/pdf/action-plan.pdf
European Research Advisory Board European Research Council EURAB 02.055 Final		http://europa.eu.int/comm/research/eurab/pdf/recommendations3.pdf
All European Academies (ALLEA) European Research Council: Position of All European Academies	Nov. 2002	http://www.ercexpertgroup.org/documents/allea_erc_2002_nov.pdf
Conference organised by the Danish research councils, **Towards a European Research Area:** Do we need a European Research Council? Summary Report, Copenhagen	Oct. 2002	http://www.ercexpertgroup.org/documents/summaryreport_copenhagen.pdf
EUROSCIENCE Summary of positions expressed by EUROSCIENCE members with respect to the creation of a European Research Council (ERC)		http://www.euroscience.org/WGROUPS/SCIENCE_POL/ERC.pdf
For **individual contributions** to the ERC debate see: **1. European Research Council Expert Group website** **2. European Life Sciences Forum website**	Various dates	http://www.ercexpertgroup.org/documents.asp http://www.elsf.org/elsfercp.html