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EUROPEAN COURT OF AUDITORS
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Did 'Networks of excellence' and 'Integrated projects' achieve their objectives ?

1. EU Research & Development context

Strengthening Europe's scientific and technological bases is one of the objectives of the EU Treaty.[2] The aim is to achieve a European research area (ERA) in which researchers, scientific knowledge and technology circulate freely. Financial assistance is provided in a significant number of research areas, both for basic and applied research, to undertakings, research centres and universities in their research and technological development activities of high quality.[3]

Figure 1 European Research

Source: European Commission, DG Research, http://ec.europa.eu/research/leaflets/index_en.html.

[1] The opinions expressed are those of the author and do not necessarily represent the views of the European Court of Auditors.
[2] See in particular articles 179 to 190 of the Treaty on the functioning of the European Union.
[3] The aim is also to strengthening the international dimension of ERA by closely involving Europe's neighbours. For example, the European Union and a number of non-EU countries cooperate in many projects and international undertakings. Among them is Japan with whom a Science and Technology (S&T) Cooperation Agreement to identify common research priorities and areas of common interest has been signed recently (see European Commission, Press release IP/09/1844, 30.11.2009).

European research is held to suffer from insufficient and dispersed investment. A 'European research system' is not yet in place, there is rather a multitude of governmental actors and research priorities (a "research labyrinth", in the words of former European Commissioner for Science and Research, J. Potočnik)[4] The following figure provides some key indicators highlighting gaps with the EU main competitors.

Figure 2 R&D – Europe's challenges

	EU-25	US	Japan
R&D intensity (% of GDP) (2004)	1.86	2.66	3.18
Share of R&D financed by industry (%) (1)	54.8	63.7	74.8
Researchers (FTE) per thousand labour force (2)	5.5	9.1	10.1
Share of world scientific publications (%) (2003)	38.3	31.1	9.6
Scientific publications per million population (2003)	639	809	569
Share of world triadic patents (%) (2000)	31.5	34.3	26.9
Triadic patents per million population (2000)	30.5	53.1	92.6
High-tech exports as a share of total manufacturing exports (%) (2003)	19.7	28.5	26.5
Share of world high-tech exports (%) (2003)	16.7	19.5	10.6

Data: Eurostat, OECD. Source: DG Research

Notes: (1) EU-25: 2003; US, JP: 2004. (2) EU-25: 2004; US: 2002; JP: 2003.

Against this context, the European Council has set for the Union the ambitious goal 'to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion'.[5] The aim was to raise overall research investment from 1.9% of GDP in 2000 to around 3% by 2010. This objective, which is eventually unlikely to be achieved,[6] was based on the assumption that 1% will come from public sources and 2% from the private sector.

1.1 EU funding

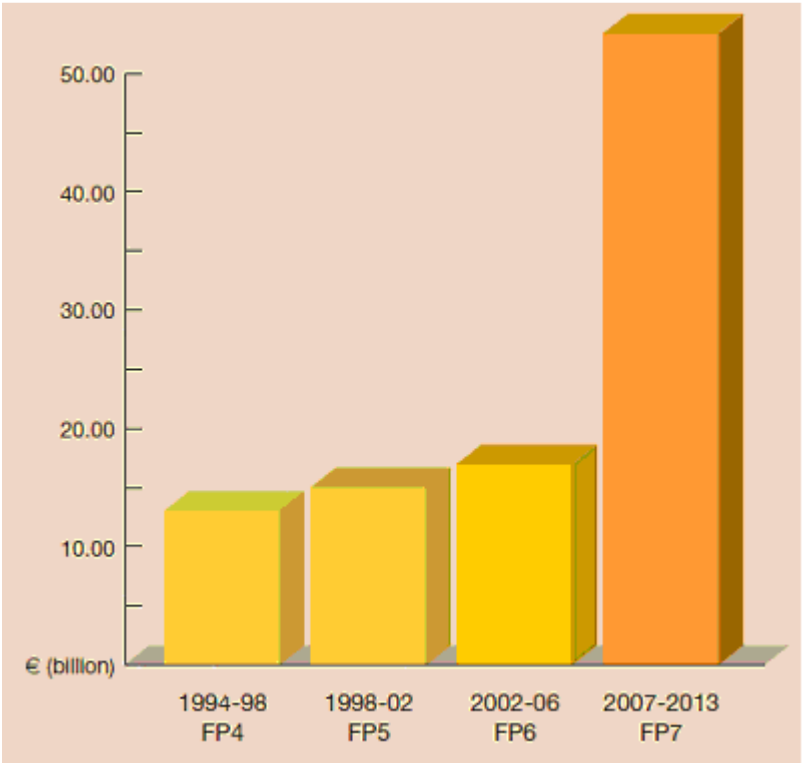
Overall, some 6 % of the Union's budget is planned to be spent on R&D activities (2007-13). The main instrument are the Framework Programmes, the first of which was launched in 1984. The Seventh Framework Programme for research and technological development (FP7) applies to the years 2007-2013. With a budget of 53.2 billion euros (6.927 billion ¥; 77 billion $), FP7 is both larger and more comprehensive than earlier Framework Programmes. A reflection of the high priority of research in Europe and the overriding aim to contribute to the Union becoming the world's leading research area.

[4] See European Commission, Press release IP/08/1395, 24.9.2008.

[5] See the Conclusions of the European Council of Lisbon, March 2000, point 5. See also the Conclusions of the European Council of Barcelona, March 2002, point 47.

[6] The 2008 Science, Technology and Competitiveness (ST&C) key figures report provides an overview of progress from 2000 to 2006 in both EU R&D investment and in implementing the European Research Area (ERA). It shows that the stagnation of the EU-27's R&D intensity (R&D expenditure as % of GDP) at 1.84% is denting the EU's ambition to become a globally competitive knowledge-based society. Despite increased investment in research by many member states and an improved efficiency of their research systems, the EU is still far from reaching its Lisbon target of investing 3% of GDP in R&D. A continued low level of business R&D investment, linked to an EU industrial structure with a smaller high tech sector than in the US, hampers the EU's performance. At the same time, Japan has increased its R&D intensity from 3.04% to 3.39%, Korea from 2.39% to 3.23% and China is catching up fast, going from 0.90% to 1.42% (see European Commission, Press release IP/09/92, 22.1.2009).

Figure 3 Evolution of EU Research Framework Programme Budgets



Source: European Commission, The Seventh Framework Programme, Taking European Research to the forefront, 2007

EU funding is designed to complement member states' own activities; it accounts for <5% of investment in research in Europe. Therefore, the EU and member states should coordinate their efforts so as to ensure that national policies and Union policy are mutually consistent.

The basic principle of EU funding is co-financing. This means that, in general, the European Commission, which is responsible for implementing the EU budget, does not 'purchase' research services by placing contracts and paying a price. Rather, it gives grants to projects, thus contributing a certain percentage to the overall costs. Grants are determined on the basis of calls for proposals and a peer review process, which are highly competitive. Grants range from about 20 000 euro (2,6 million ¥; 29.200 $) for individual researchers up to 30 million euro (3,9 billion ¥; 43,8 million $) for major collaborative projects.[7] Typically, projects last several years and beneficiaries usually work on a project as a consortium across member states or associated states.

The overall magnitude of the Framework Programme can be illustrated by some absolute figures: In the first two years of FP7 for 109 calls more than 25.000 proposals were received, involving almost 160.000 applicants. Out of these, about 5.500 proposals were finally retained, involving approximately 35.000

[7] The maximum reimbursement rates to the costs of a project depend on the funding scheme, the legal status of the participants and the type of activity. The standard reimbursement rate for research and technological development activities is 50%. Certain legal entities can receive up to 75% (non-profit public bodies, SMEs, research organisations, higher education establishments). For demonstration activities, the reimbursement rate may reach 50%. For other activities (consortium management, networking, training, coordination, dissemination), the reimbursement can be up to 100% of the eligible costs. The 100% rate applies also to frontier research actions under the European Research Council.

participants and requesting an overall Community funding of 10 billion euro (1.300 billion ¥; 14,6 billion $).

In carrying out the various tasks several European Commission's Directorates General are responsible: Research, Joint Research Centre, Information Society, Energy and Transport, Environment, Enterprise, Fisheries. Within them there are around 30 operational directorates responsible for the implementation of the various parts of the framework programme.

1.2 Framework programmes' context

R&D framework programmes of the European Union have been often criticised for lacking clarity of purpose. Indeed, the political objectives are so high level and abstract that it is difficult to assess the extent to which sub-objectives and activities are really designed to meet these objectives and to measure policy achievements. There are weaknesses in the definition of the objectives and targets of both the framework programme and the specific programmes. Also :

- The policy area is characterised by a set of complex conceptual relationships about which there may not be universal and consistent understanding;
- Early indications suggest that there is a lack of consistency in the approach taken by the different Commission departments to performance measurement;
- Previous Court's audits suggested that the management systems for enhancing and measuring impact are not particularly robust; and
- The way in which the overall EU budget financial framework is approved makes extremely difficult for results and lessons from previous R&D framework programmes to be taken into account for the next framework programme.

The main risks for legality of spending is the reimbursement of ineligible personnel and overheads, in particular when the actual costs declared for personnel working on the project are based on incorrect charging rates.

The risks to the sound financial management are at two levels:
- the inherent breadth and complexity of the research policy field; and
- the insufficient definition of specific programme objectives and targets, together with the inadequate transposition of these objectives into a multiplicity of intervention mechanisms (up to 23 different distinctive instruments are used by the Commission for the implementation of FP6).

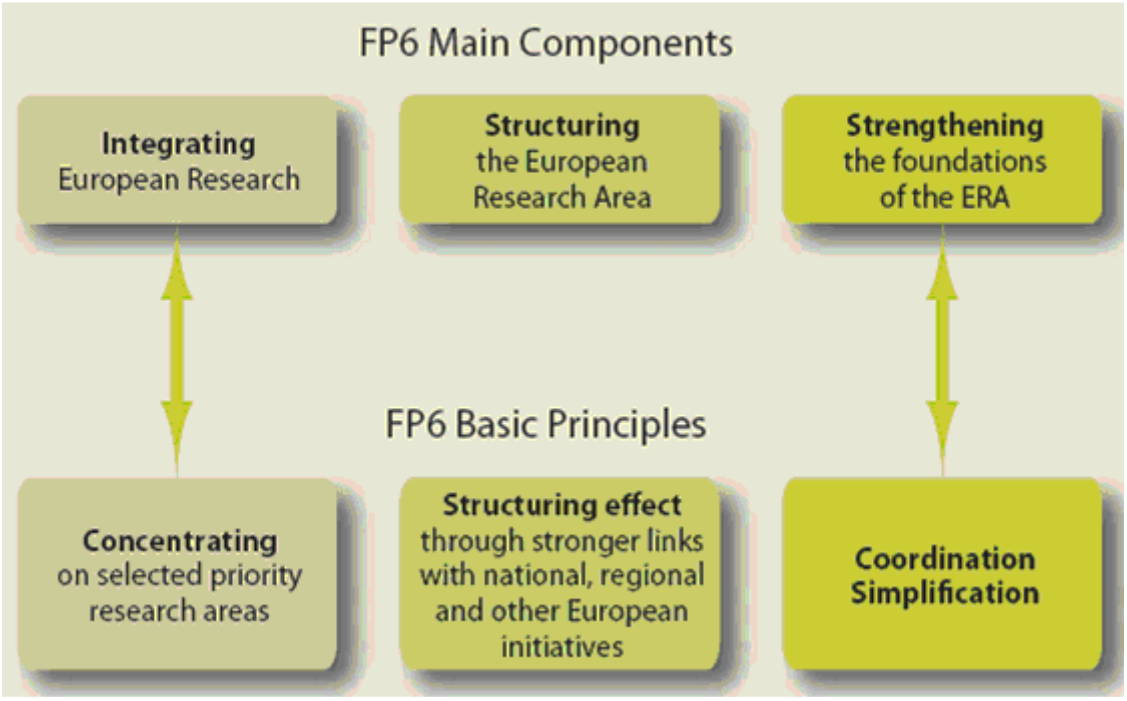
2. The audit of FP6 'Networks of excellence' and 'Integrated projects'

2.1 Reasons for the audit

With a budget of around 17 billion euro (2.213 billion ¥; 24,8 billion $) for the years 2002–06, the European Community Sixth Framework Programme (FP6) was structured around three headings. Most expenditure (around 12 billion euro; 1.560 billion ¥; 17,5 billion $) was to be carried out under the heading 'Integrating European Research', within seven 'thematic priorities'.[8]

[8] The seven 'thematic priorities', i.e. programmes covering specific themes of research, were: life sciences, genomics and biotechnology for health; information society technologies; nanotechnologies and nanosciences, knowledge-based multifunctional materials, and new production processes and devices; aeronautics and space; food quality and safety; sustainable development, global change and ecosystems; citizens and governance in a knowledge-based society.

Figure 4 FP6 Main components and basic principles



Source: Commission's guide 'Participating in European Research', 2nd Edition, February 2004

The programme aimed at scientific excellence, improved competitiveness and innovation through the promotion of increased co-operation, greater complementarity and improved co-ordination between relevant actors, at all levels. Two new support instruments were introduced by FP6 ('Networks of excellence' and 'Integrated projects') as being the main means to integrating European research capacities, thus generating added value over and above that which could be achieved through national efforts (European added value). Almost 50 % of FP6 funds were spent through these two Instruments. The main objective was not so much to achieve specific scientific or technological outcomes, but rather developing the national research systems in Europe, thereby creating the so-called European Research Area ('ERA') by generating a critical mass in terms of expertise, activities and resources (staff, skills, competences, finances, infrastructure, equipment). Also, in view of developing their technological capacity and facilitating their access to high-quality research, FP6 put special emphasis on small and medium-sized enterprises (SMEs) and earmarked for this purpose an amount of 1,8 billion euro (234 billion ¥; 2,6 billion $), i.e. 15 % of the total budget of the 'thematic priorities' (one third more than in the previous Framework Programme).

The strategic importance of the objectives underlying FP6, the key role played by the two instruments selected and the significant funding involved were the main reasons for selecting the audit.[9]

[9] The Court's report has been published in October 2009 as Special report No 8/2009 concerning 'Networks of excellence' and 'Integrated projects' in Community Research policy: did they achieve their objectives?

Figure 5 'Networks of Excellence' and 'Integrated Projects', what are they about ?

'Networks of Excellence'	'Integrated Projects'
'Networks of Excellence' (NoEs) were aimed primarily at directly tackling the fragmentation of research activities in Europe. They were supposed to be genuine 'virtual centres of excellence', with long-term and multidisciplinary objectives, a gradual integration of work programmes and high level of management autonomy.	'Integrated Projects' (IPs) were designed to generate the knowledge required to implement the thematic priorities, by achieving ambitious, clearly defined scientific and technological objectives of a European dimension. They were supposed to provide results applicable to products, processes or services and to enjoy a high level of management autonomy.
FP6 financed 167 projects as 'NoEs', involving some 5 000 participants. On average, each NoE involved around 30 partners.	Almost 700 projects were financed as 'IPs'. They involved some 17 000 participants. On average, each IP involved around 25 partners.
WHAT SORT OF ACTIVITIES WERE CARRIED OUT ?	
• Exchange of PhD students and research staff; • Organisation of joint workshops; • Creation of virtual Internet-based research working groups; • Establishment of virtual labs and institutes; • Organisation of visits intended to provide access to off-site facilities; • Funding of individual research projects; • Spreading of excellence activities included visits to industry, participation in international conferences, organisation of summer school sessions and other training events, the dissemination of project information through a dedicated web page, newsletters, press releases, and the publication of articles.	• Research and technological development activities directly aimed at creating new knowledge, including innovation-related and dissemination activities; • Demonstration activities designed to prove the viability of new technologies that offer a potential economic advantage but which cannot be commercialised directly (e.g. testing of prototypes); • Training activities intended to contribute to the professional development of researchers and other key staff, research managers, industrial executives (in particular for SMEs), and potential users of the knowledge generated by the project.

2.2 Audit scope, criteria and approach

The objectives of the performance audit were to assess to what extent:

1) 'Networks of Excellence' and 'Integrated Projects' contributed to achieve the overall research policy objectives;
2) The instruments achieved their own specific objectives;
3) The Commission effectively supported the projects' implementation, by providing the necessary guidance to beneficiaries, managing the contracts and monitoring the progress achieved; and
4) FP6 had stimulated R&D investment.

The effectiveness of research collaboration was assessed by reference to the actual achievement of project deliverables, the transfer of existing and new scientific knowledge as well as the use of good practices concerning the way in which research is carried out.

The extent to which 'NoEs' had achieved their specific objectives, the Court analysed whether:

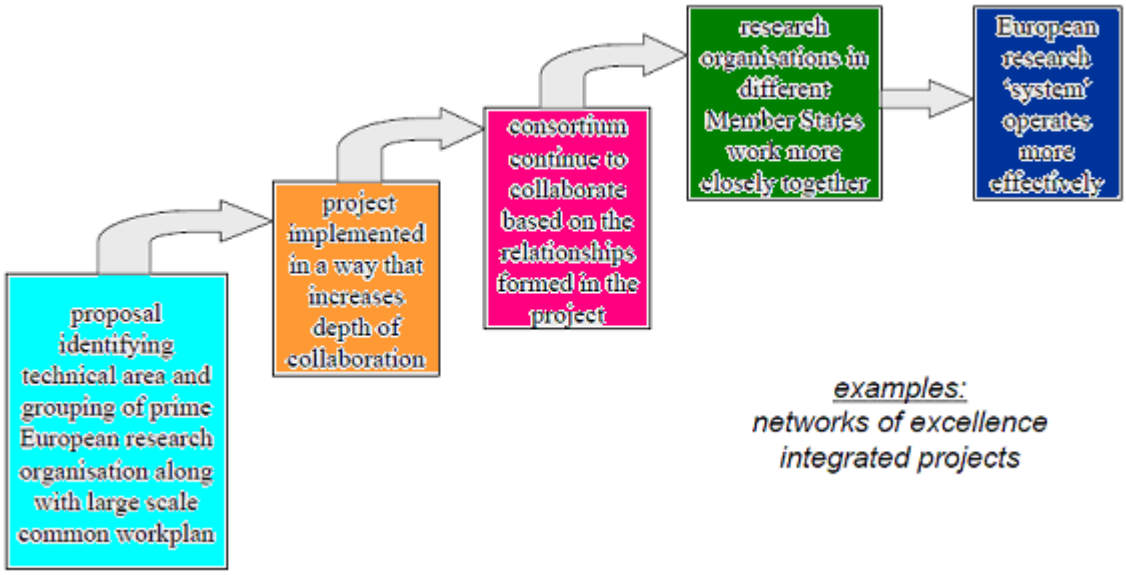
- The resources put into the network could be considered significant in relation to each participant's overall budget;
- 'NoEs' had significant control on the deployment of the resources made available for the project;
- The high-level researchers initially envisaged had actually been involved in the project; and
- 'NoEs' had progressed towards long-term research activities and partnerships beyond the duration of Community funding.

The effectiveness of 'IPs' was assessed according to the following criteria:

- Vertical integration of the full 'value-chain' of stakeholders, from those involved in knowledge production through to technology development and transfer;
- Horizontal integration of a range of multidisciplinary activities;
- Activity integration: integrating various research activities from fundamental to applied research and with other types of activity, including take-up activities, protection and dissemination of knowledge, and training;
- Sectoral integration of actors from private and public sector research organisations, and in particular between academia and industry, including SMEs; and
- Financial integration of public and private funding.

As an example, the following figure identifies the logical sequence of achieving research effectiveness.

Figure 6 'Research effectiveness' impacts



Concerning the effectiveness of the Commission's management, the Court analysed the implementation of eight calls for proposals and examined selected management process having a key impact on the instruments' performance (namely negotiation and project monitoring).

Finally, whether FP6 had stimulated RTD investment was examined through relevant statistical data.

Audit evidence was collected through:

- Review of documentation on FP6 (preparatory documents, legal framework and Commission guidance, implementation data);
- Visits to 36 project coordinators and participants involved in 14 projects in 15 different Member States;
- A series of 'round table' discussions with 60 researchers from 44 different organisations participating in FP6;
- A survey of 387 RTD organisations (274 programme participants, 104 proposers and nine non-participants);
- An analysis of selected management areas playing a key role in the performance of the instruments (including the review of the implementation of eight calls for proposals and an analysis of the conclusions of 399 independent project reviews conducted before 31 December 2007);
- The review of secondary evidence on the effectiveness of the instruments; and
- Consideration of the opinions expressed by some associations active in Community research.

2.3 The Court's conclusions

(1) The Court recalled the absence of an explicit intervention logic for FP6, as well as of SMART objectives and performance indicators.[10] While concluding that 'NoEs' and 'IPs' had promoted a good level of research collaboration between project participants, the Court notes that a significant number of projects were assessed by independent experts in the implementation stage as no more than 'acceptable'. This compares with an initial rating of 'excellence' at the planning stage.

(2) Concerning audited 'NoEs' specific objectives, the Court considered that these were not achieved because most participants allocated a relatively small proportion of their research capacities to the network. 'NoEs' failed to reach control over resources made available and to ensure the adequate coordination of project activities. In most cases the involvement of key high-level scientists in 'NoEs' was not realized. Finally, self-sustainable long-term research activities and partnerships were not achieved for any of the audited 'NoEs', thus making future collaboration subject to continued public support.[11]

By contrast, according to the Court audited 'IPs' have achieved, in general, the objectives pursued in their research field and have mobilised a significant volume of resources. But they have not succeeded in attracting additional funding from other public and private sources.

(3) The Commission's management revealed a number of weaknesses, in particular at the beginning of the implementation of FP6, which resulted in uncertainty about the new instruments specific role, insufficient guidance and weaknesses in project monitoring.

(4) When compared to the previous Framework Programme, FP6 did not succeed in generating a significant increase in terms of participants' R&D investment. Actually, the ratio 'Total investment/EU contribution' declined. Cases were found where the volume of participants' own resources was much lower than the costs actually reimbursed by the Commission, with the possibility that EU funds simply substitute participants' own resources. The participation of the private sector diminished in relative terms. The target of 15 % of the total budget of FP6 thematic priorities for SME participation was not achieved. And first results concerning the current Framework programme (FP7) show that the participation of SMEs is further declining.[12]

2.4 The Court's recommendations

The Court recommended to link in general the instruments to realistic objectives and suggested to explore the possibility of setting one single objective for each instrument as a way of ensuring clarity on the expectations. It also recommended to set for each programme appropriate performance indicators to monitor the expected outputs, outcome and impact.

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[10] This refers to the obligation made by the EU Financial Regulation (article 27 (3)) to set specific, measurable, achievable, relevant and timed objectives shall be set for all sectors of activity and that the achievement of those objectives shall be monitored by performance indicators.

[11] This is confirmed by a study carried out on behalf of the Commission following which only a minority of NoEs have moved convincingly towards self-sustainable integration with prospects for longer-term survival beyond the ending of EU funding. Two main factors can explain the difficulty that 'NoEs' have in achieving lasting integration. Firstly, the goal of setting up a new kind of intra-European network, by integrating institutions previously in competition with each other, requires a new approach to research collaboration. The reluctance of many organisations to engage in a long-term commitment did not favour this aim. Public research centres, at the heart of the NoEs' objective, found difficulties in integrating with each other due to their institutional structure and budgetary constraints. For industry, the treatment of intellectual property was a matter of particular concern. Secondly, there are areas where substantial integration can only be achieved progressively. In practice, the maximal duration of five years proved not to be realistic.

[12] There are objective difficulties in raising SMEs' participation. They have a more local/regional dimension and face by nature higher entry barriers, mainly caused by the complex application procedures and the costs of submitting proposals. Cooperation with large research organisations can be hindered by higher financial and technical risks. Also, like for private participants in general, SMEs are not always prepared to subscribe to long-term contractual commitments for fear of losing flexibility to react to changing needs.

The Court suggested to consider whether 'NoEs' and 'IP-like' collaborative projects provide significant advantages as compared with traditional instruments for research collaboration. And invited the Commission to assess on a case-by-case basis whether past achievements, potential EU added value and prospects of self-sustainability justify for existing 'NoEs' further funding under the 2007-13 Framework Programme.

In view of improving in particular the manageability of projects, their adequate implementation and appropriate evaluation, the Commission should ensure clear and timely guidance, speedier contracting process and better project monitoring.

Finally, the various reasons underlying the relatively low level of participants' R&D investment compared to the goals pursued should be examined by the Commission in view of taking appropriate measures. Data should be made available to monitor the catalytic effect of EU RTD funding. The realism of expected targets, in particular for SMEs and the private sector, should be re-assessed.

3. Reactions from the Commission and the European Parliament

3.1 The Commission

The Commission considers challenging to ensure that all objectives fit precisely within the strict definitions of 'SMART' criteria, in particular given the inherent uncertainty of research results,. It claimed that significant improvements were put in place under the Framework Programme 7 where the work programmes define the scientific goals and the scope of activities, and provide indications on the results expected.

The Commission argued that it could be too soon to reach a definitive conclusion on how and/or if the objective of self-sustainable long-term research activities and partnerships has been reached. It agreed however that continuing the financing of 'FP6 NoEs' should be carefully examined.

Concerning the management of the activities, the Commission claimed that it implemented FP6 in the best possible manner within the constraints imposed by the existing legislative framework, however without indicating necessary changes.

The Commission did not adress directly the issue of the low level of R&D investment generated. It argued that Framework programmes only represent a limited part in the overall research spending in Europe. It recognized however the difficulties encountered by the private sector, and SME's in particular.

3.2 The European Parliament

A working document of the European Parliament[13] welcomed the Court of Auditors' overall positive opinion on the promotion of research collaboration and projects of reasonable quality by 'Networks of Excellence' and 'Integrated Projects'.

The working documents noted however the high 'expectation gap' due to the fact that less than 55% of all projects reviewed *ex post* maintained their initial 'excellent' evaluation and that the vast majority of applications does not overcome the threshold of 'excellence' (only 15 to 20 %). And it goes on on regretting that FP6 did not attain the aim of stronger participation of private participants, in particular SME's.

The level of application costs borne by applicants (amounting in individual cases up to 300 000 euro) is also pointed out. And it is considered unfortunate that a significant number of beneficiaries had not a fully understanding of the nature of the instruments applied in the FP6. Concerns are expressed on possible

[13] See European Parliament, Budget Control Committee, working document of Mrs Grässle, PE 430.328v01-00 of 16.11.2009.

discouragement effects (in particular for SMEs) due to some provisions and overall rules complexity. The document also reiterated Parliament's demands for a more service and customer oriented implementation of research programmes, whereby application procedures and communication should be applied consistently across the various Commission's Directorates-General.

Finally, it is observed that the focus of evaluations is set on 'input' checks rather than output assessments and that a proper definition of SMART objectives at the outset of the project is a key element to determine its progress and eventual success.

4. Challenges in Audit on Science and Technology

4.1 The audit area *per se*

The relationship between investment in research and its results is characterised by a complex set of underlying concepts with different potential impacts. For example:

- 'direct' industrial impacts, i.e new applied technologies, materials;
- impacts in terms of enhanced policy, i.e. improved modelling which informs and underlies environmental and energy policy;
- impacts through improved regulations, i.e. healthcare, foodstuff products; and
- impacts on the effectiveness of research at the European level, i.e. improved collaboration between national research centres.

Performance audits theoretically opens the possibility to two approaches :

- Examining performance directly: this approach focuses on inputs, outputs, outcomes and impacts;
- Examining control systems; this approach focuses on the adequacy of policies and procedures implemented by managers for promoting, monitoring and evaluating performance.

Yet, research is usually the result of technical developments that have taken place over a long period and work carried out by a numerous and diverse range of researchers. This means in particular that it is difficult to isolate and attribute specific impacts to the part of the research that was funded by the EU.

Also, as there is no systematic collection of robust data allowing to examine the usual relationship *input⇒ output⇒ outcome⇒ impact*, the feasibility of a direct examination of performance seems limited. Tipically, data collection concentrates on qualitative reviews commissioned to external consultants.

Most evaluation studies focus on short-term issues of programme implementation. They measure outputs, rather than outcomes or scientific/socio-economic impacts. It would be prohibitively time consuming and resource intensive for an external audit body to collect this information directly. Therefore, direct testing of actual impacts is likely to be limited to exploring the experiences of participants via surveys, expert judgments through interviews and focus groups.

Some recent developments (for example, ex-ante assessments of major policies) show the intention to progress towards the definition of performance criteria and indicators. It is clear that FP7, which was subject to an ex-ante assessment (contrary to FP6), represents a clear progress in this respect.

4.2 Using experts' work

International Standard on Auditing 620 (Using the work of an expert) tells that "the auditor is not expected to have the expertise of a person trained for or qualified to engage in the practice of another profession or occupation, such as an actuary or engineer".[14] In fields like research's audits the use of experts is current practice. This is however not without risk, in particular concerning the objectivity of the expert and the

[14] see Handbook of International auditing, assurance, and ethics pronouncements, 2006 edition, p. 659, point 4.

possibility for the auditor of evaluating its work and remain the 'owner' of the audit process and its conclusions. In the EU context it is not easy to find experts who would not have had in a way or in another worked for the Commission or/and having an interest to work for it. The auditor should therefore mitigate this risk by enlarging the source of possible evidence (like focus groups, surveys, international comparators studies, good practices, academic literature review) and make use of its "professional scepticism". In this context, although being a useful piece of information in the audit process, evaluations studies performed under the responsibility of the management are an element provided in the frame of the "internal control function", they are therefore as such not an independent source. As research activities are characterized by the difficulty to both predict likely outcomes and impacts, and to establish unequivocal indicators, the auditor should not exclude to conclude that its audit objectives might have been too ambitious compared to the evidence that the research context may reasonably allow to gather. This is particularly the case when attempting at assessing long-term results.

4.3 Audits' added value

The above considerations introduce the debate on the 'added value' of audit activities. The difficulty for the auditor is not just to draw conclusions in a convincing way, but also to provide sensible recommendations for the management. In this context, 'realism' and 'feasibility' are the key words. The auditor should not just confirm whether the policy objectives have been achieved, but also whether they were realistic and the authority responsible for the management has done its outmost. As perfection does not exist, the issue is whether, how and to what price things could be done better. Here the auditor's judgment is obviously crucial to reach useful conclusions.

The auditor should in particular avoid to go down the way of '*l'art pour l'art*' and resist the temptation to strive for a 'perfect' management and accountability framework inspired by its documentary requirements. Particularly in the research field the auditor's needs for documents and data should adapt to the context, rather than the contrary. This to avoid to add red tape hindering the research activity itself. This seems particularly the case for audit of legality, whose results may contribute to make the research activity more bureaucratic, requiring scientists to become administrators. However, in the same way as auditors are not 'engineers', scientists are not necessarily accustomed to administrative procedures. In any event, counting the number of hours of a scientist cannot be taken as a surrogate for measuring outputs and impacts.

5. Further information

The European Court of Auditors has published a number of other reports on science and technology matters. The more recent ones are:

- Special report No 9/2007 concerning 'Evaluating the EU Research and Technological Development (RTD) framework programmes — could the Commission's approach be improved?';
- Special report No 7/2008 concerning 'Intelligent Energy' 2003-2006;
- Special report No 7/2009 concerning the management of the Galileo programme's development and validation phase.

More information on EU research:

- European Research Portal: www.ec.europa.eu/research;
- General information on the Seventh EU Research Framework Programmes: www.ec.europa.eu/research/fp7;
- Specific information on research programmes, projects and FP7 Call documents: www.cordis.europa.eu/fp7;
- General information requests: www.ec.europa.eu/research/enquiries.