The future of the European research area

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LEAGUE OF EUROPEAN RESEARCH UNIVERSITIES

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LERU was founded in 2002 as an association of research-intensive universities sharing the values of high-quality teaching in an environment of internationally competitive research. The League is committed to: education through an awareness of the frontiers of human understanding; the creation of new knowledge through basic research, which is the ultimate source of innovation in society; the promotion of research across a broad front, which creates a unique capacity to reconfigure activities in response to new opportunities and problems. The purpose of the League is to advocate these values, to influence policy in Europe and to develop best practice through mutual exchange of experience.

The future of the European research area

Summary

- *Excellent research is crucial for individual member states of the European Union as vital support for their social, cultural and economic development, in providing a magnet for the best international talents and as a contribution that Europe should continue to make to global development.*

- *The nature of the research base varies greatly across member states of the Union, partly for historical reasons and partly in response to varying political, economic, social and cultural circumstances and priorities.*

- *The European Commission has produced a Green Paper[1] on the future of the European Research Area (ERA), which LERU believes could be a dynamic and creative enterprise, capable of re-invigorating European research as a catalyst for social and economic benefit within Europe, and as a powerful contribution to development of a more just and sustainable global community.*

- *However, the motivation for the ERA must be clear. It must be to strengthen European research and its impacts rather than merely being used in a political project to concentrate greater authority at a European level.*

- *LERU strongly supports some of the Green Paper's proposals, particularly those on researcher mobility, joint planning, procurement and management of expensive infrastructure and facilities, public engagement with science, and a common cost-effective patenting system.*

- *We are highly sceptical of some of the fundamental assumptions that underlie the Green Paper, which the Paper takes to be so self-evidently correct that they are not raised as questions in the Commission's Public Consultation, but which run as threads through the Commission's approach:*
  - *that the normative organisation of European research should be based on formalised European networks with countries and regions specialising in particular areas;*
  - *and that there should be centralised coordination and direction of research at European level.*

  LERU believes these prior assumptions to be misconceived.

- ***Networks** should be a response to the joint visions and enthusiasms of active researchers for individual projects. They should be supported as such, and a network support programme should be part of the Framework Programme. They should not be legally-fixed, institutionalised structures, which will tend to be relatively costly, with the risk of ossifying and lacking in both dynamism and flexibility.*

- ***The European Research Area** should be based on well-articulated interactions between European-level, national and regional processes in a lively research ecology, in which the ERA is not just that research funded by the Commission, but the totality of European research irrespective of funding source. The European level should focus on stimulating a common market for research comprising:*
  - ***A Common European Platform for Research**, which provides competitive funding for basic research through the European Research Council (ERC), to which an increasing component of Framework Programme funding should be allocated at the earliest opportunity; enables and supports researcher mobility; simplifies the regulatory and IP environments; facilitates but does not prescribe trans-European networks; supports technology platforms; and creates a simple, common and inexpensive patent framework.*
  - ***Exploitation of the scale of the European economy** by coordinating the provision of major, expensive infrastructure and facilities available to the best talents throughout Europe; and coordinating the development and funding of globally significant research projects.*

1 European Commission. *The European Research Area: New Perspectives*. COM (2007) 161.

- *The ERA should **not** develop, as suggested in the Green Paper, with overall European-level "coordination of national and regional research activities, programmes and policies"; and "initiatives implemented and funded at European level". Such a development would make articulation with the diversity of national and regional efforts and priorities difficult, clumsy and ineffectual, and would tend to stifle bottom-up initiatives.*

- *In contrast to the ERC, which can fulfil a pan-European enabling function, we do not believe that the proposed European Institute of Technology can be an effective catalyst for economic development, as economic benefit tends to be delivered in a regional context and is best driven by regional priorities through regional efforts.*

- *The Commission must recognise the vital role of universities, particularly comprehensive, research-intensive universities, as immensely entrepreneurial institutions with an unrivalled capacity or potential for flexible response to many modern issues, particularly the imperative for inter-disciplinary issues, and in acting as powerful attractors of the best talents.*

- *In contrast, long-term, highly focused missions are best pursued through specialised government institutes, whilst "intermediary institutions" have become more important as proxy agents for the often missing, demand-pull on the research base.*

- *There is a structural problem in European universities, which have tended to converge towards a single model of the basic research-focused institution. There are two other crucial demands that need to be satisfied: one for a much greater participation rate in higher education, and the other for greater diversity in the provision of skills, and support for innovation and regional development.*

- *The importance of the research base in supporting economic and social well-being and for planetary sustainability is now so great that public confidence in its use, and involvement in its direction, are crucial parts of what must become a public rather than private enterprise. An effective European forum whereby European- and national-level public engagement processes can be coordinated and the research base more effectively involved is an important priority.*

- *We conclude that an ERA could be a powerful stimulus for European research and its application, but this will only be realised if the benefits to individual member states are made clear and if EU-level initiatives are planned and implemented in ways that demonstrate how they can add value to the European research effort: and how they contribute to an emerging "ecology" for an ERA in which the European, national and local processes interact optimally. It is important to create confidence that the Commission can efficiently develop and discharge policies for the research base based on rigorous and persuasive analysis.*

Why research matters

1. Research is a vital part of the social tapestry of a modern state. It exhibits diversity of motivation and purpose. It can be an open-ended enquiry into the essence of phenomena, of who we are, individually and collectively, and of the world we inhabit. It can be a way of responding to societal priorities: such as the nature and impacts of climate change and how we might react to them; how to improve human health and well-being; how to regard and plan health, penal, research or educational systems; how to address still widespread human poverty; how to develop sustainable energy generation; how research-derived knowledge, and the people who embody it, can contribute to the innovation process and to economic development. It is a means of preserving, falsifying and re-synthesising existing knowledge and of creating new knowledge. It is a vital pillar of higher education.

2. The world has become increasingly complex through the immediacy of modern communication, where hitherto separated heterodox traditions have been brought into confusing proximity and confronted with the scepticism of science and the disruptive pressures of new technologies promoted through globalised markets. In this context, research and education, in the humanities and social sciences as well as in the natural sciences, are vital if societies are to understand and come to terms with these complex issues. The organisation of a national research base[2], and its relationship to education, have therefore become key issues for the modern state:
   a) To what extent is strong basic research needed?
   b) How is research best organised to create the cross-disciplinary collaborations necessary to

2 The term "research base" is conventionally used to describe the publicly funded component of national research in universities and research institutes.

address complex modern problems?

c) How can interactions between the research base and public bodies be engineered to ensure effective use of research in public policy?
d) How can interactions between the research base and business be most creative in catalysing business innovation?
e) How can civic society become more involved in decisions about research priorities and the use to which research knowledge is put, and in democratic decisions about the adoption of technologies that have potentially major impacts on society?
f) And how should these issues relate to the education of tomorrow's citizens and researchers?

3. Globalisation has also sharpened the imperative for research and educational excellence. Internationally competitive research and the excellent researchers who undertake it are needed if a state is to retain and attract investment from international, knowledge-intensive companies that increasingly seek access to the best research and researchers wherever they are to be found. In this setting, the environment for research must be one that inspires creativity, is a magnet that both attracts and retains the best indigenous and international talents and is sufficiently well-funded to permit the most challenging problems to be addressed.

4. If the European Union and its member states are to realise their potential in responding to these challenges, a clearly articulated definition of national roles and optimal forms of collaboration and interaction at European level are required. The idea of a European Research Area (ERA), first enunciated in 2000 by the then European Commissioner for Research, Philippe Busquin, was conceived as a means of coordinating national research policies in terms of objectives, expertise and resources. Though forward-looking, this thrust lacked a broader vision of the most effective ways in which the spectrum of European research, at regional, national and European levels might best be articulated and supported. It is now timely that this should be done, and the recent Green Paper and the Public Consultation on ERA by the European Commission[3] provide a context for doing so. As a prelude to discussion, we first review principles of operation of a modern research base.

The functions and attributes of an effective research base

5. If a research base is to fulfil the diverse functions set out in paragraphs 1-3, it needs to operate across a spectrum of research modes, it needs processes that stimulate and support the vitality of the research base and its practical application, and needs institutions that provide an appropriate framework to fulfil the functions of research that are well-adapted to the needs of society.

Research modes

6. Research has the potential to confer a wide variety of benefits, but these are often delivered through complex pathways and interactions. Notwithstanding this, the necessary spectrum of research activity in a healthy research base should comprise several modes which largely reflect their motivation, rather than a linear progression from basic research to application as was once supposed:

Basic research investigates the essentials of phenomena. It has a powerful potential to re-define our knowledge, create new explanations, new possibilities and new questions. It can have an immense impact on technology and society in re-defining priorities for strategic and applied research. It offers generic understanding that is a fundamental "transferable skill" that can be applied to a much wider range of circumstances and phenomena than any catalogue of specific knowledge. It has become increasingly important as the lead-time taken to pull through innovation in basic research into application in new technologies and processes decreases.

Strategic (sometimes translational) research uses existing knowledge from basic research, some of which may be novel, some very long standing, and explores ways in which it might be used to solve current problems or create marketable products. It embraces a wide range of roles, for example, in forecasting the impacts of climate change, exploiting new genomic knowledge in medicine, investigating the potential toxicity of nano-particles, understanding the causes of re-offending as a basis for penal policies, etc.

Applied or innovation-engaged research is market- and business-driven. It exploits basic and strategic research to create innovative products and processes in response to existing market demands or by creating new markets. The process requires ready access

3 European Commission. *The European Research Area: New Perspectives*. COM (2007) 161.

to research and researchers by innovative business, or the "spin-out" or "start-up" of new enterprises from the research base. It is most efficient where research institutions are knowledgeable about and responsive to market opportunities, where businesses and other users are aware of the potential of the research base, where research- and business-aware people move readily between them and where licensing and patenting are rapid and efficient processes.

Processes

7. The vitality and creativeness of a research base depends upon processes that provide support, ensure development and stimulate interaction:

Support

Funding must be readily accessible, through competitive mechanisms to permit both the talented young and seasoned older researchers to undertake research at the cutting edge of knowledge and its application.

Infrastructure must be able to match these high aspirations. As the cost of doing so in many areas of science and technology can be far beyond the capacity of individual institutions, much may need to be provided at national, regional or even supra-national levels.

Development

Scholarships and long-term fellowships that are generously funded are needed for young researchers as a means of supporting their development into excellent independent researchers comparable to the world's best.

Capacity building may be needed in major novel areas of research, or where the research base has decayed but where national economic, cultural or social priorities demand its reinvigoration.

Perennial strategic monitoring is required of the structure and balance of the research base to ensure that activity and use of funds are most efficient in responding both to internal drivers of change and increasing global competition.

Mobility and interaction

Mobility between the research base and knowledge-based enterprises is a particular weakness in many European states compared with the USA, where the high rate of entry of PhD graduates into such enterprises not only provides an influx of new research-derived ideas and concepts, but also a ready link between a company's market focus and the intellectual capital of the research base, to their mutual benefit.

Interactive mechanisms between the research base and its users can powerfully support a wide variety of innovation processes[4] including creating indigenous new business, stimulating growth of major knowledge economy nodes, encouraging inward investment from international companies that seek proximity to major research centres, and catalysing the diversification and enhancement of existing business activity. Such mechanisms are also of potential importance in supporting social and cultural development.

International mobility of researchers has long been a vital means of broadcasting ideas and enhancing creativity. All states should aspire to be part of an interactive international network of ideas, which they should be able to use in developing the careers of their own researchers. Removing the barriers to mobility and employment in Europe offers great potential benefits to the careers of researchers and to the research effort. Europe must also seek to be a powerful attractor for the best international talents, whilst ensuring that the balance of trade does not denude some member states, or developing countries, of their future potential.

Engagement with the public is an increasingly important issue as research findings increasingly impinge on public life and affairs. Interaction mechanisms are needed to ensure that the research enterprise is a public and not private enterprise in order that research can achieve its full potential for public benefit.

Institutions

8. The ability of a research base to deliver excellence in these processes and modes of research depends upon the excellence and nature of its institutions. It requires bodies to plan and manage strategies, funding and coordination, and appropriate institutions to undertake research. The three principal modes of publicly-funded research are dealt with in different ways by different European states. In the UK, basic research is predominantly undertaken in universities, much strategic research is undertaken by specialist government laboratories, and innovation-engaged research promoted by special schemes. In France and Germany, much basic and strategic research is undertaken by specialist publicly-funded laboratories (e.g. Max Planck laboratories in Germany and CNRS in France), but with basic research also being undertaken in universities.

4 League of European Research Universities. *Universities and innovation: the challenge for Europe*. November 2006.

9. A publicly-funded research base provides a fertile source of ideas and trained personnel which is available to be exploited by private or public "end-users". Most public funding supports basic and strategic research modes and in the past, in the commercial domain, has tended to stop short of near-market funding, which has been regarded as the proper province of private companies. However, as efficient economic exploitation of new knowledge and concepts from the research base has received greater prominence, public funds have been increasingly allocated to "intermediary" processes designed to bring applied and translational research closer to market, and to compensate for the weakness of demand for research by European business compared with US counterparts. Examples of intermediary institutions designed to play this role include the Frauenhofer Institutes in Germany and the Intermediary Technology Institutes in Scotland.

10. One of the major challenges to national research bases where institutions have historically been organised along disciplinary lines or set up to address specific inter-disciplinary issues, is how to deal with an increasingly inter-disciplinary research agenda in which the focus evolves and shifts relatively rapidly, such that a pattern of specialist institutions set up in one decade will be inappropriate to the demands of the next.

National differentiation of circumstance and approach

11. The European Research Area can either develop as a series of research functions deployed by the European Commission; or it could aspire to develop as an interactive research ecology wherein regional-, national- and European-level processes interact in a coherent and optimal fashion, and wherein the ERA is not just that research activity funded by the Commission, but the totality of European research irrespective of its source of funding. We strongly advocate the latter. But if this is to be achieved, it will not only need to address the functions described in paragraphs 6-10, but also the ways in which research bases vary greatly across the member states of the European Union, as do the economic, political and social needs and priorities that determine their functions. The nature of national research bases is a response to national circumstances. Their progressive evolution has, in many cases, been finely tuned to national needs, priorities and aspirations for the future, which also determine the level and nature of investment in the research base. There are strong national contrasts in the structure of economies reflected by different proportional contributions to gross domestic product of agriculture, production, construction and services, with the latter becoming an increasingly important component. In several new member states the relatively low economic base has naturally led to an almost exclusive focus on applied research directed towards immediate economic objectives.

12. Moreover, scale is important. In a small country with a limited budget, maintaining both diversity and focus is problematic. On the one hand it is difficult to fund the diversity needed to respond to unexpected challenges as the research agenda changes. On the other, the quantum of funding for any one project is necessarily small unless funding is to be withdrawn from others. It is also difficult to maintain support for basic research in face of the immediacy of demands for strategic and applied research, with the consequence that the fertility of basic research is lost to the system. An issue for Europe is whether and how European-level processes can support development of a stronger research base in such countries, and whether such processes also add value to the research efforts of larger states with internationally significant research bases.

The European Framework Programmes: nucleus of the European Research Area?

13. It is important that the European Research Area is not merely seen as a geographical area within which research is done, but rather as a concept whose formal structure and organisation facilitate levels of excellence and effectiveness that are greater than the sum of the parts. In practical terms, the ERA currently consists largely of the Framework Programmes. The Green Paper refers to the ERA, embodied in the current Framework Programmes, as "more than ever a cornerstone for a European knowledge society" and "a key reference for research policy in Europe". These statements are, as yet, far from reality, although they are a strong statement of aspiration. In those states with a powerful research base, European research policy and funding remain relatively minor elements of concern, although Framework Programme funding may be important for individual institutions.

14. The Green Paper explicitly sets out to define the basis for a re-launch of the European Research Area. Although it contains some new proposals, the existing Framework Programmes remain the nucleus of the Commission's concept of the ERA. Box 1 summarises some of the recent important developments in the Framework Programmes, which we presume to reflect the Commission's thinking about priorities for the future trajectory of the ERA. These we assume to be:

- the importance of European networks, and particularly their legal formalisation;
- the development of technology-specific business/research partnerships;
- a competitive framework for the stimulation of basic research excellence;
- European institutions (European Institutes of Technology) for the stimulation of innovation.

15. Two important questions arise from this:

- Given the functions of a research base and the diversity of national economic and social circumstances, are these appropriate priorities for European-level intervention?
- If the ERA is to include, as we believe it must, both national (and regional) and European-level components, how should roles and functions be divided between these different levels?

BOX 1 – RECENT DEVELOPMENTS IN THE FRAMEWORK PROGRAMMES

Networks of Excellence. These were designed to bring together excellent groups across Europe. They have had limited success, which partly hinges on the definition of excellence, and partly on the perceived inefficiency of some networks, which the Commission believes is a consequence of network members being more attached to their home institution rather than their network partners[5]. In the 7th Framework Programme, the Commission is attempting to persuade networks to become legally-defined entities to overcome this presumed weakness[6].

Technology Platforms. These are industry-led public-private partnerships that focus work on areas with high degrees of industrial relevance and technological promise.

The European Research Council (ERC). There has been a growing realisation that excellence in basic research is increasingly the feedstock of innovation, as the lead-time between discovery and application decreases, and that basic research endows those trained in it with a powerful transferable skill that can be flexibly deployed in a wide variety of applications. In response to the perception that Europe's performance in basic research had fallen below the level required, the Commission created the European Research Council in 2005, with a remit to fund basic research on the sole criterion of excellence. Although LERU strongly supported this development[7], it has argued that its low level of funding will inhibit its effectiveness.

The concept of a European Institute of Technology (EIT). In 2004/5 the Commission proposed to create a European Institute of Technology, inspired by the success of MIT, and the recognition that Europe needed to improve the impact of its research on innovation. In principle, such an initiative would be the natural complement to the ERC. In practice, the EIT concept has been subject to strong scepticism, from within academic[8], research[9] and business[10] communities, with the final fate of the proposal yet to be decided.

5 Odile Quintin. EIT presentation to stakeholders. European Commission. Brussels, May 2006.

6 UKRO. Management and sustainability of Networks of Excellence Focus Group. 2006.

7 League of European Research Universities. *Growth, research-intensive universities and the European Research Council*. February 2005.

8 League of European Research Universities. *Competitiveness, research and the concept of a European Institute of Technology.* November 2005.

9 European Parliament Policy Department. European Institute of Technology. March 2007.

10 Lambert, R., and Butler, N. *The future of European universities: renaissance of decay?* Centre for European Reform. 2006.

Re-launching the European Research Area - reactions to the Green Paper

16. The League of European Research Universities (LERU) strongly supports a vision of a European Research Area that is a dynamic and creative enterprise capable of re-invigorating European research[11] as a catalyst for social and economic benefit within Europe and a powerful contribution to development of a more just and sustainable global community. As it has been in the past, Europe must continue to be a major contributor of new intellectual capital, rather than being dependent upon inspiration from elsewhere, unable to play a leading role in global development. This is an urgent issue, but how can it best be addressed? At the outset, the motivation for an ERA must be clear. It must be to add value to national research efforts; not merely to replicate them. It must be to strengthen European research and its impacts rather than being used in a political project to concentrate greater authority at a European level. The former will strengthen Europe: the latter could weaken it, at considerable cost.

17. A strategy for redeveloping the ERA should address three fundamental issues: the particular role of European vis à vis national and regional funding; the research model for Europe, the nature of collaboration and the roles of institutions; and the key processes that should be priorities for Europe-level strategy. We now analyse the attributes that the Commission believes to be appropriate for a European research area both in its existing priorities (Box 1) and in the Green Paper: the model of research operation, the distribution of European and national level roles and the processes that underpin its operation. We strongly support some proposals, suggest amendments to some and are critical of others.

The network model: a flawed framework for European research

18. The concept of formal networks is a pervasive theme that has underlain much of the Commission's recent approach to research, and is a thread that also runs through much of the Green Paper. The Green Paper's central model for research is of a European network of specialised institutions (though specialised in "mostly interdisciplinary areas"), and with countries and regions progressively specialising in particular areas. Such a division of labour on a national and regional basis would of course require a closely coordinated European Research Area if it is to work effectively. But apart from favouring "cohesion", would it be efficient?

19. A model of an atomised but networked knowledge base runs counter to what LERU believes is the need for knowledge, research and understanding in the modern world, and counter to the ethos represented by research universities, which we believe are aligned more closely to that need. The modern trend of science, which matches an increasing need from society and business, and therefore an increasing need in education and training, is for a more holistic approach to understanding, with deeply grounded specialists that are aware of, knowledgeable about, and sympathetic to cognate disciplinary areas and therefore better able to contribute to the interdisciplinary collaboration that is vital in addressing many major modern issues.

20. A dispersed network is not an efficient way of responding to these needs. Attempting to achieve effective cross-disciplinary collaboration through networks of specialist groups fails to recognise the vital need for co-location of groups with varying disciplinary skills if they are to understand each other and integrate their work effectively. Otherwise, they risk working in disciplinary silos without grasping the essence of the joint enterprise.

21. Networking between groups with complementary interests is ubiquitous in the modern world of research, and indeed has been beneficially supported in Europe by the collaboration requirements of the Framework Programmes. The proper role of the Commission should be to build on the greater cross-European interaction that it has helped foster, through funding processes that respond to opportunities identified by researchers across Europe who value each other's complementary skills and see serendipitous opportunities that they can grasp together. Enabling mechanisms are needed to facilitate networks that represent an optimal collaboration for the project in hand. There should be a European-level funding stream to support networks that propose excellent research projects. They should neither be prescriptive, forced as a political objective, nor inspired by the mistaken view that they represent the most efficient form of research organisation. Formal networks as a

11 The phrase "European research" is used to refer to research done in Europe rather than research with a particularly European flavour.

policy goal represent the wrong track. They need to be dynamic, and to exist only as long as they are creative.

22. The Commission believes the "Networks of Excellence" of the 6th Framework Programme have not been as successful as had been hoped, and has drawn the conclusion that stronger central management of such networks, with greater freedom of the component groups from their parent institutions is the way forward[12]. The Green Paper comments that "research institutions should also be encouraged to create 'virtual centres of excellence' in the form of strong and durable partnerships between themselves and with industry, going beyond the usual project-based cooperation". Such legal formalisation is being encouraged, though not required, in the 7th Framework Programme[13]. Although formalised networks of individually specialist components may be an effective political device to balance the interests of member states and highlight the "European label", we believe that to promote them as the normative model of future European research organisation is a fundamental error. This process could lead to an ossified, institutionalised structure that lacks the dynamism of the networks of enthusiasm created by the joint vision of active researchers for particular projects.

23. In its analysis of appropriate structures for the modern world of research, the Green Paper does not appear to recognise the great cross-disciplinary creativity of comprehensive, research universities. They have a capacity, through their unique disciplinary breadth, to bring together diverse groups of researchers to address major cross-disciplinary issues as they arise, and rapidly to re-configure their internal structures to do so, in ways that are denied, except at great cost, to specialist institutes. World-class researchers are attracted to work in institutions where there are clusters of scholarly achievement and people whose work they respect. Well-funded research universities, nurturing the talents of the young and with a wide diversity of research and scholarship, have proven to be the most powerful and cost efficient attractors of such talent. Specialised nodes in a network would be a poor replacement.

European Institutions – the European Research Council (ERC) and the proposed European Institute of Technology (EIT)

24. A key issue for the development of the ERA is to determine the generic types of institution that are best located at European level and those that should be national responsibilities. This issue has been highlighted by the creation of the ERC to stimulate basic research in Europe, and the EIT to enhance the contribution of the research base to the innovation process. Whilst this duo might seem to be natural complements at a European level, LERU believes that there are important distinctions of function which undermine such a view.

25. The European Research Council has been a highly creative initiative by the Commission, and has been strongly supported by LERU[14]. It has been set up as an independent body created to stimulate basic research, a vital area where Europe has been perceived to be losing its edge, and using excellence as the only criterion. Because of the Europe-wide competition which it creates, it has the potential both to stimulate and be an index of excellence. Through its early focus on young researchers, it is able to support the development of the young, whether from countries with a powerful research base or from those which, because of size or history, find basic research difficult to maintain (see paragraph 12). The former benefit through the benchmark of excellence that the ERC will set, the latter through the opportunities for young researchers that the ERC is able to provide. LERU is impressed by the early development of the ERC. It believes that the ERC has the potential, within the decade, to become a powerful stimulus for global excellence in basic research in Europe, but that its current level of funding is inadequate if it is to achieve that vision. We strongly advocate that, at the earliest opportunity, there should be a decisive shift of Framework Programme funding to support the further development of the ERC.

26. The concept of the European Institute of Technology (EIT), inspired by the example of the Massachusetts Institute of Technology, is to be a "flagship" for excel-

12 Odile Quintin. EIT presentation to stakeholders. European Commission. Brussels, May 2006.

13 UKRO. Management and sustainability of Networks of Excellence Focus Group. 2006.

14 League of European Research Universities. *Growth, research-intensive universities and the European Research Council*. February 2005.

lence in exploiting the research base in the innovation process, an area where Europe is perceived to be lagging behind the competition, particularly from the USA, and potentially from other states. However, the economic benefits that specific institutions bring, including institutions such as MIT, are primarily realised in their regions. As the effort to stimulate greater involvement by the research base in the innovation process has intensified in recent years, national and particularly regional bodies have supported the development of a wide variety of interaction mechanisms for technology transfer that are well-adapted to varying regional economies. They are beginning to pay considerable dividends and compare increasingly favourably with US institutions[15]. Removing the focus of effort from the regions to the European level will add little to these processes, and could undermine them. Moreover, LERU has argued[16] that the current priority for developing these processes further is not the improvement of supply, but the stimulation of demand for research by business, which, it has argued, might best be done by harnessing the power of public procurement budgets for research products.

27. We suggest that although the Technology Platforms (Box 1) developed through the Commission are a welcome development, specific interventions to stimulate innovation are best located at a regional or local level. This contrasts with our view of the ERC where there are clear benefits in a European-level body.

European-level processes

Coordination and direction of research

28. It is a truism that mould-breaking discoveries in science tend to come from unexpected research areas, places and people, and particularly from the young, whose minds are not yet so full of conventional wisdom that original ideas are denied entry. A Darwinian model of diversity of structure, funding and function might therefore seem to be most effective as a source of creativity, and particularly one in which young researchers are given the freedom to pursue their own ideas. A monolithic, top-down agenda inevitably determined by those not in the first flush of research, will tend not only to deter the ambitious young, but also to undermine much of the creativity of diversity.

29. This poses a dilemma for Europe; how to maintain flexibility, diversity and bottom-up serendipity, whilst at the same time being able to identify and fund major research opportunities that often lie beyond the capacity of individual states. Although there have been considerable European successes in doing this (e.g. CERN, EMBO, the Greenland Ice Sheet Project, etc.), very few, if any, have been driven through the Framework Programmes.

30. Thus, whereas we support the notion of greater European-level coordination and planning of major, globally-significant projects and programmes, we do not believe that greater centralised coordination and direction of much of the European research effort, which appears to be advocated in the Green Paper, is an unqualified good[17], and are highly sceptical that a common research agenda is a strength rather than a weakness.

31. We advocate a role for European coordination in developing the capability to identify, develop and support globally-significant research projects. This would best be done through a formally constituted European forum with high-level national representation, including research councils, and which, through the latter, has deep roots into the research community so that research imperatives are at the heart of any major initiative. The success over the years of the European Science Foundation in responding to, stimulating and supporting major cross-Europe initiatives provides a useful precedent for such community involvement.

Mobility of researchers

32. LERU very strongly supports the Green Paper's proposals for processes that will facilitate easy movement of researchers across Europe. We should be clear why this is important. The Green Paper implies that mobility of itself is a major attractor for people to take up research careers and to attract talented researchers from elsewhere. However, it is important to distinguish between national interests and the interests of individuals. Openness of national research systems to foreign researchers enables regions and research institutions

15 League of European Research Universities. *Universities and innovation: the challenge for Europe*. November 2006.

16 idem.

17 It should also be noted that concentration of coordination and direction of research at European level also implies the transfer of major components of research funding from national to European levels.

to correct their weaknesses by recruiting excellent individuals from elsewhere and can greatly enhance the creativity of institutions and the national research base through the cross-fertilisation of ideas.

33. The primary attractor for individuals is not mobility but opportunity:
- opportunity to address important and exciting problems through generous funding and appropriate career structures;
- freedom and responsibility for talented young researchers to choose and direct their own research;
- opportunity to work with the best researchers, to which mobility would contribute;
- and opportunity to access world-class facilities.

34. Mobility is currently restricted by the employment policies of some states, with the consequence that they do not benefit from the cross-fertilisation of ideas and research links that open employment creates. There are stark contrasts across Europe in the proportion of non-nationals in national research bases, and there is little doubt where the balance of advantage lies. We strongly support the Commission's efforts to persuade member states to open their research systems and universities to non-nationals.

35. Mobility is also inhibited by the problem of pension portability. It is a major barrier to the mobility of older researchers, and to younger researchers who fear that their pension rights cannot be repatriated if they wish to return home at a later stage. This is a difficult issue to which the Commission and member states will need to devote considerable political will if it is to be resolved. The lack of precise equivalence in many academic positions between European countries can also be a barrier to mobility, and could benefit from an analogue to the Bologna Process that is delivering equivalence between European degrees.

Infrastructure

36. European-level procurement of expensive infrastructure as advocated by the Green Paper would provide major benefits. Such a process could give access to major facilities by European researchers that none or few member states might individually be able to afford, and would benefit researchers from smaller or poorer states by giving them opportunities that might otherwise be beyond reach. It would be a means of ensuring that the best talents had access to world-class facilities. Economies of scale would permit national funds to procure greater access than would national procurement alone. This principle should not only apply to expensive facilities, but also to smaller facilities in the ownership of particular institutions, which have had and should continue to have access to them purchased by the Commission on behalf of European researchers. Major European-level procurement should be effectively coordinated and managed at a European level by institutionalising the approach being developed by ESFRI (European Strategy Forum on Research Infrastructure). It is important that this process engages with relevant, active, research communities, through the intermediacy of national research councils.

Patenting

37. We strongly support efforts by the Commission to create a simple, cost-effective patenting regime, and urge it to give high priority to its achievement. A European-wide patenting system is long overdue. The much higher cost of obtaining European-wide patent protection when compared to the US, for example, has long been recognised as an impediment to European competitiveness. The Commission must not ignore this powerful constraint on the impact of the research base as it seeks to create the ERA; instead the development of the ERA should be used as a lever to move the political process forwards. The political obstacles to the achievement of this simple goal have proved to be formidable, but without any progress in this area, the European Union's research institutions and businesses will continue to pay too high a price in their efforts to make an impact on the market.

38. Although the difficulties are well-documented, the potential rewards to be gained from achieving a common, simple and inexpensive patenting regime are such that this goal should be pursued relentlessly. Nevertheless, whilst the achievement of a European Patent is still some way off, there are improvements to the system that might more easily be made. The introduction of a grace period for inventor-only disclosures would be a welcome development. This would allow researchers to publish their work without jeopardising their patent position. In addition, the creation of a strong research exemption that allows universities to pursue non-commercial research in proprietary technologies without fear of litigation would remove concerns arising from recent high-profile cases in the United States. These and other initiatives would strengthen the ability of the European research base to make an economic impact.

An ecology for a powerful European Research Area

Principles

39. If the opportunity to develop a powerful, creative and effective European Research Area is to be seized, it must be done in a way that creatively balances the strengths of national systems with the opportunities offered by the scale of the European economy. To create an ERA that is simply a scaled-up version of a national research base would be a major lost opportunity. We argue that institutions and processes should exist and be funded that are appropriate to European, national and regional levels. The European level should make a distinctive, enabling contribution that complements national and regional efforts that are well-adapted to national perceptions, priorities for capacity building, and are relevant to their individual economic, social and cultural needs.

40. The political will to create a European Research Area worthy of the name, and the willingness potentially to allocate a larger proportion of research funds at European level, will depend on the belief that an ERA is able to deliver vital benefits that are not otherwise accessible to its member states. These benefits will need to be apparent both to states with a powerful research base and those that currently have a sub-optimal research base. An effective ecology for the ERA will be one in which European level processes interact with national and regional processes to support excellent and efficient institutions. European-level processes should be designed to support common needs and create opportunities of scale, and national and regional processes should reflect distinctive national and regional needs and opportunities. The operational institutions of the ERA will largely be national and regional, but some, such as those that provide major common infrastructure, should be at a European level, with planning, funding and managing roles at all levels but with clearly-defined individual responsibilities and inter-relationships. Such an interactive ecology, with appropriate responsibilities located at each level, would also be well-designed to achieve optimal coordination across the ERA.

European level

41. The distinctive European-level components of the European Research Area should comprise:

a common, enabling platform for research by:

- *providing competitive funding for basic research through the ERC;*
- *enabling and supporting researcher mobility;*
- *facilitating but not prescribing trans-European networks on a time-limited basis;*
- *supporting technology platforms;*
- *creating a simple, common and inexpensive patent framework.*

exploiting efficiencies offered by the scale of the European economy by:

- *coordinating the procurement of major, expensive infrastructure;*
- *coordinating the development and funding of globally significant research projects.*

For those problematic processes that are essential for a European common market for research, namely ready cross-border mobility, common patents and elements of common infrastructure, the Commission will need to work hard to create the necessary political will to implement them.

National/regional level

42. In broad terms, the national/regional components should comprise a nationally appropriate division of research roles between institutes and universities, with processes designed to promote:

- *innovative and novel research;*
- *capacity building in new and emerging areas;*
- *investment in areas of national strategic importance;*
- *sustained progress in well-established areas;*
- *training of highly-skilled people;*
- *maintaining national capability;*
- *stimulating knowledge transfer related to economic development, public policy and culture;*
- *supporting engagement with the innovation process.*

Knowledge transfer/innovation

43. Although in member states most research funding is allocated at national levels, regional development bodies increasingly regard those components of the national research base in their region to be a contribution to regional development potential. Many now allocate regional funds to stimulate research excellence, particularly in universities, and to create regional structures and processes for knowledge transfer, engagement with innovation, creative interactions with business, including the aggregation of research-business

clusters, and processes that attract inward investment, utilising national, regional and private funds. The response of many institutions, particularly universities, to these imperatives has been highly creative[18].

44. In seeking ways to improve the research environment and the exploitation of research, we urge both the Commission and member states not to introduce new initiatives that, in failing to recognise the progress that has already been made by universities and institutes, stifle rather than support[19]. The process of technology transfer has been well-developed by research-intensive universities who have made a significant investment over many years; an investment that is increasingly beginning to show dividends and compares favourably with success in this field in the US. It is a matter of concern that this is often not recognised by funders of research at national and European levels, who frequently propose to re-invent knowledge transfer structures at a level further removed from the research base. They are responding to vague concerns that "more must be done", but painting an unrealistically gloomy picture of our increasing success[20]. This risks increasing the constraints on research bodies' efforts to manage and commercialise the intellectual property they generate and, at worst, stopping successful initiatives in their tracks and removing the application and translation of research from proximity to the research base. Changes in the regulatory and IP environment must be focused on freeing research institutions to build on existing success, and make sensible and agile investment decisions, rather than forcing them into unproven and speculative structures that are likely to hinder rather than help.

System diversity

45. There is currently great diversity in European approaches to the structure and function of the research base and in addressing the issues in paragraphs 6-7. Most countries and regions are struggling with similar issues: how to achieve critical mass of effort in currently important areas that require it; how to retain "Darwinian" diversity to adapt to the unexpected; how to develop flexible inter-disciplinary structures and the "critical diversity" they require; how to sustain expensive infrastructure; how to develop creative interactions with business; and how to embed competitive structures that stimulate excellence. All in principle are addressing these issues in ways that are adapted to their individual national and regional economic, social and cultural circumstances and priorities. We believe that this diversity of approach is a strength rather than weakness. Top-down European direction of such a complex system would make efficient articulation with a diversity of national policies and approaches extremely difficult to achieve. It would tend to be clumsy and ineffectual. Far better to have a more articulated ERA framework as described in paragraphs 39-41, with European-level enabling processes of a "common market" that diverse national systems are individually able to exploit to their benefit.

Societal engagement

46. There is another dimension of challenge for Europe and for human society more broadly. The unprecedented rate of creation of new knowledge through research has created opportunities for new technologies and new understanding about the nature, health and welfare of individuals, society and the environment. However, the application of science has not only led to innovations that have massively shaped societal change, but also arguably driven planetary systems to the edge of sustainability. These trends pose three related dilemmas:

- the need for scientific expertise in maintaining planetary sustainability and development in the face of a global population set to rise to 9 billion by 2050, at a time when the popularity of science has waned amongst the rising generation;
- the need to re-build public confidence in the way that science is used at a time when it has been rocked by industry and government's handling of many science-related issues;
- the need, in a democratic society, for public knowledge of and involvement in decisions about technologies that can have such a profound effect on citizen's lives.

47. If these issues are not addressed, Europe will fail to realise the benefits of its research investments either in moving towards sustainability or in enhancing innovation.

18 League of European Research Universities. *Universities and innovation: the challenge for Europe*. November 2006

19 idem.

20 In the UK alone in the three years to June 2006, 26 university spin-out companies were floated, with a combined value at their initial public offering of £1.3bn. Source: Unico – http://www.unico.org.uk

The engagement of civic society in these matters, so that science and research are parts of a public project rather than a mandarin activity, is a vital priority for Europe. Many member states, and the Commission, have programmes to address them, but much would be gained if the Commission, in collaboration with member states, were to stimulate processes for the exchange of successful practice, and to provide a forum where efforts across Europe could be better integrated. The Green Paper's suggestion of *joint programmes for society-driven research* is one that LERU supports, although in the text this is too narrowly related to tools such as Joint Technology Initiatives. Just as many research councils now require outreach and public engagement as a condition for many grants, the Commission should consider a "*society overhead*" on research in the Framework Programmes.

The roles of institutions

48. We have been critical of the Commission's increasing stress on formalised European networks as the desirable institutional model for the European Research Area. Whereas the virtual world has become an essential component of the research enterprise, much of its power and creativity derives from its dynamism, which does not lend itself to stable, legally defined relationships. Strong institutions are the necessary bedrock for the European Research Area, stimulated by flexible and well-articulated interactions with other players. It is important to stress the crucial roles that some of these "bedrock" institutions must play if a European Research Area is to be effective as a driver of "a leading knowledge society" (Green Paper), able to "attract a critical mass of human and financial resources from across the world".

Universities

49. There is strong evidence that the most effective locations for basic research and cross-disciplinary innovation are comprehensive, research-intensive universities[21]. They contain a unique range of skills and knowledge compared with any other human institution. They have the capacity rapidly to re-configure their research and teaching to address evolving interdisciplinary opportunities and demands such that most of the novel areas of knowledge and understanding that have arisen in recent decades have come from them. Because of their flexibility, their intellectual range and the freedom that they offer, they are the most powerful attractors of the best international talents and the ideal environment in which to develop the next generation of researchers.

50. Universities have proved to be one of the great entrepreneurial centres of the modern world, and it is no doubt for this reason that they are seen by many governments as sources of new knowledge and capacity that both stimulate and can be harnessed for national economic benefit. But to see them only in this light diminishes them. They are concerned with the universality of knowledge, in all its manifestations, through the arts and humanities as well as the social, natural and applied sciences and technology. To isolate their capacity as an economic stimulus as their principal or only role is to ignore that it is the totality of that enterprise that is important. Human society is not separable in the way that governments would necessarily wish to decompose it for the purpose of discrete policy actions. The private good that they help create in "setting up their students for the act of self discovery"[22] is also a public good, in helping to create the basis for a rational, democratic and civic society able to cope, as a collective, with the complexities of the modern world.

51. The Commission's preference for dispersed networks of specialised institutions is politically understandable, but they cannot in practice effectively replicate the capacities of universities. A European Research Area must come to terms with the vital role of the universities, not least the role that the great, comprehensive, research-intensive universities must play in the ecology of knowledge and research in Europe. Without them, Europe will not only betray its past, but will impoverish its future.

52. We recognise however that there are many structural issues for the universities of Europe if the system as a whole is to play its optimal role. Some of these are internal, such as issues of governance and autonomy, which are now being addressed in many states where governance has been weak and autonomy has been inadequate for institutions to respond efficiently and

21 League of European Research Universities. *Research-intensive universities as engines for the "Europe of Knowledge*". 2003.

22 Commonwealth Universities Association. Belfast, 2003.

decisively to the challenges of a competitive international environment. Investment has also been relatively weak so that less than 25% of the EU working population has had tertiary education compared with 38% in the USA and 36% in Japan. A major, widespread problem is the lack of functional diversity in relation to the demands made upon the university system. There has been excessive convergence towards a single model of the basic research-focused university, so that many systems have a relative lack of differentiated purpose, structure and mission. Although these latter issues need to be addressed at national levels, we welcome the comments of the Commissioner for Research[23] in stimulating debate about them and placing national systems on the map of European structural priorities.

Specialist Strategic Research Institutes

53. Much strategic research is however best carried out in government institutes set up with a specific purpose in mind. This may be long-term monitoring, thematic centres set up to give technical advice in specific domains, or institutions set up with a specific scientific goal. Although they may be associated with universities, the very attributes that give universities their strength- individual autonomy, freedom and the changing pursuit of new knowledge- make them inappropriate agents for sustained strategic direction.

Intermediary Institutions

54. The contemporary explosion of knowledge-based companies, hungry for innovation and access to the research needed to feed them, have made many governments reluctant to rely on market mechanisms alone as stimuli of knowledge-based growth. They have sought to develop proxies for market pull on the research base that can fund early development processes and create short-circuited links with companies that are actively engaged with relevant markets, or seek to create early stage companies. They have also sought to create bridges between the research base and small and medium enterprises so that the latter, which rarely have margins large enough to allocate to research or to systematic search for relevant research findings, are able more readily to interrogate the research base. Many publicly-funded "intermediary institutions" have now been created to undertake this role in EU member states. They increasingly have a regional focus, and are often planned and funded by regional development agencies, with the rationale that innovation processes tend to realise their benefits at regional and national levels. They are adapted to the regional economy, and are increasingly integrated with policies, processes and the behaviour of institutions at regional levels. It is for these reasons that an EIT driven by European-level intervention lacks cogency.

Postscript

55. *The LERU universities believe that a European Research Area developed as recommended in this paper has great potential to stimulate the creativity of European research to the benefit of society, culture and the economy in all member states. This will only be realised if the benefits to individual member states are made clear, and if EU-level initiatives for the ERA are planned and implemented in ways that:*

- *clearly demonstrate how they can add value to the European research effort and its exploitation, taking into consideration the analysis and arguments that LERU and others have brought to the discussion in this paper and elsewhere;*
- *demonstrate how they contribute to an emerging "ecology" for a European Research Area in which the European, national and local processes interact optimally;*
- *create confidence that the Commission can efficiently develop and discharge policies for the research base derived from rigorous and persuasive analysis and deliberate implementation.*

We advocate that these should be prior criteria applied by the European Commission, the Council and the Parliament to major new initiatives for development of the European Research Area [24].

23 Janez Potočnik. How the European Research Council underscores the Framework Programme's central focus on excellence. Source: European Commission - http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/453

24 For example, we believe that the Commission's credibility in this regard was enhanced by the manner in which it developed the European Research Council, but has been damaged through its handling of the issue of the European Institute of Technology.

This document was prepared by the LERU Research Policy Committee:

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