



Contents

Introduction
p. 2

Some perspectives
p. 2

Issues from the debate and some conclusions

- Are we daring enough – what do the words mean?
p. 4

- Reasons for conservatism and possible remedies
p. 4

- Time and timing
p. 4

- Tensions in the science system
p. 5

- Epilogue
p. 6

Saltsjöbaden International RTD-Policy Workshop – List of participants
p. 6

The European Science Foundation acts as a catalyst for the development of science by bringing together leading scientists and funding agencies to debate, plan and implement pan-European initiatives.

Foreword

Young people are probably the most valuable source of new discoveries in science. They are usually more adventurous and unconventional and are willing to challenge old established ‘truths’. Scientists are often in the early stages of their career when they formulate new ideas which later lead to paradigm shifts or a Nobel prize. Therefore, if we want to support creativity and progress in science, we must focus on young scientists.

When one looks at the funding agencies and academies throughout Europe, which act as “gatekeepers” for research, they may seem at times to be rather conservative and offer little support for the younger generation of scientists. Their judgement and priorities are very often based on open calls and peer review evaluation committees which ostensibly appear to be independent and fair. But this peer review system often tends to favour scientific projects with a high probability of success or applicants with an excellent past track record of performance. The committees that take the decisions consist of experienced people of high merit which, by their very nature, means scientists from the older generation – another factor in the conventional approach to science.

The problem of risk willingness is not only part of the generation conflict. Multidisciplinary science and new scientific fields suffer in that their new ways of thinking have to compete with more traditional activities. There may also be an in-built gender bias in the system. As we take risks we increase the probability of failure and, as competition for research grants grows fiercer and funds remain limited, it is difficult to propose a solution. Despite this, the problem must be resolved.

One of the solutions could be to look to the financial sector where venture capitalists are willing to accept success rates as low as 10-20% for new starting companies. The investor’s way

of dealing with the high risk is to spread their investments. This could also be applied to science where investments in high-risk scientific projects could be given a priority by special funding or by supporting feasibility studies.

For maintaining standards the critical peer review seems to be the best system available. At the same time we need to develop ways and means of exploiting all the creativity in science without losing quality control.

In recent years, the R&D systems have seen an increasing control by the politicians who feel that science and technology is a valuable instrument in their portfolio. The intrinsic value of science is often forgotten. Can we work upstream? Is it worth it? How can we let breakthroughs happen within the system? If we should be more daring, how? A sign of risk/daringness is to invest in basic research. This is exactly the opposite of what European governments’ trends have been, in general for the last several years. Permanent dialogue with young scientists should be established to listen, understand and put in place new approaches. Actions to cross age barriers should be promoted. Relaxing rigidity and becoming unbureaucratic would help, but do administrative systems allow it? Funding bodies need be more independent or be mandated to take risks.

The ESF itself, as an “association” of funding agencies and academies is also affected by the conservatism of the science system. It would be strange if this were not the case. Through partnership with our Member Organisations and other science-based organisations, we aim to make a contribution to the ongoing discussion, always with a European scope true to the ESF spirit. In particular, we hope to encourage and promote inter- and multidisciplinary and to ensure that, whenever and wherever possible, we support the younger researchers.

Enric Banda
ESF Secretary General

Introduction

An open and continuing discussion of key issues in research policy is of high importance for all involved in its formation, financing and organisation. This is the reason why the former Swedish Council for Planning and Coordination (FRN) took the initiative to hold an international seminar in Stockholm with the participation of key people from research councils, national research institutes and academies. In addition, representatives from relevant ministries as well as independent scholars were invited. The FRN was fully responsible for the meeting itself while being pleased, as an ESF Member Organisation, to run such an event in cooperation with ESF.

In March 2000, the theme was “Are we daring enough?”. It addressed the dynamics, or lack of it, in our national research systems. The central question was whether our systems are daring and receptive enough to new types of proposals, especially from the younger generation of researchers? Could our understandable care for “high quality” induce a bias towards conservatism?

This included discussion of issues such as:

- How do our respective national research funding systems cope with innovativeness and daringness, i.e. do we have institutional mechanisms to deal with these phenomena?
- How do we determine that applications for research grants really are innovative and not merely “strange”, i.e. are our quality criteria biased towards good but conventional science?
- What are the mechanisms through which the financing systems favour new young talents, maybe without track records, among peers who may have, possibly, fixed ideas about ways to implement quality criteria?
- Are our systems capable of identifying and funding a new “Einstein to leave his/her patent office” for research? i.e. how do we deal with “risky” new proposals which eventually have the potential to result in paradigm shifts?

The theme for the workshop “Are we daring enough?” thus related to the design of national and international RTD - and innovation-systems. The challenge of openness concerns new ideas,

new types of demands and new approaches by the younger generations. Are our systems really designed to respond flexibly to these challenges or are they conservative, safety-first and risk averse in character? What are the ways and means in different countries to innovate structurally to address these challenges? These are the topics which were dealt with in the workshop involving approximately 30 invited participants which showed the wide diversity of national and international experiences within the science system.

Professor Arne Jernelov
Secretary General, FRN

Professor Uno Svedin
Conference Coordinator

Some perspectives

Daringness does not always mean the same, over time, for the individual, an organisation or a network, research sectors or nations. The importance of the role of an individual is exemplified by the different meaning of daringness during a traditional research career that may span a number of roles including that of the young research student, the head of a university research department and a scientific advisor to government. The young scientist may be expected to take risks and be more daring although daringness often comes when one is in a secure position rather than having to conform in order to gain the security. Can an individual be too daring? Daringness for a newly appointed professor could be in taking high-risks with projects and methods but could also be that of delegating detailed control to and stimulating initiatives from co-workers and students. The head of department may face other problems of daringness. An example could be in developing partnerships with young organisations in a fast developing and entrepreneurial culture. The scientific adviser may face problems when he dares to show both positive and negative aspects of research progress to a Minister or other politician. The same issues apply to organisations, networks, research sectors or nations, especially if one considers the organisational history as parallel to that of an individual. For example, can a young organisation generally be more daring than an old one? Is it daring to initiate a new organisation or structure?

Daringness is often involved in transitions. On the individual scale the transition from “young and promising” to “experienced and established” researcher involves daringness both of the transiting individual and his organisation. Do the more experienced and established have the integrity and moral to let younger and promising possibly achieve more than they have done themselves? At the other end of the scale there are examples of whole nations being in transitional states. Daringness in this case spans the whole range of actions, including how and how fast to reform existing institutions and ways of working, liberalise legal structures and plan new investment. In particular, the need to sustain and even expand research budgets at a time of economic restraint is certainly a sign of daringness. The last point applies equally well to young people thinking about possible careers as well as governments balancing request from different sectors and to global companies investing in science world-wide.

There is also the special case of competition and cooperation between individuals, organisations, networks, sectors and nations. The European Union is a good example of competitors continuing to compete while submerging national identities in specific areas for a common goal or for competitive advantage at the global scale. This very complex mix of cooperation and competition suggests that, perhaps, it is possible to view the European Union as one of the most daring steps taken between nations. Similarly, the vision of the ‘European Research Area’ may be a daring step in the sense that it aims to get European competitors to cooperate in order to better compete on a global scale. It is also daring in the sense that it envisages comparisons and benchmarking where, before, there were only national guidelines, at best. Similar cases may apply to academia-industry relations; regional cooperation; research infrastructure; protection of intellectual property; reference systems; increasing mobility for researchers in all stages of their careers; developing new opportunities for young researchers and women in science; and many more.

Yet another perspective is the interplay between the individual’s curiosity and societal outcome as driving forces for research. On one hand, an individual can be very daring by carrying out high-risk research while, on the other hand, there is no guarantee that the outcome will receive attention and resources proportionate to its societal importance. Too many daring researchers

in a structure could be seen as a poorly managed research portfolio that does not result in equitable distribution of benefits or mitigate the social costs of technological change. The question of how can science and technology, so often rationalised in terms of contributions to economic growth and societal needs, contribute its utmost to a myriad of widely-distributed, highly-beneficial outcomes is another matter for debate. The question may be posed as “ Who is daring to finance what and under which conditions?”

At times, small changes can make a significant difference, even within traditional systems with conservative tendencies. For instance, one could set aside a certain amount of budget for redistribution among and across the disciplines on a regular basis. Another example could be to have a small percentage of the total competitive budget earmarked for new, young applicants. While all applicants are reviewed at the same time, the key factor for the young proposers must be research potential.

On the risk side it may be noted that that a powerful personality in a key position can have a major effect on an organisation. Therefore, when it comes to funding high-risk research, it is necessary to evaluate the person or persons behind an application according to originality of ideas, cogency of their arguments, capacity to inspire co-workers and others as well as their scientific skills. This might well require a procedure involving interviews as a matter of routine.

Another thread in the discussion was the interplay between the research system and the society as a whole. Of special interest is the demographic change which is occurring. These changes have several implications such as shortage of new people entering the science system in Europe, increased international migration, severe competition between commerce, industry and academia for top talents, differences in interests between young and old, women and men, different ethnic groups and many other challenges. How should one meet such possibly contradictory demands? There is always a national interest in providing a return to the national tax-payer while, at the same time, encouraging international contacts and interaction as a necessary element in high-quality research and in sharing costs. The list of contradictions is long but the conclusion is simple: We need different tools for different aims and for different stages in the development of a research career, scientific field or funding strategy.

Issues from the debate and some conclusions

1. “Are we daring enough” – what do the words mean?

Who are “we”?

Is it the scientists? Is it the heads of university departments or even Rectors of universities? Or is it the science managers and advisers in the national funding agencies – or even the ministers of research? It was agreed that it pertains to all roles and levels.

What is meant by “daring”?

There are many words in the English language that are (almost) synonyms. It could be “bold”, “adventurous”, “unconventional”, “reckless”, and “courage in taking risks”. If we follow a line of thought that could read “Daring” as “taking risks”, then that means facing gains or losses. The further implication is that of development of criteria for determining success and failure. Both reflect the goals which have been set, either externally or internally and benchmarks are needed to measure them.

Conclusion

- NO, we are not daring at all!
- NO, and the answer is already implicit by posing the question. An interesting issue is why research funders should now be concerned about the topic. It is, perhaps, the recognition that the issue needs to be addressed in order to re-invigorate the science system.

2. Reasons for conservatism and possible remedies

The participants endeavoured to identify reasons for conservatism in the science system while, at the same time, trying to see how these problems could be overcome.

Reason

A. Rigidity and conservatism in the systems – both decision-makers and applicants feed into and off the system

⇒ Possible remedies

- deliberate measures to relax rigidity
- reform the system, including young scientists in assessment committees

Reason

B. Unsolved tension between “safe” and “avant-garde”

⇒ Possible remedies

- find new criteria for assessment
- create new “adventure funding”
- create new interdisciplinary frameworks

Reason

C. The system is ageist and gender biased

⇒ Possible remedies

- create across-age funding with special incentives for the young
- create special incentives for women

Reason

D. There is a shortage of funding and thus a recourse to “safety first”

⇒ Possible remedies

- seek increased funding for research
- increase priority setting enabling new areas for “adventures”

A number of agencies in different countries have already developed special initiatives and funding schemes in an attempt to address the problems listed above. Some examples of such actions are as follows:

- Special funding for “young researchers” (Austria, Canada and the Netherlands)
- Special funding to combat gender bias (Canada and Sweden)
- Special “Academy fellowships” (the Netherlands and Sweden)
- Special university faculty awards (Canada)
- Special funds for “risky endeavours”, e.g. “pro novo” (the Netherlands)
- Special funds for major large risk orientated projects (Switzerland)
- Special funds for new network activities (Switzerland)

3. Time and timing

Any attempt to be more daring will inevitably face a number of difficulties. Some relate to time and timing.

- Can the system change quickly enough in relationship to the needed pace of change? This is the “we are moving so slowly” perception;
- One must recognise that “what seemed revolutionary 6 months ago, today is accepted as “received wisdom”.

- Predicting the future is always risky but must be attempted in order to introduce changes to meet future needs.
- Change calls for reform of priority setting. However, there is an asymmetry between the ease of starting initiatives and the difficulty of closing down activities. Funds for research are finite and there has to be a re-cycling of money. Thus, there is a requirement for rigorous on-going assessment and evaluation during the course of a project.
- There is a further contradiction in that there are also needs for long-term project stability. This may run counter to the willingness to change. However, the feeling of having relatively assured financing may create the space and confidence for innovation and the willingness to take risks. The contradiction between the need for stability and the need for change is that projects, once approved, need guaranteed support over their agreed lifetime.
- The call for “daringness” must create a balance between continuity and change. Given that scientific knowledge tends to increase incrementally, there may be a danger in having a system that is too liable to frequent changes of direction.
- The tension between the national and the international approaches will remain. However, there are new concepts, including that of the “European Research Area” and of “open and variable geometry” which are aimed at overcoming this problem. An example of such an approach is that of the ESF EUROCORES initiative combining both national funding mechanisms and a common European action in defining topics and in assessing proposals. It must be remembered that although autonomy at all levels is jealously guarded it must be accepted that autonomy also has its cost.
- While research remains within public patronage there will always be a tension between the call for scientific freedom and independence and demands for accountability in terms of both the use of funds and the direction of research and the demands for “societally-relevant” research. This requires new approaches to determining such needs and also the development of new methods of debate between the scientific community and both Governments and policy-makers and the wider public. In addition, there has to be an acceptance that there is a need to sustain an active and broad scientific base as a precursor to priority setting.

4. Tensions in the science system

The debate recognised that any changes in the science system have to take into account that science is in a state of tension (or balance) between a number of factors.

There are number of tensions within the present system of science.

- There is an ongoing tension between so-called “bottom-up” and “top-down” approaches, especially within the rhetoric used. Most funding agencies and their committees are staffed with active scientists and could, in this case, be construed as “bottom-up”. If such groups and organisations produce priorities, then those not involved tend to label the result as “top-down”. The debate becomes more acute when the funding priorities are set by Governments for the support of policy and economic objectives. Perhaps the maxim to be used is that “Priorities may arise both “top-down” and “bottom-up” but the research has always to be “bottom-up”.
- There are many other examples which can be quoted:
 - Inside the RTD-policy system:
 - Between “safe” and “daring” postures
 - Selectivity versus broad diversification as a strategy
 - Competitive versus cooperative strategies
 - The tension between the RTD-policy and other policy requirements
 - The pressure to use military facilities for civil society RTD (so-called “dual use”) and vice-versa.
 - Increased research volume versus quality enhancement.
 - The intensification of competition for academic human resources. At the same time as we encourage the young to stay competitive through mobility we also try to prevent the “brain drain” (not only the trans-Atlantic version but that between East and West in Europe). Here the answer is that we must make our research environment attractive not only to our own younger generation of researchers but to researchers from other parts of the World.

- National selfishness versus the desire to share costs through international partnerships.
- Acceptance that there will be both success and failures and that, provided one learns from failure, then this too can be considered as part of the scientific process.

5. Epilogue

The issues raised at the FRN Conference are all matters of concern to funding agencies and policy-makers across Europe and indeed elsewhere. Risks in science have to do with trying to chart the unknown. The system uses “gate-keeping” functions to minimise the risk of failure and increase the effectiveness through filtering out already scientifically proven unproductive ideas. But the “care-taking” functions of the system also need to be identified and strengthened so that truly new ideas, as well as promising researchers, can get the chance to be rigorously tested and prove their value. Eventually they might become part of the system which is and has always been a dynamic one. Already the problems have been identified by some agencies and there are attempts to find new mechanisms, many of which can be seen as “care-taking”. The willingness to debate these issues is the first step in understanding and in taking action to introduce change.

This policy briefing was edited by Leif Eriksson and Uno Svedin (FRN) and Tony Mayer (ESF)

European Science Foundation Policy Briefings are published by the European Science Foundation (ESF). They address selected science policy issues of key concern to the Foundation’s Member Organisations and the wider scientific community.

By drawing on the advice and expertise of the ESF’s membership, the briefings aim both to provide information and to promote discussion.

**Further information on the ESF’s scientific and science policy activities is available from the Communication and Information Unit,
European Science Foundation
1 quai Lezay-Marnésia
67080 Strasbourg cedex, France
Tel: +33 (0)3 88 76 71 25
Fax: +33 (0)3 88 37 05 32
Email: communications@esf.org
www.esf.org**

The Saltsjöbaden International RTD-Policy Workshop “Are we daring enough?” 1-2 March 2000

List of participants

- Prof. Enric Banda, *European Science Foundation*
- Under-Secretary of State Agneta Bladh, *Ministry of Education and Science, Sweden*
- Prof. Kåre Bremer, *Swedish Natural Science Research Council*
- Dr. Robert Burmanjer, *European Commission, Directorate General Research*
- Prof. Michael Crow, *Columbia University, New York, USA*
- Deputy Under-Secretary of State Kerstin Eliasson, *Ministry of Education and Science, Sweden*
- Dr. Reinhard Grunwald, *Deutsche Forschungsgemeinschaft (DFG), Germany*
- Dr. Hans Peter Hertig, *Swiss National Science Foundation, Switzerland*
- Prof. Arne Jernelöv, *Council for Planning & Coordination of Research, Sweden*
- Special Adviser Ingrid Karlsson, *Ministry of Education and Science, Sweden*
- Dr. Raoul Kneucker, *Federal Ministry for Science and Transport, Austria*
- Prof. Norbert Kroó, *Hungarian Academy of Sciences, Hungary*
- Dr. Jarmo Laine, *Academy of Finland*
- Prof. Jerzy M. Langer, *Polish Academy of Sciences, Poland*
- Mr. Bertil Levin, *Council for Planning & Coordination of Research, Sweden*
- Dr. Danielle Ménard, *National Sciences and Engineering Research Council, Canada*
- Prof. Miroslaw J. Mossakowski, *Polish Academy of Sciences, Poland*
- Prof. Jan S. Nilsson, *Knut and Alice Wallenberg Foundation, Sweden*
- Prof. Erling Norrby, *Royal Academy of Sciences, Sweden*
- Prof. Pär Omling, *Research Council for Engineering Sciences, Sweden*
- Prof. Eul Yong Park, *Handong University, Korea*
- Prof. Uno Svedin, *Council for Planning & Coordination of Research, Sweden*
- Prof. Josef Syka, *Academy of Sciences of the Czech Republic*
- Dr. Peter A. Tindemans, *Global Strategies and Partnerships, Netherlands*
- Prof. Dick J. Van de Kaa, *Netherlands Organisation for Scientific Research (NWO), Netherlands*
- Dr. Zhi-qiang Wang, *National Natural Science Foundation of China, China*
- Prof. Hans Wigzell, *Karolinska Institutet, Sweden*
- Prof. Reijo Vihko, *The Academy of Finland*
- Professor Szilveszter E. Vizi, *Hungarian Academy of Sciences, Hungary*
- Prof. Georgy A Zavarzin, *Academy of Sciences, Russia*
- Prof. Da-bao Zhu, *National Natural Science Foundation of China, China*

Secretariat

- Dr. Leif Eriksson, *Council for Planning & Coordination of Research, Sweden*
- Dr. Torbjörn Fängström, *Council for Planning & Coordination of Research, Sweden*
- Ms. Lise-Lotte Wallenius, *Council for Planning & Coordination of Research, Sweden*
- Ms. Anna Åhlund, *Council for Planning & Coordination of Research, Sweden*