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7TH EU R&D FRAMEWORK PROGRAMME

A Consultation Document

OFFICE OF SCIENCE AND TECHNOLOGY

APRIL 2004

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We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets in the UK, Europe and the world. The Framework Programme is the EU's primary funding mechanism for supporting and encouraging Research, Technological Development and Demonstration in the European Community. Any legal entity within the Member States, the Accession States and certain third countries can apply and receive support.

The current four-year Programme (FP6) was launched in November 2002 with a budget of \in 17.5bn (rising to \in 19bn from May 2004 as a result of EU enlargement). Its strategic aims include strengthening the competitiveness of the EU economy and serving the objectives of other EU policies. A primary goal of FP6 (agreed at the Lisbon summit in March 2000) is to contribute to the creation of an internal market for science and technology – a 'European Research Area' (ERA) – to help ensure the better exploitation of European R&D.

The Seventh Framework Programme (FP7) will cover the period 2006-2010. The aim of this consultation is to determine UK policy for this new Programme, based as far as possible on evidence and taking account of views of all stakeholders. We aim to produce a UK position paper in mid-2004, in good time to influence the formal Commission proposal, which we expect in early 2005.

A separate short summary of this document is available. Responses can be provided via www.ost.gov.uk/ostinternational/fp7, which is structured to allow comments on a limited range of issues, if desired.

Issued 29 April 2004 Respond by 26 July 2004

Enquiries to

Emily Bourne OST International Department of Trade and Industry Bay 583 1 Victoria Street London SW1H 0ET Tel: 020 7215 6420 Fax: 020 7215 6448 Email: FP7ConDoc@dti.gsi.gov.uk

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Foreword



Lord Sainsbury of Turville, Parliamentary Under-Secretary of State for Science and Innovation

In today's increasingly global economy, access to the best science and technology, skills and new ideas are vital if Britain is to compete in high-technology, high value sectors and continue to attract high technology investment.

In the recent consultation on its ten-year investment framework¹, the Government set out its ambitions:

- World class excellence from our very best centres of science and technology, driven by competition for funding and talent;
- A dynamic research base that meets the needs of both public and private funders and is managed effectively to achieve financial sustainability;
- Greater collaboration between universities and business to provide a sharper focus for research and an impetus to innovation and productivity growth;
- Better commercial translation of leading edge technologies into applications in business and the private sector;
- The science and technology skills that our businesses and public services will need over the next decade, underpinned by excellent teaching in schools to engage the next generation of workers in the knowledge economy;
- And a society that is confident about the regulation and use of science and technology.

The European Framework Programme has a key role in realising these ambitions. It supports leading-edge science and technology and strengthens partnerships with teams across Europe and beyond, providing approximately €0.5bn of funding to UK participants each year.

It is vital the UK makes the best use of these opportunities and that the Programmes build critical mass of high quality R&D so that Europe can take the lead in high value added sectors. The Programmes need to be focused on the challenges that are most urgent to address at the European level. They should be delivered in a way that takes full account of participants' needs.

The Government values input from a wide range of organisations to this consultation, including business, academic and research bodies, trade and professional associations and funders of research. Not all issues will be of relevance to all respondents. The document, a separate summary and a web-based response form are structured to allow comments on a more limited number of issues.

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1 Science and Innovation: A Consultation Document on Working Towards a 10-Year Investment Framework, March 2004 (http://www.hm-treasury.gov.uk/media/F1761/science_406.pdf)

Executive Summary

1. Through its multi-annual Framework Programme, the EU provides funding for collaborative R&D projects, researcher mobility and the development of infrastructure for the benefit of partners across EU Member States and associated countries. This consultation document seeks views on the Seventh Framework Programme, due to begin at the end of 2006.

2. Interest in the EU Framework Programmes has historically been strong, with many calls for proposals in the current Sixth Framework Programme being significantly oversubscribed. The Programme's budget has increased substantially between successive Programmes. Participants have cited a range of benefits from the Programme, although it is hard to assess the long-term impact of such R&D support.

3. Many participants find the bidding and contracting procedures difficult to engage with, particularly the current mechanisms to support larger projects. The commitment to longer-term collaboration built into some of the new support instruments is particularly difficult for businesses. In consulting on the Seventh Framework Programme the Government is seeking views on the types of support and delivery procedures that would be most effective in the future.

4. UK participants have enjoyed strong success in the Programme, winning 16% of the overall funds in the Fifth Framework Programme and participating in 41% of all FP5 projects. Participation from universities is particularly strong, with funding accounting for 25% of the total for that sector. Although the participation rate across the private sector compares well with other countries (the UK accounting for 12.7% of all enterprise sector participations and 16.4% of private commercial research centre participations), the total funding received is relatively low at 12.5% of the total.

5. In line with its general approach to the budget, the UK Government believes that EU spending should be based on clear objectives linked to EU policy objectives and ensure clear value added from EU action, consistent with the principle of subsidiarity.

6. To complement responses received during the current consultation process, the Government has commissioned work to develop and analyse evidence on the Programme's impact in the UK and on the types of support that are likely to yield the greatest benefits to the economy, science and quality of life in the future. The conclusions of this work will be published on the Office of Science and Technology website (www.ost.gov.uk/ostinternational).

7. The consultation questions invite responses covering the following areas (a detailed list is in Annex B):

- Requirements and aims what is the rationale for the Programme, which are the areas of greatest demand or opportunity to support competitiveness and future policy requirements?
- Science and human capital is there a need for new funding and structures to support basic research, how should support for research infrastructure and the mobility of researchers develop?
- Business and competitiveness how can the Programme be more attractive to industry, including SMEs, and how can it increase innovation and exploitation of EU-funded R&D?

- Support for policy what are the requirements for research in support of policy, and the best means for developing and delivering this, including through the Community's Joint Research Centre?
- Funding instruments and research priorities what should the high level science and technology priorities be, how should instruments supporting collaborative R&D develop, how might large scale strategic development of technologies be supported and how might the Programme help increase synergies between Member States' R&D programmes?
- Delivery and UK support how can overall delivery and management of the Programme be improved, including UK advice and promotion services and the link with national programmes?

8. The Government will use the responses to the consultation to inform its negotiating position on the future Programme.

What happens next?

9. This consultation will close on 26 July 2004. Initial consultation feedback will be published on the OST website in August 2004. The website will also contain links to relevant European Commission papers, including a Communication expected in mid-May. Key information including from evidence projects and ongoing consultations will be placed on the website from June.

10. The UK Government plans to produce a position paper on the Seventh Framework Programme in early Autumn 2004. The paper will be available to the public on the OST website.

11. We will use this paper to set out the UK policy on FP7, and we will publicise it with the European institutions including the Commission and with other Member States. The paper will inform UK input to discussions between Member States and the Commission on specific research policies planned by the Dutch Presidency of the European Union during the second half of 2004.

12. The European Commission has already published a Communication on basic research in the Seventh Framework Programme². It is expected to publish a further Communication in May. Response to this is expected to inform the Commission's formal proposal, expected during the first half of 2005. The EU Member States and Parliament will negotiate the new Programme during 2005 and 2006, and it is expected that the Programme will be agreed and launched towards the end of 2006 or the beginning of 2007.

How to respond

13. A copy of the consultation response form is enclosed. An electronic version is also available at www.ost.gov.uk/ostinternational/fp7, and we would appreciate an electronic response.

14. When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.

² Communication from the Commission: Europe and Basic Research, January 2004 (http://europa.eu.int/comm/research/press/2004/pr1501en.html)

15. A response can also be submitted on the web, by letter, fax or email to:

Emily Bourne OST International Department of Trade and Industry Bay 583 1 Victoria Street London SW1H 0ET Tel: 020 7215 6420 Fax: 020 7215 6448 Email: FP7ConDoc@dti.gsi.gov.uk

16. A list of those groups of organisations and individuals to be consulted is in Annex G. We would welcome suggestions of others who may wish to be involved in this consultation process.

Additional copies

17. Further printed copies of the consultation document can be obtained from:

DTI Publications Orderline ADMAIL Publications London SW1W 8YT

Tel: 0870 1502 500 Fax: 0870 1502 333 Minicom: 0870 1502 100 www.dti.gov.uk/publications

18. An electronic version can be found at www.ost.gov.uk/ostinternational/fp7. Versions of the document in Welsh, audio cassette or braille are available on request.

Confidentiality

19. Your response may be made public by the DTI. If you do not want all or part of your response or name made public, please state this clearly in the response. Any confidentiality disclaimer that may be generated by your organisation's IT system or included as a general statement in your fax cover sheet will be taken to apply only to information in your response for which confidentiality has been requested.

20. We will handle any personal data you provide appropriately in accordance with the Data Protection Act 1998.

Help with queries

21. Questions about the policy issues raised in the document can be addressed to:

Emily Bourne OST International Department of Trade and Industry Bay 583 1 Victoria Street London SW1H 0ET Tel: 020 7215 6420 Fax: 020 7215 6448 Email: FP7ConDoc@dti.gsi.gov.uk **22**. If you have comments or complaints about the way this consultation has been conducted, these should be sent to:

Philip Martin Consultation Coordinator Department of Trade and Industry Bay 723 1 Victoria Street London SW1H 0ET Philip.martin@dti.gsi.gov.uk

A copy of the code of practice on consultation is in Annex F.

A. Requirements and aims

1. This section briefly explains the current Framework Programme, explores the rationale and evidence base for international collaboration in R&D, and suggests some requirements for future action.

2. Innovation is at the heart of productivity growth and therefore at the heart of Government policy on the competitiveness of our economy. The UK research base makes a key contribution to innovation by providing the raw materials - new knowledge and ways of understanding our world, new problem solving techniques, new technologies and a highly educated workforce. However, in an increasingly global knowledge-based economy, isolation is not an option – access to the best international science and collaboration with the best scientists is vital if the UK is to compete on the world stage. These issues will be an important area for consideration in developing the Government's ten-year investment framework for science and innovation.³

3. The need for international collaboration in research and development has also been clearly recognised by the European Union. Since 1984, the European Community has supported cross-border collaborative research programmes specifically aimed at improving the competitiveness of the European industrial base and underpinning other areas of Community policy making. These multi-annual framework programmes are implemented by the European Commission and are commonly known simply as the "Framework Programme".

4. The Commission is proposing a doubling of the research budget in the Financial Perspective, both to strengthen existing activities and fund new ones, although its recent Communication⁴ on this issue did not break down its funding proposals in any detail (see Annex A).

The Sixth EU Framework Programme for Research and Technological Development

The Framework Programmes for Research, Technological Development and Demonstration are the EU's primary funding mechanisms for supporting and encouraging R&D in the European Community. They are open to public and private entities, large or small.

The current four-year Framework Programme (FP6) was launched in November 2002 with a budget of €17.5bn (rising to €19bn from May 2004 when the accession countries raise the number of Member States to 25). The strategic aims of FP6 match those outlined in the European Union Treaty with the core objectives of strengthening the scientific and technological structure within industry and encouraging international competitiveness, while promoting research activities that support other EU policies.

³ See Science and Innovation: A Consultation Document on Working Towards a 10-Year Investment Framework, March 2004 (http://www.hm-treasury.gov.uk/media/F1761/science_406.pdf

⁴ Communication from the Commission to the Council and the European Parliament: Building our common Future: Policy challenges and Budgetary means of the Enlarged Union 2007-2013, 10 February 2004

The Lisbon summit in March 2000 agreed that FP6 should also contribute towards the creation of an internal market for science and technology – a 'European Research Area' (ERA) – that would help ensure the better exploitation of European R&D and position Europe to compete with other major global R&D markets.

FP6 is based on three main blocks of activities grouped in two specific programmes, plus a third specific programme on nuclear research, as shown in the Commission diagram, below:



The first specific programme implements the Blocks of activity 1 and 3 above. This programme aims to achieve greater integration within the ERA by promoting research:

- in seven priority thematic areas;
- responding to the special needs of SMEs;
- in international cooperation;
- to support other Community policies; and
- to explore new and emerging scientific and technological areas and to anticipate future science and technology needs.

The second specific programme is aimed at strengthening the foundations of the ERA by attacking the structural weaknesses of European research.

The third specific programme aims at intensifying and deepening European cooperation in the field of nuclear research.

Framework Programme projects support collaborations across participating states, but can also include partners from virtually any country. EU funding promotes economically and socially desirable outcomes that go beyond the private interests of participants. The EU typically funds Framework Programme projects at about 50% of the full economic cost.

Rationale for the Framework Programme

- 5. The rationale for international R&D funding is strong:
- The rationale for public spending on R&D is well-established strong external benefits; reluctance of the capital market to invest in high risk, longer term R&D; enabling research that supports public policy (health, transport, environment, business competitiveness).
- The scale, facilities and range of expertise needed for many modern R&D tasks requires international collaboration. There is evidence of US competitive advantage due to its scale of investment, of competition and of possibilities for collaboration.
- International funding can promote excellence through greater technical competition and by building networks between the best researchers and businesses.
- Public policy challenges are increasingly international, if not global, in terms of impact and degree of effort needed e.g. environment, health, food safety, climate change.
- EU-funded R&D enables a focus on research to support EU policy (e.g. quality of life for its citizens, increased EU competitiveness, excellence of European science).

Government Approach to the Framework Programme Budget

In line with its general approach to the EU budget, the UK Government believes that spending should:

- be objectives-focused, clearly linked to EU policy objectives;
- be evidence-based;
- ensure value added from EU action consistent with subsidiarity;
- achieve budget discipline and sound financial management.

The Government believes that the EU budget should be stabilised at current expenditure levels, and should not exceed 1% of EU GNI. It also supports the EU aspiration to raise R&D spending towards 3% of GDP by 2010, with two thirds of the increase coming from the private sector. The Framework Programme is an important element in achieving this goal at the European level. It is therefore a high priority for increased funding subject to the overall UK position on the EU budget. The UK would also need to be convinced that the specific proposals within the Framework Programme were soundly targeted and going to be administered and delivered in an efficient way.

The Programme must not be seen in isolation, however. Evidence suggests that the private sector contribution to the 3% goal requires the largest change and that improving the exploitation of R&D in higher value-added businesses presents a major challenge. The Government assigns high priority to addressing these issues. The EU has recognised that this will require improvements to the framework conditions affecting R&D investment and innovation, including regulation and access to finance and skills that taken together will attract and retain leading edge R&D investment in Europe.

6. The above analysis implies an increasingly strong rationale for public funding at the European level to promote, as part of the development of a European Research Area:

- industrial competitiveness and high technology inward investment;
- shared EU policy objectives such as improved healthcare, CAP reform, environmental quality, food safety, diet and health and animal health and welfare;
- improved quality and scale of research capacity;
- promoting collaboration with, and competition between, the best teams, reducing gaps and overlaps in funding and ensuring critical mass of effort in key areas.

7. These aims do not cover all relevant international R&D objectives – it is also important that Member States can promote collaborations outside Europe, either through national programmes or other mechanisms. In the future it will be increasingly necessary to look beyond traditional areas for these types of collaboration (e.g. in 'large' fundamental science, particle physics and space) to facilitate collaborations between the best scientists regardless of nationality.

8. In many cases European level R&D can be supported effectively through the central funding arrangements provided by the Framework Programme. But this is only one option. The desired benefits could in principle be achieved through means such as closer collaboration between national funding agencies. Programmes such as EUREKA are already supported through national Governments. It is vital to weigh carefully the different options for delivering the above objectives, not least because of the administrative overheads involved in managing a single programme that covers over 30 states. EU funding accounts for only about 5% of the total European public funding for R&D. This suggests it should be targeted towards those areas where the case for European action is strongest.

Question 1:

- What is the rationale for the Framework Programme?
- Is the current €19bn budget appropriate? If you feel a need for change, why?
- Which areas of the Programme have the strongest rationale and which should be assigned lower priority?

Evidence to Inform Future Policy

The Office of Science and Technology (OST) is gathering evidence to inform future UK policy. Some initial evidence has informed the development of this consultation document and further results are expected. The sources include:

- A review of previous evaluations and literature reviews (including a Commission review of the FP6 new instruments and a UK analysis of EU research performance).
- Findings from informal focus groups involving Framework Programme participants and questionnaire surveys of UK small businesses and academics.
- A new UK evaluation of the impact of the Framework Programme on UK interests. Findings from the evaluation will be available in June. This and other evidence will be published on the Office of Science and Technology Website (www.ost.gov.uk/ ostinternational). Key findings to date are summarised in Annex C.

• Consultation with other Government Departments, the Devolved Administrations, and agencies.

The review of previous studies is being published in parallel with this document on the OST website.

Initial Evidence from UK Stakeholders

Key findings from UK participants and stakeholders to date include:

- Strong support for the basic rationale for the types of European activity supported by the Programme, broadly as outlined above. The human resources and mobility programmes were particularly considered to be of value. Other areas with a strong European rationale were: science to solve policy issues, big science, demonstration and testing and research into social issues.
- A desire for fewer, more focused Programme objectives and better matching of funding instruments to objectives in each part of the Programme. Decisions on EU project support should be based on scientific and technical excellence.
- Support for a combination of a top-down, strategically driven component and a more flexible component that would allow the most technically promising projects to be selected on the basis of relatively open calls for proposals.
- A very strong feeling that administrative, bidding and contracting procedures needed substantial streamlining. Current procedures and the way in which they are administered lead to costs of entry, transaction and participation that are much too high and threaten continued engagement. In particular several UK partners are reducing their involvement as project coordinators.
- A view that the means for involving industry needs substantial improvement. Industry supports the Programme where it has opportunity to shape it directly (e.g. in aerospace).

But there are concerns about how well the Programme delivers for business competitiveness:

- The aim of sustained integration of capacity (e.g. through Networks of Excellence) does not align well with the priorities of many businesses who are pursuing flexible, dynamic technology strategies. The European Commission recognises there are problems and is beginning to change its approach.
- The time taken to agree projects and the management/bidding overheads now appears to threaten the commitment of industry participants. In particular fewer businesses appear willing to lead projects.
- Contracts requirements, e.g. for the management of intellectual property rights, act as a constraint for some businesses, although this problem is not unique to Framework Programme collaborations. UK universities regard the IPR requirements as favouring business participants.
- There need to be better means for supporting smaller businesses.
- Especially with the widening number of countries participating in the Programme, numbers of project participants need to be limited to keep projects manageable.

Conclusions from Initial Participation and Evaluation Data

Initial data suggests:

- There is high demand for participation from a range of leading organisations initial calls in FP6 were strongly oversubscribed.
- Although there have been positive evaluations of Programme impact, for example in five-year assessments, the demonstrated impacts have been largely indirect.
- Evidence for specific impacts, e.g. on specific innovations and new product development, is less strong though this might be expected as the Programme's aims are long-term.
- In recent years, the balance of funding has to some extent shifted away from industrial competitiveness. This partly reflects a significant increase in the need for policy related research.
- The UK has performed well, with more participations in FP5 than any other Member State and obtaining slightly more funding (16% of the total) than proportion of GDP.
- UK universities got 25% of all HEI funding across FP5, while the UK enterprise sector won 12.5% of all enterprise sector funding. The UK does not have the same share of intermediary technology institutions as do other Member States, so that is the area where we do worst.
- Early information on FP6 suggests that UK participations are strong compared with leading countries as are success rates; especially in the number of projects in which we participate.

Requirements for a New Programme

- 9. The initial evidence suggests that a new Programme would need:
- A clear rationale taking into account subsidiarity.
- Clearer outcomes-focused objectives, addressing competitiveness, policy aims and improving the quality and scale of research capacity.
- Funding instruments that are fit for the intended purpose, backed by stronger pilot or evaluation evidence.
- More streamlined administration and delivery. This might require simplification of underpinning regulations, possibly outsourcing of some contracting functions and learning from existing successful mechanisms (e.g. EUREKA).
- Clearer routes to exploitation and spin-out of results, e.g. through better links between EU programmes and UK knowledge transfer and collaborative research programmes.
- A strong emphasis on support for policy aims, especially on environment, including climate change, health and agriculture:
 - Focusing on areas where European scale effort is essential to make progress
 - Identifying areas where European policy will impact strongly and an evidence base is required.

- A fresh look at the concept of promoting a European Research Area:
 - Addressing the drivers that matter to business, including inward investors; helping Europe access the best S&T globally
 - Promoting greater integration and excellence, but in ways that attract the best researchers to participate
 - Greater focus on technological innovation as well as research increasing incentives to pursue promising research areas
 - Responding more flexibly to market and scientific need, e.g. by combining a few top-down priorities with support for emerging R&D themes.
- To address business drivers more strongly:
 - Harnessing/working with multinational enterprises more effectively, where this makes sense
 - Focusing on areas where European scale effort is essential to make progress
 - Recognising the role the EU can play in facilitating access to technology and skills e.g. promoting greater transfer of knowledge and best practice through people, especially for medium or smaller sized businesses.
- To strengthen the focus on promoting research excellence.
- Policy also needs to take account of the need to incorporate the new Member States who join the Community on 1 May. European Structural Funds could be directed more strongly towards building S&T capacity in countries with lower GDP per capita. This would leave the Framework Programme giving a stronger focus on promoting scientific and technological excellence. There would need to be strong links between the policies, to ensure appropriate opportunities for research partners across the EU.

Question 2:

- What evidence can you suggest on the key issues to be addressed in the new Programme?
- In which areas of the Programme is there evidence that it is working well or that it needs to function better?

B. Science and human capital

Basic Research and Promoting Excellence in Science and Technology

10. The EU debate on scientific excellence has recently concentrated on the perspective of basic research. The Commission published a Communication on 15 January entitled "Europe and Basic Research".⁵ This seeks to define what constitutes basic research and its impact and then examines support for basic research round the world. It stresses weaknesses in European research by comparison with the US, for example in terms of Nobel prizes, and suggests that these are largely due to its fragmentation on national lines. The Communication argues that this has led to a lack of critical mass in certain areas and a less attractive environment for researchers.

11. The Communication's main proposal for action is to establish a new European support mechanism modelled on the US National Science Foundation's Individual Grants (i.e. grants to individual teams chosen through competition on the basis of scientific excellence without any cross-border or mobility requirements). While this scheme would primarily be aimed at basic research it would not be confined to it. Substantial fresh EU funding is proposed for this scheme, which could be administered by a new delivery agency or a European Research Council.

12. Recent research undertaken by the UK Government's Chief Scientific Adviser⁶ has suggested that Europe retains a number of strengths in basic research in comparison with the US. The analysis shows that basic research in the EU and US receives approximately equal funding and its impact when measured in terms of article citations is very similar. But on the index of the top 1% of most cited papers the US has an impact which is about twice that of Europe, suggesting a lead by the US in the most creative science. This US lead in the best science is also reflected in the number of Nobel prizes awarded. At the same time it has been recognised that a major weakness of EU research lies in the private sector and its ability to translate basic research into saleable goods, services and products.

13. The issue of basic research was discussed at an EU Presidency symposium in Dublin in February. The symposium concluded that any scheme along the lines proposed by the Communication would have to receive substantial new European funding to make an impact and should operate according to strict criteria (funding on the basis of open competition among individual research teams, with selection made on the criterion of excellence, as identified by rigorous international peer review).

14. The UK Government has long recognised the key importance of a high quality research base in underpinning an innovative and competitive economy. The promotion of scientific excellence plays a key role in fostering this base. The Government has therefore welcomed the outcome of the Dublin symposium and the subsequent call for further work on how best to promote basic research in Europe made by EU Heads of State and Government at the European Council in March. Possible critera against which

⁵ Communication from the Commission: Europe and Basic Research, January 2004 (http://europa.eu.int/comm/research/press/2004/pr1501en.html)

⁶ Submitted to Nature

proposals to establish a new mechanism in FP7 to fund basic research could be assessed might be:

- Any action should complement rather than detract from the more directly industry-oriented research historically funded by the Framework Programme;
- Research funding should be awarded on the sole basis of scientific excellence;
- Scientific excellence should be judged on the basis of rigorous international peer review;
- Research funding should be awarded through a delivery mechanism that minimises bureaucracy and encourages the very best to apply;
- Research should be funded in a sustainable manner meeting the full costs of the research team involved.

Question 3:

- How strong is the case for a major increase in EU funding to improve excellence in basic research?
- Is basic research a priority compared with applied research?
- If there is a basic research element in FP7, how should this be administered to maximise its effectiveness?
- Should new support for basic research involve a requirement to collaborate across borders or, as is proposed, award grants to individual teams?
- Do the proposed criteria look appropriate ones to apply when judging proposals for a basic research action?

Scientific Infrastructure

15. Participating European countries have successfully developed organisations such as CERN, ESA, JET, etc, which have established funding structures and mechanisms to decide about and fund successive facilities. Under these most of the running costs of the successor facilities have been met by a budget set by the parent organisation. There are, however, some European scientific infrastructures which face persistent funding problems. An example would be the EMBL (European Molecular Biology Laboratory). In addition to uncertainties about funding at national level, the traditional four year funding period of the Framework Programme poses problems for such institutions.

16. These institutions cover well-defined fields of science. In many scientific fields, there is no international body, and infrastructure projects too large for a single European country have to be negotiated on a case-by-case basis. This is a long and complicated process as different countries have different priorities and approval mechanisms.

17. There is, however, evidence that Framework Programme funding can work well in supporting medium-sized infrastructures (Community funding below €100m) such as the Geant high-speed data communications network to support research and education, which was successfully set up in FP5 and has continued on to FP6. It now interconnects with countries as far afield as South America and Asia.

18. Funding in FP6 is focused on enabling access to infrastructures. In addition, some money is available for feasibility studies for new infrastructures and, to a very limited

extent, to assist in building, but not running, new facilities. Results from the early calls in FP6 have shown a high level of oversubscription, with even successful proposals being seriously cut back in negotiation. This may suggest a need to increase the funding level – although there is no certainty that this would necessarily translate to more proposals going through to funding or to successful proposals receiving a sum closer to the funding requested. It might instead encourage bigger proposals. But this experience does indicate there is a substantial unfunded demand for scientific infrastructure across Europe which individual Governments are currently not addressing.

19. The Commission plans to develop a more comprehensive policy for large infrastructures with a European dimension and they also want to clarify responsibilities within Europe. On a Community level, it is proposed that ESFRI (the European Strategy Forum for Research Infrastructures) will take a greater lead in preparing priorities to be proposed by the Commission. The main challenge for ESFRI is "to speed up negotiations on strategy-led policy and development, act as an incubator in the process of convergence that from such negotiations leads to concrete initiatives".

20. The Commission is likely to propose increased funding for this area. The Chairman of ESFRI has also proposed that all ESFRI countries identify a central national fund for large-scale research infrastructures. The UK already has such a fund⁷.

21. It should be noted that, under the European Growth Initiative, loans from the European Investment Bank might be available to fund infrastructure facilities. It is not yet clear how far this would go to alleviate any shortages in international funding and critical mass in this area, especially as the loans would have to be repaid from a future income stream.

Question 4:

- What should be the role for the European Community in funding scientific infrastructure development and maintenance?
- What areas are in greatest need of support and how should any Community support be delivered?
- How can infrastructure funding (by its nature long term) be reconciled with the four-year cycle of the Framework Programme?
- What is the best arrangement to support more strategic decision making on future research facilities and funding?

Human Capital and Mobility

22. FP6 saw significant changes to the mobility schemes from FP5. The funding was substantially increased to €1.58bn (with some €1.5bn extra due to come into the budget after the accession of the new Member States). The schemes are available worldwide – researchers from outside the EU and associated countries can obtain funding to come to Europe and EU researchers can be funded to go anywhere in the world. Age limits were removed to encourage greater participation from people who have made a mid-career move, say, from industry to academia. In principle all schemes are open to participation by industry – in FP5 there was a targeted Industry Host Fellowship scheme.

23. New schemes (e.g. Marie Curie Chairs and Excellence Grants aimed at funding "excellent teams") were instituted in the new Programme. More emphasis was placed on return and reintegration actions designed to encourage researchers to deploy the skills they have acquired during their fellowships in their places of origin and to attract researchers currently in third countries back to Europe. The basic distinction between individual fellowships (where the fellow applies for funding) and host fellowships (where the host institution applies and then seeks fellows to undertake the planned research programme) was retained. Host fellowships were however targeted more explicitly on research training than in FP5. The Programme also supports knowledge transfer through conferences and workshops.

24. The first round of calls in FP6 has encountered three key problems. The first of these is the very varied number of proposals, and therefore success rates, across different Programme areas. In general the highest rates of over-subscription tended to be in the host fellowship actions where success rates on some actions dropped below 10%. The Conferences action was also very seriously over-subscribed, though this was in part due to eligibility rules which allowed large series of conferences to seek funding, in consequence squeezing out more specialist one-off events. At the other end of the spectrum, the reintegration fellowships were under-subscribed.

25. Secondly, industrial participation has been very poor across the board (not just in the UK). Again the problems are concentrated in the host fellowships (individual fellowships have always been dominated by the academic sector). The Commission opposed proposals to revive the targeted Industry Host Fellowship scheme of FP5. They have also been reluctant to revisit eligibility criteria, which in FP6 have focused the host fellowships on postgraduates rather than early stage post-doctoral fellows who are of more interest to industry. A recent UK/France/Germany paper on Innovation suggested using the Marie Curie schemes to foster intercompany mobility, with special reference to the SME sector.

26. Finally, participation by institutions in the new Member States has been very poor. Apart from one of the host fellowship schemes which was explicitly designed to benefit Accession States, only one host fellowship was lead hosted by an institution based in one of those countries and only one of the 391 Intra-European Individual fellows was planning to undertake research there.

27. With the exception of the reintegration fellowships, UK participation in the Human Resources and Mobility actions has been high, though primarily focused on the university/research institute sectors. Focus group discussions indicate very strong support for the substantial expansion of these actions, especially in the university sector, where they are seen as very important for helping to maintain and strengthen the science base.

28. The Government has regularly voiced its support for:

- A greater focus on mobility
- A stronger support for industrial needs
- Support for people and knowledge transfer directed at smaller businesses to enable them to access skills and expertise.

Question 5:

- What are your views on the human resources and mobility activities in the Framework Programme?
- Do you agree that some restructuring is needed in FP7 to boost industry (especially SME) participation in the mobility activities?
- If so what structure would be optimal?
- Do you have any ideas for new activities (e.g. those that might encourage "brain gain" from third countries or foster inter-sectoral mobility in industry)?

C. Business and competitiveness

Industrial Competitiveness

29. Some early statistics from the first calls for proposals suggest a fall in the proportion of industrial participants in FP6 – from 31.8% in 2001 to an estimate of below 30% in 2003. The Commission is examining this area in more detail. A factor in this may have been the increased emphasis on longer-term and larger-scale research, which may have made it more difficult for many commercial sector participants to engage with FP6. Industry, like many others in the science community, has also been deterred by the burdensome administrative arrangements surrounding Framework Programme participation. Barriers include the cost of putting a proposal together, the increased administrative and management requirements on project coordinators, and low success rates.

30. Industry has found it particularly difficult to engage with the Networks of Excellence. These seek to create longer-term integration that does not always fit with commercial priorities, although in some areas, like aerospace, this approach has worked well due to the relatively concentrated nature of this sector and the fact that the industry helped formulate the work programme.

31. Another disincentive for industrial participants has been the perceived unattractiveness of the rules relating to intellectual property rights and the requirement in certain cases to notify the Commission and other contractors of any assignment of access rights to third parties.

32. The UK Government continues to press for the improvement of the EU's innovation performance and the need for Europe to better translate promising research into new products, processes and services. The Framework Programme could be seen to have a strong role in this through a possible focus on supporting technology strategically. In order to do this the EU would need to identify its technology and research priorities, in relation to the strength of the EU research capacity – e.g. performance of research teams in Framework Programmes – and assessment of the quality of research. It could then develop a list of strategic technological priorities, based on market-led analysis. The UK identified the need for a more strategic approach to supporting new technologies through the Innovation Report⁸ and the DTI is in the final stages of developing its Technology Strategy.

33. In addition, as part of this effort, the Commission could consider how Framework Programme funding might build on existing business-led networks and projects for developing R&D collaboration between Member States. One example could be the EUREKA programme, which has high-level industry engagement and could help demonstrate how business can be engaged more actively in pan-European science, technology and innovation.

34. The Commission is also placing considerable emphasis on the concept of European Technology Platforms and their role in bringing together all the key European players in particular areas of technology (see paragraph 55).

8 Innovation Report: Competing in the global economy: the innovation challenge, December 2003 (http://www.dti.gov.uk/innovationreport/)

Question 6:

- How can the Framework Programme be made more attractive to industry and increase private sector R&D investment?
- Are there alternative delivery mechanisms which could foster industrial participation?

Addressing the Needs of Small and Medium Enterprises

35. FP6 has an overall aim that SMEs will make up 15% of participants. In the first calls in the thematic priority areas, SMEs represented 13% of the funding for successful projects, although the wide definition of what constitutes a SME may have skewed these figures. Although it is a little early to say whether SMEs have been affected by the new focus in FP6, the longer-term nature of the new instruments does seem to have resulted in some shift in the balance of interest towards larger companies.

36. The Commission intends that SMEs will be brought into Networks of Excellence once they are established. However, it is not clear how far this will happen in practice. SME participation may also be affected by an apparent move to discourage the use of sub-contractors in favour of full partners. In many cases SMEs would prefer to participate as sub-contractors rather than long-term members of the consortium and are less likely to participate if they cannot do so on those terms.

37. This suggests that there needs to be a separate means for engaging SMEs that avoids the danger of weakening the impact of strong projects by introducing new requirements to include extra participants. Following the relatively disappointing figures from the first calls the Commission has proposed a number of corrective measures, including the introduction of SME-focused Integrated Projects. There have been strong calls from within the SME community for stronger emphasis on measures akin to the previous version of the CRAFT programme aimed specifically at SMEs. CRAFT has been carried into FP6 through revised Cooperative Research Awards (one to two year projects with a significant part of the research undertaken by RTD performers such as universities or research centres), and these have met with approval to the point where early calls have been substantially oversubscribed and there is pressure for increased funding to be allocated.

38. Clearly any new instruments aimed at SMEs must have simple delivery and management procedures, as they do not have the financial ability to commit to resource-intensive and longer-term collaborations. It also needs to be recognised that direct participation in EU R&D may only be appropriate for a relatively limited number of SMEs with a strong interest in technology or research. The Programme potentially has a key role to play in providing better access for SMEs to technology and good practice in use of technology. The UK has suggested that the Programme could also focus more on 'knowledge transfer through people' and how it can positively impact on researcher mobility, including that of employees in SMEs.

Question 7:

- How can EU funding best address the needs of SMEs?
- How useful are existing SME-specific measures and what form should future SME instruments take?
- If necessary, how can SMEs be integrated into mainstream Framework Programme projects?
- How could mobility for SME employees be increased to access technology and skills?

Better Exploitation and Spin Out of Research

39. Evidence both from applied and policy-related research suggests a need for improved exploitation of research results and the skills that are acquired. The UK evaluation and evidence projects will seek to identify options for improving the rate of industrial application, including the impact of Programme and project scale, composition and type of project supported. There may be a case for funding targeted specifically to increase the application or spin-out of results. Programme planning needs to take account of the availability of sustained private sector investment, and therefore the likelihood of eventual commercial benefit, in each area.

40. It is also important that there are strong links between UK national activities such as the development of business clusters, the work of the Regional Development Agencies and support for Collaborative R&D (LINK), Knowledge Transfer Networks (Faraday) or EUREKA Partnerships. This would enhance the likelihood of sustained investment and collaboration in key areas. Measures introduced in the UK, and being considered as a result of the Lambert Review, should help increase the benefits arising from university research. The DTI Technology Strategy will aim to promote synergies between UK and EU funding to enhance the benefits from research funding of all kinds through higher rates of technological innovation.

41. The current research and innovation part of the Framework Programme seeks to improve knowledge transfer, including through the network of Innovation Relay Centres. In order to strengthen links with promotion of enterprise and best practice this work might in future be supported outside the Framework Programme. Changes to this programme would be an obvious vehicle for implementing any policy to improve exploitation.

42. Programme planning also needs to take account of the needs of policy makers to access the evidence base produced by research, both competitive and that explicitly aimed at policy. Account particularly needs to be taken of how measures to secure intellectual property rights impact on dissemination of vital research and skills to the wider scientific and policy community.

Question 8:

 What should be done to make the Framework Programme better focused on exploitation and spin out?

D. Support for policy

Research in Support of Policies

43. The EU Treaty explicitly provides for research activities that are needed to underpin Community policy in a wide range of areas. At present this research is supported partly in the thematic priorities of FP6 and partly, on a smaller scale, in a dedicated 'scientific support to policies' programme within FP6. Clearly there will be a continuing need for this research in FP7. Just a few examples of areas where a significant research requirement can be envisaged in the next decade are energy, climate change, diet and health, agricultural policy, public safety and security.

44. A key challenge for FP7 is how the Programme manages the fundamental difference between pre-competitive industrial research and research in support of policy. The outcomes from policy research are integral to the policy-making process rather than deliverables to support economic aims directly. Instruments clearly need to be fit for purpose and the results made available to policy-makers across the Union in an open and transparent manner. These requirements will affect the commissioning and management of research in these areas. However, this is not to say that the outcomes of some pre-competitive research cannot impact on policy and likewise research of relevance to policy cannot produce technological innovations. An example would be environmental research where results can lead to both improved policy and environmental technologies.

The Joint Research Centre

The Joint Research Centre (JRC) acts as the European Commission's in-house research organisation, undertaking research in support of Commission policy on behalf of other Directorates General (DGs) itself or advising them on where to obtain scientific advice. It currently consists of seven Institutes spread over five EU countries. Its headquarters is in Ispra in Northern Italy. The JRC obtains a proportion of its funding directly through EU Framework Programmes (€1.05bn in FP6 split between nuclear and non-nuclear activities, a reduction in percentage terms on FP5) but is also free to bid for additional FP6 money in competition with other research institutions.

There have in the past been concerns that the JRC lacked a clear customer focus and did not provide good value for money. This has however improved in recent years and its administration has been strengthened with an improved management culture and a greater willingness to take a more strategic view of the JRC's role as provider of scientific advice to Commission DGs.

It has been suggested that there might be a case for abolishing or significantly reducing the direct funding of the JRC and routing funding through the customer DGs in the European Commission. The JRC's role is, however, valued as a visibly impartial provider of advice with no national or commercial links. A more client-driven approach might undermine this standing. There is also reason to doubt whether many of the policy DGs would in practice be able to act as intelligent customers. A possible approach would be to continue to bear down on the percentage of Framework Programme money going directly to the JRC, while maintaining pressure to improve management efficiency in the organisation.

45. The coordination of national programmes is also important in this area (see discussion in Section E), as is support for developing and other partner countries globally.

Question 9:

- How should FP7 be balanced to meet the needs of both research in support of policy and that in support of competitiveness outcomes?
- Should there be a clearer delineation between the two types of research in the structure of the Programme?
- How could the interests of end-users of policy-related research be better met?
- How can the need for transparency and dissemination of policy-related research be balanced with the need to protect IPR?
- What should be the future role of support for the Joint Research Centre (JRC)?

E. Funding instruments and research priorities

Science and Technology Priorities

46. Although the funding levels for FP7 are not yet established, funding is likely to amount to less than 10% of overall public R&D support. Nevertheless the input can be significant, since the EU funds only a share of project costs. It is important to establish priorities that focus on those areas where it is most important to make a real impact. It will be important for the UK to develop a clear idea of what we want FP7 to achieve – and how it relates to and complements funding at the national level.

47. Criteria for EU support might include:

- Need for scale of instrument not possible at national level (in terms of research or infrastructure)
- Providing stronger alignment between aims of different national programmes, where the risks of overlapping or fragmented funding is high
- Support for an industrial or research community that is already increasingly integrated at European or global level
- Need for collaboration, including to bring in a wide range of inputs from different sectors
- Need to support specifically EU policies or problems common across Europe
- Timescale required for developments is appropriate, bearing in mind EU planning and contracting processes.

48. The UK's identification of priority scientific and technological themes will take note of the above criteria. These priority themes will draw on evidence and priorities identified in the forthcoming Technology Strategy, by Departments and by the Research Councils, based on RCUK strategy (see Annex H).

49. The methodology for identifying immediate priorities in the Technology Strategy involved the coordination of a panel of Technology Managers drawn from across the DTI to identify, from a business perspective, the priorities for the technology programme. Information was drawn from technology trends and requirements contained in reports by Innovation and Growth Teams, Information Age Partnership (IAP), former Foresight Panels and other consultative bodies, as well as consultative reports prepared by, or for, the Department in relation to its business relationship activities. The resulting 'long list' of strategic technological priorities was compared with outputs from similar exercises in France, Germany and the Netherlands, and distilled to produce a short list by focusing on industry oriented targets.

Question 10:

- What criteria should be applied for identifying the S&T priorities for FP7?
- Can you suggest evidence that identifies key areas for support?

Relationship with EURATOM

The EURATOM programme provides for research and training on nuclear energy in FP6 for the European Atomic Energy Community. Its objectives are to help the implementation of the thematic priorities for research and training on nuclear energy, using the following horizontal activities:

- Specific support actions
- Trans-national access to large infrastructures
- Actions to promote and develop human resources and mobility
- Training fellowships
- Grants for cooperating with third countries.

EURATOM's thematic priorities cover fusion energy research, management of radioactive waste, radiation protection and other activities in the field of nuclear technologies and safety.

Fusion is an important long-term option for energy supply. Current research is focused on demonstrating the scientific and technological feasibility of fusion energy and addressing its sustainable qualities. One of the most important developments in this area is the work on the proposed international fusion experimental reactor ITER. This is the highest priority global fusion experiment and has unanimous support from its international scientific community. The EU expects to play a large part in making ITER a reality. The total cost to the Framework Programme budget is not yet clear because the Commission expects to contribute 48% of the €4.5bn construction cost if hosting the project but only 12% if not.

As well as the core ITER programme, fusion research will also need major peripheral activities conducted by Member States to address issues such as materials testing and alternative reactor configurations. Facilities such as the UK-hosted JET will be in this category. With ITER as the top priority it remains to be seen what level of funding will be available for this. It is expected that contributions will also be needed directly from Member States.

Nuclear fission energy supplies around 35% of electricity in the EU. It constitutes a key element in the debate in Europe on the means of combating climate change and reducing Europe's dependence on imported energy. Some of the power plants of the current generation will continue to be operated for at least 20 years. The UK's Sizewell B plant is expected to continue operation until 2035.

Historically, the fission programme has covered research into existing reactor safety, radiation protection and radioactive waste treatment and management. The fission programme provides added value for the UK through collaboration with other EU research groups and has a role in maintaining expertise and attracting younger scientists in a sector that is in some areas facing an uncertain future. The UK has a proactive approach towards the fission programme and has a strong delegation participating in relevant Committees.

Role of Member State and European Funding Mechanisms

50. One of key messages of the European Research Area (ERA) concept is that Member States must work better with each other and with the Community when making and implementing R&D policy. If the creation of an ERA is the top priority of EU R&D policy then the main instrument of EU R&D policy (the Framework Programme) should reflect this priority.

51. This suggests that the coordination of, and support for, Member States' initiatives should be considered as an important horizontal issue across future Framework Programmes. The level of support and its delivery needs to be commensurate with the level of ambition of the ERA project.

52. EUREKA and COST are two long-standing inter-governmental initiatives which facilitate better coordination within the European research and development community. EUREKA sets its sights nearer the market and COST much closer to laboratory bench. The Framework Programme has provided some assistance to both initiatives but does not provide research funding in either case (this is left to Member States). Similarly the European Science Foundation (ESF) EUROCORES programmes coordinate the domestic efforts of Member States in specific scientific areas and have attracted support from the Framework Programme (again Member States fund the research). More recent initiatives such as the ERA-Net scheme (which is an integral part of FP6) and the European and Developing Countries Clinical Trials Partnership (EDCTP) have indicated the potential for greater joint working between Member States. EDCTP represents a step change from the previous initiatives as the Community has, in this instance, acted as a full partner with the Member States – allocating sufficient funds to the initiative.

53. The new Programme will need to build on the opportunities offered until now by COST, EUREKA, EUROCORES and ERA-Net. Their relative roles and effectiveness need to be addressed, and appropriate links made with existing joint activities on infrastructures and policy-led research. The new Programme will need to identify how shared European goals can best be addressed collectively by Member States and the Community – including the case for Community funding of joint activities. The case for improved coordination with regional research and innovation programmes should be examined.

54. The EU Structural Funds provide significant funding for R&D activities in less developed regions, including support for research infrastructure, projects, training researchers and university-business links. The Commission's proposal for the future Structural Funds (post 2007) includes a greater emphasis on support to research and innovation. At present, there are few formal links between activities supported by the Framework Programme and through the Structural Funds.

Question 11:

- What is the future role of EU funding in supporting links between Member State programmes?
- Which mechanisms are best suited for this purpose and how might they develop?
- Should European legal provisions allowing support for Member State collaboration be more widely applied in FP7?
- Is there a need for European aspects of regional programmes to be better coordinated?
- Should this be supported through the Framework Programme or are existing mechanisms at national level and through the EU Structural Funds sufficient?

Strategic Technology Development

55. There are a number of strategically important areas where the Community can add considerable value by bringing together the widest possible group of stakeholders to discuss the development of new technologies, create a vision of where Europe needs to be in the decades to come and formulate a strategic agenda for the R&D required to achieve that vision. In recent months, this process has been referred to as a "European Technology Platform" (ETP).

56. Existing examples of this approach (e.g. for those technologies associated with the aeronautics sector – see www.acare4europe.com/) provide cause for optimism that ETPs could be a useful tool for informing Community, Member State and business investments in R&D, although there are dangers in generalising from special cases.

57. ETPs would bring together all aspects of the research, innovation and technological development chain. Participation in a platform would be necessarily broad, encompassing the research community (both public and private), industry (from raw materials to retail), public authorities (including policy-makers/regulators and consumers), the financial community, users, consumers and civil society.

58. The first phase of this approach (to generate a vision and strategic research agenda) would require a certain level of commitment from the above stakeholders and a small amount of support from the Community to provide for the secretariat, travel etc. The second phase (implementation of the strategic research agenda) would require significant financial support from the Community, Member States and industry through the variety of instruments (old and new) at their disposal.

59. The term "public-private partnership" has been applied to the ETP concept – some have suggested a commercially integrated organisation that is capable of receiving and administering Community funding on a very significant scale. There has been no piloting of this ambitious possible approach, particularly with regard to impacts on the flexibility and competition of R&D funding and how to deal with legal/IPR issues.

Question 12:

- Could the European Technology Platform concept be expanded to a wider range of technologies in FP7?
- What technologies would benefit from this approach and what criteria should be applied in the selection process?
- What level of funding would be appropriate for an ETP?

Impact of Collaborative R&D Funding Instruments

60. In the first calls for the Sixth Framework Programme, UK organisations were involved in over half of all proposals. The success rate for proposals led by UK organisations was slightly above average.

61. All calls under FP6 have been heavily oversubscribed so far, and there is a need for improved management of this including greater clarity in the calls to decide priority areas. Two-stage evaluation could play a useful role in managing over-subscription by reducing the administrative burden of applying in the first stage and increasing the success rate in the second stage. The first stage requirements should not be over burdensome and should operate against a significantly reduced set of criteria, and sufficiently quickly. A possible example of best practice is the Leverhulme Trust.

62. Instruments adopted for FP7 should be selected based on clear evidence of their value in the present and previous Framework Programmes. It appears that instruments developed previously (Specific Targeted Research Projects (STREPs), Coordination Actions (CAs), Specific Support Actions (SSAs), Specific Projects for small and medium sized enterprises (SMEs) and Specific Actions to promote research infrastructures) remain popular with researchers and seem to fulfil a useful role. The 'new' instruments in the Sixth Framework Programme (Integrated Projects (IPs), Networks of Excellence (NoEs) and Article 169) have had a mixed reception from the research community.

63. Networks of Excellence have not always been particularly well understood, and improved consistency in the interpretation of the role and structure of the instrument across the Commission will help encourage their adoption. However, Integrated Projects have been received more positively, despite some lack of clarity over the required size of the projects. There seems to have been a reduced SME participation in the new instruments. This suggests that separate means for engaging SMEs should be established, which avoid the danger of weakening the impact of strong projects.

64. Options for the Seventh Framework Programme include:

- Continue with a mix of 'traditional' and 'new' instruments, but matching the choice of instruments employed to the objectives and needs of the relevant Programme area;
- Reduce and improve the number of instruments, learning from the best, drawing on the results of current reviews (such as a Commission-appointed panel chaired by Ramon Marimon, for example) to increase their attractiveness to industrial participants;
- Continue/expand specific SME measures: Introduce specific measures to engage SMEs in 'new' instruments, perhaps engaging more SMEs as subcontractors in projects and possibly reintroducing measures based on the earlier CRAFT scheme for SMEs;
- Develop new instruments to support basic research projects based on the scientific and technical quality of individual research teams;
- Expand the New and Emerging Science and Technology (NEST) programme to allow exploration of emerging topics.

Question 13:

- Which options would you support for funding collaborative R&D?
- What priority should this area be given?
- Could the number of instruments be reduced and how?
- How might alternative instruments function?

F. Delivery and UK support

Programme Management and Delivery

65. One of the key issues for any successful funding programme is how it is managed, monitored and evaluated. It is true to say that a large multi-national funding programme will be inherently complex, as there is a need for a sound legal basis and robust processes to prevent fraudulent activity. However, the Framework Programme does suffer from a reputation of having particularly burdensome administrative arrangements. Issues raised by participants include:

- Detailed rules and extensive accompanying guidance documentation;
- Complex and resource intensive application process;
- (Often) long contract negotiations;
- Delays in the availability of key documents, changes to them and inconsistent application of procedures across Commission project officers.

66. Some possible administrative improvements include:

- A revised two-stage application process for heavily oversubscribed instruments, with simpler requirements for first stage proposals – in line with emerging practice in some areas of the current Programme;
- Reduced number of instruments and simplification of the rules;
- Improved guidance from the Commission for proposers, evaluators and project managers on the application and scope of the new instruments;
- Further clarification of the Commission's guidance on intellectual property rights (IPR) assignments and application and possible modification of instruments to reflect differing IPR requirements;
- Simplification and shortening of negotiation procedures, including provision of negotiation timetables, including minimum notice periods for attendance at meetings and document generation;
- Significantly greater transparency of process, including publication of information on Programme management, proposal evaluation, and the work of advisory groups. This would improve participants' confidence in the selection and management procedures.

67. Since its inception the Commission has managed almost all aspects of the Programme. With the increasing complexity of the Programme (in terms of rationale, scope and structure) there may be arguments for looking at other methods of delivering the Programme. Possible options might include:

- An EU agency (e.g. to support basic research or science-driven research/industrial research more widely);
- A separate body or unit to undertake specific functions, such as contracting;
- Use of Member State research systems, for instance EUREKA, to deliver funding where appropriate;
- Build on existing models that have proved effective e.g. the European Molecular Biology Laboratory (EMBL);
- Use of the EUREKA programme to support industrial R&D (see paragraph 52-3).

Performance Measurement

68. The Framework Programme is the EU's third biggest funding mechanism, but lacks a comprehensive and transparent system of performance measurement. There is some work underway to address this and the UK, with some other Member States, has continued to press for improvements. More comprehensive, accessible and timely information would support effective monitoring and assessment of the Programme's delivery processes, outputs and likely impact. It might assist the Commission, with Member States (through the Framework Programme Management Committees) in taking appropriate and timely decisions. It would also permit Member States to target more effectively their national services for information and advice. Elements of a possible approach include:

- Clear objectives defined for each Programme area
- Performance metrics for each area, related to the objectives, and reported on regularly
- Published quality control information, e.g. on length of time to contract, user experience of the contracting process and measures to address difficulties
- Improved process for evaluating bids, including ensuring the most appropriate and qualified experts are employed for this role
- Quicker, more accessible and comprehensive supply to national authorities of data on participation so that authorities can plan their national information and promotion work more effectively
- More systematic, sustained and strategic analysis of the impact of the Programmes, conducted at arm's length from the Commission and supported by a dedicated budget
- The information to be openly published, although detailed information on participation would be supplied in confidence to national authorities.

UK Strategy and Support

69. The UK Government has a key role in ensuring appropriate promotion of the Framework Programme and contributing effectively to its management. The European Commission relies on a network of National Contact Points set up by Member States to provide information on Programmes to potential participants. Member States are also represented on a series of Programme Management Committees where views can be expressed and key decisions made.

70. The Government recently set up a Central Information Point to provide a single initial point of contact for enquiries on the Programme and to improve the effectiveness of its promotion. In addition, the Research Councils support the UK Research Office in Brussels and Departments support a network of National Contact Points. In Scotland and some English regions, specific support is offered to assist the development of proposals.

71. Building on this, the Government recognises the need for further improvements, for example in integrating the promotion of the Framework Programme more strongly with the UK business support infrastructure. Existing links with national programmes for collaborative research can be strengthened to ensure that European funding is considered by UK partnerships and that appropriate opportunities are taken for UK programmes to support the further development of R&D funded at the European level. A number of Regional Development Agencies are already active in this area. Several

UK sectoral initiatives, such as the Innovation and Growth teams, have highlighted the importance of influencing and exploiting European funding.

72. It is important that national and EU programmes complement each other in appropriate ways. Views on how to achieve this were invited in the Government's recent consultation on a ten-year investment framework for science and innovation.⁹ The role of the Technology Strategy was outlined in the Innovation Report.¹⁰ Other relevant factors in deciding strategic UK priorities for EU programmes include the science priorities of the Research Councils developed through RCUK and, where appropriate, Departmental strategies for science and technology.

73. At an operational level, Departmental representatives to Programme Management Committees meet regularly to develop a shared understanding of trends and concerns and agree action. Issues that cut across Programme areas are raised directly with the Commission or through Horizontal Programme Committees. Collaboration with other Member States, particularly on areas relating to improved delivery, is helpful in understanding and identifying solutions to common problems.

74. EU support is allocated on a shared cost basis, whereby some of the full economic costs of projects are covered by participating institutions. This principle is intended to align EU R&D projects with the organisation's wider aims. As the UK moves towards funding a greater proportion of costs directly, it is necessary to consider whether the different approaches might create unintended barriers to international collaboration. This issue was also raised as part of the consultation on the ten-year science and innovation investment framework.¹¹ For academic institutions and public bodies, higher proportions of Community contribution would reduce these disparities and place EU funding on a more equal footing with national support.

Question 14:

- Are there barriers facing business and the science base in effective engagement with EU research programmes?
- How can the UK more effectively influence and benefit from EU research funding and policies?
- How could management and administrative procedures be changed to make it easier for UK organisations to participate?

⁹ Science and Innovation: A Consultation Document on Working Towards a 10-Year Investment Framework, March 2004 (http://www.hm-treasury.gov.uk/media/F1761/science_406.pdf)

¹⁰ Innovation Report: Competing in the global economy: the innovation challenge, December 2003 (http://www.dti.gov.uk/innovationreport/)

¹¹ Science and Innovation: A Consultation Document on Working Towards a 10-Year Investment Framework, March 2004 (http://www.hm-treasury.gov.uk/media/F1761/science_406.pdf)

Annex A: Commission's proposals in the Financial Perspective

Although a Commission proposal is not expected until the first quarter of 2005, their current thinking is reflected in a Communication on the Financial Perspective. This suggests the following themes for S&T spend:

Strengthening the European effort in research and technological development

An obvious area where the EU budget can, and should, make a difference is research and technology. The European research effort remains too fragmented, too compartmentalised and insufficiently connected to international cooperation. Moreover, Europe devotes only 2% of its GDP to research, compared with 2.7% in the United States and more than 3% in Japan. Europe has not been able to attract the best world's researchers, and many excellent European scientists still choose to work in US. This is a critical issue to improve our productive sector's capacity to benefit from the new international division of labour.

To help Europe to become a beacon of excellence attracting researchers and investments, we must remove the barriers to excellence arising from segmented national programmes. But quality improvements will not be enough. Increasing the research effort will also be necessary. This implies that the Union must pursue simultaneously three related and complementary goals:

- **Realise a "European research area"**, acting as an internal market for research and technology, as well as a space for a better coordination of national and regional research activities and policies, to overcome the present fragmentation and duplication of research efforts in Europe.
- Help raise the **European effort on research to 3% of Union GDP by 2010**; with 1% to come from public sources, and 2% from the private sector.
- **Support and strengthen research** throughout Europe by providing direct financial support at European level to complement national programmes helping to achieve the first two objectives.

Financial support at EU level offers a high added value in research by helping to create critical masses of financial and human resources, stimulating excellence and creativity through exchange, networking, collaboration and competition at European scale, and increasing the visibility of European capacities and performances.

There is hence a strong case for a significant increase in EU research funding currently at 0.04% of GDP, as a contribution to bridging the remaining gap towards the 1% target of public investment, as a complement to national efforts and in close relationship with them. The Union's action should concentrate on 5 main themes corresponding to 5 major issues Europe is facing in research:

• Stimulating the dynamism, excellence, creativity and productivity of European research by giving **financial support** to projects carried out by **individual research teams selected on a competitive basis** at European rather than at national scale, in particular in basic research, to explore new scientific avenues and topics, in close relationship with the scientific community.

To that end a European facility would be established along the lines of, for instance, the National Science Foundation in US, for awarding grants to the highest level individual research teams in competition at European level, in fields such as advanced mathematics or quantum physics in the perspective of new breakthroughs in informatics and software.

• Strengthening European **research capacities** by supporting the design, development and use of key research infrastructures of European dimension and interest, as well as the development of human resources in research and technology, by supporting training, helping remove the obstacles to pan-European scientific careers, and promoting researchers' transnational mobility. These actions would need to be coordinated with those under cohesion policy.

Research capacities of this kind would be, for instance, European large lasers and neutrons sources facilities for the exploration of matter and biomedical applications; or European bio data-banks in genomics and the upgrade of Europe's research networking and computing infrastructure. Support to improve human research resources would include large scale support programmes for European young and established scientists.

• Setting up pan-European **public/private partnerships** for technological research through joint initiatives based on the **technological platforms concept** which brings together public and private stakeholders, to set up and implement common research agendas in fields of industrial relevance, on the model followed in the European Growth Initiative.

Examples of these partnerships would include the development of a new generation of clean and economic aircrafts at the horizon 2020, the development of hydrogen networks and fuel cells, mastering electronics at the nano-scale, investment in future mobile and wireless technologies and applications, enhancement of joint efforts in embedded systems, as well as new technologies in solar energy, and European coordinated effort in advanced chemistry, for multiple industrial applications and social purposes.

 Stimulating the development of European "poles of excellence" based on networking and collaboration at laboratory level by supporting transnational medium-scale networks and projects through the new instruments used in the 6th Union Research Framework Programme improved on the basis of experience.

This strand involves supporting European poles of excellence in fields such as environment and climate research, information communication technologies, medical and food research, or research on new materials and industrial processes, by creating and supporting the cooperation of European high-level laboratories in European "networks of excellence" and joint research towards precise and well targeted objectives in "integrated projects". • Improving, through specific networking mechanisms, the **coordination of national and regional research programmes and policies**, to create critical masses of resources, strengthen the complementary character of national activities, and improve the coherence of public research agendas throughout Europe. It involves stimulating exchanges, the mutual opening of programmes and the launch of common initiatives.

National research programmes would be pooled in areas like, for instance, cancer, Alzheimer and emerging diseases, nanotechnologies, or research on the main social and economical challenges, like demography, education, employment and innovation.

In close link with its action in research, the Union should support the development of a coherent and strong effort at European level in two fields in which science and technology play a key role:

• **Space**, in support of a European space policy aiming at greater coherence of European and national private and public efforts, and focusing on the development of applications in fields such as positioning and navigation, earth observation and monitoring, and telecommunications, coordinating R&D investments at various levels and helping the EU to better realise its policy objectives in partnership with existing space powers such as Russia, and emerging ones like China, India and Brazil.

Action in this area will rely on the implementation of a European space programme strengthening EU space projects (such as the GMES – Global Monitoring for Environment and Security).

• Security, in support of the implementation of Union policies, by fostering research needed to increase security in its different dimensions in Europe as a follow-up of the preparatory action launched in this field, in which US investments are five times higher than Europe's. This constitutes a Commission contribution to the wider EU agenda to address Europe's challenges and threats as set out, inter alia, in the European Security Strategy that was endorsed by the European Council in December 2003. It is complementary to the actions and efforts that are being deployed by the Member States and the other EU institutions.

It would involve the development of knowledge and technologies with European added value to successfully anticipate, monitor and mitigate new security threats, such as those related to bio-terrorism, cyber-crime and global security, and to ensure the European position in the complex research networks.

EU action in the field of **dissemination of research results** will be strengthened accordingly, and **European participation and leadership in global initiatives** will be reinforced.

[Source: Communication from the Commission to the Council and the European Parliament: Building our common Future: Policy challenges and Budgetary means of the Enlarged Union 2007-2013, 10 February 2004 (http://europa.eu.int/comm/budget/pdf/financialfrwk/enlarg/COM_2004_101_en.pdf)]

Annex B: Consultation Questions

Question 1:

- What is the rationale for the Framework Programme?
- Is the current €19bn budget appropriate? If you feel a need for change, why?
- Which areas of the Programme have the strongest rationale and which should be assigned lower priority?

Question 2:

- What evidence can you suggest on the key issues to be addressed in the new Programme?
- In which areas of the Programme is there evidence that it is working well or that it needs to function better?

Question 3:

- How strong is the case for a major increase in EU funding to improve excellence in basic research?
- Is basic research a priority compared with applied research?
- If there is a basic research element in FP7, how should this be administered to maximise its effectiveness?
- Should new support for basic research involve a requirement to collaborate across borders or, as is proposed, award grants to individual teams?
- Do the proposed criteria look appropriate ones to apply when judging proposals for a basic research action?

Question 4:

- What should be the role for the European Community in funding scientific infrastructure development and maintenance?
- What areas are in greatest need of support and how should any Community support be delivered?
- How can infrastructure funding (by its nature long term) be reconciled with the four-year cycle of the Framework Programme?
- What is the best arrangement to support more strategic decision making on future research facilities and funding?

Question 5:

- What are your views on the human resources and mobility activities in the Framework Programme?
- Do you agree that some restructuring is needed in FP7 to boost industry (especially SME) participation in the mobility activities?
- If so what structure would be optimal?
- Do you have any ideas for new activities (e.g. those that might encourage "brain gain" from third countries or foster inter-sectoral mobility in industry)?

Question 6:

- How can the Framework Programme be made more attractive to industry and increase private sector R&D investment?
- Are there alternative delivery mechanisms which could foster industrial participation?

Question 7:

- How can EU funding best address the needs of SMEs?
- How useful are existing SME-specific measures and what form should future SME instruments take?
- If necessary, how can SMEs be integrated into mainstream Framework Programme projects?
- How could mobility for SME employees be increased to access technology and skills?

Question 8:

• What should be done to make the Framework Programme better focused on exploitation and spin out?

Question 9:

- How should FP7 be balanced to meet the needs of both research in support of policy and that in support of competitiveness outcomes?
- Should there be a clearer delineation between the two types of research in the structure of the Programme?
- How could the interests of end-users of policy-related research be better met?
- How can the need for transparency and dissemination of policy-related research be balanced with the need to protect IPR?
- What should be the future role of support for the Joint Research Centre (JRC)?

Question 10:

- What criteria should be applied for identifying the S&T priorities for FP7?
- Can you suggest evidence that identifies key areas for support?

Question 11:

- What is the future role of EU funding in supporting links between Member State programmes?
- Which mechanisms are best suited for this purpose and how might they develop?
- Should European legal provisions allowing support for Member State collaboration be more widely applied in FP7?
- Is there a need for European aspects of regional programmes to be better coordinated?
- Should this be supported through the Framework Programme or are existing mechanisms at national level and through the EU Structural Funds sufficient?

Question 12:

- Could the European Technology Platform concept be expanded to a wider range of technologies in FP7?
- What technologies would benefit from this approach and what criteria should be applied in the selection process?
- What level of funding would be appropriate for an ETP?

Question 13:

- Which options would you support for funding collaborative R&D?
- What priority should this area be given?
- Could the number of instruments be reduced and how?
- How might alternative instruments function?

Question 14:

- Are there barriers facing business and the science base in effective engagement with EU research programmes?
- How can the UK more effectively influence and benefit from EU research funding and policies?
- How could management and administrative procedures be changed to make it easier for UK organisations to participate?

Question 15:

- Are there any areas we have not anticipated in this document?
- Do you have any other comments that might aid the consultation process as a whole? Comments on the layout of the document would also be appreciated.

Annex C: Statistics on participation in Framework Programme

1. UK participation is strong with UK organisations involved in 40.7% of FP5 projects and coordinating 18.5% of projects – the highest of any Member State.

2. This UK participation in FP5 projects was less than the 47.1% seen in FP4, partly due to the larger number of countries participating and partly to other countries increasing their performance.





3. The share of participation by industry (including enterprise sector, private non-profit, and private research centres) remained relatively constant between FP4 and FP5 (37% of UK participants in FP4 compared with 38% in FP5). Industry's share of UK Framework Programme funding rose from 30% to 35% over the same period.

4. In the first tranche of calls for FP6, UK organisations accounted for 11% of participations, with an average UK success rate of 20.1%. This compares with an average success rate for proposals involving UK participants in FP5 of 27%. Oversubscription has been higher overall compared with FP5, but the UK success rate is comparable with other leading countries.

5. The UK higher education sector performs most strongly in the Framework Programme. 46% of UK participations in FP5 were undertaken by HEIs. This was, in absolute terms, the highest in Europe (EU average of 30.8%).

6. The enterprise sector is the next strongest, accounting for 27% of UK participations in FP5. This is slightly below the EU average for enterprise participation (29%), though the absolute numbers compare well with other leading countries.



7. UK organisations received a total of €2,047m of EC funding from FP5, representing 16% of the total.

8. Roughly half that funding (\in 1,013m) went to HEIs and almost one quarter (\in 429m) to the enterprise sector.



9. UK HEIs attracted 25% of all HEI funding across FP5, whilst the UK enterprise sector attracted 12.5% of all enterprise sector funding.



PNP: Private non-profit

HEI: Higher education institute

PCRC: Private commercial research centre

PNRS: Public (non research) sector

Ent: Enterprise sector

ND: Not defined

PNPRC: Private non-profit research centre

PRC: Public research centre

[Source: Analysis of data conducted by Technopolis Ltd, based on data provided by DG Research and DG Enterprise, February 2004]

Annex D: Summary of review of evaluation studies

1. The targeted review assessed the 'state of the art' in the understanding of the impacts of the CEC RTD Framework Programme and their strengths and weaknesses in comparison with national programmes and other international research programmes, particularly from a UK perspective.

2. The general economic literature favours 'technical change' as a primary cause of productivity growth and hence research and development as being an important factor in securing higher living standards in the long term. However care has to be exercised in interpreting this general view in the context of specific R&D programmes.

3. The payoff to higher spending on R&D, and especially basic research, is subject to 'long and variable lags'. As such, in the medium term, the link between R&D and productivity is difficult to demonstrate. Indeed, we found few instances of evaluations that had managed to quantify programme impact at all and none that had sought to aggregate such effects to the level of the wider economy.

4. In attempting to assess long-term effects, there would appear to be no option other than to invoke more general econometric estimates of the effects of overall public R&D expenditure on the macroeconomy. A recent OECD paper outlined an econometric calculus for estimating the effect of Framework on total factor productivity (TFP), using data on private sector R&D, public R&D and foreign business R&D. Application of the formula generates a figure of around 0.2% for Framework, which corresponds to an annual contribution to UK GDP of around £1.6 billion, representing a manifold return on UK Framework activity, in economic terms. There are large uncertainties surrounding the accuracy of this estimate; nevertheless the benefits of Framework Programmes are likely to outweigh the costs.

5. The literature makes clear that the value of R&D is not confined to the (eventual) commercial outputs. 'Indirect' payoffs such as expanding the supply of trained graduate students may be as, or even more, important to business and society. Framework Programme evaluations permit us to understand the range of types of benefits, as well as participant satisfaction. However, they say nothing directly regarding the extent of the Programme's impact on UK (or European) competitiveness. The benefits identified are essentially intermediate outputs (knowledge, skills, tools, relationships, et cetera). Of the many Framework sub-objectives, the evaluations reveal that 'stimulation of collaboration' is being achieved consistently.

6. There are no programmes that directly 'compete' with Framework in providing public funding for (pre-competitive) collaborative research, conducted at the European level, with the ambition of facilitating social, economic and scientific programmes. There are other international schemes, however, that support research in Europe. EUREKA concerts public and private sector interests, at a scale similar to Framework, as a means by which to amplify the relationship between research and productivity growth in key economic sectors. COST (European Cooperation in the Field of Scientific and Technical Research) offers yet another model by which to stimulate cooperation, this time through support for the knowledge exchange process rather than R&D per se. While each has a broadly similar rationale to Framework, they do exhibit distinct objectives,

thematic focus, instruments and eligibility, and as such Framework may be said to be a worthwhile addition to the suite of support measures available to European Member States.

7. The US Advanced Technology Programme (ATP) adopts a rather more strategic approach and in so doing poses several challenges to Framework. ATP evaluations are at least as positive regarding the impact on business and commerce, as are any that have been undertaken for Framework, and yet the programme follows a very different approach. ATP achieves critical mass through a highly selective strategy – with funding on a similar scale to the FP, but with a much smaller overall programme budget – closer to that of the EPSRC. ATP is pursued at the Federal level while individual States provide more universal assistance. Moreover, in contrast to Framework, collaboration is not an essential requirement – 70% of awards have gone to single-company projects – and where networks are supported they tend to reflect competence rather than geography.

8. The literature deals poorly with the question of 'critical mass,' providing no readyreckoner to check whether more or better capacity is necessary. However, empirical studies do suggest that certain fields of scientific endeavour – space astronomy or gene sequencing for example – are more demanding than are others – social anthropology for example – in terms of both capital investment and research capacity. The need to seek partnerships beyond national boundaries depends on size of country. For smaller European states, recent evidence suggests that international collaboration is vital to maintaining world class capabilities in many areas of S&T.

9. Beyond the big science facilities, such as CERN, the empirical literature points to few areas where the UK may be said to lack critical mass, with successful R&D collaboration being possible at the national level in most fields. That said, there are areas where other countries' scientists have higher levels of competence than does the UK (Germany and the nanosciences) and in these fields UK scientists and engineers look to Europe (or the US) as a crucial adjunct to their efforts to sustain or enhance national capability. Moreover, where international collaboration is pursued, it is just as likely to be global as European. Such logic suggests that many areas of Framework offer minimal 'value added' to UK scientists in terms of facilitating access to complementary and world-class expertise, compared with national funding, and must be justified in other terms.

10. On the specific question of the relative benefits to UK participants of international programmes compared with UK national programmes, while the contribution of foreign participants is often seen to be of value, the availability of a subsidy is a critical factor for most.

11. There are areas of S&T activity that seem to be more appropriately addressed at the international or European level (big science, issues of common concern such as environmental protection, cohesion in research capability). On the other hand, there are sectors where national industries remain strictly 'un-Europeanised' and where high-quality Framework proposals have been thin on the ground.

12. In terms of administrative efficiency, while detailed improvements are no doubt possible, there is no obvious alternative administrative model being used in other precompetitive collaborative research programmes, which is markedly different and preferable to the approach used in Framework. There seems to be a trade-off between the use of relatively lengthy and detailed procedures on the one hand, and less expensive, however also less rigorous and focused, procedures on the other.

13. On balance, there is a value in retaining both national and international programmes as instruments of UK S&T policy. The former allow greater scale and scope, essential in some technological areas, while the latter permits greater exploitation of the UK's National System of Innovation. However, the interplay between national and European is not very clear, and is nowhere explained in writing.

[Source: Emerging findings from *Targeted Review of Added Value Provided by International R&D Programmes*, Technopolis Ltd, 2004]

Annex E: Glossary of abbreviations

ATP	Advanced Technology Programme
CA	Coordinated Action
CAP	Common Agricultural Policy
CEC	Commission of the European Communities
CERN	European Organisation for Nuclear Research
COST	European Cooperation in the Field of Scientific and Technical Research
CRAFT	Cooperative Research Projects
DG	Directorate General
DTI	Department of Trade and Industry
EDCTP	European and Developing Countries Clinical Trials Partnership
EMBL	European Molecular Biology Laboratory
EPSRC	Engineering and Physical Sciences Research Council
ERA	European Research Area
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum for Research Infrastructures
ETP	European Technology Platform
EU	European Union
FP	Framework Programme
FP4	Fourth Framework Programme
FP5	Fifth Framework Programme
FP6	Sixth Framework Programme
FP7	Seventh Framework Programme
GDP	Gross Domestic Product
GMES	Global Monitoring for Environment and Security
GNI	Gross National Income
HEI	Higher Education Institute
IAP	Information Age Partnership
INCO	International Cooperation Activities
IP	Integrated Project
IPR	Intellectual Property Rights
ITER	International Tokamak Experimental Reactor
JET	Joint European Torus
JRC	Joint Research Centre
NEST	New and Emerging Science and Technology
NoE	Network of Excellence
OECD	Organisation for Economic Cooperation and Development
OST	Office of Science and Technology
R&D	Research and Development
RCUK	Research Councils UK
RTD	Research and Technological Development
SME	Small and Medium Enterprise
SSA	Specific Support Action
S&T	Science and Technology
STREP	Specific Targeted Research Project
TFP	Total Factor Productivity

Annex F: Cabinet Office code of practice on consultation

The Consultation Code of Practice Criteria

1. Consult widely throughout the process, allowing a minimum of 12 weeks for written consultation at least once during the development of the policy.

2. Be clear about what your proposals are, who may be affected, what questions are being asked and the timescale for responses.

3. Ensure that your consultation is clear, concise and widely accessible.

4. Give feedback regarding the responses received and how the consultation process influenced the policy.

5. Monitor your department's effectiveness at consultation, including through the use of a designated consultation coordinator.

6. Ensure your consultation follows better regulation best practice, including carrying out a Regulatory Impact Assessment if appropriate.

The complete code is available on the Cabinet Office's Web site, address http://www.cabinet-office.gov.uk/regulation/Consultation/introduction.htm.

Comments or complaints

If you wish to comment on the conduct of this consultation or make a complaint about the way this consultation has been conducted, please write to Philip Martin, DTI Consultation Coordinator, Bay 723, 1 Victoria Street, London SW1H 0ET or telephone him on 020 7215 6206 or email to Philip.Martin@dti.gsi.gov.uk.

Annex G: List of organisations to be consulted

We have directly consulted over 100 people representing a cross-section of stakeholder groups in the development of this document. We have also sent out a survey to 11,000 previous UK participants in the Framework Programme.

In addition we expect this paper to go to the following groups:

Government Departments and Agencies Research Councils and the UK Research Office **Research Institutes Public and Private Research Bodies Devolved Administrations Regional Development Agencies Funding Councils Royal Societies Professional Institutes** Universities UK **Confederation of British Industry Trade Associations Major Research Charities** Universities Industry **SMEs**

Annex H: RCUK science and technology priorities

Suggested scientific priority areas for FP7

1. Collaborative research in thematic areas

The table below summarises a number of broad scientific areas that the Research Councils have identified as an initial framework for priority themes, where European collaboration can clearly add value in FP7. For comparison, they are matched against the existing seven priority areas in Framework Programme 6.

Broad research area	Comments	Matching to FP6 priority area
Sustainability	Identifying sustainable solutions toEuropean-wide and/or global issues:- climate change: predicting and mitigating impacts	Sustainable development, global change & ecosystems Food quality & safety
	 ecosystems: management of water and soils; hazard mitigation 	
	 biodiversity (soil and marine biodiversity, biodiversity and ecosystem function) 	
	 agriculture and land use (for food chain, incl. CAP reform); aquatic bioresources 	
	 non-food crops (including pharmaceuticals and novel specialist materials) 	
	 next generation plant/animal breeds 	
	 energy and energy efficiency (including biomass and raw materials) 	
	- transport.	

Broad research area	Comments	Matching to FP6 priority area
Post-genomics, biology and biotechnology for human health, plants and animals	Incorporating integrative biology and systems (incl. the large-scale facilities to support them) for: - human health - plant, animal and microbial systems to inform the understanding of plant and animal agriculturally-important species and disease mechanisms - regenerative medicine.	Life sciences: genomics & biotechnology for health Food quality & safety
Emerging/re- emerging disease and infection	Human and animal infectious diseases, incl. diseases related to poverty; clinical trials, epidemiology and modelling (incl. mathematical approaches) to analyse the spread of disease. Relationship between environment, socio-economic factors, diet and health.	
Electronics, informatics, optics/photonics	Next generation electronics (incl. aspects of nanotechnology); application of these technologies in a business environment, and for social, economic and cultural benefit. Interactions of light and matter.	Nanotechnologies and nanosciences, knowledge- based multifunctional materials and new production processes & devices
Globalisation	 The broad mechanics and effects of globalisation: demography, migration, cultural & linguistic identity/diversity impact on groups, societies, regions and nations developments of markets and economic competitiveness economic, social, political and institutional models (incl. European integration) to frame the above. 	Citizens & governance in a knowledge-based society

2. Technological initiatives

While the proposed technological initiatives element of FP7 currently remains relatively ill-defined, Research Councils have identified some possible priority topics for this line, as summarised in the following table. These will need to be developed further once the scope and objectives of the activity become clearer.

Broad research area	Comments
Sustainability	Environmental and renewable energy technologies.
Aeronautics and space	Innovative technology development in power systems to reduce emissions and improve thrust, research in turbulence towards greater efficiency in flight. Developments in materials and manufacturing processes for improved efficiencies. Socio- economic impacts of increased mobility.
Enabling infrastructure	Technological innovation to assist research, e.g. development of technologies and sensors for bioscience (including medicine), Earth and ocean observation, exploration and monitoring.

[Source: RCUK, March 2004]



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