

Actions for creating an attractive research climate in Europe

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1. Optimizing conditions for excellence

Europe has the ambition to be a world knowledge leader. But for several decades already, Europe is a net exporter of research talent. Talented people in research appear to monitor and assess their opportunities on a global scale and often choose to go abroad to pursue their research and to develop their careers in a foreign environment which offers greater opportunities to perform the research they want, to gain desired and prestigious academic positions, to build up and lead important and vital research groups, to make use of excellent scientific infrastructure, etc. As a result of this global competition in the science domain, many European researchers seek for a research career outside Europe (and in particular move to the USA), while also many talented Asian researchers find their research base there. In the light of the needs of a society which is critically dependent on advancements in science and technology and needs talented people to carry knowledge forward, Europe needs to redress the imbalanced outflow of its own talents and moreover it even needs to attract talented people from other parts of the world.

For a further diagnosis, we need to examine the causes of the current situation. After a long period of scientific progress in Europe in the past centuries, other parts of the world, most notably the USA, have in the post war period come up with science systems which offer higher benefits to and more recognition for the best scientists. Larger investments and available funds, a higher drive for promoting talented researchers to important academic positions and a higher concentration of qualified people at top universities pose rather attractive working conditions, so that researchers from all over the world often aspire to work in the academic environment of the USA. In Europe, relatively smaller investments in science, fragmentation in the research system (and thus less critical mass in area where this is required for advancing the frontiers in science), barriers for career movements of the best people, to mention a few causes, have all contributed to a less attractive research climate, thus eroding Europe's competitive position vis-à-vis the rest of the world.

Moreover, other parts of the world outside the USA (e.g. Japan, Korea, China, India) are stepping up their efforts and investments in research and development. These processes will finally result in strong emerging science nations like China and India, which will compete for the best people and make it more attractive for their citizens to perform sophisticated research domestically. The speed with which Europe is making progress is too slow in order to gain real competitiveness, despite current initiatives both of individual countries and of the European Union. More is possible however, as Europe's potential is underdeveloped and needs to be unlocked.

As the awareness grows that Europe needs to work harder and as the sense of urgency is growing, many initiatives are undertaken at local, national, international and European level. Current initiatives cover many domains, but approaches often are too fragmented and have too little scope and mass. Also, within Europe itself, a significant imbalance still exists between countries and universities in terms of investments and appropriate conditions. The endeavour of building up the European Research Area is of the utmost urgency and needs to be continued full force. Moreover, it is of the utmost importance that the pace of progress in building up the ERA is accelerated. Thus, the quality of the research climate (see below) is both a European and a national and local concern.

2. Opportunities

High quality research depends on many factors next to the human brain factor: the presence of good scientific infrastructure and facilities, the provision of sufficient and well allocated funding and adequate funding instruments, excellent access to information, a favourable social capital, good possibilities for exchange and interaction, attractive career structures, clear and visible leaders, etc. Together, all such factors determine the attractiveness and quality of the operating context for researchers, thus constituting what we could call an attractive *research climate*. It is this climate which provides – and crucially sometimes fails to provide – opportunities for people to perform qualitatively good research.

In order to create an attractive research climate, a wide range of opportunities needs to be generated, for example, by generous funding and appropriate career structures, by freedom and responsibility for talented young researchers to choose and direct their own research, by the possibility to address challenging, novel issues and high risk research

topics, and by access to world-class facilities. The more and better such opportunities are created in Europe, the more it will succeed in retaining and attracting talented people, resulting in a higher quality of research in science and technology, which is key to a successful European economy and society. However, in order to achieve this goal, important improvements are still necessary in a number of critical aspects, of which we regard the following to be particularly important:

- **careers and funding** Positions in the science and knowledge domain often lack enough attractiveness in terms of career opportunities for talented people (unclear perspectives, lack of autonomy) and labour market status (worse job conditions and social provisions than positions outside academia). Attracting young people starts with good doctoral education (high quality, open structure, professional supervision, competitiveness with other sectors in the labour market). Subsequently, attractive conditions exist if talented young people have the opportunity to build their career and leadership profile, in academia, but also in industry. Furthermore, adequate funding providing greater autonomy to individual investigators is still in short supply, whereas progress towards the creation of a better career structure, e.g. tenure track systems, is too slow.
- **facilities and access** Concentrations of outstanding research facilities and activities are very important to create challenging and attractive working conditions and opportunities for talented people. Such centres foster high quality of research through the larger scale of competition and greater possibilities, which form the seedbed for creative thinking. Also contributing to the enhancement of the attractiveness of research is the facilitation of access to and the use of (new) technologies and sophisticated research infrastructure facilities.
- **mobility** (International) mobility of researchers is vital for broadcasting ideas and enhancing creativity. Still many barriers to mobility exist, thus impairing the inflow and exchange of highly skilled workers. Complicated and prohibitive legal, administrative and entry regulations¹ obstruct free

¹ On 23 October 2007, the Commission adopted a general proposal for a Directive on a single application procedure for a single permit for third-country nationals to reside and work lawfully in the territory of a Member State ('blue card') and on a common set of rights for third-country workers legally residing in a Member State. Its aim is to simplify and streamline application procedures. Nevertheless, there are still many barriers in a free exchange of knowledge workers into the EU.

entry to research opportunities and prevent exchange of scientists and scientific ideas. Diminishing (or removing) barriers offers great potential benefits to the careers of researchers and to their research efforts. Europe needs to improve mobility both inside and outside its borders on a larger scale (Marie Curie is already a good step in that direction). Furthermore, negative financial implications for researchers (e.g. the lack of pension portability²) unnecessarily inhibit mobility, whereas intersectoral mobility between academia and industry is too low, damaging both economy and society. In conclusion, the research climate in Europe needs to be made much more attractive in order to re-establish very competitive working conditions for talented people in the research and technology domain. As mentioned above, significant improvements have to be made in various core domains in order to remedy Europe's main weaknesses, in particular:

- entrance conditions to Europe: tearing down formal, legal, practical barriers for knowledge workers;
- gearing funding instruments towards the attraction of qualified people on a global scale;
- creating merit-based research career structures;
- investing more in scientific research infrastructure;
- diminishing inequities in science opportunities across Europe;
- promoting opportunities for undertaking creative research in Europe worldwide.

3. Action needed: Europe, the place to be

The domains mentioned above are diverse and cannot be taken up by just one party, but require efforts from many parties. For example, the improvement of career opportunities for researchers often depends on regulations at the local level (universities, institutions), at the national level (labour market regulations and conditions) and at the transnational level (attractiveness of working conditions differ among countries in Europe as well as compared to the rest of the world). It is therefore important to discern and outline what should be done, by whom and at what level in practical action terms.

At the local level and the national level many variables influence the working environment, e.g. job conditions, career paths, etc. Shortcomings

² On 9 October 2007, the Commission adopted an amended proposal for a Directive on improving the portability of supplementary pension rights is aimed at reducing obstacles found within some supplementary pension schemes in order to facilitate worker mobility.

here will have to be remedied by changing local or national circumstances by providing adequate chances to promising young researchers. On the other hand, the European level is required to act with respect to conditions which impact the broader aspects of pursuing careers in science and technology throughout Europe. Such conditions concern especially mobility, European-wide supporting frameworks (e.g. for patenting), efforts concerning large, European-wide research endeavours (big science facilities, trans-European networks, certain domains of science, e.g. climate issues), etc. Joint efforts here at the European level can exploit opportunities offered by the scale of the European economy, while complementing local and national efforts.

The endeavour of the European Research Area (ERA) is a relatively young, but important new concept which can provide an answer to various challenges in the domain of European research, provided it offers the right solutions to the right selection of problems, i.e., if it delivers benefits that are not otherwise accessible to its member states and if it supports common needs and exploits the opportunities of scale. In order to create an attractive research climate and opportunities in such a manner that highly qualified researchers aspire to work in European science, we envisage that at the European level the following three issues deserve serious consideration by all stakeholders:

• **Improve the inflow and exchange of qualified people**

-Create critical mass in terms of increasing the opportunities of research grants and positions which contribute to the independent career of the best scientists. In this respect, the grants of the European Research Council may prove to be seminal for creating more attractive opportunities for researchers by enabling them to start an independent career. At the European level, the number of grants and the budget of the ERC should still be extended.

-Allow/increase the portability of granting instruments between universities, industry and countries without bureaucratic or financial obstacles (i.e. implementation of the principle of money follows researcher, but also practical solutions to social security portability).

-Stimulate the opening up of national regulations and programmes in order to enable portability of and access to research opportunities and grants. This implies running down formal and informal barriers which form impediments

for highly skilled knowledge workers (e.g. legal issues concerning visa, job security, pensions, etc.).

• **Exploit the scale offered by Europe**

Using the larger European scale especially applies to the area of investments in expensive facilities and scientific infrastructure. Such facilities are important, as they drive science forward at the edges through fundamental discoveries, but they also attract talented people and foster innovative research, thus creating a dynamic and inspiring environment for people to work in. Europe should drive forward the formation of research concentrations at the European level by, for example, coordinating the provision and the development of funding of major, expensive infrastructure. The European Strategy for Research Infrastructure (ESFRI) can offer an effective means to engage the relevant research communities in developing initiatives and agenda setting, but this has to be followed up by national and local initiatives.

• **Improve the career perspectives for (young) researchers**

Last, but not least, there is a great need to establish better career paths for researchers and to attract young people to a science career. A number of things are needed in this domain:

-Improvements in the structure of doctoral education in order to increase the quality and attractiveness for young people to pursue careers in science and technology. Improvements include better structure of education (not only at the tertiary level; conditions at the secondary level have to be improved too, in order to create interest in pursuing science careers), as well as better coordination across systems (enhancing exchange possibilities). In this area, the Bologna process is very important.

-Also, better conformity to industry requirements in order to attract qualified researchers to work in industry is needed as well as an open bidirectional flow of researchers between industry and academia.

-The most talented young researchers need to have a clear career perspective, and a system of tenure track has to be put in place. The career perspective should also involve the opportunity to establish a group and/or laboratories under their leadership.

-Funding of different sources (research councils, ministries) has to be adapted to support suitable career paths for young researchers. Experiences at many levels show that granting career and research autonomy improves both quality of research as well as science career opportunities and science career attractiveness. Therefore, funding instruments which support this have to be developed and stimulated. Europe can help to bring different instruments and initiatives in line with each other.

-Finally, more and better coordinated efforts in terms of communication and dialogue with society are required to promote the visibility and the attractiveness of European science. In this respect, the recent plans for creating a European Innovation Partnership are important.

4. Practical proposals

To be effective, it is necessary to focus policy actions specifically on a few selected items, which can be relatively easily achieved and which are likely to have relatively immediate effects. The creation of an appealing research climate is a joint responsibility which must lead to a dedicated operational strategy. In doing so, the support and cooperation of the EU is needed, as it is necessary to join efforts at the national, but especially at the European level. The priority initiatives and actions comprise the following:

- A joint initiative together with the EU is needed to **attract talented people** from outside its borders to Europe. The possibilities of attracting qualified people to Europe stand to benefit enormously from a Europe-wide and broadly recognizable initiative which makes available financial resources for salaries, scientific equipment, personnel costs etc. at the disposal of outstanding scientists with the proven ability to drive science forward. On the basis of a proven track record, national parties (science councils, universities, research institutes) should select and invite candidates of their choice, in order to stay in Europe for an extended period (e.g. min. 5 years) on a significant budget (e.g. 5-10 M€). The selected researchers would be given the opportunity to perform research activities of their choice, at institutes of their choice, without bureaucratic and other limitations. Of course, quality based on competition is critical here. The national parties might share their costs with the EU, which at the European level would select initiatives to match.

- In a knowledge based society an intensive **publicity and promotion of attractive European science positions** in the rest of the world is needed, most notably in the US, as we believe that better visibility of the opportunities in Europe is necessary and opportune. Therefore, we suggest in cooperation with the EU, to take the initiative to organise events in the US to promote Europe science positions and job openings. For example, this could be set up alongside important science conferences or gatherings of science communities (e.g. AAAS).
- An intra-European initiative is necessary, financed by the EU, to **build up capacity in science excellence**, by getting researchers from e.g. recent member countries involved in high-level research environments in other European countries. In this way, scientists from new accession countries build up competencies and experiences, to be used in their countries of origin when they return to important positions there.
- **Easier access** from third countries (e.g. US) to EU, national and multinational research programmes (e.g. ERA-Nets) and vice versa is needed in order to intensify collaboration and to enhance possibilities for joint research cooperation across continents.

5. Epilogue

Europe needs and deserves an attractive research environment, not only for scientific reasons (important as these are), but also for economic and societal reasons. The advancement of human knowledge through the development of intellectual capital – in particular, the development and acquisition of skills through innovative research support systems – is a sine qua non for a healthy future of Europe. Excellent knowledge will create favourable benefits in the business and commercial sector and for society at large. It will also enhance our opportunities to improve quality of life (e.g., environmental protection, health schemes, social integration, cultural advances), while it will favour balanced policy-making in the public and private sector as well. That is why highly innovative, novel and frontier-shifting research is so badly needed. This will stimulate effective capacity building in new promising domains, lead to training and education of highly skilled people and develop new *modi operandi* for government and business. The value added of excellent research is invaluable! And Europe has the task to invest in the best it has, viz. scientific talent.

Finally, it is our firm belief that a joint action agenda for improving the attractiveness of the research climate for talented scientists will make **Europe the place to be.**

Selected list of relevant documents

- Academy of Finland: Methods for Evaluating the Impact of Basic Research Funding, Helsinki, 2006.
- ALLEA: Challenging of the Future: Reflections of ALLEA on ERA, 2007.
- EC Green Paper “The European Research Area: New Perspectives”, 2007.
- EC Green Paper “From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation Funding”, 2011.
- EUA: Doctoral Programmes in Europe’s Universities: Achievements and Challenges, 2007.
- EUA: Lisbon Declaration. Europe’s Universities beyond 2010: Diversity with a Common Purpose, 2007 -EURAB: Increasing the Attractiveness of Science, Engineering & Technology Careers, 2007.
- EUROHORCS-ESF response to the Commission Green paper, 2007 - ESLF: Careers in the Life Sciences, 2003.
- LERU: Universities and Innovation: the challenge for Europe, 2006.
- LERU: The Future of the European Research Area, 2007 - Research Councils UK, Excellence with Impact, Swindon, 2007.